Renewable Energy - Overcoming Intermittency

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DECLARATION OF OWN WORK

I declare that this thesis:

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Signature: .....

Name of student: Givanildo José de Almeida

Name of supervisor: Prof. Dennis Anderson

To my family

Science is a wonderful thing if one does not have to earn one's living at it.
Albert Einstein

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Abstract

This thesis investigates the potential role of wind power in the Northeast of Brazil to enable more flexible management of Northeast Brazil's hydropower reservoirs and the benefits of integrating local wind power into the regional electric power system.

It first outlines the problem of electric power supply in the northeast of Brazil and the possible indigenous alternative (wind power), which also constitutes an environmentally acceptable solution. A general approach to improving the planning of wind and hydro integrated systems is then discussed, leading to the development of a set of aims for the thesis. This is followed by the development of the case study, which is in several parts: the development of the data bases for wind and hydro and the characterisation of the data bases through stochastic models; the development of the simulation model, which uses the *System Dynamics* approach and software; exploration of scenarios of alternative patterns of system development; a discussion of results; and conclusions.

Historically, the modelling of hydropower system in all regions of the world has been undertaken considering thermal addition to the existing hydropower based system; the possibility of using intermittent wind energy as a complement to hydro is a relatively recent development, and poses new questions for simulation models to address. Hydropower is dependent on the river flows, which fluctuate seasonally, entailing a varying capacity of supply. Wind power on the other hand fluctuates more than hydro (hourly and daily) representing a difficulty for its integration into conventional existing systems. To my knowledge, no energetic model is available for simulating the integration of wind to big hydrothermal systems with reservoir. In addition, the value of wind as a supplement to hydro systems still needs to be estimated, certainly for a country like Brazil.

The results show that wind power would benefit the electric power system of NE Brazil by improving the storage conditions of the reservoirs and reliability of supply. Costs are sensitive to market conditions but are comparable to or less than the costs of the thermal alternative.

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CHAPTER ONE

1 Overview

1.1 INTRODUCTION

This thesis investigates the potential role of wind power in the Northeast of Brazil to enable more flexible management of Northeast Brazil's hydropower reservoirs and the benefits of integrating local wind power into the regional electric power system. The potential benefits relate to generation, transmission and distribution (Almeida, 1995). This chapter contextualises the study, and sets out the aims and summarizes the achievements of the research work. It first outlines the problem of electric power supply in the Northeast of Brazil and the possible indigenous alternative, which also constitutes an environmentally acceptable solution.

A general approach to improving the planning of wind and hydro integrated systems is discussed, leading to the development of a set of aims for the thesis. At the end of the chapter the boundaries of the thesis are defined, the structure is outlined, and the achievements and the research findings are summarised. A schematic diagram of the design of the project (Figure 1-1) outlines the relationship between the background literature survey, the design of the project method and the sub-topics, which contribute to the analysis, discussion, and the conclusions of the thesis.

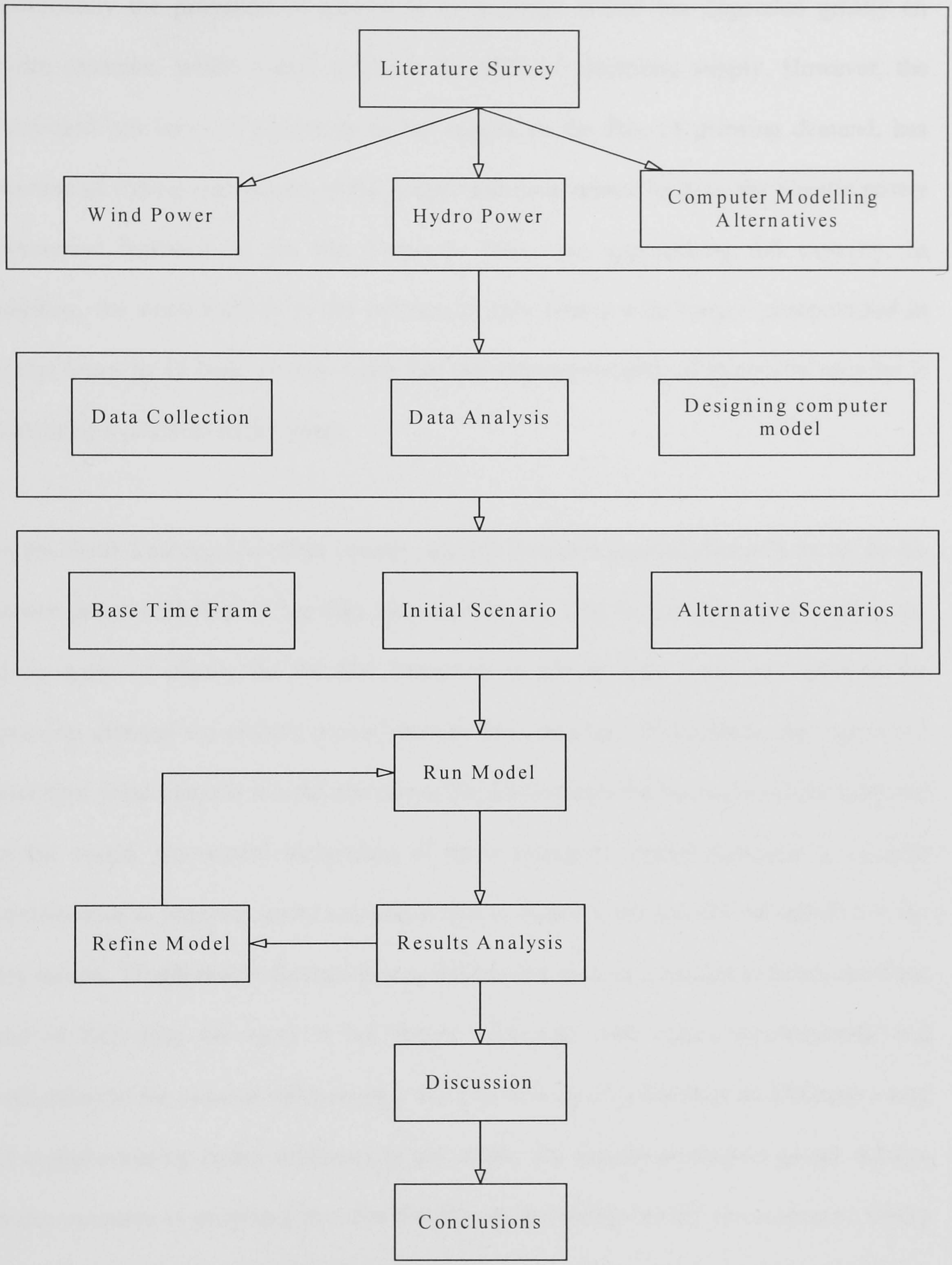


Figure 1-1 Project diagram

Historically the provision of electricity in northeast Brazil has depended greatly on hydro resource, which today[1] accounts for 96% of electricity supply. However, the continued provision of electricity in the region, in the face of growing demand, has become of critical importance to the people and government because the electric power generation facilities on the São Francisco River are approaching full capacity. In addition, the water inflows in the wet season vary over a wide range—compounded in recent times by El Nino events—such that maintaining security of electricity supplies is becoming a problem in dry years.

In the North East regions of the country, electric power is generated mostly by big hydro power plants installed on the São Francisco River. This is the only river suitable for these types of plants. As the São Francisco is almost fully exploited, meeting the growing demand for electric power remains the challenge. Fortunately, the region has excellent wind patterns for electric power production and the largest artificial reservoir in the world. Successful integration of these resources would represent a valuable contribution to improve social conditions and to improve the security of supplies in the dry season. Traditionally, thermal power stations are used as a backup to hydro schemes, and in fact, they are used in NE Brazil. However, with recent developments and reductions in the costs of wind energy, this can now be considered as an alternative way of complementing hydro schemes. In this work, the supply of electric power using a native resource is proposed as a contribution to the energy needs of the region, taking advantage of the synergy between wind and hydro inflow in the region to improve

[1] December 2004

management and use of the local water resources, which are scarce and a fundamental necessity for the survival of humankind.

1.2 Geo-Political context of the project

Brazil is divided politically and geographically into five different regions, each with particular physical, human, economic and cultural traits (MRE, 2003). They are: North, Northeast, Southeast, South and Centre-west (see Figure 1-2). The boundaries of each region correspond to the frontiers of the states, which form them.

The Northeast region comprises Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe and Bahia States, with a total area of 1,561,177.8 km^2, representing 18% of the area of Brazil. This work will focus on the electric power system in the Northeast of Brazil, which means the Northeastern states (except Maranhão), a region where there is only one river suitable for big hydroelectric power plant projects, the "Rio São Francisco" (São Francisco River).

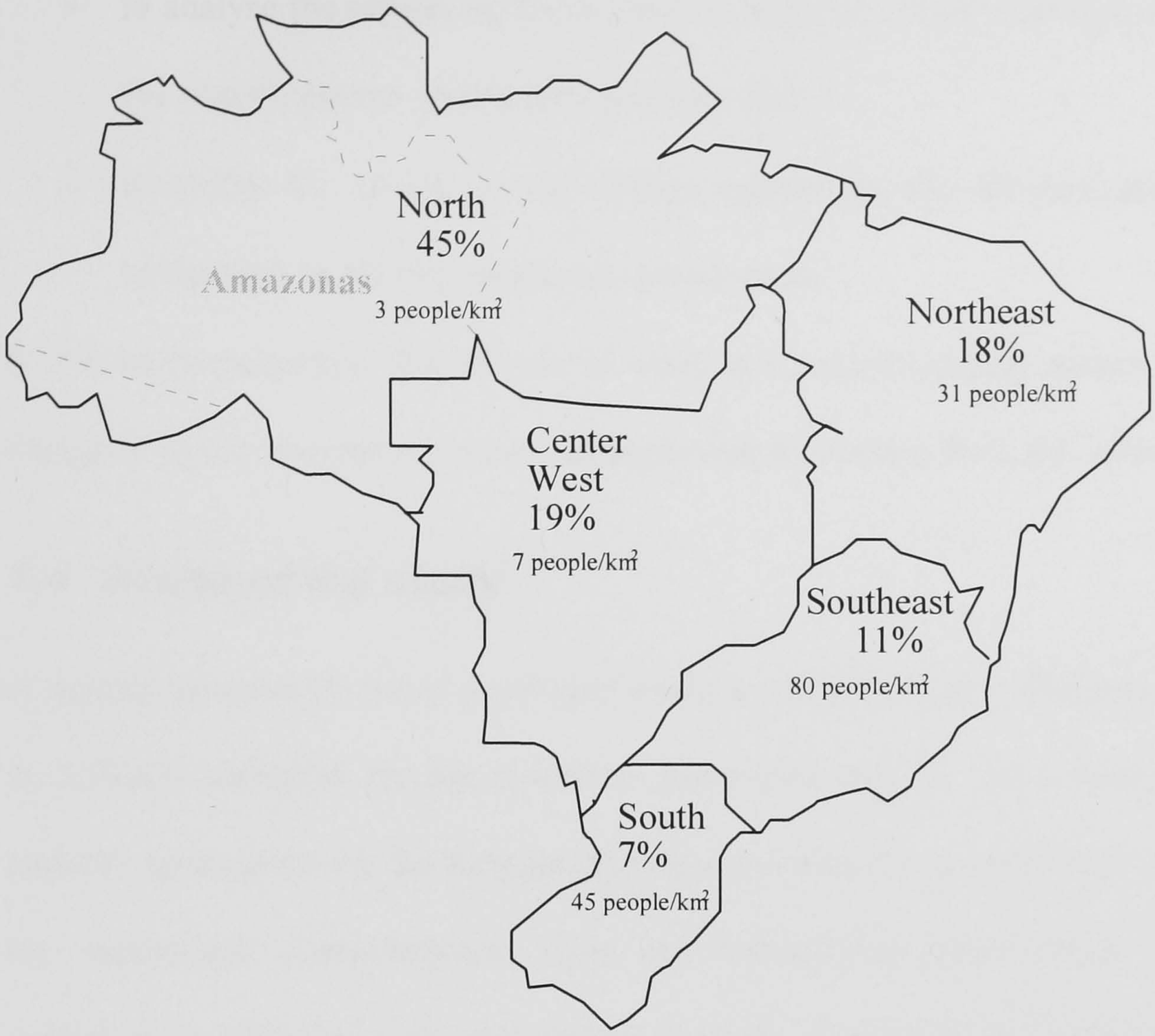


Figure 1-2. Regional division by area and distribution of Population.

Source: MRE (2003)

1.3 Aims of the study

The overall aim of this project is to develop a methodology for identifying the economic viability of electricity-generating systems using alternative energy sources (with emphasis on wind power) in a mixed system based on hydro generation plants. There are the three specific objectives:

- to develop a simulation model of energy generation and storage appropriate for Northeast Brazil;

- to analyse the effects on the drawdown reduction once wind farms connected to the electric power system are operating; and
- to verify the effects of the change caused by the diversification in energy technology especially on electric power costs.

It will be demonstrated that the use of wind as a complementary source of power and energy to hydro systems is a means of improving the returns from the latter.

1.4 Scope of the study

A simulation model is being developed to allow analyses of the efficiency and the costs in different scenarios for the electricity generating sources. As a basis, the installed capacity appropriate for the forecasted market and monthly generation is calculated, and the operational characteristics, costs and loss-of-load probabilities of alternative combinations of hydro, wind and thermal capacity for meeting the demand are estimated for each case. The results indicate what the contribution to system security and the net costs of wind power for a system using hydro, wind and thermal generation might be under various assumptions.

This study will thus provide a means for understanding the behaviour of the aforementioned type of system when an intermittent source is integrated into it. This will contribute to the development of more effective energy policies and an increased interest in the application of intermittent sources of energy in Brazil.

A stochastic dynamic model is used to analyse the uncertainties of the hydro flow. There are good historical series of hydro inflows in the region. These inflows, as will be seen, are modulated by environmental variation in a random or unpredictable fashion over the period covered by the model (Haddon, 2001). In the present study they are characterised

using the Monte Carlo method (simulations where the model is run repeatedly with the same input data but for each run new random values are produced for the stochastic parameters). Wind energy, which is also stochastic, is represented by the wind power generated by the results of calculation of hypothetical plants generating power from wind measurements for a given period.

While this study is focused on the area of northeast Brazil, it is believed that the approach developed here can be applied to other areas in the world where hydro power generation strongly contributes to the total electric power production and where at the same time there is an availability of wind resources. One of the benefits of complementing hydro energy with wind energy is that hydro electricity overcomes the "intermittency problem" associated with the latter at higher levels of wind energy input, since the hydro reservoirs can absorb the hour-to-hour and day-to-day fluctuations in the wind energy. In addition, the wind energy available in both the wet and dry seasons enables the rate of drawdown[2] of the hydro system to be reduced, leaving more energy in storage for critical periods. Finally, there is also the possibility of raising the power capacity to energy storage capacity (MW/MWh ratio) by installing extra turbines at the hydro sites, thus improving the performance of the hydro schemes by increasing their ability to meet peaks loads as well as energy needs while not diminishing the aggregate energy they can supply; in short, they can add to both the MW peak capacity and MWh energy benefits available from hydro schemes.

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[2] A lowering of the ground water surface caused by pumping from an aquifer or lowering the water surface in a reservoir by releasing water either through the turbine or outlet pipes or over the spillway.

1.5 Main Issues addressed

Electric power is an indispensable part of modern life. In the northeast of Brazil, where the main electric power has been generated mostly from hydro plants, many factors led planners and investors to consider the integration of other types of energy sources into the electric power matrix. One of these factors specific to that region was the exploitation of the only river suitable for big electric power generation projects. The last big hydro power plant in NE BR, Xingó, took seven years and nine months from the beginning of construction to start of operation. The deregulation of the electric power sector has motivated the adoption of projects with shorter lead times. Although wind power has the advantage of short lead times, one problem that has kept investors away from wind power - an abundant local resource - is the lack of a study that would provide insights on the benefits of its integration into mixed hydro-thermal systems. The mechanisms created to attract interest for wind power through the PROEOLICA program have not effectively resulted in a higher participation of this source in the electric power generation of the country. The need to qualify the importance of its contribution will be tackled here through a model which can be used to show what possible consequences an increase in wind power generation could have on the electric power system and in the region. With the changes in the electric power sector from a state owned monopoly to a mixed system, in which several private companies compete in the electric power market the need for a new approach to analyse these issues (different electric power sources impacts and costs) has intensified. The market and the rules for electric power supply have changed. Therefore, traditional tools must be complemented with tools that can provide insights in the new market structure.

1.6 Structure of the thesis

In the next chapter, the background to the themes at the centre of the thesis is described: the wind resource and characteristics in northeastern Brazil, the electric power structure in the region and the challenge to supply electric power in the region in which there is an increasing demand and a variable hydro inflow. These themes are brought together through the existence of the complementarity of wind and hydro resources in the region. Chapter 3 summarises and discusses the characteristics of the hydro and wind resources in Brazil. The issues related to the intermittence of wind power are discussed in that chapter. In Chapter 4 the hydro resources and their characteristics are described including their relevance to the security of electric power supply in the region. Chapter 4 presents a discussion about the wind resource in the region including its characteristics and available potential for electric power generation. In Chapter 5 the empirical treatment for the hydro inflow is described. The method to generate the synthetic river inflows is described and the results are discussed. Chapter 6 clarifies the empirical treatment for the wind power calculation. A detailed debate about the wind energy in the region and the methodology adopted to obtain it is made. Chapter 7 sets out the basic ideas underlying system dynamics and a discussion on the decision to use it. In Chapter 8 the framework of the project is explained with a discussion of the specifications and detailed analysis of what the model should be able to represent. The several modules represented by the model are discussed and system constraints identified (e.g. maximum generation capacity). The details of the model and the case study are put together. The usefulness of the results and the uses of the results are discussed. Chapter 9 develops the

discussion of the results and assesses its relevance for the electric power industry in Brazil. In Chapter 10 the conclusions are drawn and recommendations outlined.

1.7 Contribution of the research

There is evidence that new renewable energy technologies (RE) could make a positive impact contributing to the electric power sector in Brazil. They have made little contribution as yet, due to several factors, the most important of which are perceptions of high costs, fears that the problems of intermittency supposedly brings to the electric power grid, and the lack of a tool to help decision makers to decide on investment in the area. This project will represent a contribution as a modelling tool, through which the integration of wind into the electric power system in the NE Brazil area can be evaluated, and a policy assessment tool to support decision-makers.

The modelling of hydro-electric system over the past several decades concentrated on the application of the mixture of hydro and thermal energy, with thermal energy initially providing a back-up source to hydro energy, and later enlarged to make a more fundamental contribution to base, as well as peak, loads as the system expanded and the available hydro resources became fully exploited. The thermal power from gas, coal or oil was firm. There have been, in contrast, few attempts to model an intermittent form of generation such as wind energy as a complement to hydro. This thesis aims to make this attempt; it is especially applicable to the case of Northeast Brazil now that hydro power is reaching its limit. There are also many other developing countries with good hydro resources that could similarly make good use of intermittent renewable energy

resources, including solar energy as well as wind, and in this sense it is believed that the methodology developed here could be applicable elsewhere.

The implementation of the model using *System Dynamics* (SD) is also novel in the area of renewable energy in Brazil. A stocks and flows design with feedback and delay loops is the basic idea used in SD applications; it is capable of handling large numbers of loops, non-linearities and stochastic inputs, and has the ability to link different modules. This provides considerable flexibility for its development and future use. Updating the simulation model or adding new features to it is another practical and valuable feature of System Dynamics.

1.8 Literature

During the review, resources available from the college library (printed and online) have been searched, as well as web sources. Few publications have been written and published on the use of hydro/wind combined generation. The technical literature has been reviewed, and these papers are discussed.

The review suggests that that only two research studies in deep detail involving the integration of wind and hydro energy are being carried out. The first one carried out by Roskilde University (Meibom, 1999) develops a simulation model to investigate the collaboration that hydro-based Scandinavian countries can offer in the scope of the Nordic Power Pool. The second one developed by the Commission Federal de Eletricidad of Mexico and the Instituto Politécnico Nacional of Mexico (Cadenas et al., 2001) aims at the evaluation of reliability indicators using Loss of Loads Expected and

Loss of Energy Expected. Additionally, articles, reports, research papers and books have been collected in the following areas:

- Electricity Economics
- Applied Hydrology
- System Dynamics
- Wind/Hydro integration
- Wind speed data analysis
- Renewable energy integration to the grid
- Electric power system operation planning
- Renewable energy policy
- Dynamic programming
- Linear Programming

The following sections refer to some of the most relevant articles and research papers reviewed, and discuss the implications for this research.

CHAPTER TWO

2 ELECTRIC POWER GENERATION AND SUPPLY IN N.E. BRAZIL

2.1 INTRODUCTION

To provide a better understanding of the reasons for undertaking this investigation, a brief overview of Brazil and of the Companhia Hidro Elétrica do São Francisco (CHESF) service area is given in this chapter. Section 2 sets out the main features of the demand and its evolution while Section 3 describes installed capacity in the CHESF area.

Electric power consumption per capita has grown (see Figure 2-1) steadily in Brazil, more than doubling in amount since 1980 (Seth, 2000). As can be seen from the figure, the comparisons with per capita consumption in the UK and the US, where per capita consumption is respectively 3.5 and 7.0 times higher, show that Brazil still has a lot of 'catch up' to do before it reaches levels of the industrial countries. Different proportions are noted in the illustration explained by the different development stages of the countries consumption patterns of the population due to purchase power and cultural inclination as well. Industrialization, electric appliances, heating and air conditioning and more recently computerization have each been contributing factors. In developing countries especially, consumption per capita is increasing rapidly, especially in a country with high economic growth as Brazil, requiring significant investment. For the

specific case of the area of Brazil under study more detailed comment are made in the next paragraphs for this increase in electric power consumption.

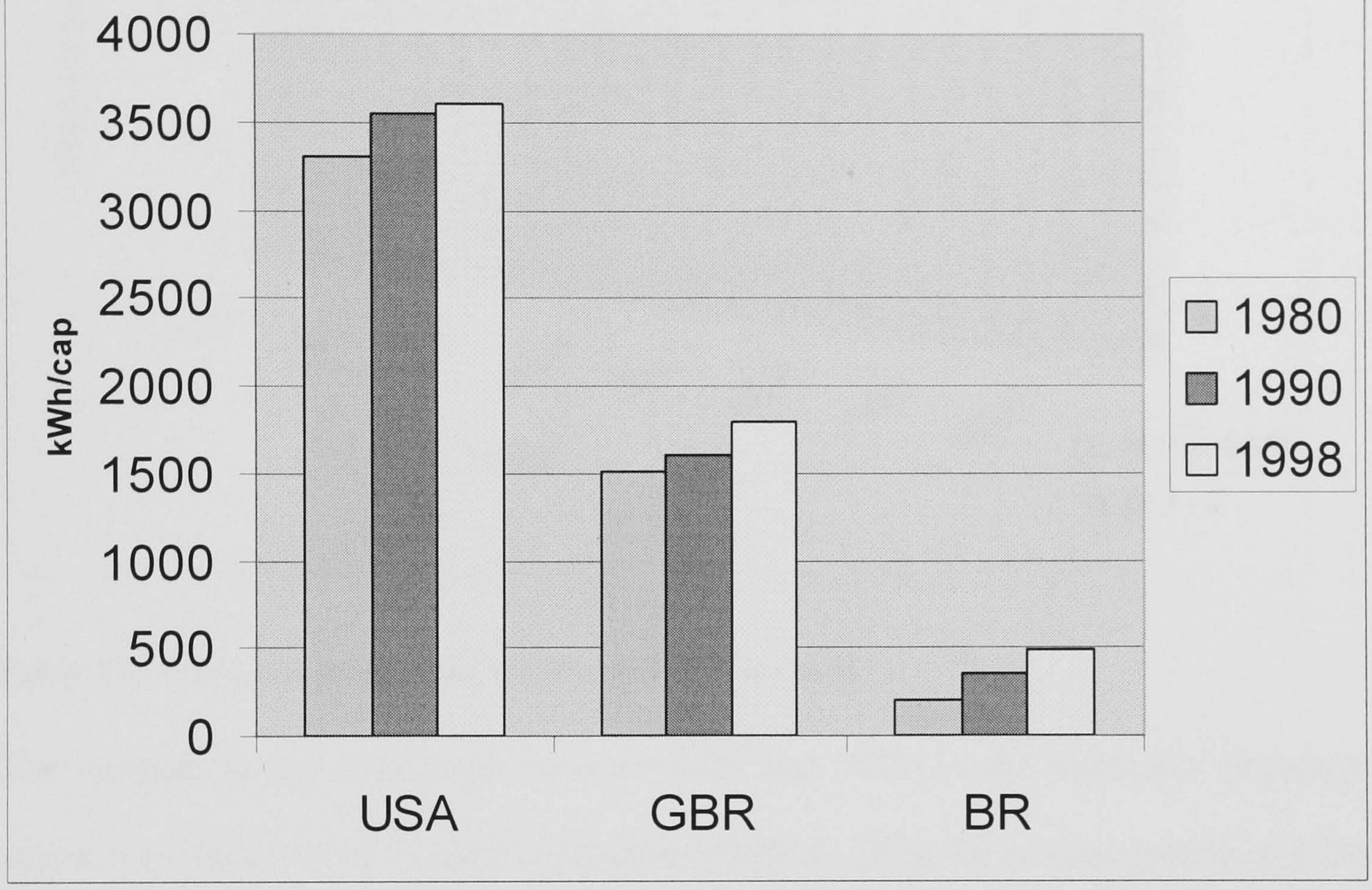


Figure 2-1. Unit consumption of electricity

Source: World energy council 2004

Population growth is one of the major drivers of the rise in electric power consumption. Figure 2-2 graphs population growth in Brazil as a whole and in the northeast of Brazil in particular.

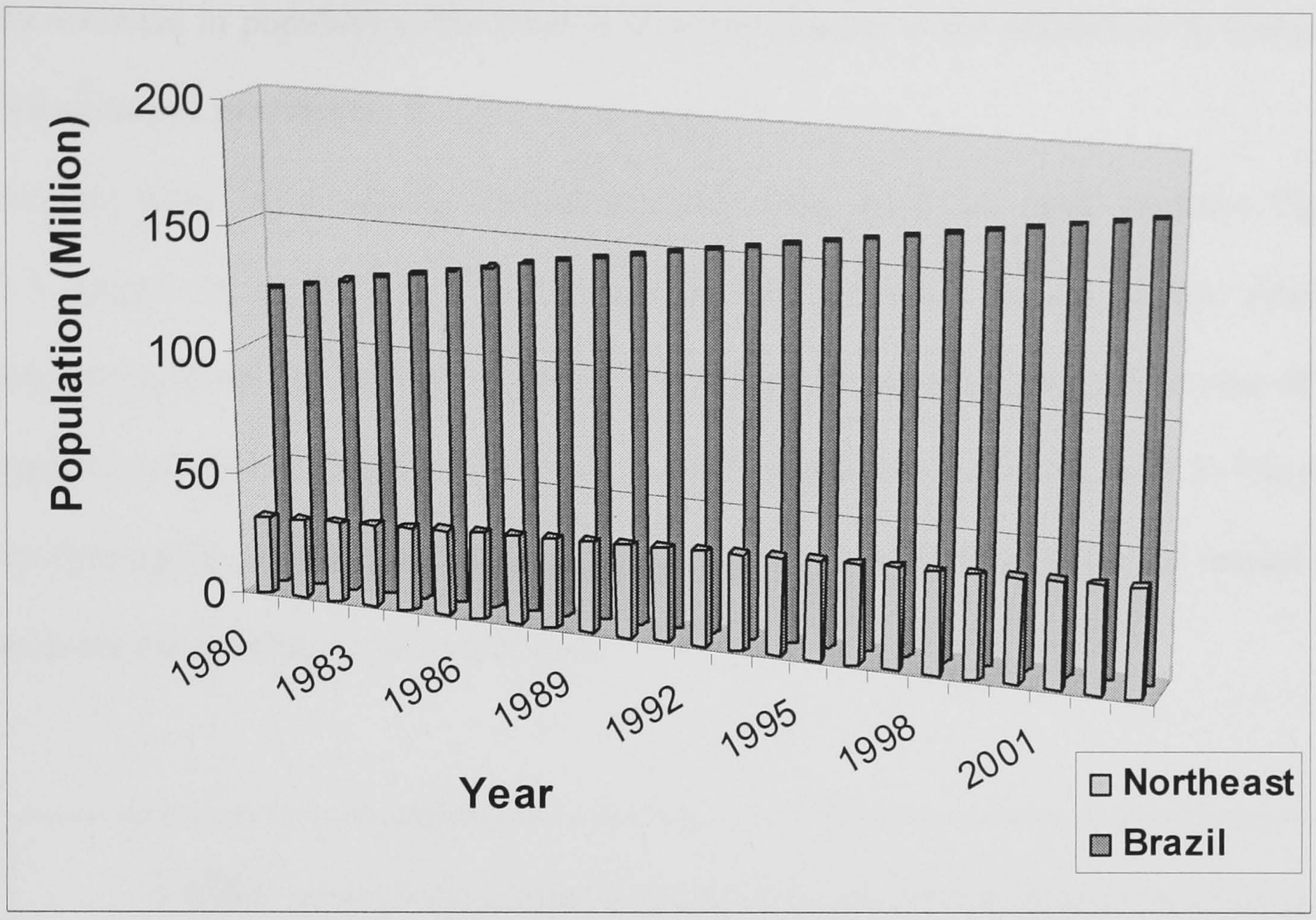


Figure 2-2. Population evolution in Brazil and in the Northeast

The increase in the population between 1998 and 2002 in the Northeast electricity region was from 39.5 to 43 million inhabitants (IBGE, 2003) an average growth of 2.2% per year. It is interesting to note that the population in Brazil increased at an average rate of 1.8 per annum in the period 1980 to 2002, the higher growth was registered in the first decade – 1989-1990 which was 1.9% per year, and in the second the increment was of 1.6% per year. Population growth the NE region over the same period was somewhat lower, around 1.5% per year, falling from 1.8% per year in the first decade (1980/1990) to 1.3% per year in the second (1991/2002). It should be observed that the Brazilian population has had the highest increment in the years 1980 to 1990 and the northeastern population followed its growth trend, representing 29% of the Brazilian population in 1980 and 27.9% in 2002. As the rise in demand for electricity is directly proportional to

the increase in population, the latter is of great concern to the authorities in charge of infrastructure provision.

Another major factor driving demand increases is the rise in per capita incomes. Figure 2-3 graphs the increasing trend of the income per capita in the region. Another interesting trend can be seen in Figure 2-4 where the percentage of the income of the region in relation to Brazil is shown. It is clearly shows an increasing trend in this ratio confirming the prospects of a higher participation of the region in the energy market and an expected increase in load with time.

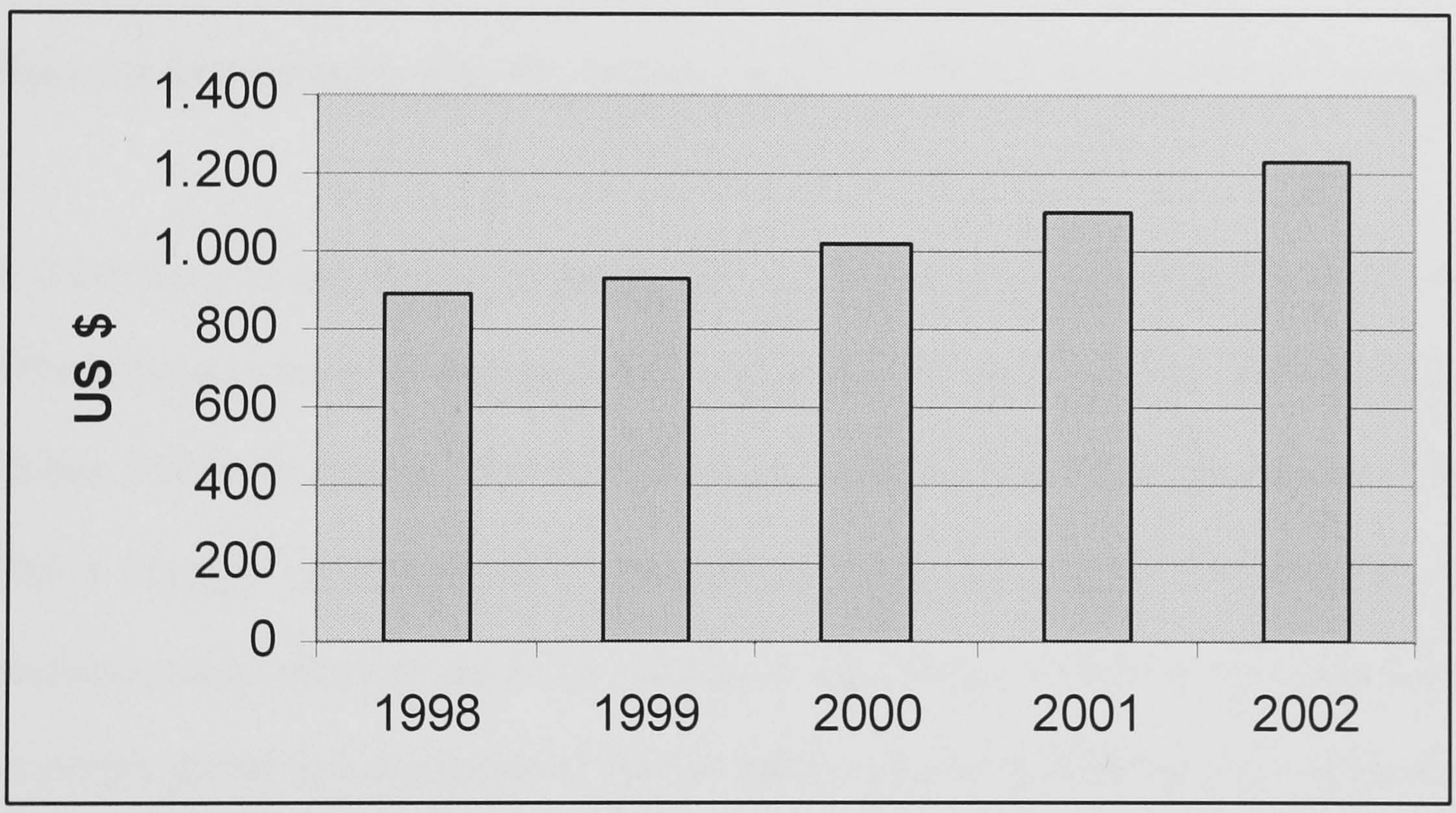


Figure 2-3.Gros s Domestic Product (GDP) per capita[3]

[3] Reference year 2002

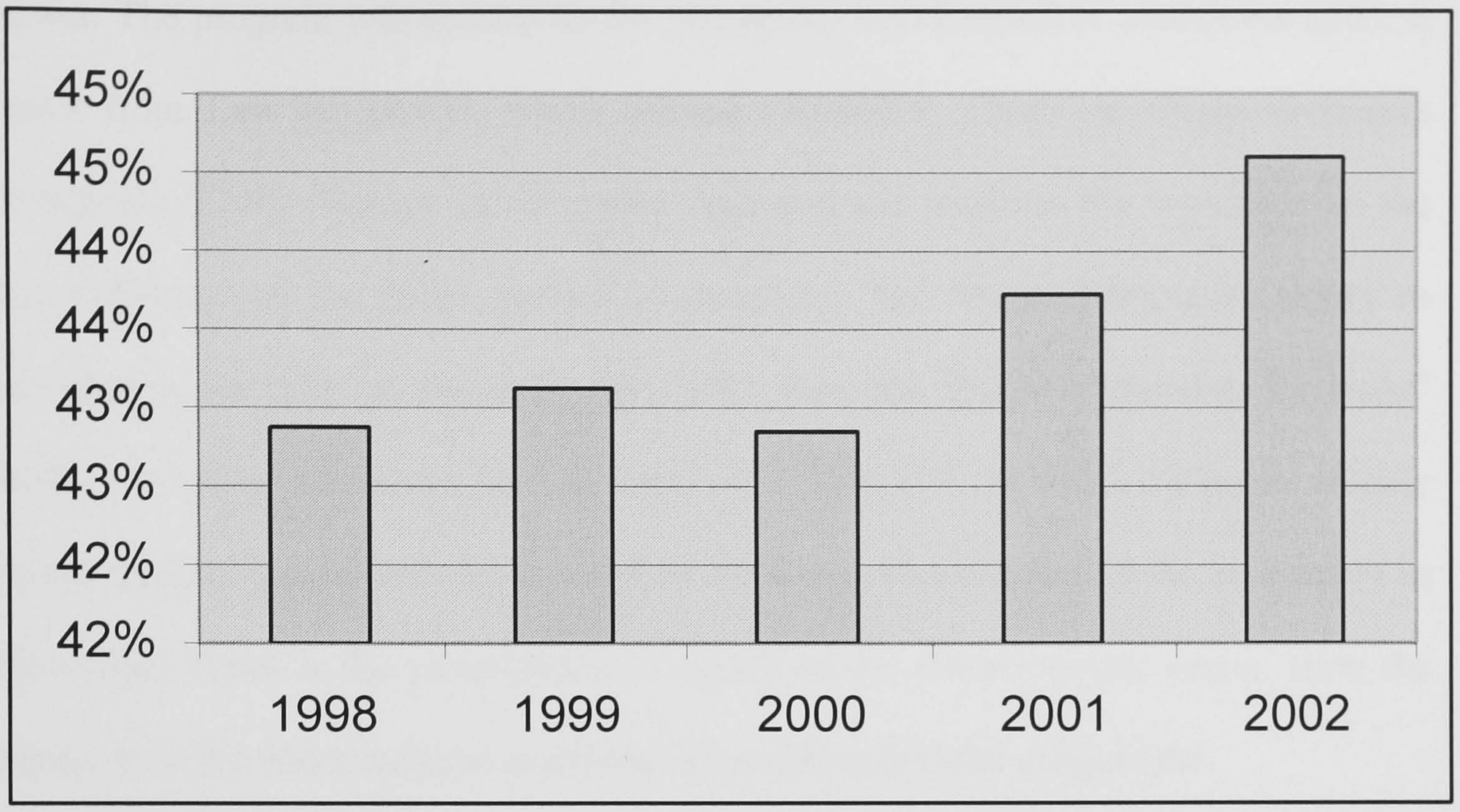


Figure 2-4. GDP per capita of the NE region in comparison to Brazil's average GDP per capita, %.

A third factor is the number of people still not receiving electricity service. Still over 14% of the population in the region had not received electricity by 2001 (see Figure 2-5) (Ribas, 2004a). In January 2004 the federal government instituted the programme "LUZ PARA TODOS" (Light for all[4]). The objective of the programme is to eliminate the exclusion of people from electricity services in the country. It aims at providing access to electric power to a population of over 12 million people by 2008 the share of the rural population who have no access to electric power. The installation costs for electric power supply to households of low income and monthly consumption lower than 80 kWh will be free of charge. In NE when the programme was put in force 39.3% of the inhabitants of rural areas (approximately 5,8 million people) had no access to electric

[4] The translation is literal to convey the spirit of the programme; the title could be translated as "Electricity for all".

power. The program was created by the decree No. 4.873 dated 11 November 2003. It stems from Law no 10.438, which created PROINFA, Conta do Desenvolvimento Energético (CDE) (Energy Development Account) and modifies the legislation on the unversalisation of the public service of electricity. The financial resources would be provided by the CDE created in 26 April 2002, from the "Reserva Global de Reversão" RGR, one accounted created by Law 5.655 of 20 May 1971 in which the public electric power utilities deposit into an account for the legal remuneration of the investment in the sector. There is the participation of agents of the electric power sector, from the States, from the Municipalities and from others destined to the programme.

The priorities of the programme are:

I- project in Municipalities with low rate of households having access to electric power, under 80%, based on the 2000 census;

II- rural electrification projects which benefit population affected by construction of dams, whose responsibility is not of the entrepreneur of the plant;

III- rural electrification projects which focus on the productive use of electric power and promote the integrated local development;

IV- rural electrification projects in public schools, health centres and water wells.

V- rural electrification projects which benefit rural resettlements; and

VI- electrification projects for family agriculture.

In order to carry out this programme the alternative of meeting the demand for electricity will be the extension of the conventional grid and systems of decentralised generation, with isolated grids or individual systems.

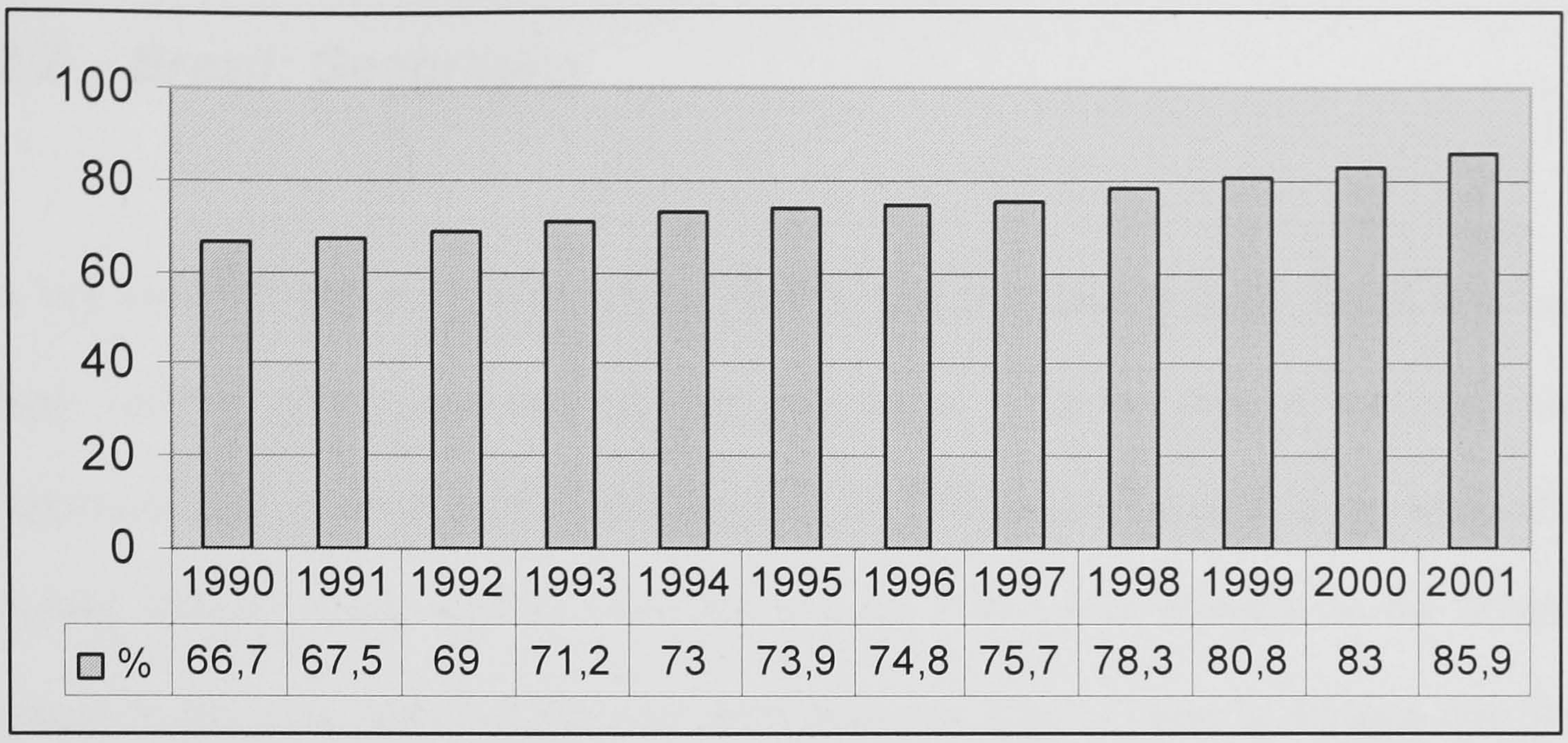


Figure 2-5. Rate of household which have access to electricity in the study area

Figure 2-5 show the rate of household which have access to electricity in the study area.

This data shows that the rate of households supplied is increasing. Although this will contribute to the increase in load, its contribution is relatively small in comparison to the other factors. This happens because the population who have not access to electric power at the moment are mostly in the rural area and have a very low income. Therefore it is expected that their per capita and aggregate consumption levels will be low. It is expected that populations already connected to the grid, along with the demands of industry and commerce will be the main sources of the increase in load.

2.2 *Brazil: Geography*

A key issue for electric power consumption in Brazil relates to scale: Brazil is a very large country with a large and growing population. It has an area of 8,511,965 km^2 (approximately 34 times that of the UK). It is the fifth largest country in the world after Russia, China, Canada and the USA (Carpentieri, 1991). It is bounded by the Atlantic ocean on the east, with a 7,408 km coast line (see Fig.1-1) and is divided into five regions (see Fig. 1-2). In Figure 1-2 the area distribution and concentration of population by region are shown.

Brazil has extensive natural resources, including one of the most extensive river systems in the world with eight drainage basins. The Amazon River, which has more than 1000 tributaries, constitutes the largest river basin in the world with an area exceeding 5,580,000 km^2. It also has the highest rate of discharge—a more than 170,000 m^3/s. About two thirds of the Amazon River lies in Brazil. However, its gentle gradient prevents its use for hydroelectricity, and of course it is also valued for the biodiversity it contains. Hence, there is now a need in the country to find alternative means of making use of the available energy resources, including renewable energy.

2.3 ELECTRICITY DEMAND

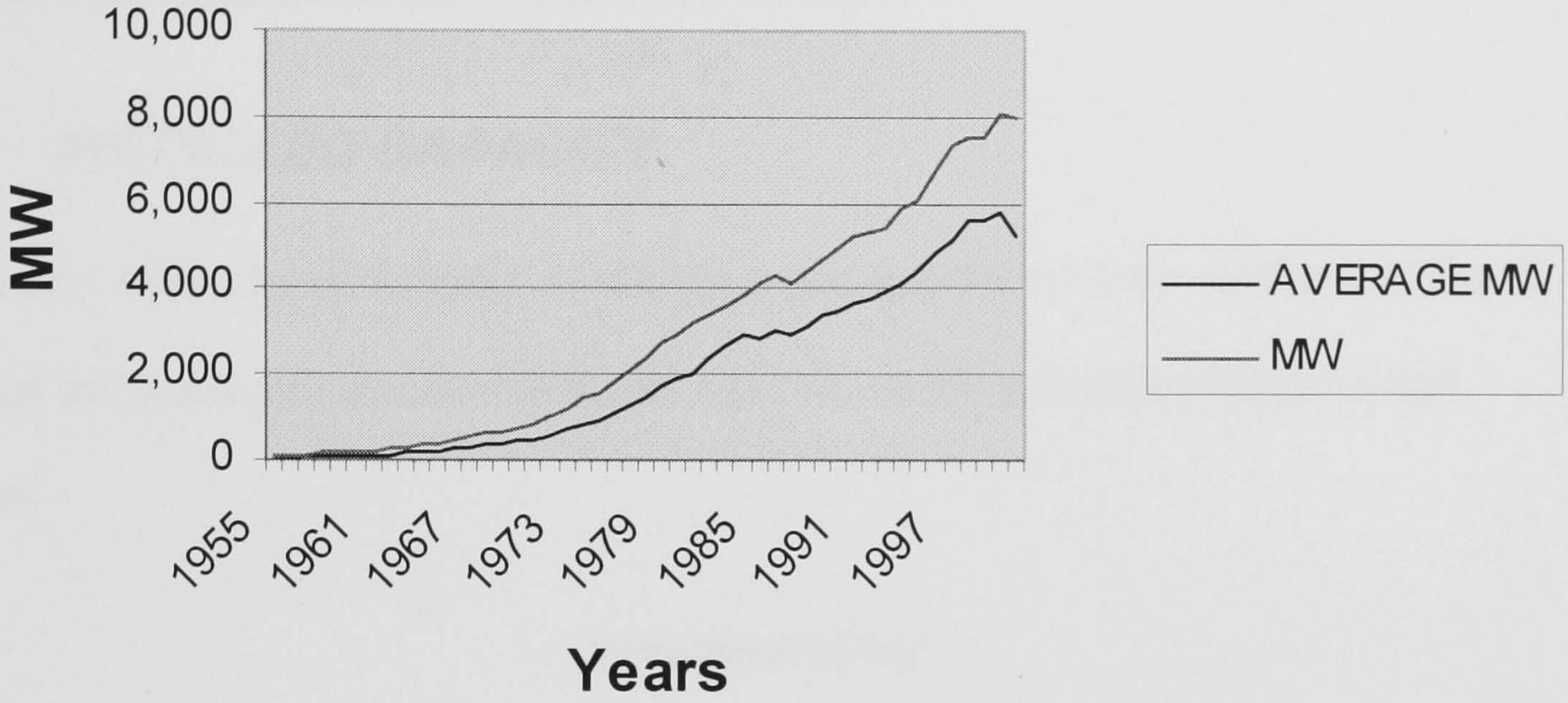


Figure 2-6. Energy and demand in NE Brazil

The hydroelectricity consumption[5] is 84.9 million tonnes oil equivalent, approximately 80% of the region's total electricity supplies, with an increase of 0.8% over 1998 and a total share of 11% of the hydroelectric power produced in the world. The total consumption of primary energy in 2000 was 102.3 million tonnes oil equivalent. This represents 2.8% of the world consumption for that year.

Brazil has an average population density of 20 persons per km^2 (see Figure 1-2), which is very low in comparison to the UK which has 241 persons per km^2 (OPT, 2003). (England has the highest density, with 372 people per km^2 (HMSO 1995) followed by Wales with 140 people per km^2, Northern Ireland with 121 people per km^2, and Scotland

[5] BEN national energy balance 2001 year for hydroelectricity consumption 1999.

with 66 people per km^2). There are many different ethnic groups in Brazil formed by the progressive mixture of races since its colonisation. (e.g. Portuguese mixed with indigenous Indians and Africans originally brought to produce the crops and work in mines). The areas that the Brazilian Indians still control are the most remote and economically unattractive parts of the Amazon basin.

2.4 INSTALLED CAPACITY

Figure 2-7 shows the distribution of electric power generation in the northeast of Brazil by fuel and graphs the shares of different types of electric power generation in that region.

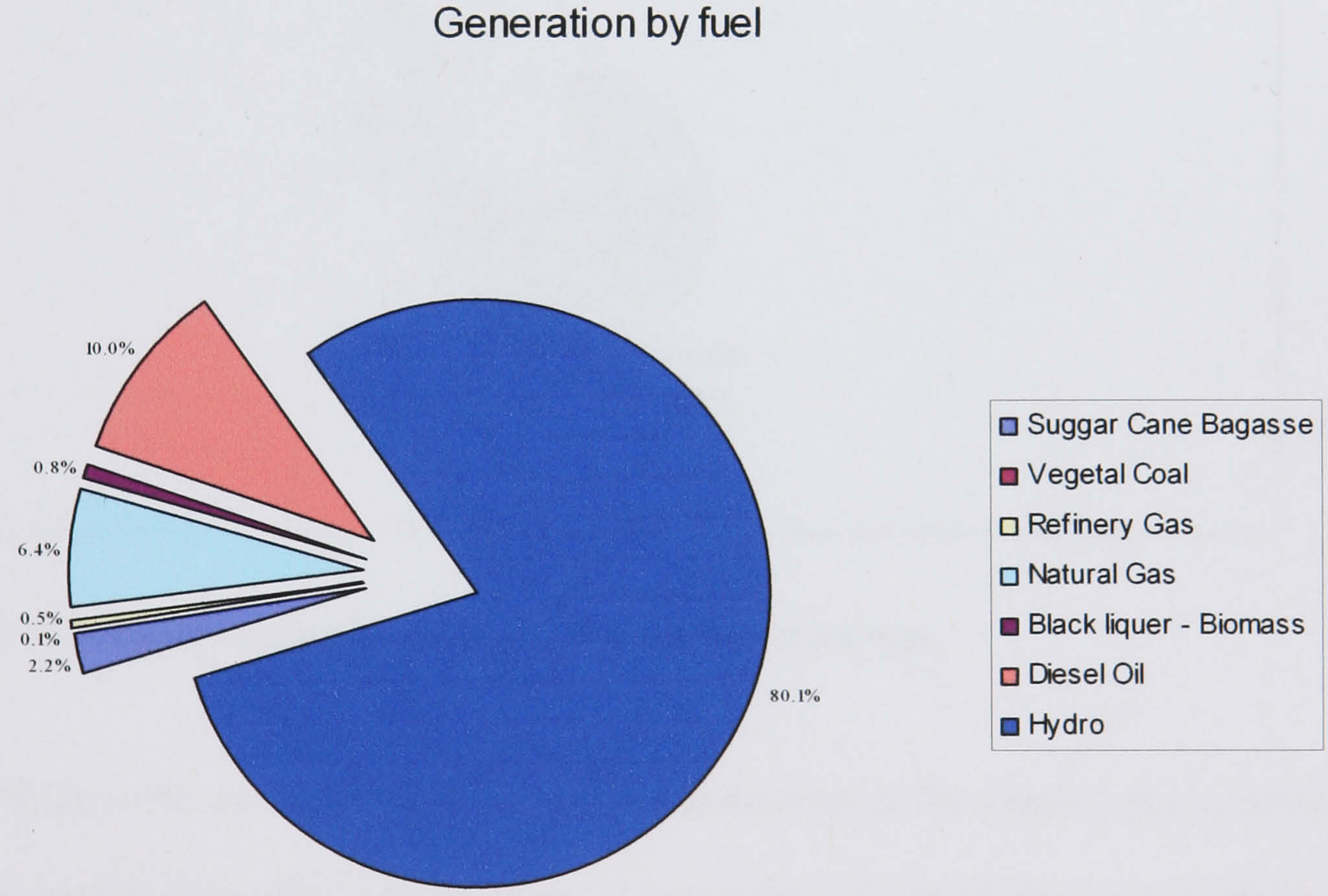


Figure 2-7. Electric power generation in NE by fuel

Figure 2-8 displays the participation of different fuel types on the electric power generation in the region. It can be seen that the contribution of renewable energy is practically zero. Yet the wind resources (and also solar resources) are appreciable. Although the commercial application of wind power is in an advanced stage in the world in NE Br its utilisation has not been incentivated. It could contribute with its participations in the electricity production share to lowering the imports of oil having the advantage of being a local resource.

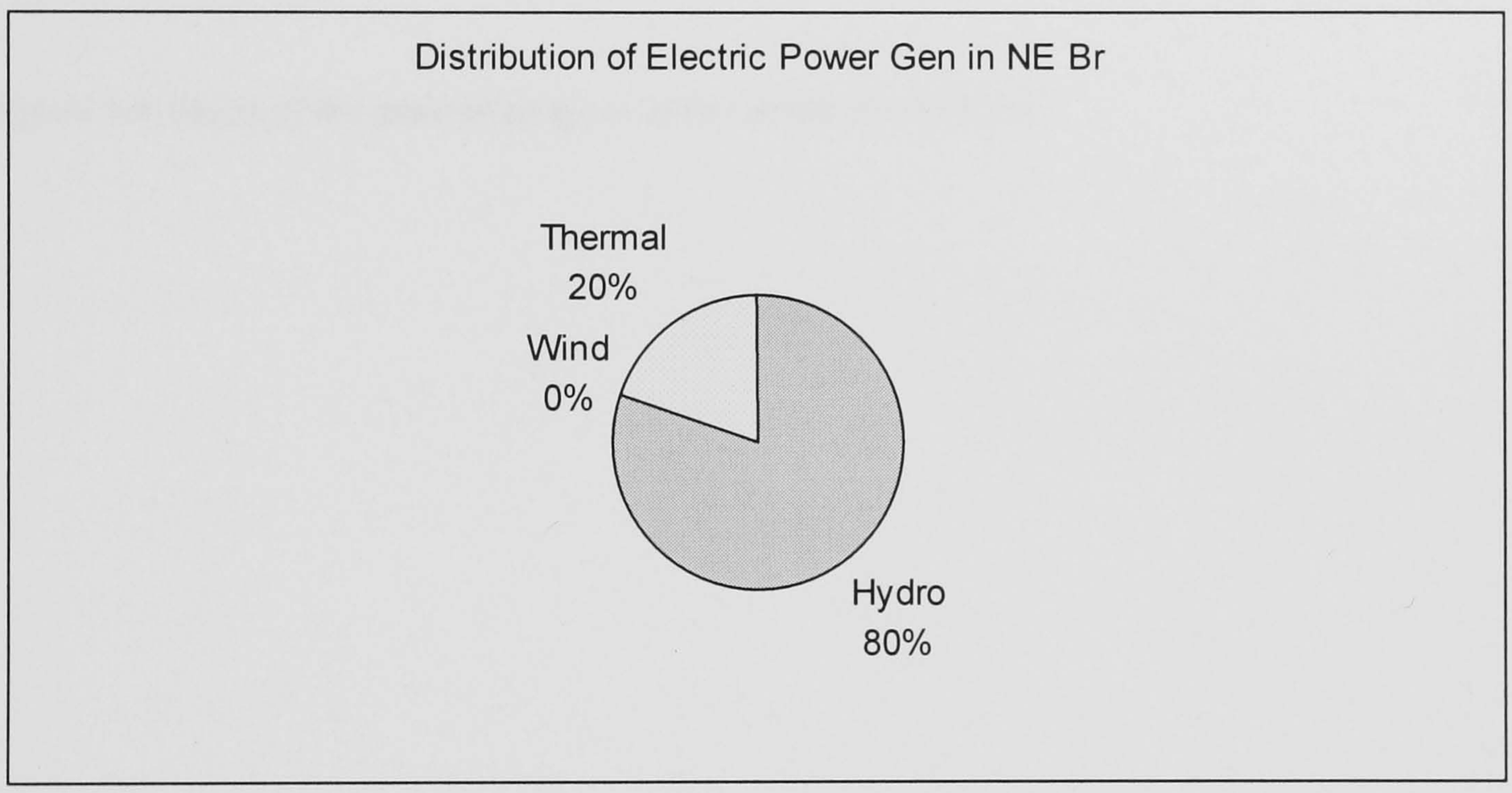


Figure 2-8. Distribution of generation in the northeast of Brazil per type.

Figure 2-9 show the particiaption of the private generation in the electric power sector. It is expected that it increases steadly as the government is fostering the investment from the private firms in electric power generation; practically all of this is in thermal generation; Figure 2-10 shows the composition of generation in more detail.

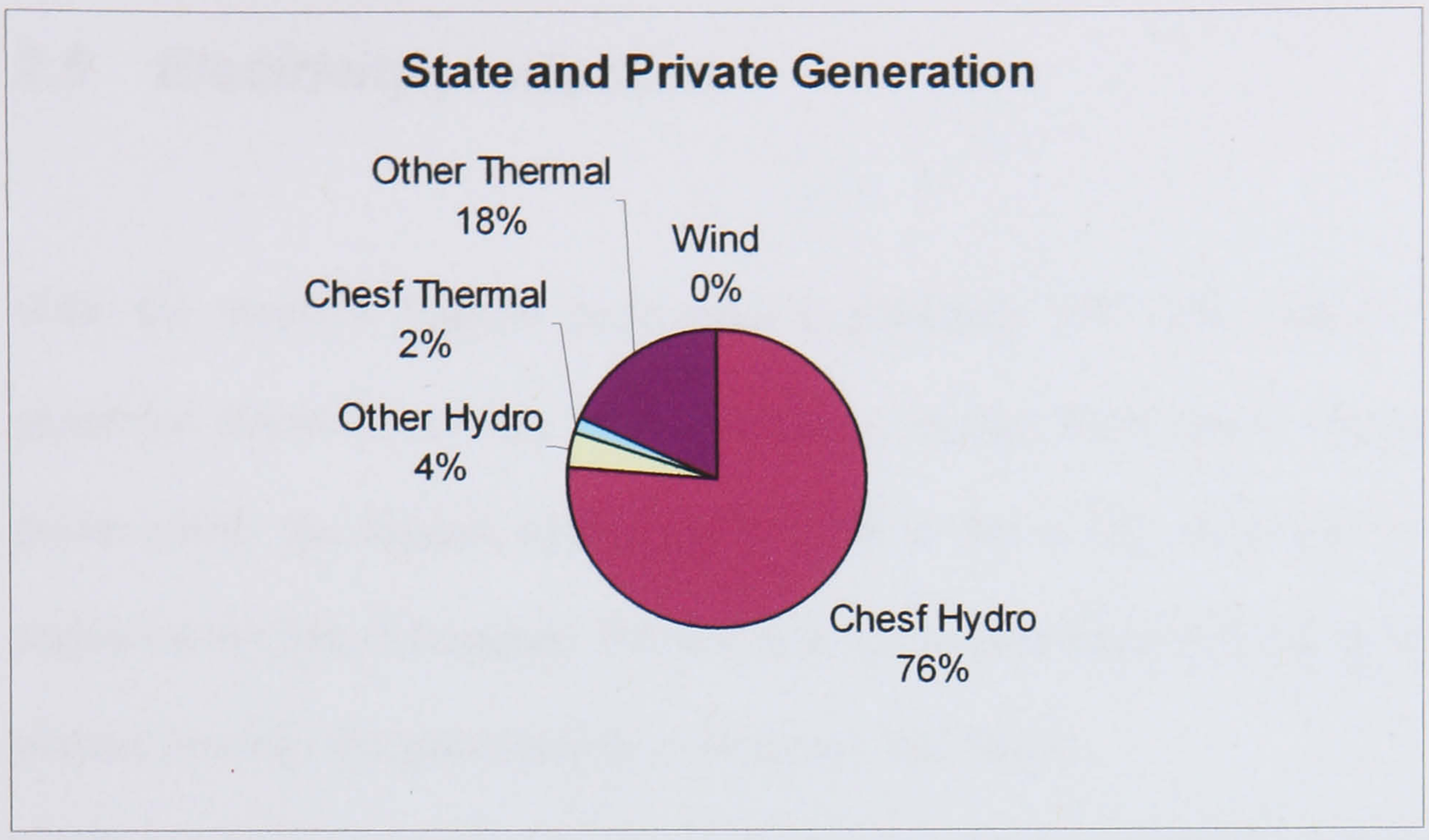


Figure 2-9. Share of the generation types in the northeast of Brazil

2.5 Electricity production

With the world's highest hydroelectric potential, 260 GW (ANA, 2003), Brazil generates electricity mostly from harnessing energy from hydro sources. The Itaipu power plant, the biggest hydroelectric plant in the world, is located in the southern region on the Brazil-Paraguay frontier, near the Iguaçu Falls; it is the result of a bilateral project between the governments of Paraguay and Brazil.

Northeast Brazil however, despite its extensive area, possesses few rivers suitable for hydro power production. The São Francisco River is the only one suitable for the production of electric power via big hydro power plants. It is the largest and most important River lying wholly within Brazil, flows over 1,609 km northward before it turns eastward into the Atlantic. The precipitation rate in the São Francisco basin averages only 63 cm annually and often receives < 25 cm p.a.

Rains usually start at the end of March and occur sporadically until June. The geographical situation of Northeastern Brazil, near to the equator, makes the day length very uniform with small variations throughout the year (the variations in the 12-hour days go almost unnoticed).

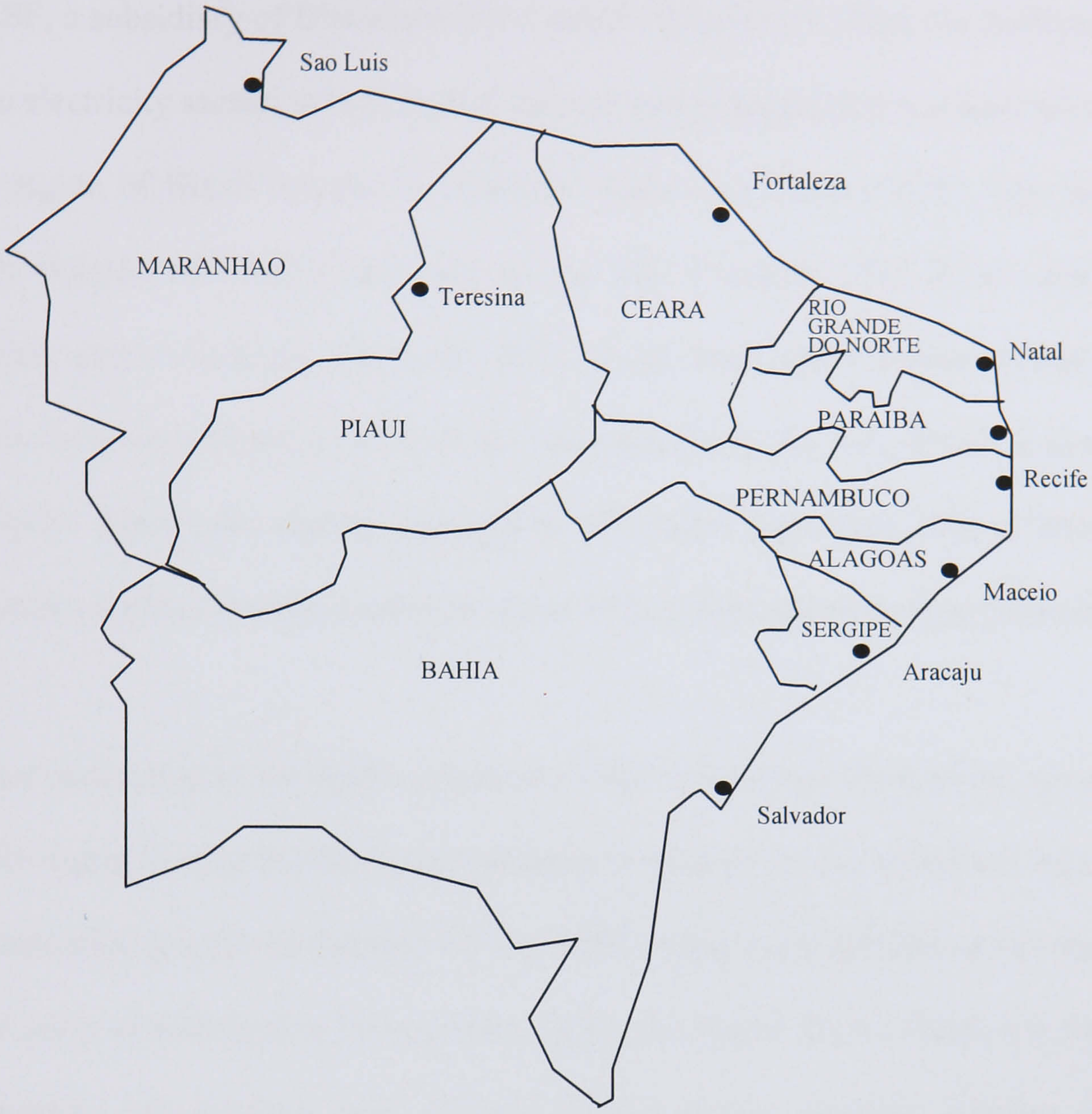


Figure 2-10. Northeast Region States

The tropical climate is pleasantly moderated by altitude in most of the region and by sea breezes along the coast. Temperatures usually range from 20 to 30 degrees Celsius. These factors greatly influence electricity demand profiles. Building heating loads are virtually non-existent, unlike in the UK, and air conditioning use is currently much lower than in the USA. Electricity tariffs are low, but the low average income[6] may be constraining the electricity consumption. TV usage is widespread but the opportunities for outdoors activities may help limit its contribution to the total residential load.

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[6] The minimum wage unit (MWU) per calendar month in Northeast Brazil is £ 46.51 (29.12.2003) and a high share of the population earns a MWU.

CHESF, a subsidiary of Eletrobrás (the Central Electricity Utility, the holding company of the electricity sector) is in charge of electric power generation and transmission to the N.E. region of Brazil (except in Maranhão State - see Figure 2-10). The main hydro power stations of CHESF are built on the São Francisco (SF) River, and the total installed power currently represents 85% of the total hydro power foreseen for the region. In terms of energy, 89% of the hydroelectricity for N.E. Brazil is produced by this river.[1] The hydro electric potential in NE Brazil represents 10% of Brazil's total whilst this region currently consumes about 15% of the total electricity production.

Further harnessing of the hydro resources of this river seems improbable, given the fact of this region having limited hydro potential in relation to the utilisation pattern today, the forecasted growth in demand for the forthcoming years and the environmental and social costs of adding new hydropower capacity to the SF River. Thus, it is now urgent to identify and develop new primary electric power sources, without increasing dependency on fossil or nuclear fuels. The first increasing electric power capacity using thermal fossil fuel fired plants and the second with nuclear plants. CHESF has been investigating the possibility of using, in the medium term (before 2010), the renewable solar and wind resources of the region as primary sources.

2.6 Renewable Energy Resources

This section presents some comments about the renewable energy resources in the region. Renewable energy resources can be defined as energy resources that are not

being depleted, such as sun light and heat, wind power, biomass energy, etc. An assessment of potential sources for different areas has been undertaken by CHESF (CHESF and Brascep, 1987). This assessment included biomass use for thermal power generation, wind power, solar power, urban waste and other potential energy sources. Based on this, the company decided to focus on three areas: Biomass, Wind Energy and Solar Energy for their prospects of a shorter utilization due to the advances in technological status and more favourable costs among the different technology options. At that time, there was no regional measurement programme to evaluate these sources but as it was stated by Talukdar "As the ability to predict wind energy availability improves, so will its value" (Talukdar et al 1986). Thus, CHESF has developed a plan and started the installation of a wind measurement network in NE Brazil to improve the quality of the available wind data. This was made initially with the co-operation of COELCE and COSERN; the electricity distributors for the states of Ceará and Rio Grande do Norte, respectively. However, the interest in wind power in Brazil increased and these two companies were privatised. Because of this, the incentive to share the data seemed to diminish. The joint work was terminated and the wind data acquisition equipment belonging to CHESF were disassembled and returned to the company.

Before the privatisation, via co-operative work with COELCE (The Electricity Distribution Utility of the State of Ceará), a wind farm was installed in Ceará. Several problems arose in the farm. Extra unforeseen maintenance costs which added considerably to the normal costs of the plant, the gearbox of one of the machines failed and some gears had to be replaced. Afterwards it was verified that the whole command

and control system needed to be replaced. This represented too high an investment to keep the plant operating, and the partners involved lost interest on this project. This led to its deactivation after only a few years of operation.

NE Brazil has good potential in respect to utilising solar energy, as it is characterised by a high level of solar radiation. In the semi-arid tropic region, 200 to 250 W/m^2 of daily average power[7] is available as primary energy. In other words, the solar radiation incident on the surface of the ground if integrated over a day is equivalent to 4800 to 6000 Wh/m^2. This places NE Brazil among those regions in the world with the highest solar energy potential (Lyra, 1991a).

Calculations have been carried out based on the work develop by Lyra (1991b) to show the potential for electric power generation using Solar Electricity Generating Systems (SEGS) and solar photovoltaic (PV) panels. Table 2-1 shows the summary of results of these calculation, the following assumptions have been made:

- all the area would be used for the installation of the solar plant;
- occupation factor of the area is 50% for PV plants and 26% for a Solar Thermal Electricity Generating System (SEGS);
- conversion factor of total solar radiation (average global yearly efficiency) is 11.5% for PV plants
- conversion factor of the beam solar radiation is 16% for SEGS

To evaluate the potential of solar power generation potential sites were identified and the value of solar radiation obtained. Data of average annual daily solar radiation (Hh)

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[7] Calculated from the integrated value to the 24hours (day) average, i.e. 6 000 Wh/24h=250 W/m^2.

are supplied by the closest meteorological stations to the chosen sites having similar characteristics in terms of solar resource. Data for NE are catalogued in the solar technology assessment work developed by CHESF (1987). For the chosen sites:

Souza (PB) – São Gonçalo meteorological station (PB) Hh = 6,024 $Wh/m^2.day$: Santa Maria da Boa Vista (PE) – Petrolina meteorological station (PE) Hh = 6,271 $Wh/m^2.day$;

and Pilão Arcado (BA) – Petrolina meteorological station (PE) Hh = 6,271 Wh/m2.day.

For PV panels the total surface of the panels (SP) is equal to 50% of the total area (TA) and the conversion efficiency of total radiation to electricity (ηPV) is 11.5%. The electric power generated (PG) in an average day is given by:

$$PG = SP \times Hh \times \eta PV \qquad \textbf{Wh/day (2-1)}$$

where

$$SP = 0.5 \times TA \qquad \textbf{(2-2)}$$

The annual generation (Gy) and the average power (Pa) are obtained by the equations:

$$Gy = 365 \times PG \qquad \textbf{Wh} \qquad \textbf{(2-3)}$$

$$Pa = Gy / 8760 \qquad \textbf{W} \qquad \textbf{(2-4)}$$

8760 corresponds to the number of hours in a year

For SEGS it is necessary to calculate the solar beam radiation direct normal, annual daily average, (*Hbn*), which can be obtained by:

$$Hbn = h \; x \; Ibn \qquad Wh/m^2.day \qquad (2\text{-}5)$$

where h is the length of the day.

$$Ibn = 1.37\,Kh - 0.34 \qquad \textbf{(2-6)}$$

where *Ibn* is the normal beam solar radiation hourly annual average and *kh* is the clearness index for the site given by:

$$kh = \frac{Hh}{Ho} \qquad (2\text{-}7)$$

Ho is average annual radiation for the latitude of the site outside the atmosphere.

Ho value for each month is available for several latitudes and is interpolated for the sites under study. For instance for -5 degrees latitude:

***Ho* (-5deg) = 10.034 kWh/m2.day**

Annual values of *Ho* are calculated through the average of the months of the year.

***Ho* (-10deg) = 9.485 kWh/m2.day**

Then for São Gonçalo ($6^o45'S$):

Ho = 9.843 kWh/m2.day, therefore, *Kh* = 0.612 and *Ibn*= 0.498 Wh/m^2.

Petrolina ($9^o23'S$):

Ho = 9.553 kWh/m2.day, therefore, *Kh* = 0.656 and *Ibn*=0.559 W/m^2.

On average the length of the day in NE region is 12 hours, this way:

$Hbn = 12 \times Ibn$ $\quad Wh/m^2$

The surface of the SEGS concentrators (*SS*) is 26% of the total area (TA) and its conversion efficiency for the beam solar radiation to electricity (ηTS) is 16%. The electric power output in a day is, annual average and the average power is given by:

$Gd = SS \times Hbn \times \eta TS \qquad (2\text{-}8)$

where

$SS = 0.26 \times TA$ $\quad Wh/day$

$Gy = 365 \times Gd$ $\quad Wh$

$Pa = Gy/8760.$ $\quad W$

Site		Souza(PB)	Sta. Maria da Boa Vista (PE)	Pilão Arcado (BA)
Total Area (km^2)		653.4	129.6	271.8
Photovoltaic Plant with fixed panels	Surface of panels (km^2)	326.7	64.8	135.9
	Average daily total solar radiation on the horizontal plan (kWh/m^2)	6.024	6.271	6.271
	Daily electricity generation(GWh)	226.32	46.73	98.01
	Yearly energy generation(GWh)	82608.51	17056.99	35772.31
	Average electric power (MW)	9430.20	1947.15	4083.60
Solar electric generating systems (SEGS)	Surface of concentrators (km^2)	169.88	33.70	70.67
	Yearly Normal beam radiation daily year average (kWh/m^2)	5.981	6.705	6.705
	Daily electricity generation(GWh)	162.58	36.15	75.81
	Year electricity generation (GWh)	59341.63	13193.70	27670.12
		6774.16	1506.13	3158.69

Table 2-1. Potential electric power generation from the solar resource for regions with highest average radiation in NE Brazil.

In fact, the solar resource in the region is immense. This means that with thermal solar this means that only 22% of the Sobradinho Lake area[8] (the lake has the same area of London) in the region would be needed to increase the double of the current electricity output in GWh to meet the electricity need (49,934 GWh) for the period January to November 2004 of the region (Silva, 2005). For PV plants the same area would produce 2.71 of the electric power needed by the region.

[8] Sobradinho hydro power plant represents approximately 10% of the hydro power installed in the NE system.

2.7 Diversification of supply

In the Northeast of Brazil, as well as in the rest of the country, continued supply of electric power depends on well-managed and reliable water availability. However, recent experience has shown that electricity shortage occurs due to a combination of factors including the stochastic nature of the river flow, the lack of investment in generation, and the reduction in water volume caused by low levels of rainfall in the river basin catchment's area, especially due to the intensification of droughts caused by El Nino (Andrade, 2001). In a similar context, wind power in combination with hydropower has been studied in Tanzania as a solution to electric power problems (Kainkwa, 1999). The electricity shortage in Brazil has forced the government to carry out electric power demand side management. To avoid brown out the government acted in two fronts. The first trying to reduce the electric power consumption and the second endeavour rapidly increases the electric power offer. The installed capacity in Brazil in 2000 was 72,208 MW, from which 5262 have been added in that year. From 1990 to 1994, there was an addition of 1,100 MW/year in the installed capacity. Between 1994 and 2000 there was an increase of 25.3% (14,579 MW), corresponding to an average of 2,437 MW/year.

From 1990 to 1994 the installation of 3,430 km of transmission lines has been made and from 1995 to 2000 an extra 7,700 km. New transmission investments were being carried out in 2000 due to the bidding of the concessions made by ANEEL in 2000, representing 3.983 km of new transmission lines. For 2001, it was forecasted that the bidding would

include an extra 5,475 km.

On the other hand the Brazilian market was growing, in average 4.23% a year, in the period 1994/2000 it grew in the order of 4.64%. Specifically between 1999 and 2000 the variation was of 4.95% which corresponds to an increase of 1,643 MW/year.

From 2001 to 2003, generation capacity of 23.590 MW entered into operation, 6.166 MW only in 2001. These measures described above adopted in the three-year-period before 2001 would ensure meeting the demand for electricity even with low inflow in the wet period under 20% of the historic average.

However, the hydrological conditions in that year were extremely unfavorable with inflow under 29% of the historic average in the southeast/centre-west and 53% in NE. This situation took the storage levels of the reservoir verified in 18/02/2001 to 38.2% in NE. In consequence the necessary inflow in both regions to reach the minimum security levels at the end of the wet season in 30/04, 49% in southeast and 49% in southeast /centre-west and 50% in NE, would have to be 110% and 86% of the historic average, respectively. According to the "Instituto Nacional de Meteorologia" (INMET) (the national institute of meteorology - Brazil) the southeast and center-west regions have experienced the most extreme drought in 20 years. Facing the scenario of unfavourable hydrology and considering the end of the rainy season it was necessary to adopt a plan for reduction of the consumption and increase in the electricity offer so that the electric power market of these regions could be satisfied. It was created a commission to manage the reduction of the consumption and increase of the electric power offer, with the objective to approve the plan until 30/03/2001, establish directives for its implementation, in 2 April 2001, and to monitor the execution of the measures defined

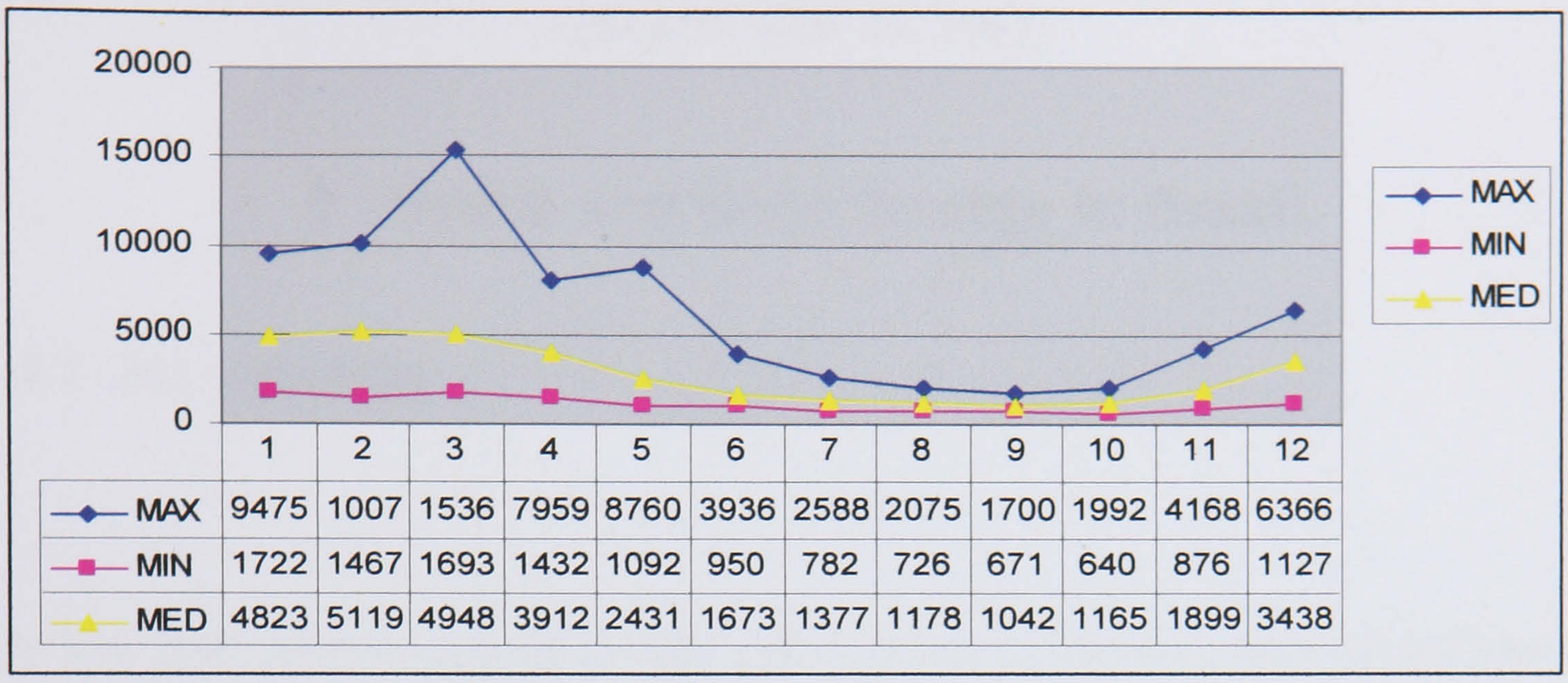
and their results.

Another fact that contributed to the shortage was the increase in the demand for electricity in recent years caused by socio-economic development. The increase in the population, for instance, between 1998 and 2002 in the Northeast was from 39.5 to 43 million inhabitants (IBGE, 2003) an average growth of 2.2% per year. However, despite difficulties, and due to the successful management of the reservoirs, there was no brown out. Integrated operation of the reservoirs enabled hydropower production to maintain the reliability of supply in the driest months of 2002. More flexibility in water management (e.g. reducing hydropower generation by using renewable energy generation) for electricity production would have allowed water conservation and therefore ensure the reduction of water shortages. Water availability fluctuations can be reduced through alternative power generation, which allows increasing system storage. It is expected that generation technology diversification will increase security of supply (Leach, 1995).

2.8 Role of new generation capacity

The predominant hydropower generation in the Northeast Brazil is a characteristic, which makes it difficult to plan the operation of the system. This is due to the stochastic characteristic of the SF hydro flow as seen in Figure 2-11. From the figure and the table, significant amplitude can be observed from data collected from 1931 to 1998.





	1	2	3	4	5	6	7	8	9	10	11	12
MAX	9475	1007	1536	7959	8760	3936	2588	2075	1700	1992	4168	6366
MIN	1722	1467	1693	1432	1092	950	782	726	671	640	876	1127
MED	4823	5119	4948	3912	2431	1673	1377	1178	1042	1165	1899	3438

Figure 2-11. Monthly maximum, minimum average water flow in m3/s

Due to the characteristics of the wind resource and the hydro inflow, wind parks and hydroelectric power production complement each other (Rocha, 1999). During high-speed wind periods, the excess the wind power generated will reduce the rate of drawdown. In addition, a higher capacity factor (GWh/GW ratio) may be permissible from the hydro plant in the dry period. This makes this energy option potentially attractive to be integrated into the system in that region. In the driest months of the year, water saved from hydropower generation due to wind contribution would be used to produce electric power. In the wet period, when there is less wind availability, the higher inflows would compensate for the lower wind speeds. At the same time, the wind energy provided in the wet season will enable more energy to be left in storage if the wet season is unusually dry, as has happened in several years.

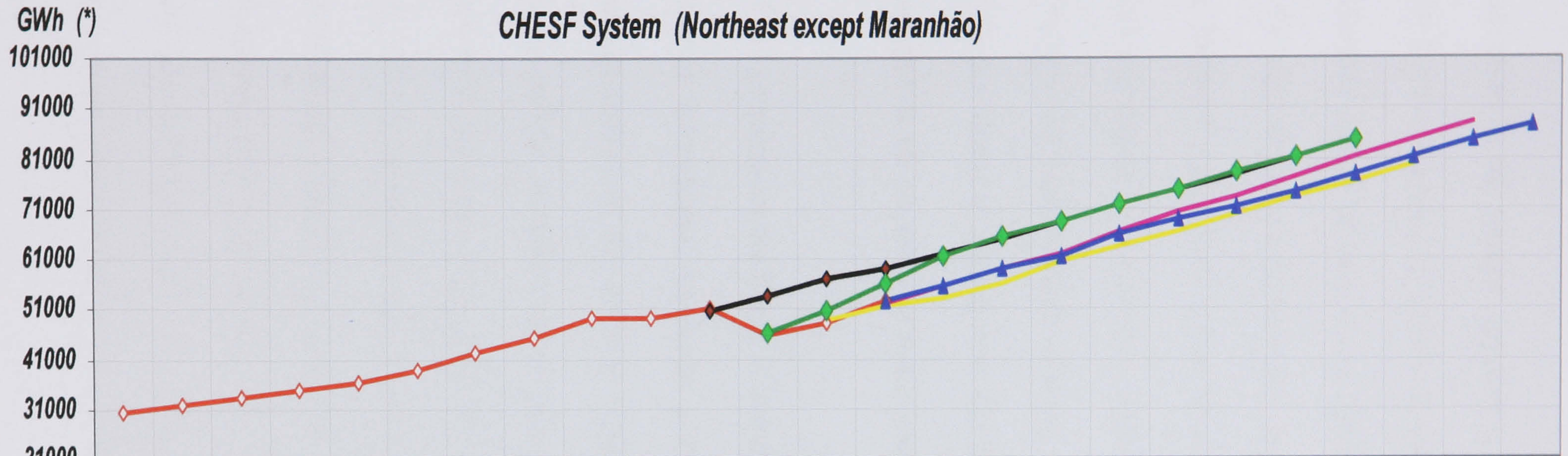
Electric power generated by renewable energy converters is stored in reservoirs, providing load levelling, reducing drawdown and resulting in a potentially more efficient utilisation of the electric power system. It has a potential to benefit the electric sector not confined only to the northeast region (ANA, 2003).

CHAPTER THREE

3 Hydro and Wind Energy in Brazil

3.1 Introduction

In May 2001, there were acute shortages of electricity in Brazil, in what became known as an "energy crisis". The crisis was attributed to the lack of rain in the country but lack of rain was just one factor that helped to make it stand out; it was reinforced by underinvestment, which led to deficiencies in the transmission system and shortages in the country's generation installed capacity. The longstanding situation is that, in Brazil, hydropower generation has been in use for several decades and it depends upon the variation of rainfall. As hydropower generation is over 90% of the total generation capacity it is designed to be able to cope with these fluctuations; however, it was not able to do so in 2001, as summarized in Figure 3-1 below (Ribas, 2004b); this figure also shows the consequences of the drought that occurred in 2001 for the long-term development of the market (see also the discussion of Figure 3-3, on the declining trend of water storage levels, below). Since dry periods are cyclical in the country and the possibility of their occurrence can be planned for, they should not lead to power shortages on the scale that actually happened. Some of the reasons for this are discussed in this section.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Historic	30580	32082	33361	34936	36330	38668	42332	45352	48991	48998	51044	45727	48331	52745											
Cycle 2000/01											50818	53776	57157	58827	61873	65056	68340	71792	74840	78000	81328				
Cycle 2001/02												46108	50609	56042	61371	65512	68619	71773	75001	78152	81472	84853			
Cycle 2002/03													48705	51777	53340	55931	60368	63401	66186	70004	73133	76392	79800		
Cycle 2003/04														52285	55733	58904	62221	66505	70492	73585	77228	81274	84720	88105	
Cycle 2004/05														52745	55439	59015	61308	65792	68773	71341	74350	77678	81459	84512	87578

Figure 3-1 Total Electric Power Load in CHESF system, historic and forecasted curves and tables

The reduction in the energy supplied is clearly seen. In the cycle 2000/01 (forecasted load for 2001 calculated in 2000) the energy supplied should be much higher than the load depicted in the historic curve. There is a loss of over 10% for the market. In the cycle 2001/02, the expected recovery of the market was not achieved. In the followings cycles 2003/04 and 2004/5 it can be noticed that the recovery was still far from the expected and the sales losses were considerable. It can be concluded from this graph that even though the hydrological situation has returned to normal, the dangers of water shortages are likely to persist over the long term unless there is adequate backup from thermal generation or new renewable energy resources.

Figure 3-2 emphasises the point. It shows the monthly inflow of the São Francisco River measured at Sobradinho. As can be seen inflow of 1971 was very low, around 60% of the average inflow in the 1931 to 1998 period. Looking at the graph for other years where the inflow is below the average are noticed and observing the historic data occurrence of dry years occur naturally in a cyclic pattern. Two particular years stand out: (i) 1971 when there was an extreme drought and (ii) 1979 when there was the highest flooding of the river. Looking back at the history of electricity in the Northeast Brazil since the 1960s, not all dry years have been accompanied by an energy crisis.

To avoid electricity shortage, reservoirs have been constructed which would be able to provide a multi-annual storage of water for the hydro power plants for up to five year periods.

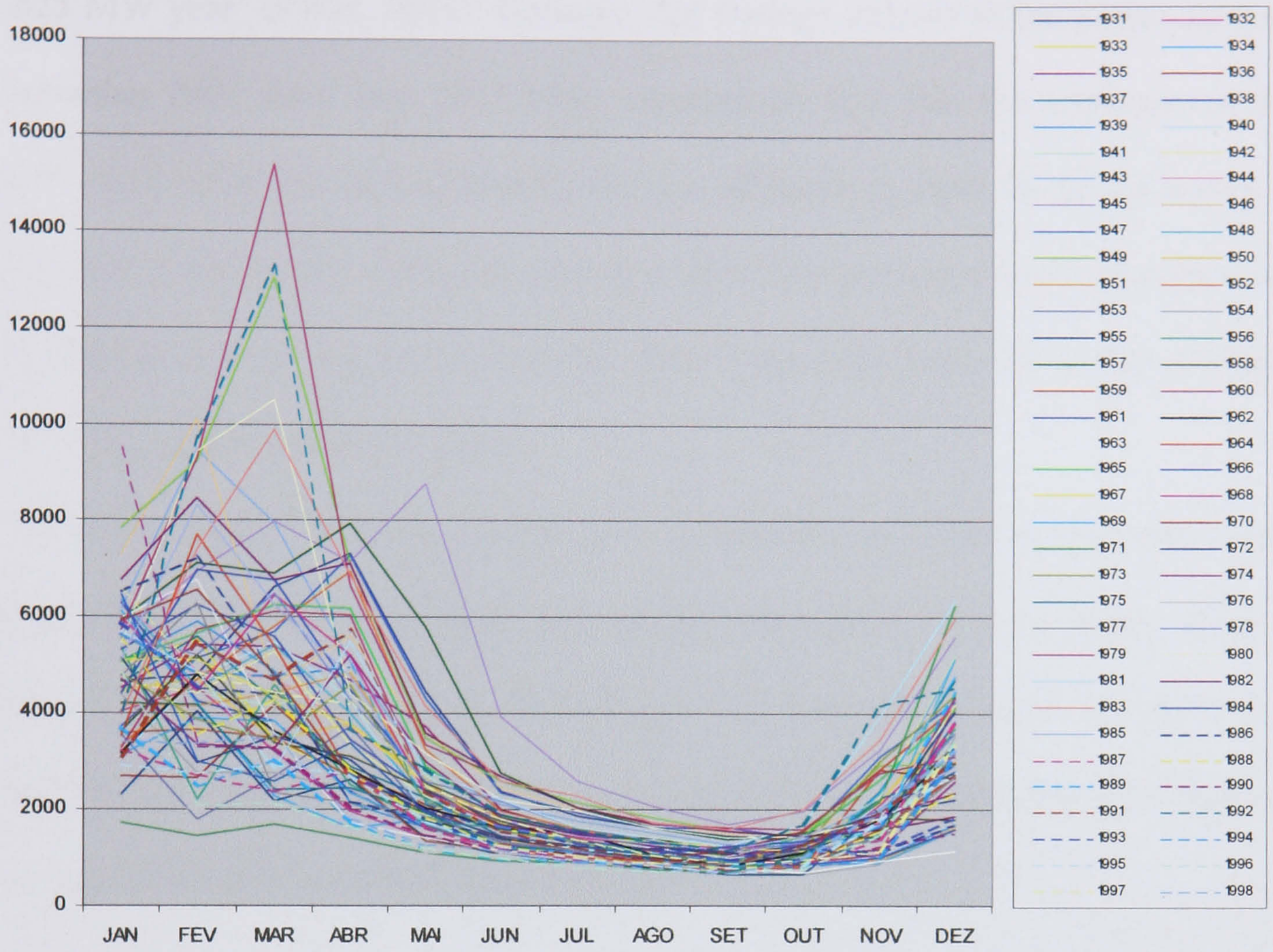


Figure 3-2. Monthly inflow of São Francisco River

However, with the growth of energy demand, and that the limits of hydro energy availability are being reached, this means of 'guaranteeing' energy supplies is no longer sufficient, which is why recourse is now being made to thermal energy as a backup.

In the case of the northeastern Brazilian system the water stored in its reservoir, Sobradinho is equivalent to an energy storage of 14000 MW average capacity when the reservoir is full. The hydro installed capacity in 2002 was 10268.3 MW (Total capacity 10703.3 MW) (Cubas, 2004) and the average electricity consumption of the region was

5625 MW year[9] (Ribas, 2004). However, the average inflows in the period January to December 2001 were only 3017 MW, substantially less than the consumption (5263 MW year), while the thermal backup was not sufficient to make up the difference. The computer model used to plan the reservoirs takes into account extreme draughts, which occurred in a very long period, and that these reservoirs should be able to accumulate water for a period of up to 5 years.

The average power increases steadily so it is necessary to add new generation capacity periodically. This has been done through the construction of hydro power plants and thermal plants. There are other alternatives being used, as discussed in chapter 2, e.g. biomass and coal. In Brazil there are energy conservation programmes fostering energy saving and adoption of efficient equipments.

Figure 3-3 shows the evolution of the water storage in the Sobradinho reservoir in a five-year period. In 2000, the maximum level reached 65% of the capacity of the reservoir and since then in the studied period it has not reached the same level. In 2001 it reached dangerous low level for the system's security of supply, close the 5%.

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[9] It is usually attempted to maintain a five years accumulation for the interconnected system. In this work will we concentrate in the northeast system. It is important to note that not all reservoirs in the country are full at the same time.

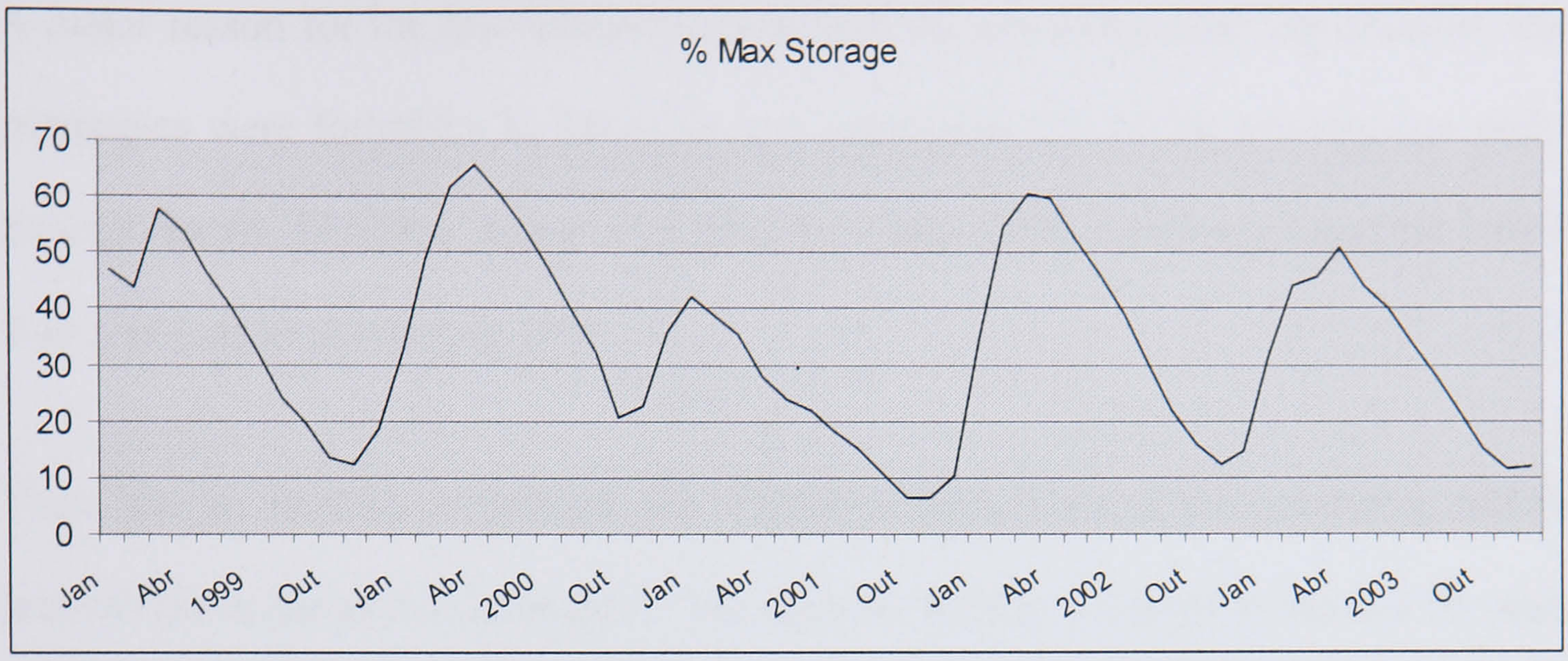


Figure 3-3. Percentage of maximum storage capacity in NE Brazil (Sobradinho).

3.2 The problem of low investment

As noted above, water shortages were not the only issue. There was also a period of under investment. Investment mostly from the public sector that in the period form 1980 to 1989 were always higher than US$10 billion per year. They have reached US$15.1 billion and 15.4 in 1982 and 1987 respectively and dropped to an average of US6.5 billion per year between 1990 and 1999, lowering further to US$4.3 billion and US$4.7 billion in 1995 and 1996 (Comissão Especial Mista, 2002).

The investments have not been enough to keep up with the increased demand. Between 1997 and 2003, the consumption increased 17% and the installed capacity only 0.3 % (Cubas, 2004). From the above description, it is clear that the energy shortage is not solely due to the lack of rainfall but to the combined effects of water availability and inadequate investment in the in electric power backup capacity.

A major reason for the low investment was that the generation and transmission state companies were forbidden to invest in new generation due to the privatisation policy through the art. 47 of the Decree nº 2.594, of 15 May 1998, which regulated the Law nº 9.491, of 9 de September de 1997.

There was an increase in demand, the continuous drawdown of the reservoirs, and the lack of rain in the period 2000/2001. The extreme draught occurred in the last 70 years, which left Sobradinho with only 5.51% of its maximum capacity registered in 18 November 2001. There has been a lack of investment of the federal government, practically the only investor until the end of the decade of 80. Added to this there has been a lack of the inclusion in the necessary speed of the private investments, as of 1995, insufficient investment in strategic installations, including transmission lines, by the Federal Government and the delay in the "Programa Prioritário de Termelétricas" (Priority programme of thermal power plants). Hence the emergence of the supply problem in 2001.

The incomplete implementation of the new institutional model certainly also helped to accelerate the start of the crisis. The blurred indication due to the partial restructuring hampered the management of the sector and the attractiveness of new investment. Another factor that contributed to the delay in the addition of new generation was the slow process for the concession of environmental licences for thermal and hydro plants enterprises. So the private investors, which were allowed to invest in generation, and were expected to do so by the supporters of privatisation, did not do so.

The justification for the privatisation were threefold: more efficient tariffs for the end user due to competition; private sector investment in generation; and a more cost-effective and reliable electricity service. So far, however, the effects have been higher tariffs, insufficient investment in generation and a lowering of the service to the point of the rationing.

With electricity consumption split 44% by industry, 23% by households and 20% consumed by services, the sector that most strongly felt the effects of rationing was the residential sector because it is very difficult reduce the electricity consumption of families with consumption already low. Consumption in households mainly comprises using electricity for refrigerators, hot water and illumination. The biggest reduction in consumption came from the replacement of light bulbs with long life economic lamps. The energy generated by CHESF in December 2001, due to the low hydro inflows was 61% of that produced in the same month of 2000. The rationing established caused a retraction of the load curve as shown previously in Figure 3-1. This represented a reduction of 20.4% of electricity supply in the period July/December (DRC, 2001). There were concerns over the effect on the industrial GDP[10]. According to the most optimistic estimative there would be a reduction of approximately 10%, a reduction on the GNP by 3%; 60% of the industry would lay off employees; investment would diminish; intensive electricity consumer would cut 20000 jobs; there would be a fall in exportation and the annual growth of commerce would reduce in 2%.

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[10] The gross domestic product (GDP) is the most important economic indicator. It represents a broad measure of economic activity and signals the direction of overall aggregate economic activity.

The impact of the restriction of electricity offer over the economy was mitigated by several actions of the group (Câmara de gestão da crise de energia elétrica GCE – Chamber of management of the electric power crisis) designated to deal with the electric power crises reporting directly to the presidency of the republic. They negotiated the rationing targets directly with the economic sectors and instituted market of quotas certificates, open in stock market and bilateral, allowing the market to seek the best resource allocation of the available energetic resource and to establish its price. At the beginning of January 2002, the first estimates of the 2001 GNP growth, 2.2%, and the exportation increase, 5.7%, suggested that the impact of the rationing was less than that expected by GCE).

3.3 Wind Energy

Wind power for electric power generation has proved to be a technically feasible option for electricity generation, and is commercially viable and attractive in some regions. It has been evolving worldwide. In 1991, there was less than 2000 MW of installed capacity (EWEA, 2002) (BTM Consult, 2003): in 2002 the total capacity was over 32000 MW. From Figure 3-4 it can be seen that installed wind power generation capacity has increased more than ten-fold over the last decade, with an average rate of growth of 26%.

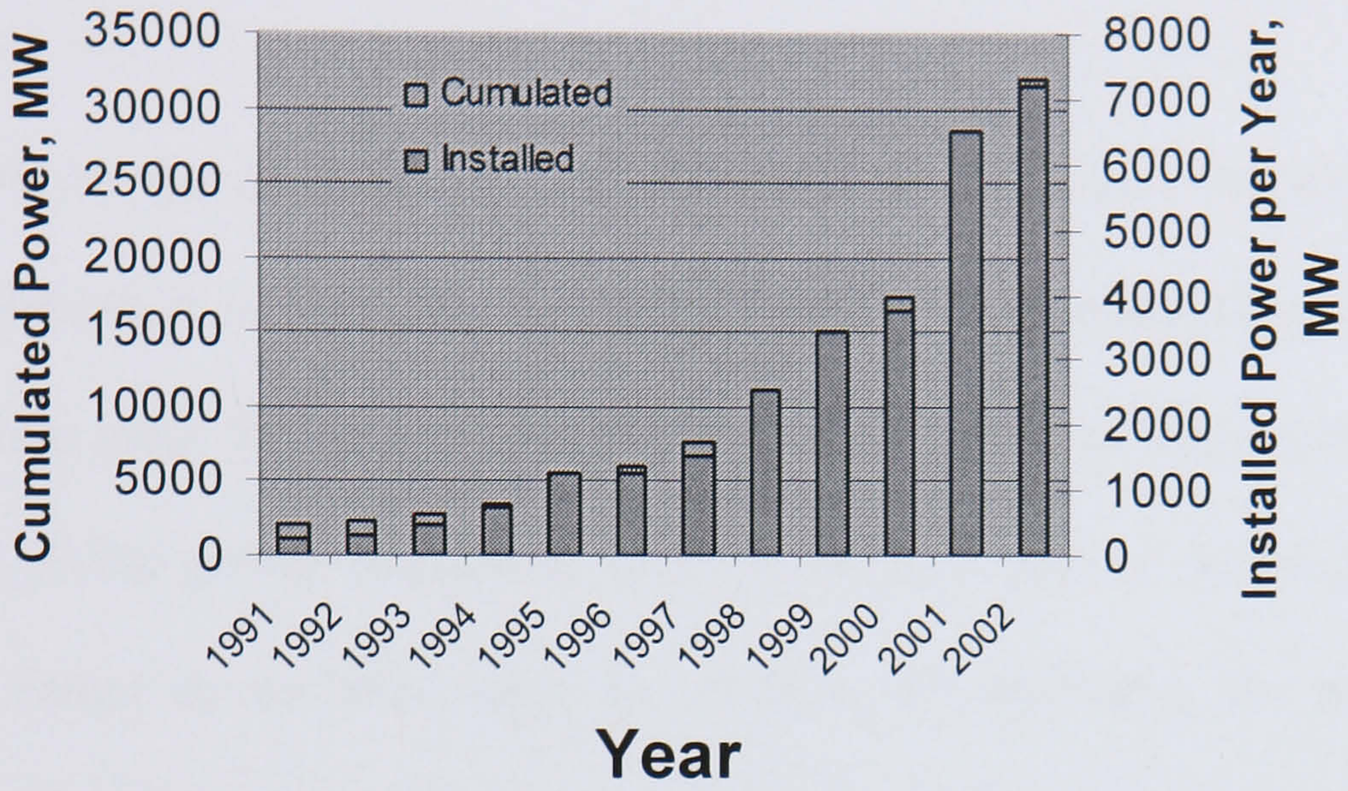


Figure 3-4. Cumulated and Yearly World installed Wind Power Capacity (MW) (Source: EWEA 2002 & BTM Consult 2003)

The cost of the wind power installation has been one difficulty for its wider commercial application. Nevertheless, cost has been declining. In 2002 the cost per installed kW was US$800 (KUJAWA, 2003) and costs forecast for 2003 and 2007 were US$750 and US$650 respectively, an annual average decrease of 4.1%.

In Brazil, large wind turbines are already being produced. The Ministry of Mines and Energy has created a renewable energy incentive programme named PROINFA (through law number 10.436 of 26 April 2002). The programme aims at the diversification of electric power generating sources by increasing the use of RE's such as wind, small hydro power plants and biomass. Government regulatory agency, ANEEL, in Brazil, has

received a large number of applications for permits to build wind farms and has granted eighty-seven permits totalling 6052 MW of wind power capacity (ANEEL, 2003).

Turning to the analysis of wind energy in Brazil, since the energy is stochastic and intermittent, it is necessary to find an approach for quantifying financial uncertainties and risks prior to the installation of the plant. Such an approach is outlined by (Klug, 2002). Wind power prediction systems are now able to forecast the power output of wind farms up to three days in advance: for example, the ability to estimate the aggregate wind power output of wind farms in several regions has been incorporated in Proviento (Lange, 2002). Selected sites considered representative are used to calculate the individual region's power output and these are later combined to obtain the power output forecast for a large area. This is a very important tool for decisions regarding the dispatch in short term operation of electric power generating system having a considerable participation of wind generation (which of course is not the case of Brazil as yet).

3.4 Wind Potential in Brazil

Brazil is blessed with very good wind speeds confirmed through the wind speed map collated by True Wind Solutions contracted by CEPEL (See Figure 3-5) in 2000. In order to attract more investment in the most favourable areas, wind measurement stations need to be deployed. A better availability of geographic data, which influence the wind speed pattern, in electronic format would facilitate the use of GIS systems to

better evaluate investments in wind power. In Figure 3-5 it can be seen that the most favourable areas lie on the coast of the Northeast of Brazil. This is shown in more detail in Figure 3-6 where average annual wind speeds over 8m/s has been encountered.

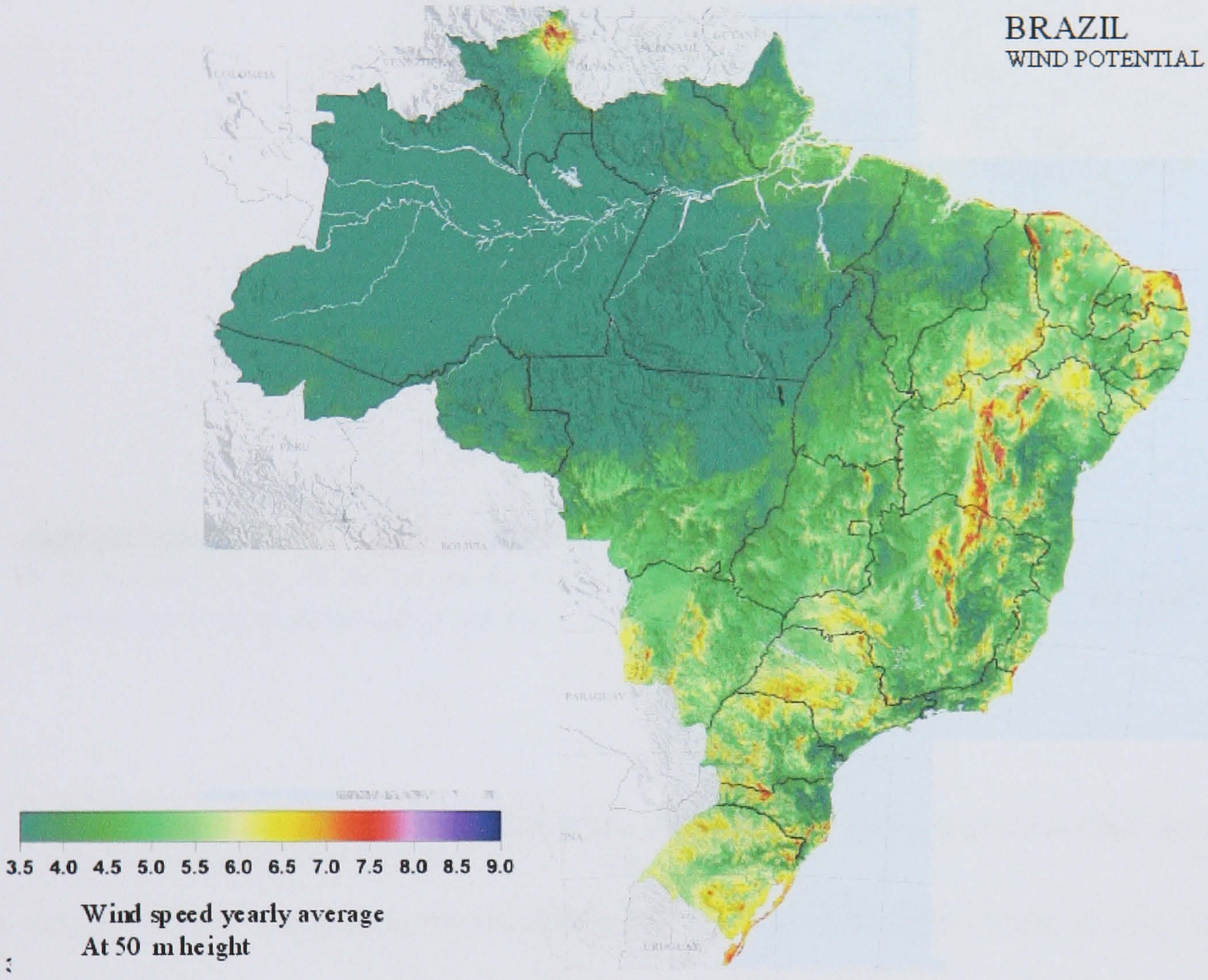


Figure 3-5. Wind Potential in Brazil (Source: Atlas do Potencial Eólico Brasileiro - CRESESB)

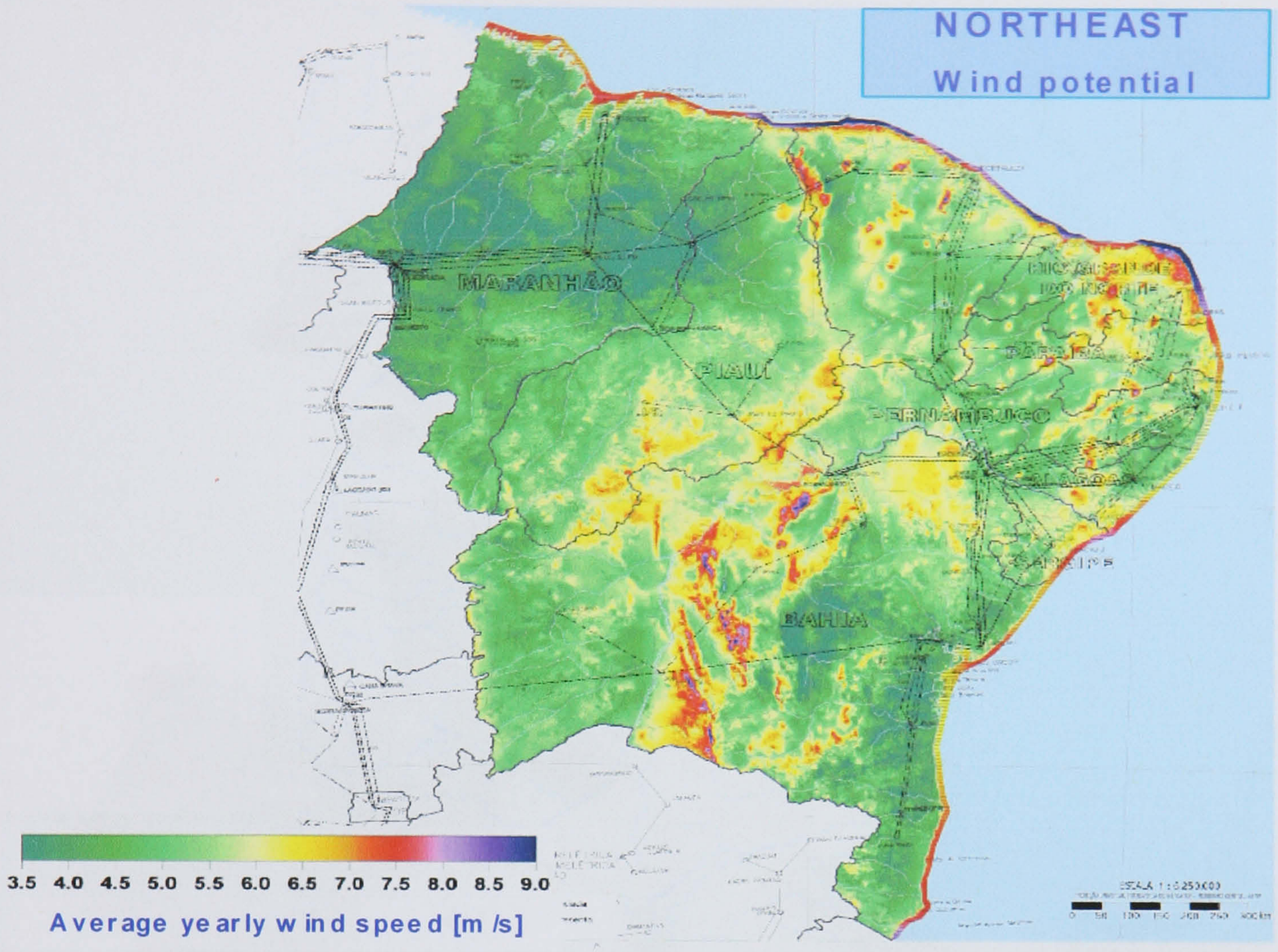


Figure 3-6. Wind potential Northeast Brazil (Source: Atlas Eólico Nacional - CRESESB)

In several areas, the resources compares favourably with that found in the UK and Western Europe. As it can be seen in figure 3-7 the greatest wind potential found in most of Scotland, the coast of Ireland, a part of Denmark and southern parts of France. Those resources are in the same class of the resources seen in the previous figure for NE Brazil.

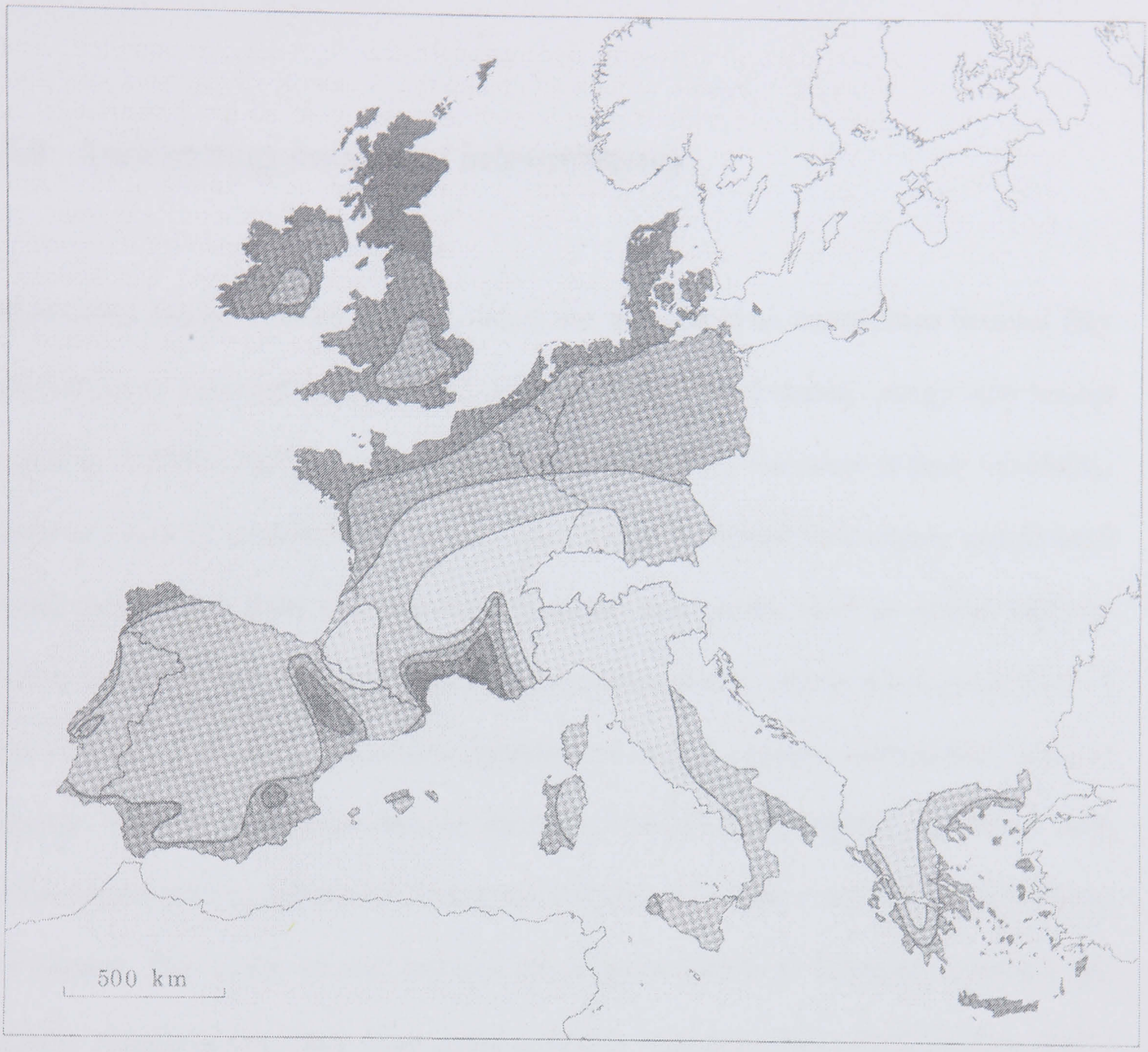


Figure 3-7 – Wind resource map for Europe (Janardan, 1994). The darkest area corresponds to class 6 in Table 3-1.

Class	Sheltered Terrain		Open Plain		Sea Coast		Open Sea		Hills and Ridges	
	m/s	W/m2	m/s	W/m2	m/s	W/m2	m/s	W/m2	m/s	W/m2
1—	< 3.5	< 50	< 4.5	< 100	>5.0	>150	<5.5	<200	<7.0	<400
2 —	4.5	100	5.5	100	6.0	250	7.0	400	8.5	700
3 —	5.0	150	6.5	200	7.0	400	8.0	600	10.0	1200
4 —	6.0	250	7.5	300	8.5	700	9.0	800	11.5	1800
5 6—	>6.0	>250	>7.5	>500	>8.5	>700	>9.0	>800	>11.5	1800

Table 3-1 Wind resources at 50 m level by classes for different topographic conditions.

3.5 Addressing issues of intermittency

Renewable energy resources (wind, solar) are referred to as intermittent because they are subject to interruption or periodic stopping. They deliver mainly energy with limited capacity (UNDP, 2000). A second characteristic of these resources is their variability; there is a lack of uniformity in their supply. A third is related with supply and demand relationship. Once there is a demand, the supply side cannot store its output. Demand has to be met in real time. A shortage of generating capacity due to a low availability of the resource could cause unreliable operation in energy systems without the means of storage. Systems with hydro plant on them are, however, an exception; the energy from wind can be used to reduce the drawdown of hydro, providing what is in effect a means of storage. That hydro electric turbines can respond rapidly to changes in demand and supply situations (i.e. they have good dynamic response characteristics) also makes them suitable for managing systems with intermittent resources such as wind.

3.5.1 Variability

Utilities still disagree as to whether the high variability of the wind power output is a problem for the grid system if wind power is added to it. (Krau, 2002), and the nature of renewable energy resources, its variability and availability, are major obstacles for their acceptance. In a detailed study, Grubb (1991) showed that the drawbacks when renewable are connected to big power systems are much less than in small systems. He

showed that very large capacities of renewable energy (RE) could be incorporated into the system without major operational difficulties.

Hydro plants are sometimes described as 'energy limited' plants, in that they can meet MW demands provided the energy is available. (In this sense the electric power generation from RE depends more on the energy available than on the installed capacity.) Conventional thermal plants in contrast are not energy limited and can deliver power up to their maximum capacity. Wind is also limited in its capacity to meet peak demands, and there are times, at high levels of installation when it will be providing more power and energy than is needed by a grid, and at other times less.

Wind power is becoming more important because of its potential strategic and environmental contribution, clarifying the issues related to its integration into the conventional generating system is crucial. It is recognised that storage would benefit renewable energies but the extent to which it would benefit needs to be analysed. The consequences of RE power's insertion into the power system are being studied based on operational experience by several countries such as Germany and Denmark (which is linked to the Norwegian hydro system through interconnection) (Sorensen, 1999). Wind and hydro are (i) good complements and (ii) the hydro system offers a means of storage.

In Brazil, the complementarity between hydro and wind has been identified (Bittencourt, 1999) (Amarante, 2001) and there is also a good match between demand and average wind energy. In the region, there is a water reservoir from a hydro power plant, which

can accommodate seasonal variations in wind energy. All these facts together add to the opportunity of using and integrating wind energy to the conventional system.

3.5.2 *T he combination of wind & hydro to tackle Intermittency*

The consequences of intermittency to the electric transmission grid have been a concern to utilities (Chapman, 1998)due to the wind resources being remote from the load centres, as in the UK. In the Northeast of Brazil the additional transmission requirements required to bring wind energy onto the system would not be so demanding in the immediate future due the fact that the best wind resources are in areas close to the main load centres. In addition, because it has a large-scale hydropower system with a high capacity storage reservoir, with multi-annual capacity, the region has positive characteristics for the integration of wind power into the conventional system. Although the region has the highest energy potential of solar power in the country for the long term, wind has been chosen for the short term due to its advanced development stage and possibilities of application in the short term. This is mainly due to its lower costs, when compared to solar, which makes wind more likely to attract investments, in the medium term.

The adoption of wind power plants will allow optimal energy use determined by the conditions of the system comparing the costs of the stored energy with different wind contributions of present and future electricity supply costs. Wind power would operate at the top of the merit order. Demand upon the hydro power plants in the system would

be reduced and wind would be considered by the ISO as a negative load. Fluctuations in wind profiles for large numbers of coupled turbines, are not dissimilar to the hourly fluctuations of electricity demand, so this new negative load would not in principle present difficulties to be dealt with by the system's operator at least with respect to hydro systems. Considering that wind power plants will be dispersed, the variation of the output would be much less than that of a single plant and so its effects on the stability of the system will be minimized (Persaud, 2003). Usually RE are considered as negative load this way a lower net load has to be met by thermal plants and their use will allow greater flexibility in the operation of the reservoirs allowing a higher control of the draw down. It is known (Grubb, 1991) that varied energy sources are more suitable for large power systems, which is the case in the Northeast Brazil situation being studied. The number of wind plants necessary would result in a widespread area for the installation sites and this would smooth the variability of the power output, improve predictability and reduce zero power output times. Since hydro plants respond quickly to load variations, the difficulties of integration of wind resources into this type of base generation would be greatly reduced. Therefore the fluctuations would be a result of the combination wind (negative load) with demand (system load) and storage would benefit the whole system. The stored power would stem from cheap electricity and the losses associated with the storage, in this case evaporation, would be minimal since there are no energy conversion penalties[11] from power to storage and vice-versa, which occurs in other types of storage.

[11] Energy storage is achieved by deferring the use of the stored water. So there is no conversion of one from of energy to another and then back again.

3.5.3 Reliability

According to experience in other countries (Persaud, 2003) a small share of participation of wind in the generation mix can be accommodated on grid systems. This can be done with little impact on system operation and reliability; the additional fluctuations arising from wind are substantially less than those of hour-to-hour fluctuations in demand, and at low penetrations (up to around 10-20% of electricity supplies) wind can be considered as a negative load (Grubb, 1991).

On hydro systems, augmenting the capacity of wind power may raise the quantity of water that can be left in hydro storage; and, as in Brazil, the storage already exists this is a straightforward way of adding value to the hydro power system. These benefits will be quantified from the results obtained from the model developed in this thesis. The amount of thermal capacity needed will be influenced by several factors: the wind energy available during peak time; the extra water in storage due to the contribution of wind power to supplies during base load periods; the (extra) hydro power available during peak times; and the limits of the transmission system at those times. The availability of wind during peak periods will therefore increase the reliability and economic performance of the system. Even for all thermal systems, without the added options that hydro power can provide, Grubb (1991) argued that the Wind Power Plants would reduce the overall risk of failure, in some circumstances:

> "It can be shown that when capacity of any independent source is small relative to the rest of the system its capacity value is independent of its actual reliability, and

equals that of a completely reliable generating plant generating at the same average power at times when the system could be at risk."

In Brazil, there is yet another potential benefit, since wind speeds are higher during the months in which the river flows are at their lowest, which will contribute to a better value attributable to wind power and increased availability of conventional plants. Wind data for the northeast of Brazil has been characterised and its complementarity with hydro inflow of the Sao Francisco River confirmed. In Figure 3-8 the complementarity between wind and hydro can be seen from the calculations of wind power in the region and water inflows of the SF. The wind power calculation will be detailed in Chapter 6.

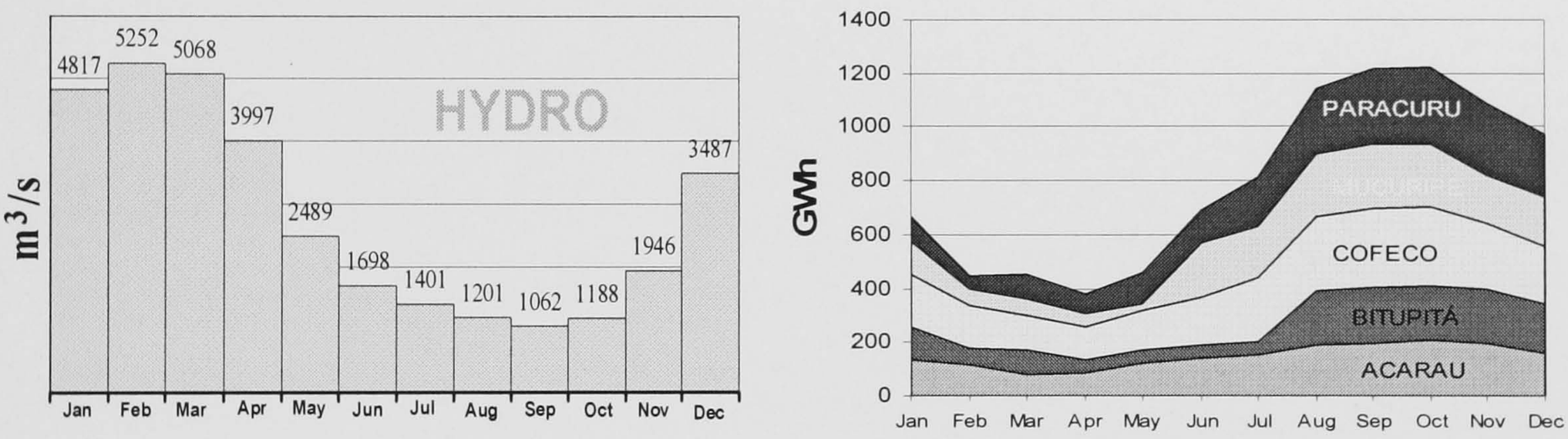


Figure 3-8 Hydro Inflow and calculated wind power for NE Brazil.

Finally, with wind on the system, it is possible to use higher outflow rates – power rates – on the hydro plant by adding more penstocks and turbines to the system. This enables the hydro plant to produce higher power outputs while leaving the total annual energy output *approximately* unchanged. The energy output of the hydro schemes may be reduced somewhat by higher evaporation losses due to larger average lake levels and surface areas; on the other hand, more rapid drawdown in the wet seasons could lead to lower losses from spillage years of high rainfall; both factors can be allowed for in the

model derived in Chapters 8 and 9. Overall, however, there would be an increase of peak capacity (MW) availability while having approximately the same energy (GWh) generated by the hydro plants, and in this sense too the value of hydro power can be improved by having wind energy on the system.

CHAPTER FOUR

4 Theoretical Background

4.1 Hydrothermal Operating System

The operational planning of the Brazilian Electric Power System is divided by time into different expansion phases: system expansion planning over five years, operation planning, one to five years, and the monthly and short term (weekly) planning of dispatch (Aquino, 2001). The stochastic behaviour of the water inflow in this type of base load system is its most salient characteristic. Generation planning is approached in different ways depending on the time frame being considered. In long term planning, the seasonal and yearly patterns of water inflow are completely unforeseeable and it is necessary to generate synthetic inflow values to calculate probabilistic values for generation, deficit, and other variables relevant to the study. For mid and short terms, predicted values of inflow can be used: in a medium term study, different scenarios must be used to carry out the energy planning. In order to carry out the financial analysis of the investment, it is important to consider the random characteristic of the water inflow.

The planning of operation of hydrothermal systems is used to establish how to meet the market demand for electric power for a given time frame. It aims to determine how much each power plant must generate to meet the energy market demand and, if the demand is not met, what power deficit may result. Therefore, it must also determine

how the reservoirs are going to be operated i.e., initial and final storage volume and outflow resulting from the hydro power generated and water spillage, in such a way that the operation restrictions are fulfilled.

In order to make the best use of the available resources and to provide electric power of highest quality, it is necessary to use optimisation techniques for the electric and energy operation (Aquino, 2001). The criteria 'merit order' of operation is one in which the plants with lowest operation costs are used as much as possible, while those with higher costs contribute gradually as the plants with lower costs reach their full capacity, from base load to peak plants. Due to the limitation in the water stock, hydro power plants cannot operate at their maximum power all the time. As the operating costs of conventional thermal plants, which usually complement the power needed by the system, are much higher than those of hydro power plants, a careful schedule for the operation of each hydro plant taking into account inflow and storage levels is necessary to use the minimum amount of thermal electricity possible. This is done taking into account the need to store energy for the dry season and for peak periods.

The addition of wind power to the existing system requires knowledge of its influence on the operation and costs of the system. It is expected to bring more flexibility to the existing system. This motivates us to investigate a model which will use hydro thermal plants, in the case of the Northeast of Brazil, and Wind Power Plants.

4.1 The wind power contribution

The total wind power contribution to the electric power system is estimated based on several wind power plants, with a total number of wind turbines z resulting in a total rated power N_{wpt}, (Kaldelis et al, 2001a):

$$N_{WP(t)} = \sum_{j=1}^{z} A_j N_j \qquad (4\text{-}1)$$

where N_{wp_t} is the effective power obtained by the sum of power produced by the individual wind turbines in the period t considered and Aj is the technical availability of each machine[12]. The total wind power and hydro power output will ensure energy autonomy as defined by the Brazilian Electric Power System Operator (ONS, 2002) for that region. The installed hydroelectric power should be able to meet the grid electric power demand N_{peak} and the combination hydro electric and wind power should supply the electricity consumption for a given year E_{annual} taking into account the incremental power and energy for that year (Kaldelis et al, 2001b), expressed by:

$$N_{wp} + N_{hp} \geq (N_{peak} + \delta\ N) \qquad (4\text{-}2)$$

With the addition of thermal capacities the equations (2) would be changed to

$$N_{wp}(t) + N_{hp}(t) \geq (N_{peak}(t) + \delta N(t)) \qquad (4\text{-}3)$$

$$Eh_{annual} + Ew_{annual} \geq E_{annual} \qquad (4\text{-}4)$$

---

[12] The time subscript to Nj has been omitted to simplify the notation.

where:

δN is the incremental Power

N_{wp} denotes the power produced by the installed wind power plants at time t

N_{hp} denotes the power produced by the installed hydro electric plants at time t

Eh_{annual} denotes the energy produced by hydro power plants

Ew_{annual} denotes the energy produced by wind power plants

The share of the demand to be met by wind would be expressed as:

$$N_{wp_{eff}} = N_{wp} \times CF \qquad (4\text{-}5)$$

where

$N_{wp_{eff}}$ is the effective power and N_{wp} is the installed power

$$N_{wp} = \frac{N_{wp_{eff}}}{CF} \qquad (4\text{-}6)$$

Hence

$$N_{wp} \geq \left(\frac{Ew_{annual} + \delta E_w}{8760.CF} \right) \qquad (4\text{-}7)$$

where δE is the incremental energy and CF is the capacity factor of the wind plant.

4.2 The Hydro Plant

An equivalent power plant is represented in the model using Sobradinho reservoir for simplification. The water volume, inflow and outflow of the lake are used with the accumulated productivity of the hydro power system.

An outline of the model is provided in Figure 4-1. The relationships between the load and the different generation sources are presented. Wind power is used to supply part of the energy needed, thermal power is necessary for backup and hydro inflow has several uses: electric power production, storage of energy and where it is referred as other, navigation and fisheries. The symbols used are: TEP (thermal electric power conversion), WEP (wind electricity generated), HEP (hydroelectric power), ES (energy storage) and other (other uses of the water). The load graph represents two variables: peak power (MWh/H) and average energy consumption (MWh).

The model uses as input the total load of the Brazilian Northeastern electric grid, electric power generated from hydro power plants derived from water natural inflow and wind power produced obtained from wind speed data. This is done at every discrete time unit (t) (e.g. one month of the year).

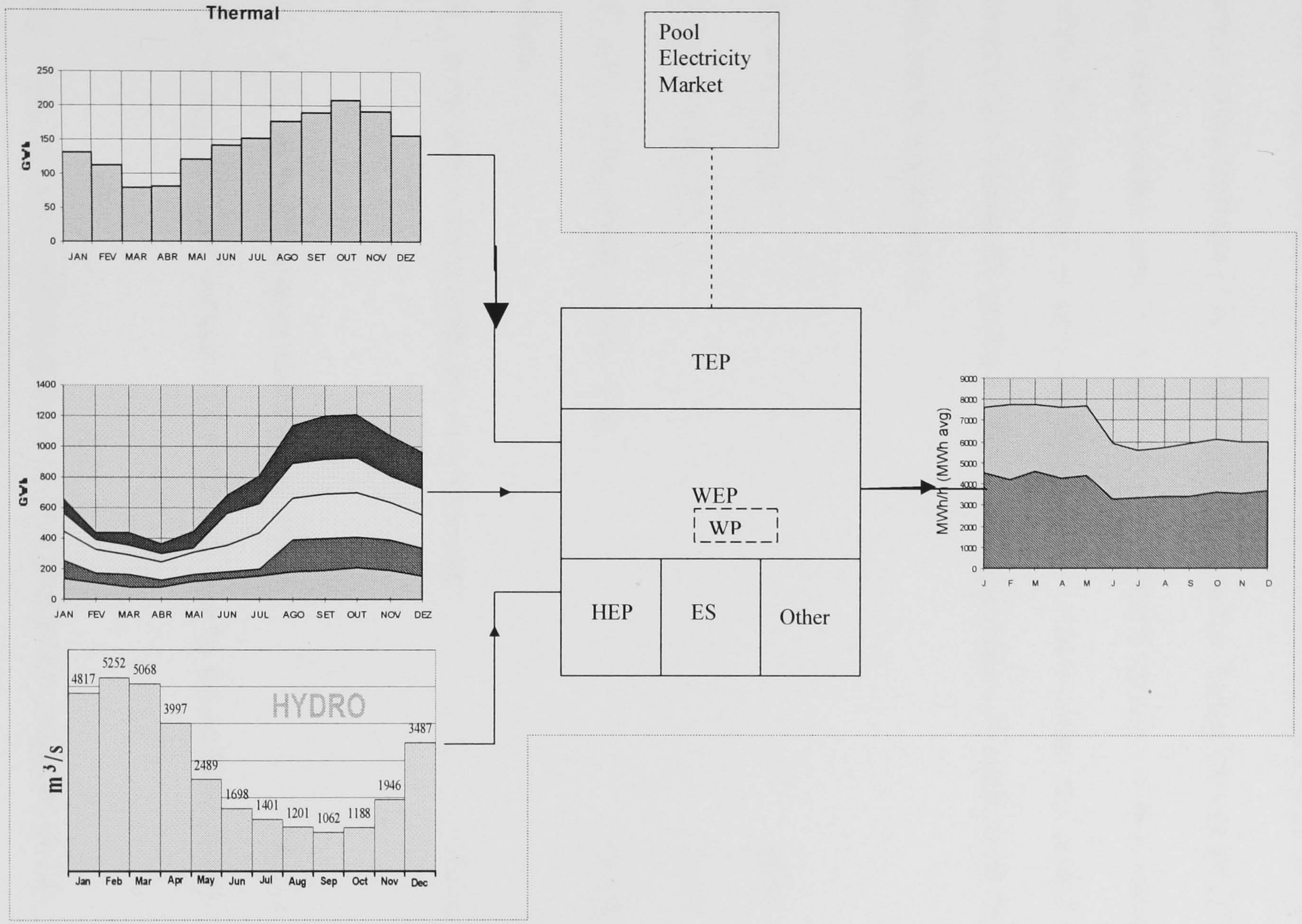


Figure 4-1. Schematic presentation of the intended model

The basic hydro characteristics taken into account by the model are: maximum capacity, maximum water level and minimum water level. The model calculates the volume of water in the reservoir which is equal to the volume in the period t-1 (V_{t-1}), plus the water inflow during t (Vin) minus the consumption during the period t ($Vout$), minus the water volume used for irrigation ($Virr$) in the period t, minus the spillover (Vsp, when this happens) in period t. Once the Vt is determined the model calculates the evaporation during the period t ($Vevp$) and recalculates Vt subtracting the evaporation, this can be expressed by:

$$Vf_t = V_t - Vevp_t \qquad (4\text{-}8)$$

$$Vevp_t = f(V_{t-1}, V_t) \qquad (4\text{-}9)$$

$$V_t = V_{t-1} + Vin_t - Vout_t - Virr_t - \mathrm{Vsp_t} \qquad (4\text{-}10)$$

where

V_{t-1} is the lake volume in the previous time step (4-11)

$V_{in_t} = \int q_{in_t} dt$ is the volume added by the inflow (4-12)

$V_{out_t} = \int q_{out_t} dt$ is the volume reduction of the lake by the outflow (4-13)

$V_{irr_t} = \int q_{irr_t} dt$ is the volume reduction of the lake by the irrigation (4-14)

$V_{sp_t} = \int q_{sp_t} dt$ is the volume reduction of the lake by the spillage (4-15)

Note that evaporation has to be calculated through a separate iteration since it is a function of the area of the water surface and meteorological conditions; thus we need an initial estimate of volume in storage and of the associated surface area of the lakes before an estimate of evaporation can be made, which in turn leads to a revision to the estimated volume in storage. (In this model, the reservoirs' monthly values of evaporation per area will be used to define water losses in this process; since the water surface is associated with the volume, the total area of each reservoir is obtained as a function of the volume.) The evaporation rate is strongly dependent on the average monthly temperature (Correia, 2002); there is also a very small effect of *local* precipitation on lake levels, which are considered to be included implicitly in the water inflow data. The meteorological conditions are considered to a certain extent indirectly since evaporation rates in fact are linked to the time of the year; evaporation rates are lower in the winter than in summer when temperatures are higher. In this way, the meteorological conditions are reflected in the somewhat time dependent relationship between the reservoir surface area and evaporation. Figure 4.2 summarises the basic relationships discussed above:

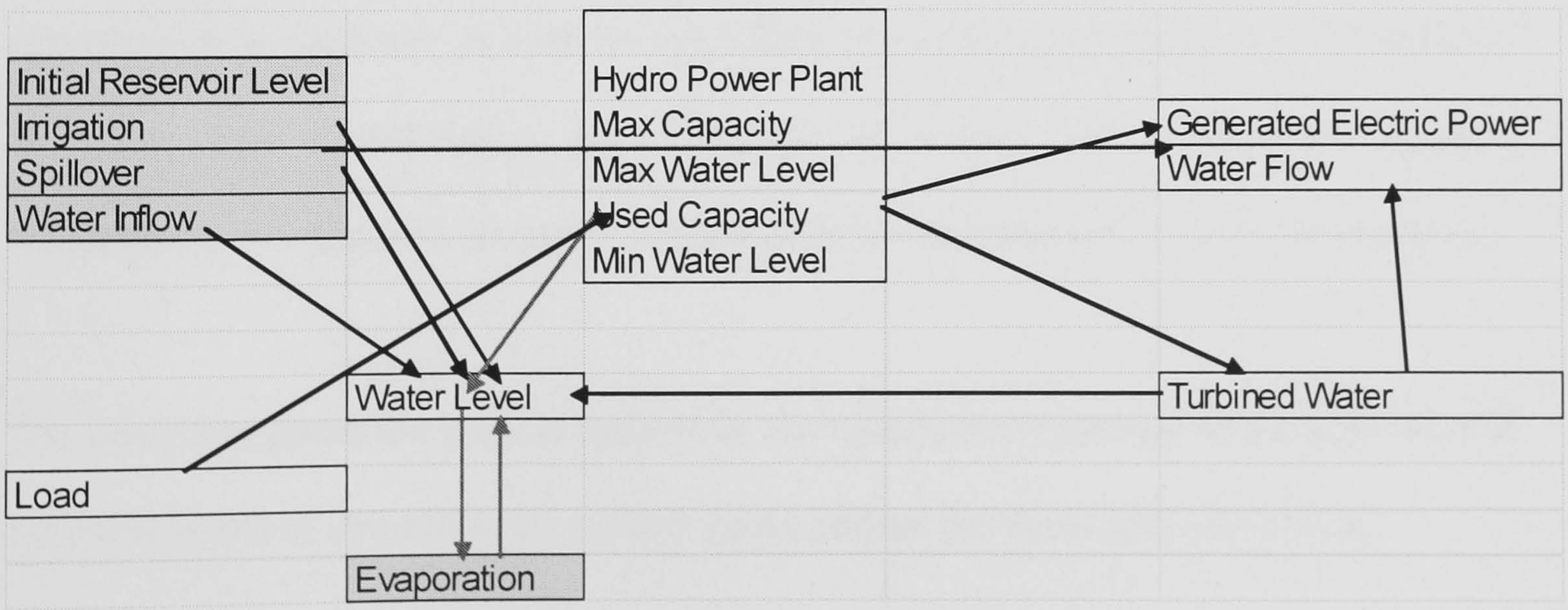


Figure 4-2. Model of the hydro Power Plant

Safety constraints. Outflows must be monitored to guarantee a safe operation of the system (Rozakis et al, 1997) V_t must be less than the reservoir nominal maximum capacity V_{max} and higher than the a safe minimum operation volume V_{min} .

The maximum level of a hydro power plant is defined with relation to the safe operation of the dam. The reservoirs of the hydroelectric power system are spread over a considerable geographic region and in most of these hydrographical basins, there have been considerable socio economic occupation after the construction of the plants. The deployment of the reservoir has provided reasonable regulation absorbing low scale flooding, avoiding this way impact downstream of the dam (ONS, 2004). Consequently areas which were frequently flooded were protected and could be used, although still subject to determined risk.

The resolution number 420 of ANEEL date 31 October 2000 regulates the elaboration of an annual plan for preventing flooding.

So the maximum level of water of a hydro electric power plant is defined by the safe operation of the reservoir. It must be considered that water cannot spill over the dam and be taken into consideration the formation of waves and exceptional flooding downstream. For that aim an empty volume must be maintained as a flood control pool.

The minimum operation level is defined by the operation conditions of the turbines. For very low levels of operation, the turbine could present problems like cavitations.

Another problem, which must be avoided, is the transport of solid particulates (sediments) to the interior of the turbine. This could happen if the water level were too low. So a minimum volume (level) must be observed. This is the dead storage and it is dimensioned taking into account that for a 100 years lifespan the sediments should not be carried to the lower rim of the intake.

Both values, safety and nominal capacity, are defined in the project of the power plant.

These conditions[13] can be represented by the equation (see Figure 4-3):

$$V_{\min} \geq V_t \geq V_{\max} \qquad (4\text{-}16)$$

The outflow is constrained by the safety volume according to the expression:

$$V_{out_t} \leq V_{t-1} - V_{\min} + V_{in_t} - V_{evp_t} - V_{irr\,t} \qquad (4\text{-}17) \text{ (for low levels of the reservoir)}$$

These volumes are defined in equations (4-11) to (4-15).

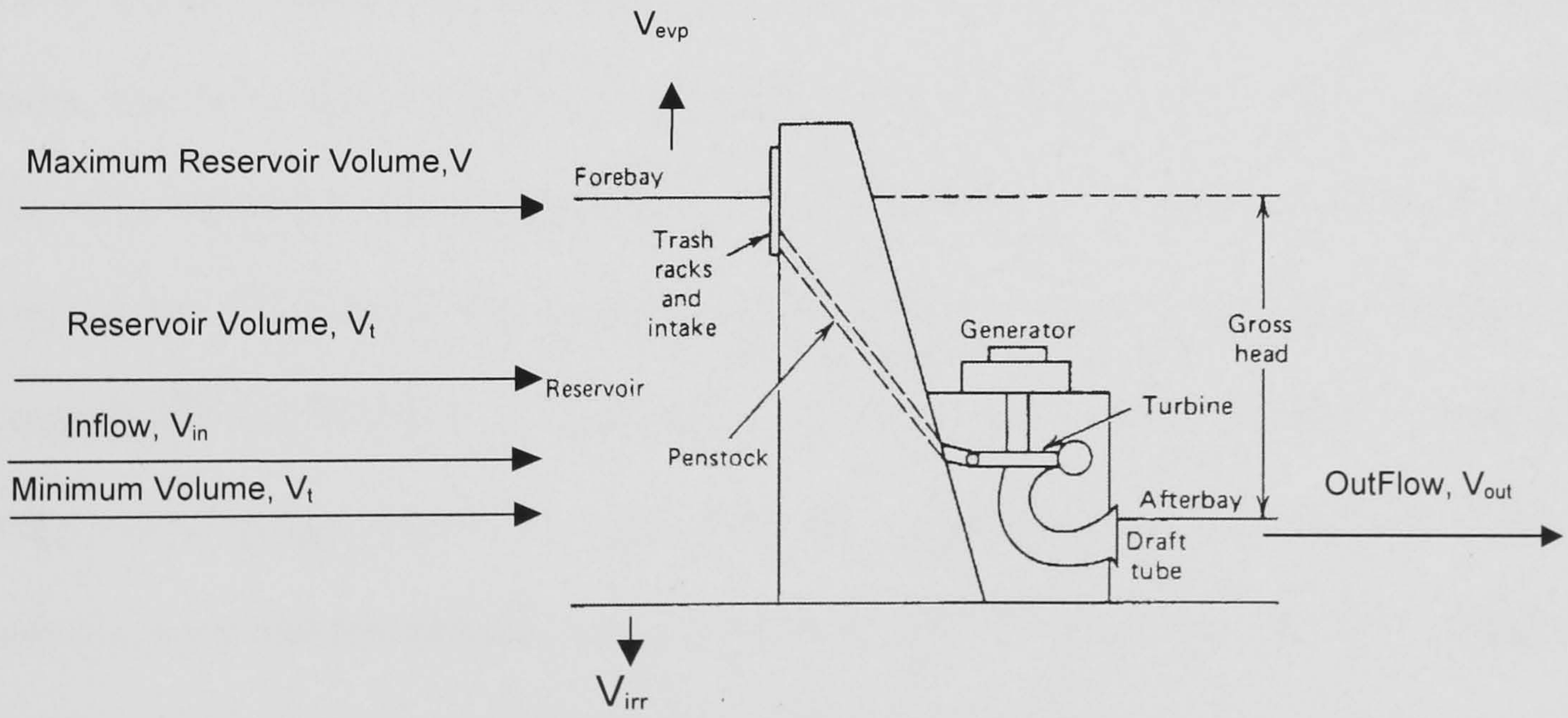


Figure 4-3 Water inflow and outflow from the Hydro Power Plant

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[13] The maximum and minimum volume used were supplied by the CHESF, no attempt has been made to simulate the flood control. There is a specific model for this aim in the electric power sector.

This can be described as the stored water, which must have a minimum water level recommended for the safe operation of the plant, plus the incremental volume in the period *t* less the "water losses" using electricity as the reference.

4.3 The Inflow Data

In Figure 3.1, the inflow data form the São Francisco River was shown from 1931 to 1998. It has been seen that there is considerable fluctuation for different years and for different months in the same year. A common pattern is noted in which, during the months of February, March and April, the availability of water is higher and in September, August and October it is lower. The seasonal behaviour of the inflow indicates the potential benefits of a means, which allows a greater flexibility of the management of the reservoirs on ce wind power generation is incorporated into the system. *Firstly*, reduced electric power generation by the hydro plants during the driest months, due to a better availability of wind, would increase water saving and would allow more versatility for the decisions on the operation of the system. *Secondly*, wind energy in the wet season will allow more hydro energy to be left in storage for the dry season. In the wetter years, on the other hand, this could lead to spillage. However, *thirdly*, such spillage could be reduced by the installation of extra turbines on the reservoirs, such that the spillage would be avoided and the peak power capacity rating of the hydro plant increased (some provision for this possibility was made in the design of the reservoirs).

4.4 Dispatch hydro thermal with wind power plants

The modelled solution will be made using an algorithm that will be detailed in the next chapter. The configuration is initially defined as it stands in the real system. As the load is forecasted to increase, capacity will be added to the system. Thermal power is added as a back up to both hydro and wind. Wind will be added in 600 MW power plants[14]. This operation is made attempting to meet the demand for electric power, evaluating the deficit when it occurs and seeking alternatives to avoid it. This is shown schematically on Figure 4-2. The dispatch is determined through a heuristic function defining when more hydro electricity should be used as the reservoir levels vary and the inflows increases.

Hydro power plants supply part of the electric power market, another share is supplied by thermal plants and wind power contributes in the electric power supply as well.

Chapter 8 details the procedures and variables used to carry out the dispatch of the hydrothermal power system with and without wind power plants integrated into the system.

4.5 Conceptual framework

The model will provide results to compare the results between wind power utilization in the NE Br region and no wind option (i.e. conventional thermal). The plants will be

[14] Calculation for wind power generated are detailed in chapter 6, it has been considered that those plants will enter into the electric power system gradually.

located at sites where the wind characteristics for electric power generation are best. optimising the performance of the wind power generating systems.

The analysis utilising this model will indicate the impacts of wind utilization on the security of the system. The investment and operation costs involved from which the cost of electric power production can be derived will lead to the calculation of the average energy costs in both situations. Wind power will be gradually inserted in the system, thermal power will be used as backup and the new costs calculated. After all costs are calculated, it is possible to determine the impacts on energy cost for different contributions of hydro, wind, and thermal. The model will dispatch the system using a heuristic function, which will be based on the level of the reservoir and average monthly inflows to make the decision on the contribution of the different sources in order to meet the demand. From these decision will derive the electricity production costs considering the mixture Wind, Hydro and Thermal power plants.

The sum of capital and operating costs over a defined period can be calculated using the equation below, as suggested by Anderson (1977), for a hydro-thermal system

$$\sum_{v=1}^{T}\sum_{j=1}^{J} C_{jv}.X_{jv} + \int_{=0}^{T}\sum_{v=-V}^{t}\sum_{j=1}^{J} F_{jv}(t).U_{jv}(t).dt \qquad (4\text{-}18)$$

where

C_{jv} are capital costs per unity capacity of plant j, vintage v.

Xjv are capacity of plant j ,vintage v

$F_{jv}(t)$ are the discounted operating costs for each unit of energy output

$U_{jv}(t)$ Power output of the plant at any instant *t*.

the objective is to minimize the sum of capital and operating costs over some time period 0 to T.

The objective function is to minimize these costs meeting the customers need as denoted in equation below, i.e. meeting the demand for electric power adding wind capacity to the system. A capacity variable X will be used in a simulation model developed, with the Xs defined exogenously through scenario analysis.

$$\min \sum_{v=1}^{T}\sum_{j=1}^{J} C_{jv}.X_{jv} + \int_{=0}^{T}\sum_{v=-V}^{t}\sum_{j=1}^{J} F_{jv}(t).U_{jv}(t).dt \qquad \text{(4-19) or, in more detail}$$

$$\min[\sum_{v=1}^{T}\sum_{j=1}^{J} C_{jvh}.X_{jvh} + \int_{=0}^{T}\sum_{v=-V}^{t}\sum_{j=1}^{J} F_{jvh}(t).U_{jvh}(t).dt + \sum_{v=1}^{T}\sum_{j=1}^{J} C_{jvt}.X_{jvq} + \int_{=0}^{T}\sum_{v=-V}^{t}\sum_{j=1}^{J} F_{jvq}(t).U_{jvq}(t).dt +$$

$$\sum_{v=1}^{T}\sum_{j=1}^{J} C_{jvw}.X_{jvw} + \int_{=0}^{T}\sum_{v=-V}^{t}\sum_{j=1}^{J} F_{jvw}(t).U_{jvw}(t).dt] \quad \text{(4-20)}$$

Where h, q and w denotes hydro, thermal and wind power respectively.

This is the standard approach for optimum dispatch of energy systems. It assumes, however, a higher degree of predictability than is the case for wind-hydro systems, and some modifications of the approach are needed when the various energy supplies are highly stochastic, as in the present case. As noted, in this thesis I have used a heuristic function, described in chapter 8, for permissible hydro use according to the level of water in the reservoir.

4.6 Hydro Balance Equation

The hydro balance establishes the relationship between inflows, outflows and stored water volume in the reservoir. The hydraulic state plays a major role when the problem

for the hydro power system has to be solved. The hydro power plants must be operated in such a way that each hydrographical basin has its hydro balance equation satisfied. These balances can be represented by the equation

$$V_{j,t} = V_{j,t-1} + Vin_{j,t} - (Vtur_{j,t} + Vsp_{j,t}) - (Virr_{j,t} + Vtrp_{j,t} + Vevp_{j,t}) + \sum_{HPU} (Vtur_{k,t} + Vsp_{k,t})$$

(4-21)

where:

$V_{j,t}$ denotes volume of reservoir j in time t.

$Vin_{j,t}$ denotes natural inflow to the reservoir j in time t.

$Vtur_{j,t}$ denotes turbine flow in reservoir j in time t.

$Vsp_{j,t}$ flow of spillway in reservoir j in time t.

$\sum_{HPU}$ summation of hydro power units downstream the reservoir j .

$Virr_{j,t}$ volume of water used for irrigation from reservoir j in time t.

$Vtrp_{j,t}$ volume of water used for transposition from reservoir j in time t..

$Vevp_{j,t}$ volume of water evaporated from reservoir j in time t.

The border of the main lake, Sobradinho, has been extensively developed for agriculture, especially for exportation. Therefore, part of the water is used for irrigation in the neighbouring area. The limits of the water flow entering the turbines, and initial and final volumes also must be considered (see chapter 3). The final volumes or reservoirs levels are used in the operation planning and will depend on the planning horizon case. Taking into account the constraints presented in equation 4-9 for

maximum and minimum volumes. Another option is to utilise a function of the future costs and decide which cost is aimed at planning the system to operate as close as possible to this cost. In this case, the stochastic nature of the inflow is taken into consideration with different alternatives (hydrologic scenarios). In this methodology, the function of future costs is disaggregated for the equivalent system reservoir. As a function of these costs, the contribution of each reservoir is considered. The dispatch decisions are the base for the expected value of future costs of operation (CEPEL, 2004).

Figure 4-4 shows the equation of the hydro balance representing the behaviour of the inflow with two hydro power plants in cascade j and k. Where k is the index for the dam upstream "j" reservoir and the latter being the reservoir under analysis.

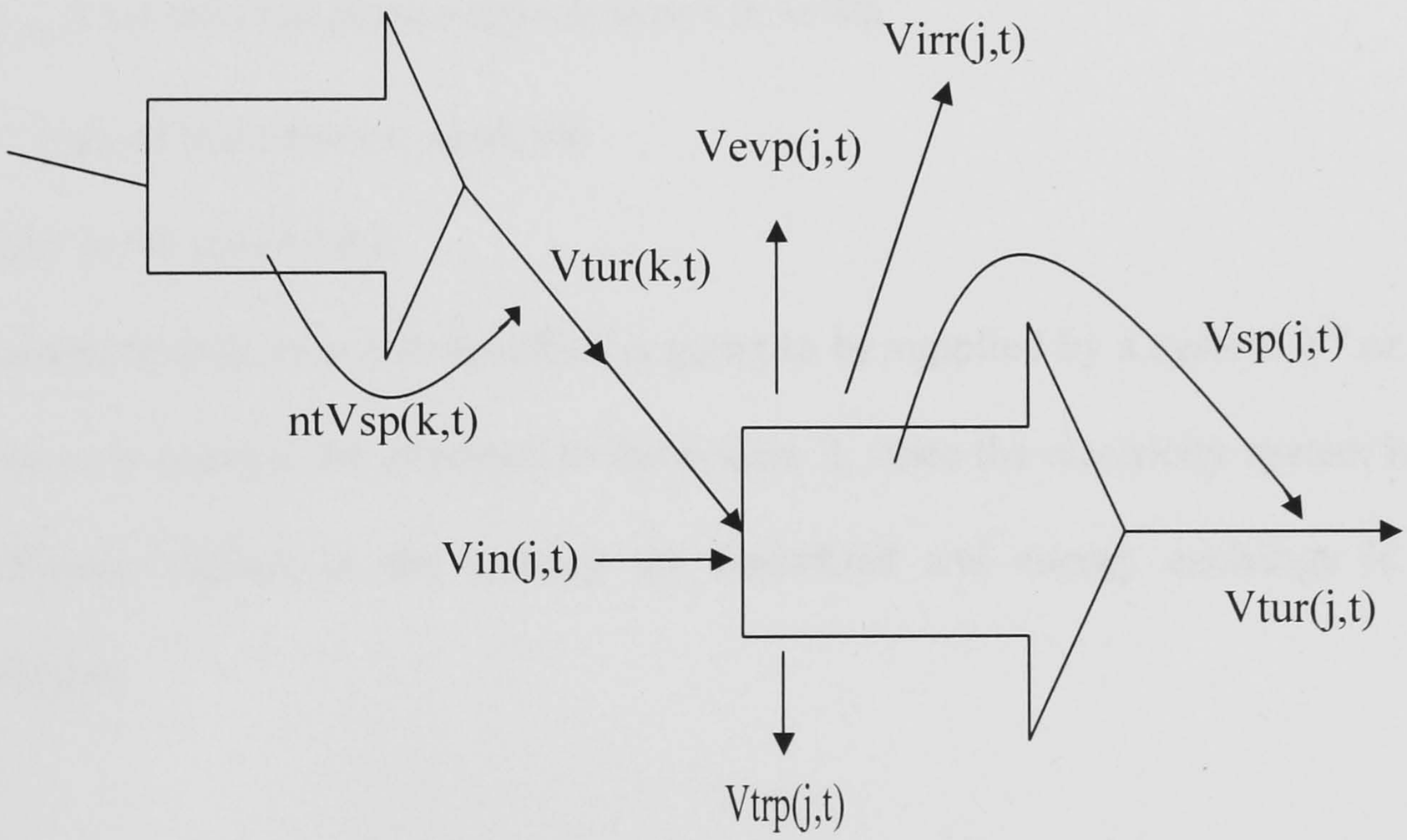


Figure 4-4 Representation of the hydro balance equation

4.7 Energy Balance

The energy balance defines the way the load demand should be met. The electric power is supplied with different contributions from hydro electric power generation, thermal power generation and wind power generation. If the load is not fully met there will be a deficit. The equation of energy balance for the system can be represented by

$$\sum_{j=1}^{J}\sum_{v=-V}^{t} U_{jtvp}(t) + DEF_1(t) - EXP_{12}(t) + EXP_{21}(t) = Q_1(t) \qquad (4\text{-}22)$$

where

$U_{jtvp}(t)$ is the total plant output in time t in MWh

j = type of plant hydro, wind, etc

$Q_1(t)$ is the load MWh

Assuming that an eventual deficit is going to be supplied by a system 2[15] or an eventual excess is going to be exported to the system 2, since the electricity system is integrated, different regions in the country are connected and energy exchange is a common practice.

As three different generating plants are being used, the equation can be expanded by type of generation: in this case Hydro (h), Wind (w) and Thermal (u).

[15] In Brazil the regional electric power systems are interconnected. In this work NE is considered as an independent system.

$$\sum_{t=1}^{T}\sum_{v=-V}^{t} F_{jvh}(t).U_{jvh} + \sum_{t=1}^{T}\sum_{v=-V}^{t} F_{jvw}(t).U_{jvw} + \sum_{t=1}^{T}\sum_{v=-V}^{t} F_{jvu}(t).U_{jvu} + DEF_1(t) - EXP_{12}(t) + EXP_{21}(t) = Q_1(t)$$

(4-23)

where

h denotes the index for power produced by hydro plants

w denotes the index for power produced by wind plants

u denotes the index for power produced by thermal plants

DEF denotes deficit of the system

EXP is the energy purchase from other system (4-23) or sale to other system (4-22).

In the equation (4-23) the thermal generation limits and the energy flux limits must be considered. On the above equation one can see that there are two main sets of restrictions to solve the problem; the hydro demand to be met and the energy demand to be met.

4.8 The Power Demand

To determine the operating conditions and optimum operating schedules some conditions need to be met. First, the total capacity of all plants operating at all times needs to be sufficient to meet the instantaneous power demand.

$$\sum_{J=1}^{J}\sum_{v=-V}^{t} V_{jvt} \geq E_t \quad (t=1,\ldots,T) \qquad (4\text{-}24)$$

where E_t denotes the power demand (MW)

Second, individual plants cannot operate above their rated capacity:

$$0 \leq V_{jvt} \leq a_{jv}.X_{jv} \quad (j=1,\ldots,J;\ v=-V,\ldots,t;\ t=1,\ldots,T)$$

where a_{jv} is the availability of the plant j, vintage v.

Third, constraints in operation of the hydro plant shall be considered (see figure 9). The electricity to be generated by the hydro plant in a season is limited to the amount of water available for electricity generation. In many cases, the river water has multiple uses such as irrigation, fisheries and navigation. Regulation of the river to prevent flooding is another factor, which imposes careful management of the water inflow. Droughts limit the availability of water and consequently of energy for that season. For a hydro-based system, which will be the first alternative to be applied in the model, the hydro operation is carried out as base load generation. That means that other types of generation for instance, thermal power plants will be operated at times of peak demand. To take into account these constraints, the hydroelectric energy H_{vs} to be delivered in a season s by the hydro scheme vintage v, will be controlled by decision variables. The decision variable for hydro operation $U_{jv(t)}$ $(j = hydro = h)$ will be chosen through the heuristic function referred to in section 4.5.

$$\int_{season_s} U_{hv}(t).dt = H_{vs} \qquad (4\text{-}25)$$

4.9 Electric Power Generated

The expression below defines the electric power produced by a hydro plant. The efficiency of the generator varies with the power output (see Figure 4-3).

$$E = 9.81 \times \eta T \times \eta G \times H \times Q \times 10^{-3} MW \qquad (4\text{-}26)$$

where

9.81 - gravitational constant, **m/s²**

E-Electric Power Produced

ηT- Turbine efficiency

ηG- Generator efficiency

H-Head

Q` - water flow rate, m^3/s

In the expression

$$R = 9.81 \times \eta T \times \eta G \times H \times 10^{-3} MW / m^3 / s$$

R is denominated productivity coefficient and relates the amount of power that can be produced by a hydro power plant when one cubic metre of water drives the turbines for one second. It can be used for a hydro power plant or, for a group of power plants in the same river. This approach is referred to as the equivalent power plant. Hence the expression for hydro electric power produced would be obtained multiplying the turbine flow *Qtur(j,t)* by the productivity of the power plant *r(i)* during the time *t*.

$$Eh(j,t) = r(j) * Qtur(j,t) \qquad (4\text{-}27)$$

R(j) - is productivity at plant j, $MW/m^3/s$

Qtu(j,t) - flow rate in time t, m^3/s

As the hydro turbine efficiency varies with the head and with the turbine flow, the head varies with the turbine water flow and the generator efficiency varies with the power, this approach would prove very complicated to adopt. To calculate the electric power

produced using instantaneous values would require updating the efficiency for every change in head. This would be a very time consuming process and the benefit aggregated would not justify the extra computing.

One approximation is widely accepted (ANEEL, 2001 and Lino 2001) and used today. Hydropower is calculated by multiplying ***the turbine flow*** by the ***average productivity*** of the power plant during the period *t*.

4.10 Conclusions

This chapter began with a characterization of the system expansion planning and of the generation planning in the Brazilian electric power sector. This is followed by a short explanation about the dispatch strategy used in that sector. Subsequently the broad specification for the tool required to assist in modelling the hydrothermal system with wind generation in NE Brazil. The specification identified the principal structural and physical features that were needed to model such systems following the review of previous models developed for the planning of a system in that electric power sector.

The equations and relationships were gradually refined in the rest of the chapter. From a graphical representation of the system including sources of energy, storage means and loads, the necessary parameters and constraints were identified, described and the main equations presented. This was made with base on the theoretical studies in the literature and review of works presented by modellers responsible for the development of tools in the Brazilian electric power sector in this area of research, operation and planning. The experience of other countries, which was later condensed in a book, was used for adopting equations defining operation costs and constraint analysis of the system.

This chapter aimed to specify mainly the hydro and thermal parameters to be used in the model. Chapter 5 now describes the empirical treatment and characterisation of the hydro data and Chapter 6 or the wind data.

CHAPTER FIVE

5 Empirical TREATMENT OF HYDRO INFLOW DATA

5.1 Introduction

In this section, the basis for the generation of hydro inflow series will be outlined and the methodology detailed. This study analysed observed monthly streamflow data of the Sobradinho reservoir in the São Francisco river for simulation using the Thomas-Fiering stochastic modelling approach (Fiering et al, 1971).; this method of simulation provides a concise way of representing a large number of possible hydro inflow patterns using stochastically generated data suitable for the analysis of h ydro system design and management under any structure under uncertainty. In many hydrologic applications, information based on continuous discharge or flow measurements is the basis of analysis and decision-making. Ultimately, however, design decisions must be based on a stochastic or a combination of stochastic and deterministic models (Yurekli et. al. 2004), which is the purpose of the approach now described. .

5.2 Hydro Inflow Synthetic Series

The design and operation of water resources systems by using streamflow records of appropriate length are made by operational hydrology[16]. When the measured length of

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[16] Fernando Correia, World Bank consultant on hydrology, has guided me through the process of building the synthetic streamflow model presented here.

recorded inflows is not long enough to provide a representative input for analysis, the hydrologist needs to extend the data by using stochastic models to obtain synthetic series. This is done by using simulation models calibrated using the available data parameters. The quality of the synthetic data is a function of the amount of the data available. In this study, monthly streamflow series to the Sobradinho reservoir are generated by the Thomas-Fiering model. The results will be discussed and compared to the actual acquired data.

In the analysis of alternative scenarios and water inflow regimes over a time horizon of 20 years, a large number of randomly chosen time series sets need to be generated both to explore the scenarios and for sensitivity analysis. As the monthly inflow data available (section 3) represents a time series of only 68 years, it is necessary to characterize the series mathematically so as to generate alternative assumptions - sometimes called synthetic values - for the analysis.

In the Thomas-Fiering-Model, a Markov chain generation scheme treats hydrologic series as chains of serially dependent values (Viessman et al 1992). It divides the flows into two parts, the first part being deterministic and the second part probabilistic (Correia 2001) (Draper 2001).

5.3 Monte Carlo methods

Monte Carlo (MC) simulation is a mathematical modelling method, which uses observed parameters of a data series to simulate stochastic processes (Haddon, 2001). There are several MC techniques. The method is called after the city in the Monaco

Principality, because of the roulette, a simple random number generator. The name and the systematic development of Monte Carlo methods date from about 1944. *Here* the technique Markov chain Monte Carlo (MCMC) will be used. Monte Carlo methods started to be used as a research tool in the atomic bomb development during the Second World War. This work involved a direct simulation of the probabilistic problems concerned with random neutron diffusion in fissile material. Monte Carlo models and simulations are computer intensive methods that can be used to test specific hypothesis and to answer less specific "what-if" type questions, including alternative projections or scenarios of the future. Modelling tasks that requires a projection extrapolation of a model's implication into the future is well accomplished applying Monte Carlo simulation techniques. In this chapter we are considering aspects of modelling the river inflows that are required when implementing simulations that include hypothetical or unknown components. Monte Carlo simulations require resampling from statistical distributions. In particular they require resampling with replacement from theoretical probability functions (PDFs). This principle will be used in the approach to generate the synthetic São Francisco River inflows needed to this work.

5.4 Markov Chain

The Markov Chain uses a recursive equation for Q_{i+1}, defined as follows for normal yearly stationary processes:

$$Q_{i+1} = \overline{Q} + \rho\left(Q_i - \overline{Q}\right) + t_i \times \rho\sqrt{\left(1-\rho^2\right)} \qquad \textbf{(5-1)}$$

where:
i year index

Q_{i+1}
generated flow in year i+1

$\overline{Q}$ the mean of observed flows in period $j+1$

ρ linear correlation coefficient between flows j and j+1

t random normal variable with:

mean = 0

standard deviation=1

5.5 Matalas transformed

In order to obtain PDF conveniently closer to normal it is suggested to transform the flows into logarithms. When the modeller uses the Markov generation scheme to produce logarithms of flows he must remember that the procedure reproduces the mean, variance, serial correlation coefficient and skewness coefficient of logs of flows. The serial correlation and skewness coefficient of the flows themselves will not necessarily be preserved. In practice, the resultant distortion may be important and Matalas (1967) has suggested procedures for ensuring that the moments of the flows are maintained.

Matalas assumes that the number α is a lower bound on the possible flow values and that if x denotes a flow then $y = \log(x - \alpha)$ is normally distributed. The parameters of the x are related to the parameters of the y as follows:

$$\mu(x) = \alpha + \exp\left[\sigma^2(y)/2 + \mu(y)\right] \qquad \textbf{(5-2)}$$

$$\sigma^2(x) = \exp\{2[\sigma^2(y) + \mu(y)]\} - \exp[\sigma(y)^2 + 2\mu(y)] \qquad \textbf{(5-3)}$$

$$\gamma(x) = \frac{\exp\left[3\sigma^2(y)\right] - 3\exp\left[\sigma^2(y)\right] + 2}{\left\{\exp\left[\sigma^2(y)\right] - 1\right\}^{3/2}} \qquad \textbf{(5-4)}$$

$$\rho_1 = \frac{\exp\left[\sigma^2(y)\rho_1(y)\right] - 1}{\exp\left[\sigma^2(y)\right] - 1} \qquad \textbf{(5-5)}$$

To preserve the historical statistics of the flows rather than of their logarithms, Matalas suggested calculating the sample statistics $\bar{x}$, $s^2(x)$, and $r_1(x)$ and substituting these values into the four equations above. The equations can then be solved for values of $\mu(x)$, $\sigma^2(y)$, $\rho_1(y)$, and α. These estimates, not the sample statistics of the logarithms of historical flows, are used in the flow generation process to give a series h1 ,h2 , ...of synthetic logarithms of flows. When a series of synthetic flows is formed from

$$q_i = \exp(h_i) + a \qquad \textbf{(5-6)}$$

the flows have expected parameters $\bar{x}$,$\sigma^2(x)$, $g(x)$and $r_1(x)$, as desired.

Finally, it is noted that the Markov models discussed above assume that all time periods, taken here to be years, are characterised by identically distributed flows, the flow in each period have mean μ, the variance σ^2, and serial correlation ρ. For studies that use only annual flows this assumption seems reasonable and can generally be defended unless long-term trends are at work. However, for hydro systems the mean flow for a month or other period during a wet season is substantially different from the mean flow for the same duration in a dry season, so disaggregation into monthly patterns is needed. This section draws extensively on the original work of Fiering and Matalas. which has

been found ideally suited for the purposes of this thesis. In the following text a summary of their approach has been provided, adapted as necessary to the problem of this thesis.

5.6 Generation of Inflow Sequences

The inflow sequences for analysis were generated using a simple lag one monthly autoregressive model (Fiering, 1961)17.Generation of the inflows with a 3-parameter lognormal (LN3) distribution was carried out using (5-1) in association with the moment transformation equations proposed by Matalas (1967), the log-transformed inflow $Y_{i,j}$ being generated and then exponentiated to produce synthetic inflows in the real domain, (5-7) $Y_{i,j}$ is the log-transformed inflow at month j and year *i*.

where:

Q original variable (flow)

a monthly shift parameter for each month.

$$Y_{i,j+1} = \mu_{j+1} + \left(\rho_{j,j+1} + \frac{\sigma_{j+1}}{\sigma_j} \right)\left(Y_{i,j} - \mu_j\right) + t_j \sigma_{j+1} \sqrt{1 - \rho_{j,j+1}^{\ 2}} \qquad (5\text{-}7)$$

Y_{j+1} the generated log-normal flow in month $j+1$

μ_{j+1} the mean of the log-normal flow in month $j+1$

$\rho_{j,j+1}$ the correlation coefficient for log-normal flow in months j and $j+1$

σ_{j+1} the standard deviation of log-normal flow in months j+1[18]

t the normally distributed random number with zero mean and unit variance

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[17] "This section draws extensively on the original work of Fiering and Matalas, which I found ideally suited for the purposes of this thesis. In the following text I have provided a summary of their approach, adapting it as necessary to the problem of this thesis."

[18] j+1 month to be generated, i year to be generated.

$$\mu_x = a + \exp\left[\frac{\sigma_y^2}{2} + \mu_y\right] \qquad (5\text{-}8)$$

$$\sigma_x^2 = \exp\left\{2\left[\sigma_x^2 + \mu_y\right]\right\} - \exp\left[\sigma_y^2 + 2\mu_y\right] \qquad (5\text{-}9)$$

$$\gamma_x = \frac{\exp\left[3\sigma_y^2\right] - 3\exp\left[\sigma_y^2\right] + 2}{\left\{\exp\left[\sigma_y^2\right] - 1\right\}^{3/2}} \qquad (5\text{-}10)$$

$$r_x = \frac{\exp\left[\sigma_y^2\, r_y\right] - 1}{\exp\left[\sigma_y^2\right] - 1} \qquad (5\text{-}11)$$

Procedure:

Calculate

μ_x

σ_x

γ_x

r_x

With data from the original observed flow

Calculate using Newton-Raphson: $\mu(q)\ \sigma(q)\ \rho\ (q)$

Note:

-Calculate initially $\sigma(q)$ in equation (5-10)

-Substitute $\sigma(q)$ in equation (5-9) and calculate $\mu(q)$

-Substitute $\sigma(q)$ and $\mu(q)$ in equation (5-8) and calculate "a"

-Substitute $\sigma(q)$ in equation (5-11) and calculate $\rho\ (q)$

To generate the synthetic values

Matalas transformed assure reproduction of mean, standard deviation, skewness and coefficient of linear correlation of the original data for all months.

- Initially calculate an initial value for December of the previous year. It can be the mean of Q_{12}.

Calculate $Q_{\phi 12} = \log\left(\overline{Q}_{12} - a_{12}\right)$ **(5-12)**

Generate $t_{1,1}$ for January of the first year to be generated (produce 12 uniform numbers from 0 to 1, add them and subtract 6 to produce a normally distributed number with mean 0 and standard deviation 1). The Gaussian distribution with these parameters is known as *standard normal distribution.* (And et. all, 1975). Between +6 and –6 standard deviations we can expect to find most of the numbers in a normal distribution. Using a normal distribution table to calculate the probability of the data being in the chosen interval 99.9999999% is obtained.

Calculate the first month of the first year to be generated.

$$q_{1,1} = \mu_1 + \rho_{1,12}\left(\frac{\sigma_j}{\sigma_{j-1}}\right)\left(q_{0,12} - \overline{\mu}_{12}\right) + t_{1,1} \times \sigma_1\sqrt{\left(1-\rho_{1,12}\right)^2}$$

$$q_{1,1} = \mu_1 + \rho_{1,2}\left(\frac{\sigma_1}{\sigma_{12}}\right)\left(q_{0,12} - \overline{\mu}_{12}\right) + t_{1,1} \times \sigma_1\sqrt{\left(1-\rho_{12}\right)^2}$$

Calculate $Q_{1,1} = \exp\left(q_{1,1}\right) + a_1$

Use q as the initial value for the following month and alter all monthly and yearly indexes as the process proceeds in time.

In order to obtain an independent series of the initial value, 2 to 3 years of the generated data must be discarded. With approximately 300 successive years of generated data values of mean, standard deviation, skewness and linear correlation coefficients are practically identical for different series generated stochastically with the model. Sometimes negative values are generated when the original series has very low values or values equal to zero. When this occurs, generated values can be truncated to zero or to the "maximum recession" of flows (limit the drop of flows of one month to the next month to the maximum value observed in the historical data). This alters slightly the reproduction of the parameters of the original series but can give a convenient and acceptable solution to the negative values of flows. The following figures (Figures 5.1 a through f) based on an example illustrates the results and compares them with the range of data in figure 3.2.

5.7 Results

The data used to generate the synthetic time series are the natural monthly inflows to the Sobradinho reservoir. They are shown in Table 5-1 for the period 1931 to 1998, the statistical parameters are displayed at the top of the table.

Sobradinho natural inflow

"biased" monthly statistics parameters													Annual parameters	
Parameter:	January	February	March	April	May	June	July	August	September	October	November	December	Sum	Mean
Number of Years	68	68	68	68	68	68	68	68	68	68	68	68	68	68
Average	4822.5735	5119.3676	4948.0294	3911.6176	2430.5735	1673.4853	1376.8971	1178.1029	1041.6029	1164.9412	1899.1176	3438.2647	33004.5735	2750.3811
Standard Deviation	1417.7981	2082.4371	2630.8535	1751.7989	1177.6248	539.6066	377.4393	295.3859	260.2193	300.1035	708.4164	1187.6235	9179.4649	764.9554
Variation Coef.	0.294	0.407	0.532	0.448	0.485	0.322	0.274	0.251	0.250	0.258	0.373	0.345	0.278	0.278
Assimetry Coef.	0.340	0.630	1.978	0.634	2.826	1.469	0.956	0.856	0.815	0.535	1.047	0.303	0.977	0.977
Correlation Coef. i, i-1	0.574	0.393	0.748	0.612	0.798	0.929	0.971	0.978	0.946	0.797	0.632	0.607	0.359	0.359
Maximum Value	9475.0000	10073.0000	15364.0000	7959.0000	8760.0000	3936.0000	2588.0000	2075.0000	1700.0000	1992.0000	4168.0000	6366.0000	57574.0000	4797.8333
Minimum Value	1722.0000	1467.0000	1693.0000	1432.0000	1092.0000	950.0000	782.0000	726.0000	671.0000	640.0000	876.0000	1127.0000	20235.0000	1686.2500
First year of original serie	1931	See monthly data of the original series from line 20												1931
Last year of original series	1998													1998

Range of data input: B20 : N321

Sobradinho natural inflow

YEAR	JAN	FEB	MAR	APR	MAI	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total	Mean
1931	4674	4803	6628	7331	4465	2395	1867	1617	1446	1373	1933	2205	40737.0000	3394.7500
1932	4034	4529	3211	1974	1422	1289	1173	993	902	980	2104	3592	26203.0000	2183.5833
1933	5011	5513	3426	2690	1902	1354	1248	1070	912	1192	1796	3334	29448.0000	2454.0000
1934	6107	4220	2295	1613	1782	1165	994	894	796	874	902	1603	23245.0000	1937.0833
1935	4517	5439	5406	4714	3737	2008	1554	1234	1053	1077	1175	2583	34497.0000	2874.7500
1936	2693	2661	4171	2761	2107	1297	1089	931	858	884	1595	2721	23768.0000	1980.6667
1937	4640	5595	4239	2885	2234	1452	1228	1034	897	917	2392	4700	32213.0000	2684.4167
1938	6305	4234	3847	2369	1611	1417	1155	1031	954	911	1536	2955	28325.0000	2360.4167
1939	5093	5895	4888	2153	1625	1256	1104	1033	933	1282	1017	1705	27984.0000	2332.0000
1940	3101	4736	5497	4295	1911	1413	1185	1052	858	923	2135	3790	30896.0000	2574.6667
1941	5002	4420	4129	4789	2718	1656	1420	1257	1019	1134	1667	2312	31523.0000	2626.9167
1942	4621	4417	5274	3357	2271	1544	1297	1114	1021	1321	2271	5167	33675.0000	2806.2500
1943	6183	9463	7963	5094	2878	2110	1771	1519	1286	1391	2202	5147	47007.0000	3917.2500
1944	6325	4860	4746	3726	2515	1735	1465	1275	1100	959	1649	3845	34200.0000	2850.0000
1945	5629	6941	7969	7147	8760	3936	2588	2075	1700	1975	3264	5590	57574.0000	4797.8333
1946	7281	10073	4592	5588	3578	2450	2006	1722	1494	1515	2168	3766	46233.0000	3852.7500
1947	3746	5139	5702	7280	4315	2350	1939	1623	1610	1433	3109	4245	42491.0000	3540.9167
1948	6340	4517	5418	4013	2207	1843	1578	1356	1203	1321	1501	5152	36449.0000	3037.4167
1949	7846	9216	13040	7131	3496	2586	2151	1817	1544	1461	2925	2941	56154.0000	4679.5000
1950	4447	4712	3457	3780	2617	1739	1512	1301	1072	1262	2135	4124	32158.0000	2679.8333
1951	4175	4152	4435	4851	2518	1842	1483	1272	1099	1023	938	1638	29426.0000	2452.1667
1952	3306	4714	5788	6934	3253	1967	1600	1307	1188	1132	1778	3389	36356.0000	3029.6667
1953	3559	1789	2681	3736	1930	1303	1103	967	852	1156	1407	3185	23668.0000	1972.3333
1954	4401	2775	2776	2425	1439	1195	974	847	710	640	876	3540	22598.0000	1883.1667
1955	2306	4047	2161	2611	1432	1067	894	782	671	655	1973	3301	21900.0000	1825.0000
1956	5366	2211	4581	2538	1768	1634	1320	1061	897	835	1464	3683	27358.0000	2279.8333
1957	5944	7114	6899	7959	5810	2762	2027	1638	1366	1516	1411	4338	48784.0000	4065.3333
1958	3619	5208	3381	3099	2415	1691	1406	1414	1121	1512	1833	1794	28493.0000	2374.4167
1959	3597	3655	3490	2702	1357	1132	1008	898	813	841	1595	2707	23795.0000	1982.9167
1960	3287	5725	6119	6052	2461	1757	1380	1143	970	894	1071	4167	35026.0000	2918.8333
1961	5323	6270	5593	3445	2395	1745	1349	1159	972	880	1018	1583	31732.0000	2644.3333
1962	3183	4800	3643	2829	2048	1640	1526	1080	841	1108	1787	3241	27726.0000	2310.5000
1963	5965	6776	3580	1729	1418	1133	1021	903	786	689	924	1127	26051.0000	2170.9167
1964	3528	7716	5404	2713	1648	1214	1009	932	746	805	2829	4148	32692.0000	2724.3333
1965	5082	5655	6268	6178	2910	1871	1527	1269	1030	1460	2630	4122	40002.0000	3333.5000
1966	4434	6989	6760	4481	2571	1917	1505	1322	1059	1272	1996	2782	37088.0000	3090.6667
1967	5106	5105	4351	3775	2529	1598	1421	1351	1210	1136	1756	3800	33138.0000	2761.5000
1968	5970	4441	6461	5223	2343	1654	1418	1277	1206	1264	1718	4322	37297.0000	3108.0833
1969	3148	3920	3842	2361	1682	1212	1119	1005	831	940	2366	4775	27201.0000	2266.7500
1970	5909	6559	4792	2675	1959	1421	1143	1002	1156	1565	2830	2672	33683.0000	2806.9167
1971	1722	1467	1693	1432	1121	950	894	747	690	1080	2182	6257	20235.0000	1686.2500
1972	5150	2981	3509	3049	1809	1254	1127	1010	825	1268	1879	4029	27890.0000	2324.1667
1973	4800	3880	3418	4611	2191	1554	1311	1026	888	1196	3007	4377	32259.0000	2688.2500
1974	4696	3341	3284	5232	2992	1830	1486	1250	1058	1161	1877	2349	30556.0000	2546.3333
1975	4230	4180	2427	2468	1951	1233	1132	955	742	1008	2252	2766	25344.0000	2112.0000
1976	2128	2001	2187	1826	1092	1085	851	847	1031	1420	2234	4825	21527.0000	1793.9167
1977	4751	6278	2358	2147	1875	1355	1147	933	867	1188	1379	2708	26986.0000	2248.8333
1978	5561	5227	6502	4274	2591	2193	1615	1350	1140	1326	1899	3601	37279.0000	3106.5833
1979	5740	9301	15364	6666	3349	2679	2031	1700	1631	1587	2748	3101	55897.0000	4658.0833
1980	5472	9415	10501	4409	3190	2200	1961	1634	1426	1455	1843	4164	47670.0000	3972.5000
1981	5706	4862	2848	5484	2789	2203	1639	1412	1259	1698	3942	6366	40208.0000	3350.6667
1982	6757	8455	6786	7129	3593	2693	2037	1732	1543	1459	1600	1868	45652.0000	3804.3333
1983	3985	7394	9868	6869	4153	2600	2294	1744	1579	1992	3443	5970	51891.0000	4324.2500
1984	6468	3020	2599	3382	1947	1437	1239	1083	1237	1347	1626	3823	29208.0000	2434.0000
1985	5116	8340	6266	4775	2465	1795	1464	1278	1169	1459	1957	2887	38971.0000	3247.5833
1986	6518	7222	4724	2186	1823	1413	1240	1212	1149	944	1147	1686	31264.0000	2605.3333
1987	3263	2745	2385	2833	1635	1207	982	845	744	911	1382	3783	22715.0000	1892.9167
1988	5485	3542	4297	2840	1840	1277	1026	904	809	899	1546	2350	26815.0000	2234.5833
1989	3707	2488	3051	1738	1198	976	940	880	858	971	1702	4436	22945.0000	1912.0833
1990	9475	3325	3281	2033	1470	1166	1121	969	967	863	1234	1537	27441.0000	2286.7500
1991	3087	5456	4698	5730	2375	1553	1203	1013	879	1273	1919	2996	32182.0000	2681.8333
1992	4059	9713	13254	3689	2865	1892	1585	1351	1186	1679	4168	4549	49990.0000	4165.8333
1993	5878	4531	4437	2774	1992	1610	1330	1097	980	1199	1134	1820	28782.0000	2398.5000
1994	5681	4839	4786	4992	2135	1662	1365	1099	939	842	988	3057	32385.0000	2698.7500
1995	2950	2777	2923	2742	1776	1242	1010	865	706	797	1762	2780	22330.0000	1860.8333
1996	4811	2106	2141	1642	1219	988	782	726	781	758	1488	3360	20802.0000	1733.5000
1997	6520	4858	4440	4211	2512	1839	1367	1076	890	962	1157	3333	33165.0000	2763.7500
1998	3416	3369	3536	1821	1294	1161	893	796	674	966	1969	3233	23128.0000	1927.3333

Table 5-1 Sobradinho natural inflow

Using the above data the following parameters are obtained:

Sobradinho natural inflow													
LN3 Distribuition with Matalas' transformed for reproduction of the parameters of the original series													Yearly
LN3 Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total
My i	9.43221	9.19535	8.25172	9.01558	7.07781	6.97760	7.06261	6.93090	6.85382	7.42334	7.59907	9.37115	10.23208
Sy i	0.11250	0.20483	0.54714	0.20616	0.69108	0.43601	0.30188	0.27292	0.26094	0.17513	0.32737	0.10036	0.30772
Ry (i, i-1)	0.57552	0.39013	0.74725	0.61617	0.79780	0.92606	0.95890	0.96531	0.93386	0.78899	0.62974	0.60223	0.36427
Ax i	-7740.7556	-4940.6915	494.7355	-4495.4725	925.4836	494.2090	154.9852	115.8602	61.2954	-535.5492	-207.1232	-8365.6137	3877.4649
Iterações	14	12	9	12	8	10	11	11	11	13	11	14	11
Initial year of the series		1931											
Final year of the series		1998											
RX (i, i-1)	1.84	2.78	2.44	2.92	2.61	2.04	1.46	1.36	1.34	1.23	1.37	1.10	1.78

Table 5-2 Parameters LN3.

Statistics of Monthly Hidrologic Series, adjust of LN3 distribuition and monthly and generation annual sintetic series

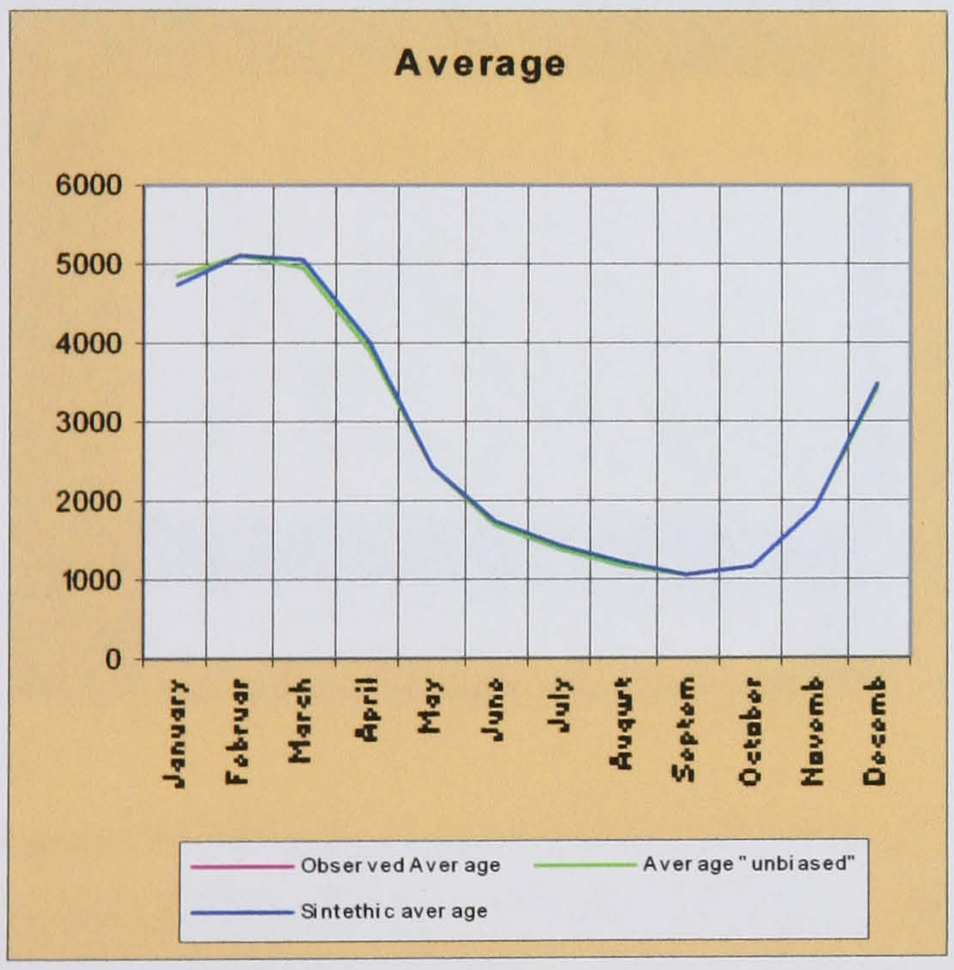
Sobradinho natural inflow													Yearly parameters "unbiased"	
Monthly statistics monthly parameters *"unbiased"*														
Parameter:	*January*	*February*	*March*	*April*	*May*	*June*	*July*	*August*	*September*	*October*	*November*	*December*	*Total*	*Mean*
Maximum recession (i, i-1)	1.843	2.778	2.436	2.918	2.613	2.041	1.460	1.362	1.344	1.232	1.366	1.097	1.777	1.777
Number of years	68	68	68	68	68	68	68	68	68	68	68	68	68	68
Average	4822.5735	5119.3677	4948.0294	3911.6177	2430.5735	1673.4853	1376.8971	1178.1030	1041.6030	1164.9412	1899.1177	3438.2647	33004.5736	2750.3811
Standard deviation	1417.7981	2082.4371	2630.8535	1761.7989	1177.6248	639.6066	377.4393	295.3859	260.2193	300.1035	708.4164	1187.6235	9179.4649	764.9554
Coef. Of Variation	0.294	0.407	0.532	0.448	0.485	0.322	0.274	0.251	0.250	0.258	0.373	0.345	0.278	0.278
Coef. Of Assimety	0.340	0.630	1.978	0.634	2.826	1.469	0.966	0.856	0.816	0.535	1.047	0.303	0.977	0.977
Coef. Of Correlation i, i-1	0.574	0.387	0.737	0.603	0.786	0.916	0.966	0.964	0.932	0.785	0.623	0.598	0.363	0.363
Maximum	9476.0000	10073.0000	16364.0000	7969.0000	8760.0000	3936.0000	2688.0000	2076.0000	1700.0000	1992.0000	4168.0000	6366.0000	57574.0001	4797.8333
Minimum	1722.0000	1467.0000	1693.0000	1432.0000	1092.0000	950.0000	782.0000	726.0000	671.0000	640.0000	876.0000	1127.0000	20235.0001	1686.2500
Initial year of the series	1931	See output area of monthly data of the series studied starting from line 8!												1931
Final year of the series	1998													1998

Range de saida da série estudada

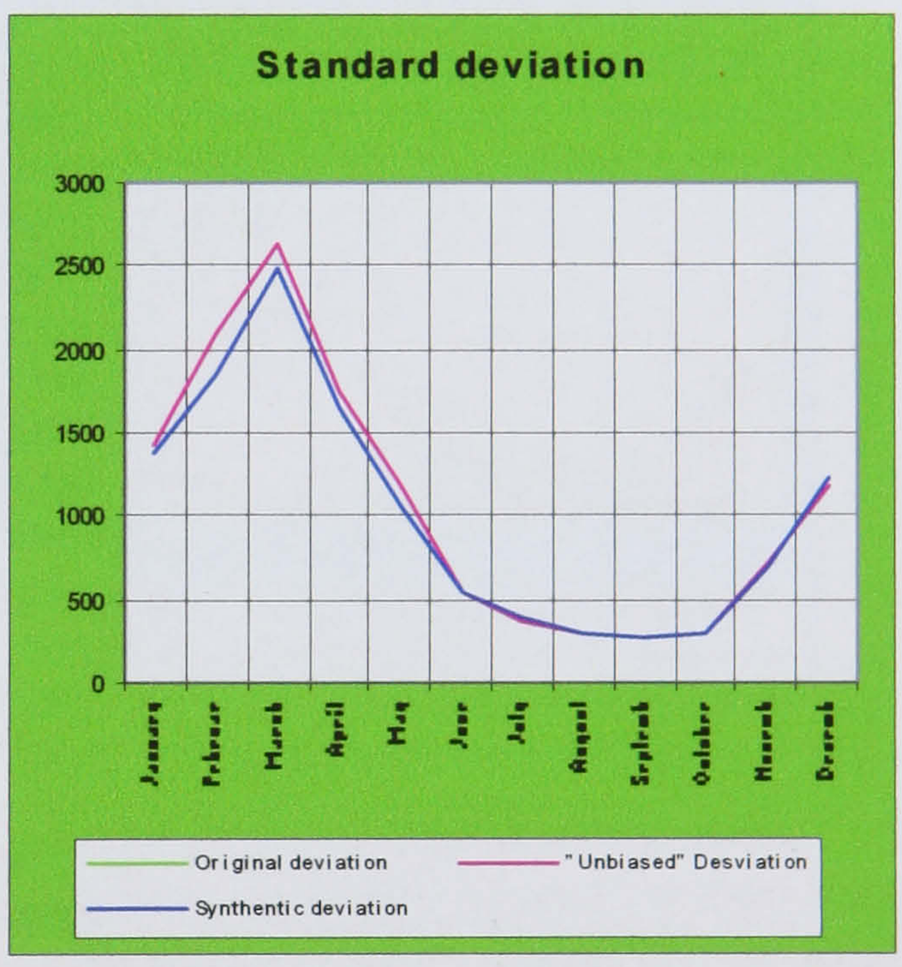
Sobradinho natural inflow													Yearly	
Year	January	February	March	April	May	June	July	August	September	October	November	December	*Total*	*Mean*
1931	4674.0000	4803.0000	6628.0000	7331.0000	4465.0000	2395.0000	1867.0000	1617.0000	1446.0000	1373.0000	1933.0000	2205.0000	40737.0001	3394.7500
1932	4034.0000	4529.0000	3211.0000	1974.0000	1422.0000	1289.0000	1173.0000	993.0000	902.0000	980.0000	2104.0000	3592.0000	26203.0001	2183.5833
1933	5011.0000	5513.0000	3426.0000	2690.0000	1902.0000	1354.0000	1248.0000	1070.0000	912.0000	1192.0000	1796.0000	3334.0000	29448.0001	2454.0000
1934	6107.0000	4220.0000	2295.0000	1613.0000	1782.0000	1165.0000	994.0000	894.0000	796.0000	874.0000	902.0000	1603.0000	23245.0001	1937.0833
1935	4517.0000	5439.0000	5406.0000	4714.0000	3737.0000	2008.0000	1554.0000	1234.0000	1053.0000	1077.0000	1175.0000	2583.0000	34497.0001	2874.7500
1936	2693.0000	2661.0000	4171.0000	2761.0000	2107.0000	1297.0000	1089.0000	931.0000	858.0000	884.0000	1595.0000	2721.0000	23768.0001	1980.6667
1937	4640.0000	5595.0000	4239.0000	2885.0000	2234.0000	1452.0000	1228.0000	1034.0000	897.0000	917.0000	2392.0000	4700.0000	32213.0001	2684.4167
1938	6305.0000	4234.0000	3847.0000	2369.0000	1611.0000	1417.0000	1155.0000	1031.0000	954.0000	911.0000	1536.0000	2955.0000	28325.0001	2360.4167
1939	5093.0000	5895.0000	4888.0000	2153.0000	1625.0000	1256.0000	1104.0000	1033.0000	933.0000	1282.0000	1017.0000	1705.0000	27984.0001	2332.0000
1940	3101.0000	4736.0000	5497.0000	4295.0000	1911.0000	1413.0000	1185.0000	1052.0000	858.0000	923.0000	2135.0000	3790.0000	30896.0001	2574.6667
1941	5002.0000	4420.0000	4129.0000	4789.0000	2718.0000	1656.0000	1420.0000	1257.0000	1019.0000	1134.0000	1667.0000	2312.0000	31523.0001	2626.9167
1942	4621.0000	4417.0000	5274.0000	3357.0000	2271.0000	1544.0000	1297.0000	1114.0000	1021.0000	1321.0000	2271.0000	5167.0000	33675.0001	2806.2500
1943	6183.0000	9463.0000	7963.0000	5094.0000	2878.0000	2110.0000	1771.0000	1519.0000	1286.0000	1391.0000	2202.0000	5147.0000	47007.0001	3917.2500
1944	6325.0000	4860.0000	4746.0000	3726.0000	2515.0000	1735.0000	1465.0000	1275.0000	1100.0000	959.0000	1649.0000	3845.0000	34200.0001	2850.0000
1945	5629.0000	6941.0000	7969.0000	7147.0000	8760.0000	3936.0000	2588.0000	2075.0000	1700.0000	1975.0000	3264.0000	5590.0000	57574.0001	4797.8333
1946	7281.0000	10073.0000	4592.0000	5588.0000	3578.0000	2450.0000	2006.0000	1722.0000	1494.0000	1515.0000	2168.0000	3766.0000	46233.0001	3852.7500
1947	3746.0000	5139.0000	5702.0000	7280.0000	4315.0000	2350.0000	1939.0000	1623.0000	1610.0000	1433.0000	3109.0000	4245.0000	42491.0001	3540.9167
1948	6340.0000	4517.0000	5418.0000	4013.0000	2207.0000	1843.0000	1578.0000	1356.0000	1203.0000	1321.0000	1501.0000	5152.0000	36449.0001	3037.4167
1949	7846.0000	9216.0000	13040.0000	7131.0000	3496.0000	2586.0000	2151.0000	1817.0000	1544.0000	1461.0000	2925.0000	2941.0000	56154.0001	4679.5000
1950	4447.0000	4712.0000	3457.0000	3780.0000	2617.0000	1739.0000	1512.0000	1301.0000	1072.0000	1262.0000	2135.0000	4124.0000	32158.0001	2679.8333
1951	4175.0000	4152.0000	4435.0000	4851.0000	2518.0000	1842.0000	1483.0000	1272.0000	1099.0000	1023.0000	938.0000	1638.0000	29426.0001	2452.1667
1952	3306.0000	4714.0000	5788.0000	6934.0000	3253.0000	1967.0000	1600.0000	1307.0000	1188.0000	1132.0000	1778.0000	3389.0000	36356.0001	3029.6667
1953	3559.0000	1789.0000	2681.0000	3736.0000	1930.0000	1303.0000	1103.0000	967.0000	852.0000	1156.0000	1407.0000	3185.0000	23668.0001	1972.3333
1954	4401.0000	2775.0000	2776.0000	2425.0000	1439.0000	1195.0000	974.0000	847.0000	710.0000	640.0000	876.0000	3540.0000	22598.0001	1883.1667
1955	2306.0000	4047.0000	2161.0000	2611.0000	1432.0000	1067.0000	894.0000	782.0000	671.0000	655.0000	1973.0000	3301.0000	21900.0001	1825.0000
1956	5366.0000	2211.0000	4581.0000	2538.0000	1768.0000	1634.0000	1320.0000	1061.0000	897.0000	835.0000	1464.0000	3683.0000	27358.0001	2279.8333
1957	5944.0000	7114.0000	6899.0000	7959.0000	5810.0000	2762.0000	2027.0000	1638.0000	1366.0000	1516.0000	1411.0000	4338.0000	48784.0001	4065.3333
1958	3619.0000	5208.0000	3381.0000	3099.0000	2415.0000	1691.0000	1406.0000	1414.0000	1121.0000	1512.0000	1833.0000	1794.0000	28493.0001	2374.4167
1959	3597.0000	3655.0000	3490.0000	2702.0000	1357.0000	1132.0000	1008.0000	898.0000	813.0000	841.0000	1595.0000	2707.0000	23795.0001	1982.9167
1960	3287.0000	5725.0000	6119.0000	6052.0000	2461.0000	1757.0000	1380.0000	1143.0000	970.0000	894.0000	1071.0000	4167.0000	35026.0001	2918.8333
1961	5323.0000	6270.0000	5593.0000	3445.0000	2395.0000	1745.0000	1349.0000	1159.0000	972.0000	880.0000	1018.0000	1583.0000	31732.0001	2644.3333
1962	3183.0000	4800.0000	3643.0000	2829.0000	2048.0000	1640.0000	1526.0000	1080.0000	841.0000	1108.0000	1787.0000	3241.0000	27726.0001	2310.5000
1963	5965.0000	6776.0000	3580.0000	1729.0000	1418.0000	1133.0000	1021.0000	903.0000	786.0000	689.0000	924.0000	1127.0000	26051.0001	2170.9167
1964	3528.0000	7716.0000	5404.0000	2713.0000	1648.0000	1214.0000	1009.0000	932.0000	746.0000	805.0000	2829.0000	4148.0000	32692.0001	2724.3333
1965	5082.0000	5655.0000	6268.0000	6178.0000	2910.0000	1871.0000	1527.0000	1269.0000	1030.0000	1460.0000	2630.0000	4122.0000	40002.0001	3333.5000
1966	4434.0000	6989.0000	6760.0000	4481.0000	2571.0000	1917.0000	1505.0000	1322.0000	1059.0000	1272.0000	1996.0000	2782.0000	37088.0001	3090.6667
1967	5106.0000	5105.0000	4351.0000	3775.0000	2529.0000	1598.0000	1421.0000	1351.0000	1210.0000	1136.0000	1756.0000	3800.0000	33138.0001	2761.5000
1968	5970.0000	4441.0000	6461.0000	5223.0000	2343.0000	1654.0000	1418.0000	1277.0000	1206.0000	1264.0000	1718.0000	4322.0000	37297.0001	3108.0833
1969	3148.0000	3920.0000	3842.0000	2361.0000	1682.0000	1212.0000	1119.0000	1005.0000	831.0000	940.0000	2366.0000	4775.0000	27201.0001	2266.7500
1970	5909.0000	6559.0000	4792.0000	2675.0000	1959.0000	1421.0000	1143.0000	1002.0000	1156.0000	1565.0000	2830.0000	2672.0000	33683.0001	2806.9167
1971	1722.0000	1467.0000	1693.0000	1432.0000	1121.0000	950.0000	894.0000	747.0000	690.0000	1080.0000	2182.0000	6257.0000	20235.0001	1686.2500
1972	5150.0000	2981.0000	3509.0000	3049.0000	1809.0000	1254.0000	1127.0000	1010.0000	825.0000	1268.0000	1879.0000	4029.0000	27890.0001	2324.1667
1973	4800.0000	3880.0000	3418.0000	4611.0000	2191.0000	1554.0000	1311.0000	1026.0000	888.0000	1196.0000	3007.0000	4377.0000	32259.0001	2688.2500
1974	4696.0000	3341.0000	3284.0000	5232.0000	2992.0000	1830.0000	1486.0000	1250.0000	1058.0000	1161.0000	1877.0000	2349.0000	30556.0001	2546.3333
1975	4230.0000	4180.0000	2427.0000	2468.0000	1951.0000	1233.0000	1132.0000	955.0000	742.0000	1008.0000	2252.0000	2766.0000	25344.0001	2112.0000
1976	2128.0000	2001.0000	2187.0000	1826.0000	1092.0000	1085.0000	851.0000	847.0000	1031.0000	1420.0000	2234.0000	4825.0000	21527.0001	1793.9167
1977	4751.0000	6278.0000	2358.0000	2147.0000	1875.0000	1355.0000	1147.0000	933.0000	867.0000	1188.0000	1379.0000	2708.0000	26986.0001	2248.8333
1978	5561.0000	5227.0000	6502.0000	4274.0000	2591.0000	2193.0000	1615.0000	1350.0000	1140.0000	1326.0000	1899.0000	3601.0000	37279.0001	3106.5833
1979	5740.0000	9301.0000	15364.0000	6666.0000	3349.0000	2679.0000	2031.0000	1700.0000	1631.0000	1587.0000	2748.0000	3101.0000	55897.0001	4658.0833
1980	5472.0000	9415.0000	10501.0000	4409.0000	3190.0000	2200.0000	1961.0000	1634.0000	1426.0000	1455.0000	1843.0000	4164.0000	47670.0001	3972.5000
1981	5706.0000	4862.0000	2848.0000	5484.0000	2789.0000	2203.0000	1639.0000	1412.0000	1259.0000	1698.0000	3942.0000	6366.0000	40208.0001	3350.6667
1982	6757.0000	8455.0000	6786.0000	7129.0000	3593.0000	2693.0000	2037.0000	1732.0000	1543.0000	1459.0000	1600.0000	1868.0000	45652.0001	3804.3333
1983	3985.0000	7394.0000	9868.0000	6869.0000	4153.0000	2600.0000	2294.0000	1744.0000	1579.0000	1992.0000	3443.0000	5970.0000	51891.0001	4324.2500
1984	6468.0000	3020.0000	2599.0000	3382.0000	1947.0000	1437.0000	1239.0000	1083.0000	1237.0000	1347.0000	1626.0000	3823.0000	29208.0001	2434.0000
1985	5116.0000	8340.0000	6266.0000	4775.0000	2465.0000	1795.0000	1464.0000	1278.0000	1169.0000	1459.0000	1957.0000	2887.0000	38971.0001	3247.5833
1986	6518.0000	7222.0000	4724.0000	2186.0000	1823.0000	1413.0000	1240.0000	1212.0000	1149.0000	944.0000	1147.0000	1686.0000	31264.0001	2605.3333
1987	3263.0000	2745.0000	2385.0000	2833.0000	1635.0000	1207.0000	982.0000	845.0000	744.0000	911.0000	1382.0000	3783.0000	22715.0001	1892.9167
1988	5485.0000	3542.0000	4297.0000	2840.0000	1840.0000	1277.0000	1026.0000	904.0000	809.0000	899.0000	1546.0000	2350.0000	26815.0001	2234.5833
1989	3707.0000	2488.0000	3051.0000	1738.0000	1198.0000	976.0000	940.0000	880.0000	858.0000	971.0000	1702.0000	4436.0000	22945.0001	1912.0833
1990	9475.0000	3325.0000	3281.0000	2033.0000	1470.0000	1166.0000	1121.0000	969.0000	967.0000	863.0000	1234.0000	1537.0000	27441.0001	2286.7500
1991	3087.0000	5456.0000	4698.0000	5730.0000	2375.0000	1553.0000	1203.0000	1013.0000	879.0000	1273.0000	1919.0000	2996.0000	32182.0001	2681.8333
1992	4059.0000	9713.0000	13254.0000	3689.0000	2865.0000	1892.0000	1585.0000	1351.0000	1186.0000	1679.0000	4168.0000	4549.0000	49990.0001	4165.8333
1993	5878.0000	4531.0000	4437.0000	2774.0000	1992.0000	1610.0000	1330.0000	1097.0000	980.0000	1199.0000	1134.0000	1820.0000	28782.0001	2398.5000
1994	5681.0000	4839.0000	4786.0000	4992.0000	2135.0000	1662.0000	1365.0000	1099.0000	939.0000	842.0000	988.0000	3057.0000	32385.0001	2698.7500
1995	2950.0000	2777.0000	2923.0000	2742.0000	1776.0000	1242.0000	1010.0000	865.0000	706.0000	797.0000	1762.0000	2780.0000	22330.0001	1860.8333
1996	4811.0000	2106.0000	2141.0000	1642.0000	1219.0000	988.0000	782.0000	726.0000	781.0000	758.0000	1488.0000	3360.0000	20802.0001	1733.5000
1997	6520.0000	4858.0000	4440.0000	4211.0000	2512.0000	1839.0000	1367.0000	1076.0000	890.0000	962.0000	1157.0000	3333.0000	33165.0001	2763.7500
1998	3416.0000	3369.0000	3536.0000	1821.0000	1294.0000	1161.0000	893.0000	796.0000	674.0000	966.0000	1969.0000	3233.0000	23128.0001	1927.3333

Table 5-3 Sobradinho Natural inflow with statistics monthly parameters unbiased

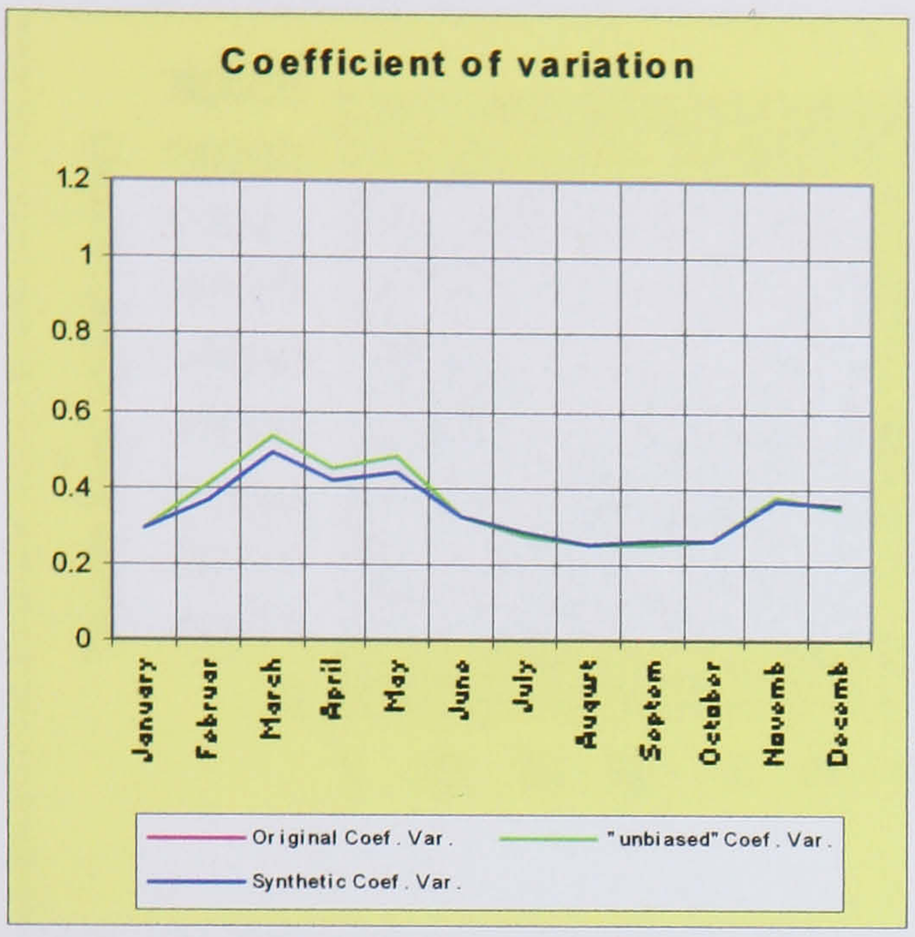
Figure 5-1 a) through f) shows sample graphs of comparison between the main parameters of the natural inflows and the synthetic generated data. From the parameters used it can be seen that the model produces a good fit. For the purpose of this modelling it can be accepted that the features of the original data are preserved in this simplified synthetic generation process. It is not in the scope of this work to present a detailed research on the suitability and validity of synthetic generation models of streamflow data. The Thomas-Fiering model has been extensively and successfully used by hydrologists in the Brazilian electric power sector to be recommended as the single choice of generation model for this research.

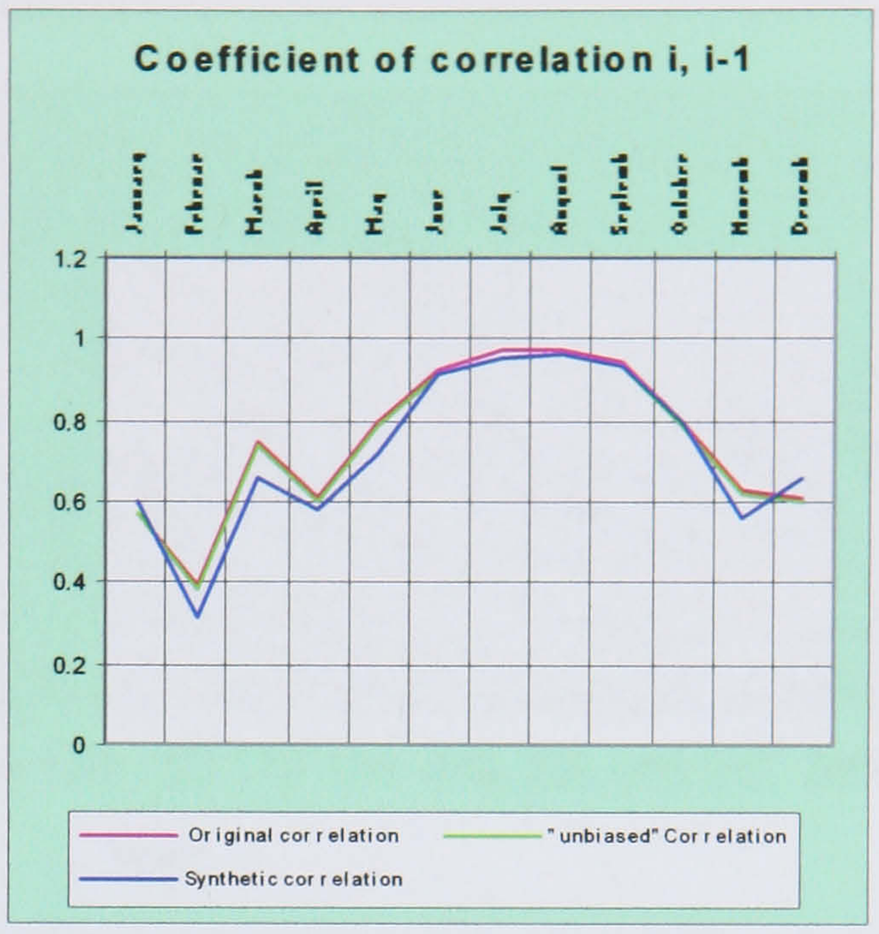


a)

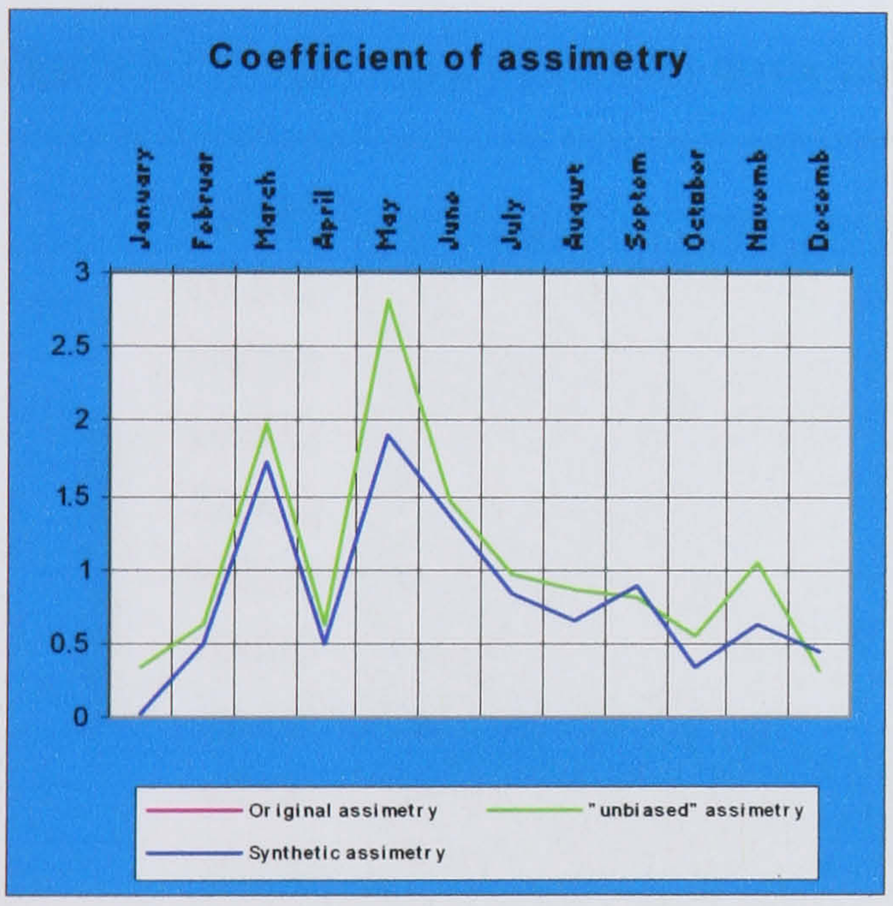


b)

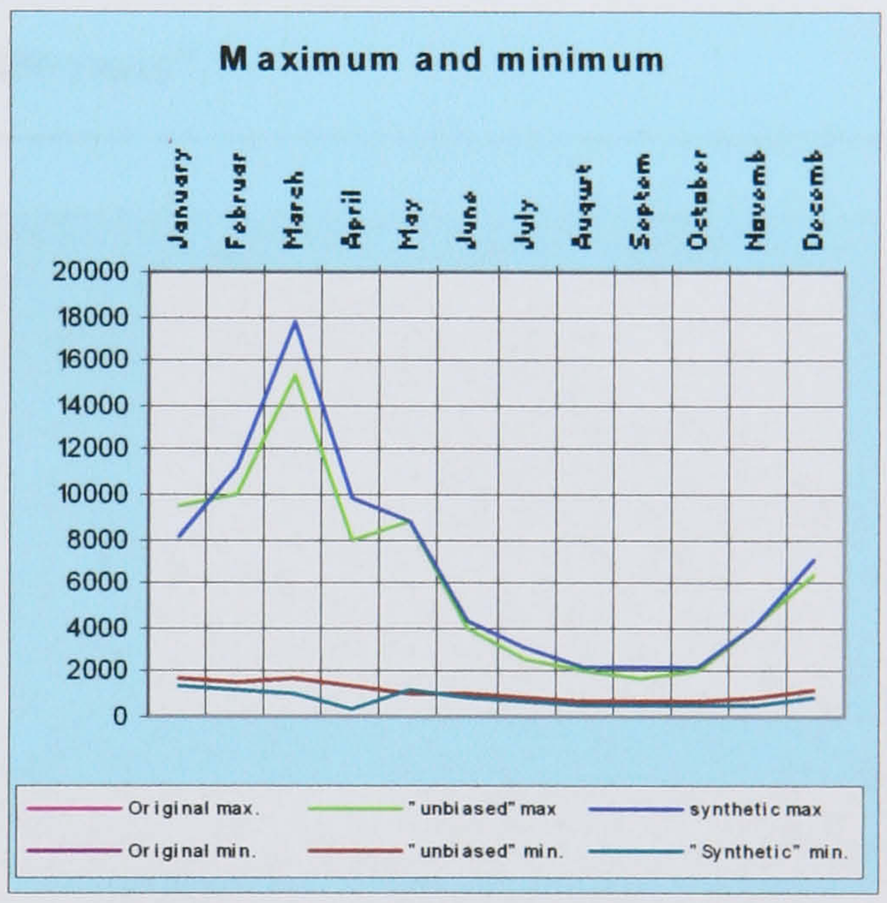




c)



d)



e)

f)

Figure 5-1 Graphs of comparative parameters for natural inflow and generated time series

Yearly series of sums	Summary of yearly parameters			
Parameter	Original monthly	"Unbiased" monthly	Synthetic monthly	Synthetic yearly
Average	33004.5735	33004.5736	33150.4215	33467.5349
Standard deviation	9179.4649	9179.4649	8216.3971	10559.8662
Coef. de variation	0.278	0.278	0.248	0.316
Coef. de assimetry	0.977	0.977	0.756	1.174
Coef. de correlation i, i-1	0.359	0.353	0.157	0.460
Maximum	57574.0000	57574.0001	65341.9152	77765.5809
Minimum	20235.0000	20235.0001	14586.5995	17122.5657

Table 5-4 Values of comparative parameters for natural inflow and generated time series

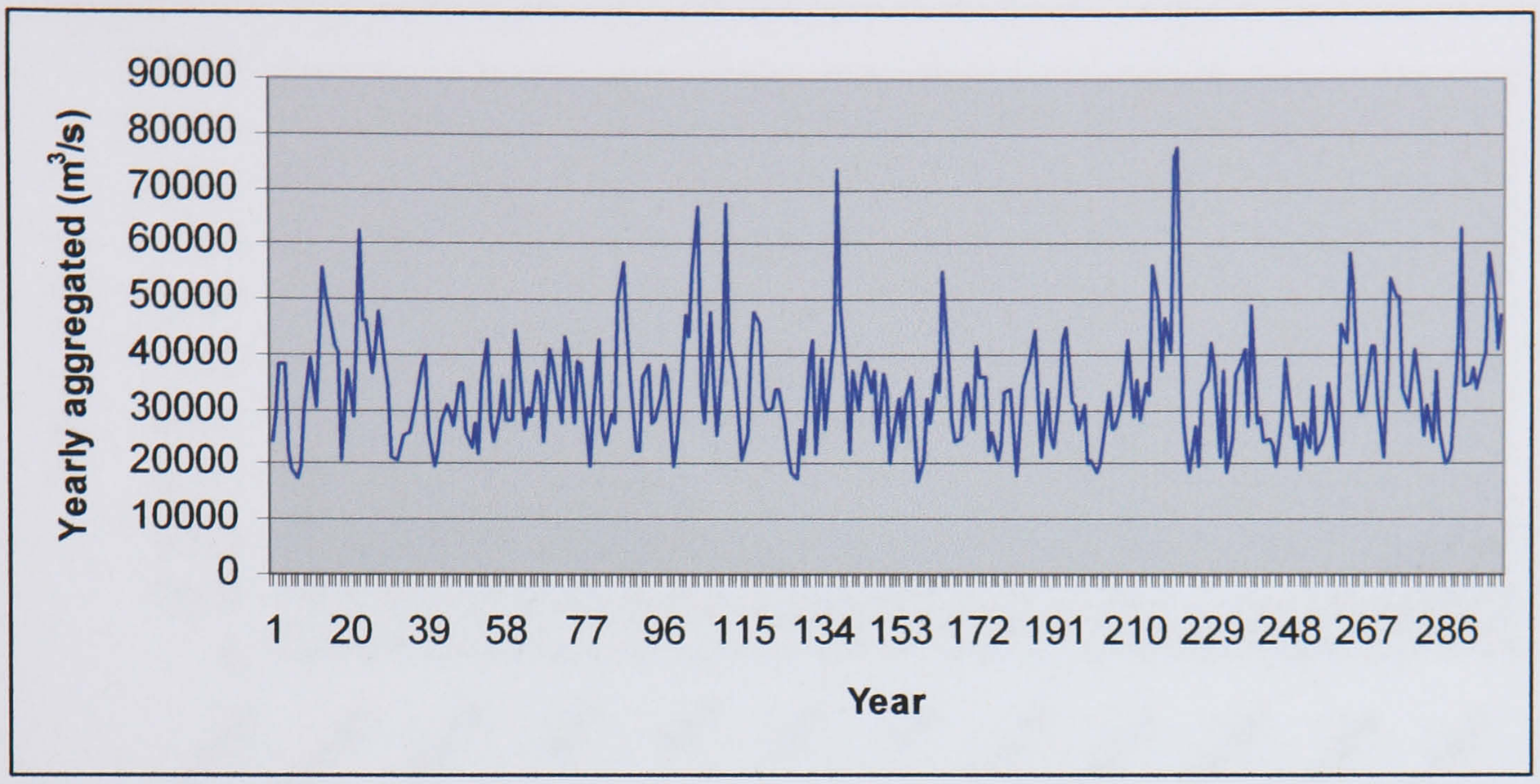


Figure 5-2 Graph of generated time series for 300 years[19]

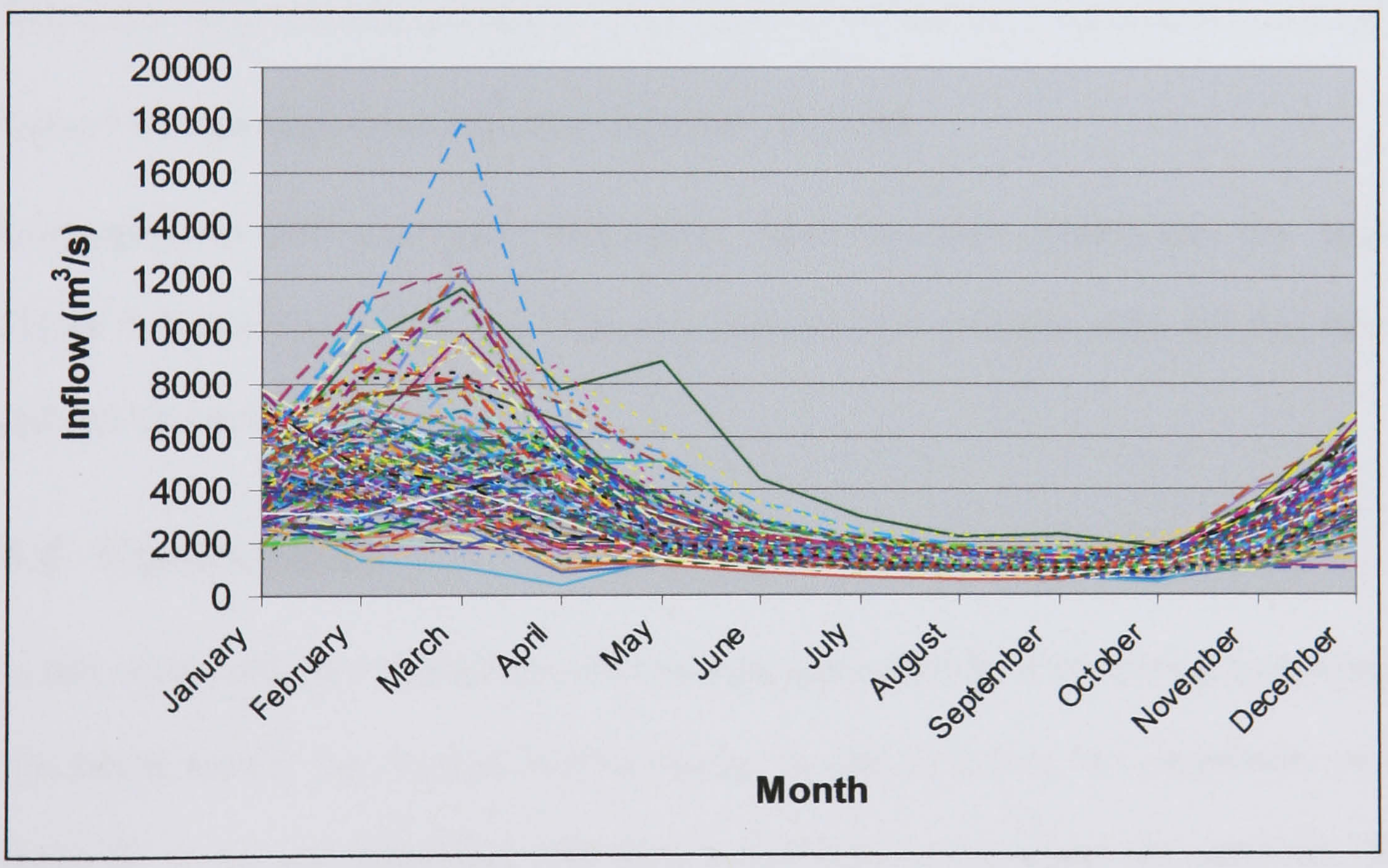


Figure 5-3 Graph of generated time series for the first 150 years

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[19] Aggregated inflows from January to December for each year.

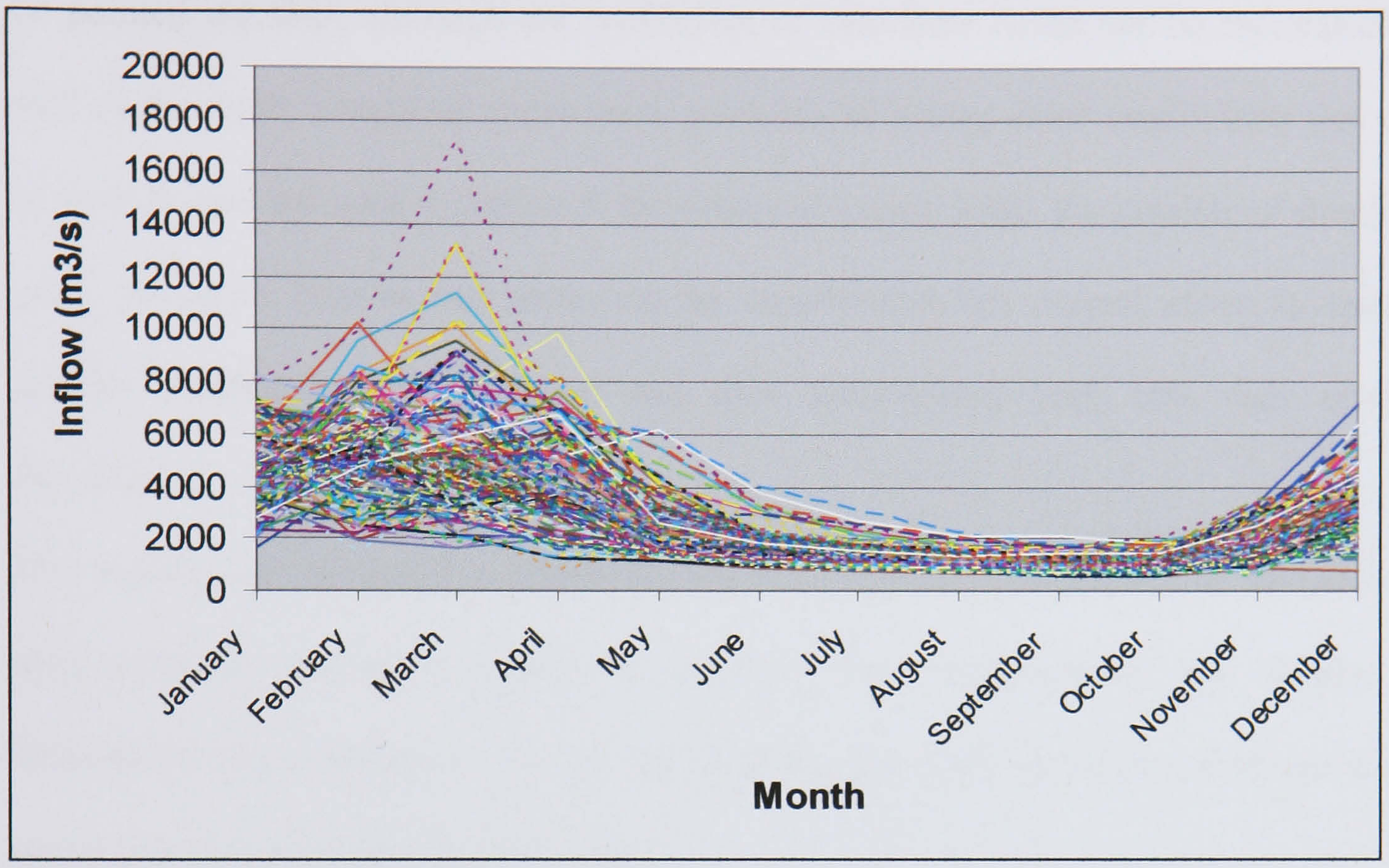


Figure 5-4 Graph of generated time series from year 151 to 300.

Comparing the 300 years generated series, which has been divided into two graphs, Figure 5-3 and Figure 5-4, the similarity between the synthetic data and the natural inflows becomes apparent.

5.8 Conclusions

In this study, monthly streamflow data sets are generated by a traditional hydrological simulation model; the Thomas-Fiering model. In this approach, the parameters of the observed series are calculated and then transformed to a lognormal function. This transformation is made to convert non-normal data into normal data through the Markov chain Monte Carlo the data are randomly generated and then the series is transformed via the inversion function. Even though the length of the synthetic series is much longer than that of the observed one (300 years / 68 years), there is a very good match between the main statistical parameters of the two series. They have very close values. It should

be pointed out that, although the coefficient of skewness could not be reproduced so well as the mean, simulated series show tendency of having skew coefficients that vary in wide ranges but tend to approach the observed values when the number of simulated years increases. Non-normal series can be transformed into normal series by using a suitable transformation, simulated and then transformed back into their original distribution.

This model was successful in preserving the main statistical parameters of the observed time series as previously aimed. Summarizing the conclusions of this chapter the Thomas-Fiering approach is suitable for the data generation schemes for simulation of monthly hydro flow data for this work.

CHAPTER SIX

6 EMPIRICAL TREATMENT OF WIND POWER

6.1 Introduction

This chapter draws on relevant sections of the report "Estudos exploratórios para o aproveitamento comercial da energia eólica na região do litoral do Rio Grande do Norte e Ceará: Capitulo II – Potencial eólico no Litoral do Ceará e Rio Grande do Norte para geração de energia elétrica (Exploratory studies for commercial harnessing of wind power in the coastal region of Rio Grande do Norte and Ceará: Chapter II – Wind potential on the coast of Ceará and Rio Grande do Norte for electric power generation) DEFA-EO-RT-002/96. I was co-author of this report with my colleagues Carpentieri and Bittencourt (Bittencourt, Almeida and Carpentieri, 1996)[20].

Data used in this work were obtained from digital anemographs (DFACE/COELCE 1996) and specific information obtained from COELCE (1996). To obtain these data wind speed, direction sensors and NRG LOGGER # 9200 were used, which measure the wind characteristics every second and have a resolution of wind speed of 0.45 m/s and of direction of 1 degree. It makes the calculation of average wind speed and direction possible in 5, 10, 30, or 60 minutes interval. It has autonomous operation and the data are stored in chips to be processed by IBM PC computers.

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[20] The co-authors of the report have given me written permission to use the work on my thesis.

6.2 *New versus old anemometric stations*

Information about the characteristics of wind in Ceará and Rio Grande do Norte have also been obtained from the old meteorological network, basically INEMET-SUDENE and airports. These data, although very valuable, do not always represent appropriate sites. For electric power generation from wind, once they aim to supply information for meteorological studies suitable for agriculture and aeronautics. Moreover, the instruments used have different precisions. When compared with modern digital anemographs, which collect data at every second, they are less accurate.

This fact indicated the necessity of carrying out a comparative study, between the average data registered in old anemographs in the period 1978/1981 in Acaraú station of the Agriculture Ministry (Lat. 2° 53' s and Long. 40° 08' w) (Chesf and Brascep,1987a) and the Acaraú 3 station of COELCE (Lat2° 52' s and Long. 40° 03' w) in the year 1993 measured with modern instruments. This is not a correlation, since the periods are different and it is known that there is a variation from one year to the other. But the wind regime provides a idea of order of magnitude, in the relation between the average electric power of the wind generators, in sites different from the area of Acaraú-CE, as a function of the quality of the basic data used for this evaluation.

a) Old station of Acaraú (Average electric power):

Wind generator Enercon E-40: P1=107.5 kW

Wind generator Tacke TW-600: P2=112.1 kW

b) New station of Acaraú–3 (Average electric power)

Wind generator Enercon E-40: P3=196.0 kW

Wind generator Tacke TW-600: P4=205.4kW

c) Power ratio

P3/P1= 1.82; P4/P2= 1.83

This means that, when the measurements are made at suitable sites and using modern instruments, it is encountered a value which is approximately 80% greater than that found when the measure is undertaken with old instruments inadequately sited. In the work (Rohatgi, 1988) the wind energy group of the Universidade Federal de Pernambuco, performed a correlation between the wind speed measured at the Fortaleza Airport and data collected by a digital anemograph situated at COFECO/CE, 25 km distant from the airport.

WAsP (the Wind Atlas Analysis and Application Program) [21] was used in this work, which with the data of the terrain characteristics and the wind data from COFECO, supplied the wind data without the influence of the obstacles of the area. These wind speed data found were used to determine the characteristics of the wind speed at

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21 WAsP is a PC program for predicting wind climates and power productions from wind turbines and wind farms. The predictions are based on wind data measured at stations in the same region. The program includes a complex terrain flow model, a roughness change model and a model for sheltering obstacles. WAsP was developed by RISO National Laboratory in Denmark.

Fortaleza airport, introducing the conditions of roughness and the existing obstacles in the area of the airport. After processing this information a new data series was determined and it was verified that the ratio between the power obtained with the calculated data is 1.75 times higher than that obtained from the data collected at the airport. This 75% difference illustrates the importance of carrying out adequate measurements for the desired application. This deviation is high and necessarily limits its applicability for investment decisions. This illustrates the large difference in results when two type of instruments have been used for Fortaleza. For the case of this City (in Ceará State), data from suitable instruments have been used. For the area of Rio Grande do Norte State where the comparison has not been possible, the data available have been used and although the potential is good it is expected to obtain better results if new instruments suitable for wind power measurements are installed.

6.3 Theoretical Concepts

The wind power available is the kinetic energy in the time unit of an air mass crossing an area "A", perpendicular to the instantaneous velocity vector "v", is given by the expression:

$$P_d = \frac{1}{2}.\rho A v^3 \qquad (6\text{-}1)$$

ρ = air density (function of the atmospheric pressure and temperature)

Usually, P_d is given in Watt, ρ in kg/m^3, A in m^2 and v in m/s.

The wind power flow is defined as the wind power available P_d by unit area, generally given in W/m^2.

$$F_p = \frac{1}{2}.\rho v^3 \qquad (6\text{-}2)$$

For the electric power calculation at a determined wind speed the following expression can be used:

$$P = \frac{1}{2}\rho.c_p.\eta_M.\eta_G.Av^3 \qquad (6\text{-}3)$$

Where:

P=Electric power (W)

ρ=Air density (kg/m3)

c_p=Power coefficient (ratio between the mechanical power on the axis of the rotor and the available power, Pd)

η_M=Efficiency of the multiplier

η_G=Efficiency of the generator

A=Area of the wind turbine rotor

v=Instantaneous wind speed

When a determined period of time is taken into consideration, the average electric power can be obtained through the following equation:

$$P = \int_0^\infty f(v)\,P(v)\,\mathrm{d}v \qquad (6\text{-}4)$$

Where $f(v)$ is the probability density of the wind speed distribution and $P(v)$ is the power curve of the wind generator at the instantaneous wind speed.

6.4 Wind speed distribution

The distribution of the frequency of wind speed shows for how long wind speeds occur for each of the class's interval, usually, of 1 m/s. In other words, the frequency obtained dividing the number of observations of the wind speed class by the total number of observation made in the considered period.

If the frequency distribution is unknown it can be calculated by the Weibull distribution function, $f(v)$ which expression is given by

$$f(v) = \frac{k}{c}\left(\frac{v}{c}\right)^{k-1} e^{-\left(\frac{v}{c}\right)^{k}} \qquad (6\text{-}5)$$

Where $f(v)$ is the probability distribution, v is the wind speed (m/s), k is a dimensionless shape factor and c is the scale factor (m/s). Figure 6-1 and Figure 6-2 show examples of Weibull distribution.

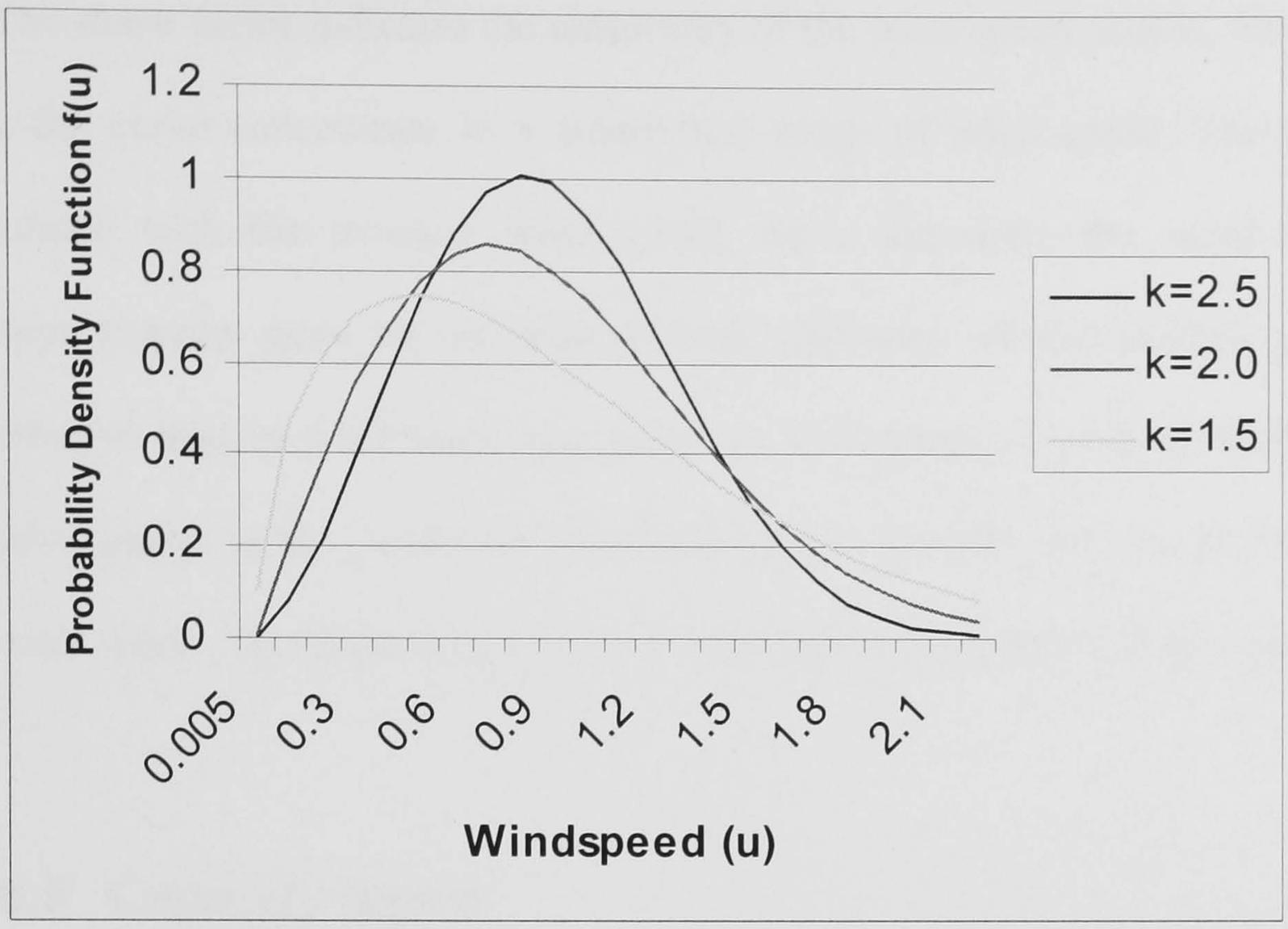


Figure 6-1 Example of a Weibull distribution curve with different shape factors (c=1)

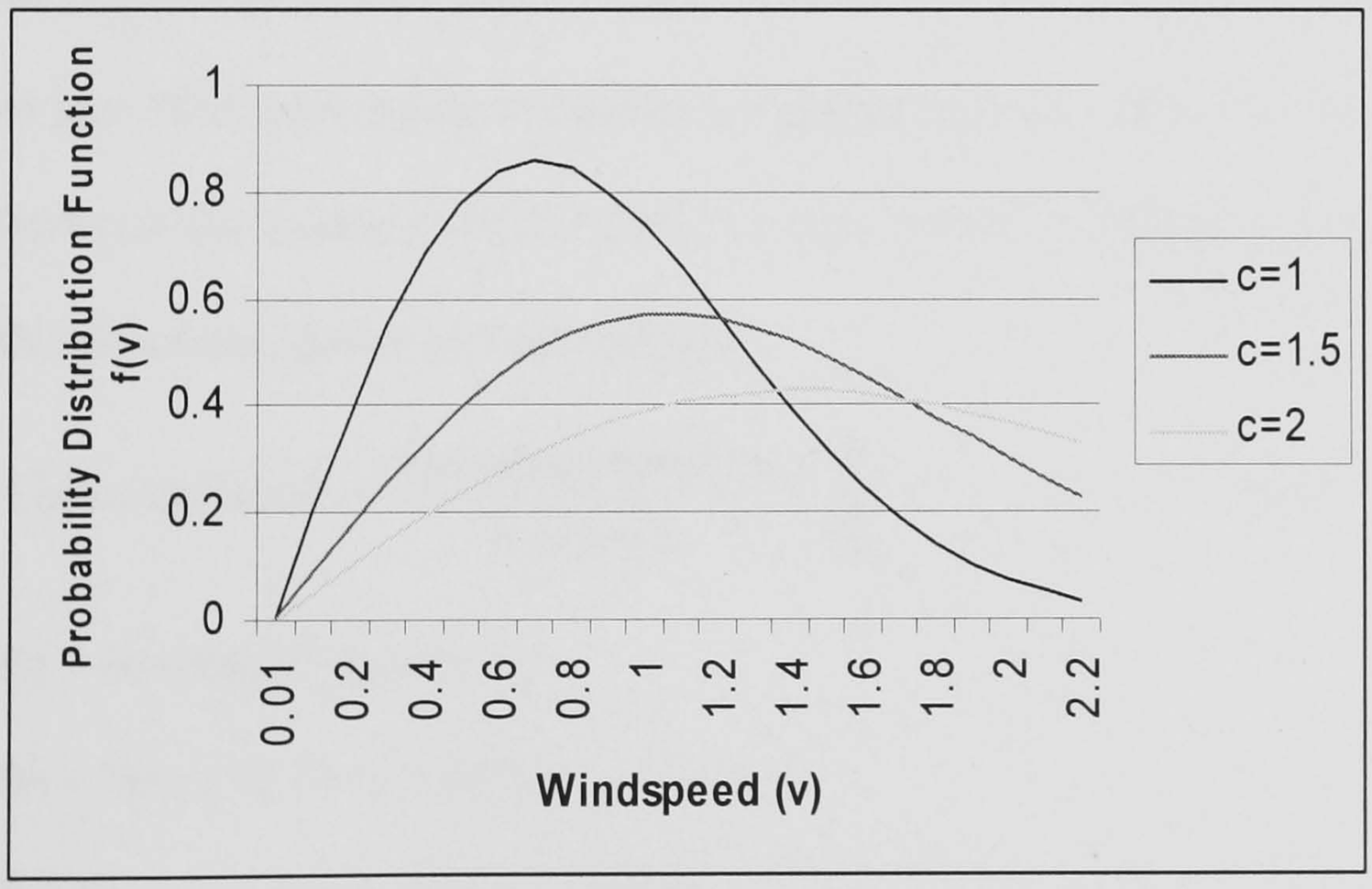


Figure 6-2 Example of a Weibull distribution curve with different scale factors (k=2)

This expression has been widely used in applications for wind power harnessing.

The shape factor indicates the uniformity of the wind speed, that is, for higher values of k the curve concentrate in a determined range of wind speed. The scale factor c is related with the average wind speed. As c increases, the wind frequency curve approximates more to the area of best efficiency of the modern wind generators. Observe that, in wind speed histograms as in frequency curves of Weibull, the average wind speed, in the considered period, does not coincide with the highest occurrence of wind speed. The highest frequency of wind speed coincides with the peak of the curve.

6.5 Capacity factor

The capacity factor is defined as the ratio between the electric power production in a determined period of time and the nominal power. The period can be annual, monthly, or any other previously established (Eggleston et al, 1987) In other words, it is the ratio between the average electric power in the period considered and the nominal power of the generator, given as a percentage.

$$CapacityFactor = \frac{EnergyGeneration}{P_n x Hours} = \frac{P_a}{P_n} \qquad (6\text{-}6)$$

Pa – Average Power (kW)

Pn – Nominal Power (kW)

For one year period Hours = 8760

This fraction represents the percentage of the energy that could have been generated at continuous full-power operation during the same period.

In this work the terminology adopted was the one used in the (Eletrobrás, 1994). In the latter, production losses resulting from the wind farm efficiency from problems related to the machine maintenance (availability factor) are considered. The capacity factor does not take into consideration these losses and is similar to the one adopted in the "software" adopted here.

6.6 Influence of the height and of the surface roughness

The wind speed changes with the height and with land roughness. As a general rule the wind speed increases as height increases. Natural and artificial obstacles alter the wind flow. The exponential equation, which relates its velocity with the height in relation to the ground:

$$\frac{v}{v_o} = \left(\frac{H}{H_o}\right)^n \qquad (6\text{-}7)$$

where v_o is the wind speed at height H_o, v is the wind speed at height H and n is a coefficient that varies from 0.10 to 0.40 and represents the roughness of the terrain. It is common to use this expression in the generic form with the exponent n=1/7. The variation of the speed as a function of the height can be represented by the logarithmic law:

$$\frac{v}{v_o} = \frac{\ln\left(\frac{H}{Z_o}\right)}{\ln\left(\frac{H_o}{Z_o}\right)} \qquad (6\text{-}8)$$

where Z_o is terrain roughness parameter; it has units of meters

This expression adjusts well for heights in the range 30 to 50 m.

The following table indicates some values of Z_o and n as a function of the type of surface.

Type of surface	z_o (meters)	n
Flat (sea, sand, snow)	0.001-0.02	0.10-0.13
Smooth (short grass, wheat fields or other cereals)	0.02-0.3	0.13-0.20
Rough (woods, urban areas)	0.3-2	0.20-0.27
Very rough (city, buildings)	2.10	0.27-0.40

Having obtained a basis for estimating wind velocities (adjusted for surface roughness) with hub height, it is necessary to convert the wind data available to power. Since wind power is proportional to the cube power of wind speed the following equation has been used, which is based on equation 6.7.

$$\frac{E}{E_o} = \left(\frac{H}{H_o}\right)^{3n} \qquad (6\text{-}9)$$

where, 3n varies between 0.30 and 1.20.

6.7 Methodology used

From the hourly wind speed data and from their frequency distribution in the study period, associated to the power curve of the wind generator, it was possible to use the

data of the anemometric stations through the computer program ALWIN[22]. This way average electric power and capacity factor data have been obtained, for the wind generators pre-selected. The next step was to choose sites which capacity factor equalled or surpassed average capacity factors of American wind farms in the year 1993 (20% to 25%) (U.S. Department of Energy 1994).

From the average electric power and, given the measurement period of a station, the electric power which wind farms operating under those conditions could generate was quantified. A use of 2% and 10% of the coast strip of the Ceará and Rio Grande do Norte States has been considered.

COELCE measurement stations were installed envisaging the wind potential for electric power generation, as opposed to the measurement stations of the Climatologic Network of Northeast Brazil. Hence, some differences in the characteristics of wind of these stations. For Ceará Coast was possible to analyse these data with more details, due to the availability of elements supplied by the station COELCE, more modern installed with the objective of electric power generation. The same did not occur for Rio Grande do Norte State, where the data were obtained from the climatologic Network of Northeast Brazil.

6.8 Area studied and data used

Generally wind is more intense over oceans than over continents because in these the vegetation and the landscape contribute to reduce the speed of the air. Normally, wind

[22] ALWIN for windows is copyright software of DEWI and Ammonit, which links the data of a wind potential site with the technical data of a turbine and provides energy prognosis.

speed reduces from the sea to inland. The coast and islands, due to the good wind conditions, generally present themselves, as favourable zones for wind potential harnessing. The Northeast's coast is one of the regions where the most favourable wind speeds have been registered, hence the decision to study Ceará and Rio Grande do Norte.

6.9 Areas considered

Initially Ceará state was considered, a costal strip of 573 km x 10 km, covering 10 anemometric stations installed by COLECE. Regarding Rio Grande do Norte (RN), only data of (CHESF et al LTDA., 1987) were available[23], that is, Macau and Natal stations. Later on, sites where the wind turbines presented a capacity factor superior to 20% were adopted. The isolines of wind power in RN were observed as well. From this information and the coastal strip studied limited to an area defined by the distance of 5 km from the sea was established. This was based on the coverage measurement area of Acaraú station in Ceará. Including, therefore, 573 km of the Ceará coast and 244 km of the Northern coast of RN, limited at the Eastern extreme by the city of Touros.

6.10 Anemometric Data

The measurement instruments used in Ceará were adjusted to supply average wind speed in one hour intervals. In this study, to calculate the roughness parameter, Z_o.

[23] This potential assessment gives a good indication of the potential and promising areas but it is very limited for decisions on investment. Specific measurement methods must be used for the latter.

when available, average wind speed at different heights was used. Weibull distribution parameters have also been used, corresponding to the monthly data. The data have been obtained from DFACE/COELCE (1996) and COELCE (1996). Data used for RN are derived from the frequency distribution, that is, the quantity of hours which each wind speed occurs at 1 m/s intervals. These data have been collected at a height of 10 m, in the period 1977 to 1981 (CHESF and Brascep, 1987b).

6.11 Temperatures and elevation of the stations

To correct the air density, data concerning temperatures and elevation of the anemometric stations have been used. Data of the average temperature have been obtained from IBGE (1994) from the Eletrobrás (1988) and (Ministério da Agricultura e da Reforma Agrária, 1992). Temperatures of Bitupitá, Camocim, Coité, Copan, Paraipaba and Piracurú stations were estimated from data of near localities. Values of the elevation of the stations have as source the report DFACE/COELCE (1996) and the National Atlas of the wind Potential (Ministério da Agricultura e da Reforma Agrária, 1992)

Air density is generally expressed by the formula:

$$\rho(kg/m^3) = \frac{0.3488 \times atmospheric\ pressure\,(mb)}{temperature(K)} \qquad (6\text{-}10)$$

The average atmospheric pressure of Fortaleza in 1994 was 1008.7 mb and the average temperature 27.2° C (IBGE, 1994) which corresponds to an air density of 1.17 kg/m^3. Changes in the average temperature, of 3° C, can result in an air density variation and consequently a power production reduction of 1%, which is negligible for the aims of

this work. To illustrate the point the city of Fortaleza presented in 1994 a maximum average variation of only -1.2° C compared to the yearly average.

6.12Wind generators and correction factors

The types of wind generators used in this study are installed today in several countries with big acceptance. They are German machines of different conceptions. Turbines E-40-500kW of Enercon are pitch controlled, that is, the blades spin around its axis seeking for the best angle to harness the wind, besides, they are wind generators of variable speed, they do not use multiplier[24] and have a rotor diameter of 40,3m. Turbines Tacke TW600-600kW, have a fixed pitch, stall regulation, constant rotation for each of the two generation stages, 200 kW and 600 kW, respectively. Its rotor has a 43m diameter.

Both wind generators generate electric power in the 3 m/s to 25 m/s wind speed range.

In wind farms several types of machine layout are employed. The one adopted here is the 5D x 7D, that is; the space between wind generators is 5 rotor diameters in the orthogonal direction in relation to the prevailing wind and of 7 diameters distance between rows of wind turbines. Studies for wind farms require much more details than these here commented. Simulations with different layouts and several models of turbines, wind rose studies, vibration of turbines and towers, acoustic, etc., are beyond the aims of this work.

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[24] This results in a more efficient conversion due to the avoided losses in the gears of the multiplier.

Efficiency of Wind Park varies in function of several causes, among them, those caused by aero dynamics interference between rotors, layout and number of machines, electric power transmission in the wind farm, and others. In Figure 6-3 average efficiencies of wind farms for different layouts are presented. The model adopted here has an efficiency of 92%. A 90% value was adopted in the evaluation of the generated electric power, since in the figure electrical losses have not been considered in the transmission inside the wind park and the utilisation of 60 Hz wind generators.

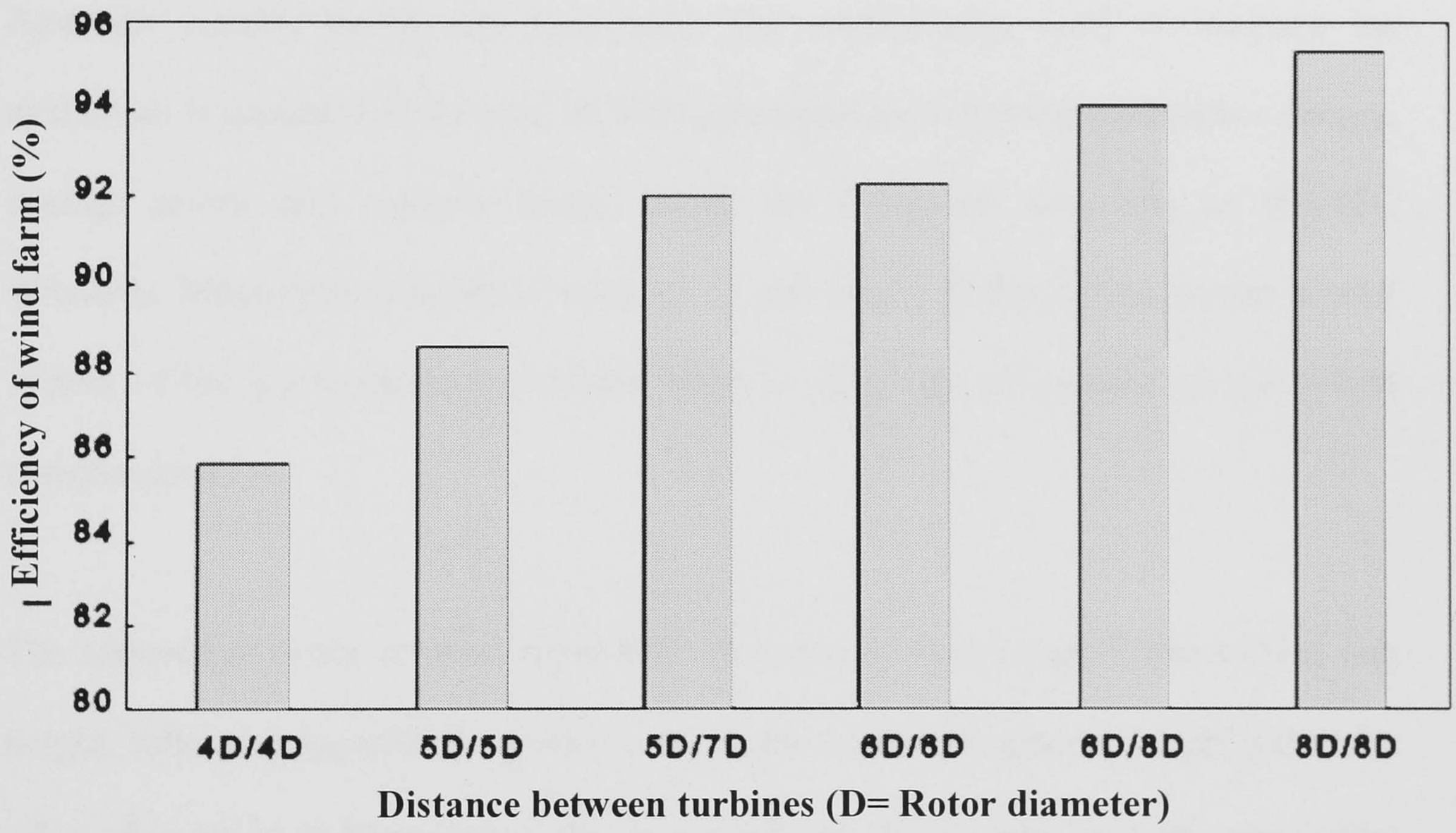


Figure 6-3. Efficiency of wind farms in function of layout.

The availability factor is another loss element to be considered in the energy production. It is defined as the ratio between the time the machine is available for operation and the total period under consideration. It is usually calculated with base on the number of

hours in the year. This factor is presented in percentage and takes into account the time of interruption caused by failures or corrective or preventive maintenance. which are this way characterised by this index. Here, a 95% availability factor has been adopted; today it is a representative value of the technology of present wind generators.

6.13 Elaboration of calculation

To elaborate most of the wind potential evaluation the computer program ALWIN, developed by the Deutsches Windenergie-Institut (DEWI), Wilhelmshaven and Ammonit GmbH, Berlin, has been used. The methodology used to complete the evaluation is presented in the text. ALWIN calculated the following parameters: energy, average power and capacity factor, which are calculated according to IEA/IEC standards. Measurement height of wind speed, hub height of the turbine, power control system of the wind generator (variable pitch or stall) and air density are taken into consideration.

The conversion factor of wind speed from the measurement height to the turbine hub height, follows a logarithmic profile used in the surface roughness length parameter (Z_o), of equation (6.8) and when this is not defined, the program uses the exponential equation (6.7) with n=1/7.

It presents the wind speed frequency curve as well, which is corrected considering the wind measurement height and the machine hub height, using for this, the same conversion factors.

The electric power of the wind generator is corrected for the local air density, applying the appropriate correlation according to IEA/IEC standards recommendations for power curve measurement. Usually the power curves of wind generators follows standard atmospheric conditions, that is: temperature 15° C, atmospheric pressure 1013 mbar and air density 1.225 kg/m3.

The program gives the average power of the wind generator for the observed period, in a determined site, and this value is converted to estimated energy production in annual terms. It presents the capacity factor and the Weibull distribution parameter for the turbine hub height, wind speed conversion factor and the characteristics of the site.

6.14 Evaluation of the potential in the Ceará coast

Data of ten anemometric stations of COELCE have been used, from which monthly values of Weibull parameters have been extracted. Besides these factors, monthly wind frequencies at COFECO station in the period 1991 to 1992, wind speeds at different heights which enabled the calculation of the surface roughness parameter(Z_o) to be carried out, the local data of each station which made it possible to correct the air density and the power curves of the Enercon wind generator – E40 and Tacke TW600,

made the base for the information that has been used or generated by the program ALWIN, obtaining monthly data of average electric power and nominal capacity factor, for each turbine and station considered.

The values for Acarau-3, in January, February and August/93, have been obtained by correlation of the data of average wind power flow (W/m^2), in the period 1977 to 1981 (CHESF et al 1987)

For this, the method of linear regression function, which expressions are shown below, was adopted:

Turbine	Regression Function
Enercon - E40	$y = 1.0628x + 100.1605$
Tacke - TW600	$y = 1.1293x + 104.3588$

In the expressions above x and y are the values of the power flow in W/m^2 and the average electric power in kW respectively.

R=0.934 (coefficient of correlation calculated).

The values of July and August/95, of Bitupitá station, have been obtained from the average monthly wind power flow measured at 10 m (DFACE/COLECE 1993) respectively 47 W/m^2 and 199 W/m^2. The conversion factor adopted to adjust the wind speed from 10m to 50m, turbine hub height, was 1.401, obtained from expression (6.8). Using equations (6.2) and (6.3), the following results are obtained:

Turbine	Average Electric Power (kW)
Enercon - E40	62.0 (July/95) – 262.5 (August 95)
Tacke - TW600	70.6 (July/95) – 298.8 (August 95)

Considering the average monthly power (P) and the nominal capacity factors (Fc), the efficiency of the wind farm of 90% and the availability factor of 95%, the total capacity factor (F) was calculated, for the selected sites. From these (F) values those which are higher than 20%, (US DOE, 1994) and (CHESF et al, 1995), have been selected as preferred locations for the installation of wind farms. These way five stations have been chosen to represent the characteristics of wind to be adopted for the hypothetical wind farms.

6.15 Electric Power Production in Ceará Coast

The evaluation of the potential for electric power production in the coastal strip of Ceará requires a definition of the total area possible of implementation of wind farms. For this aim, Acaraú station has been considered, 5 km distant from the sea and a coastal strip of 573 km of length. In this area it was assumed that 10% could be used to harness wind power for electric power generation.

Next the layout of the machines and the number of turbines per square kilometre has been defined. A layout of 5x7 diameters (5Dx7D) has been chosen and there are five characteristic wind farms, 2% of area occupied by a typical wind farm has been adopted, a total of 10% of the total area chosen 2865 km^2 (573 km x 5 km) or

$$(573\ km\ \text{x}\ 5\ \text{km})\ \text{x}\frac{2}{100} = \frac{573}{7.071}\ \text{x}\ \frac{5}{7.071} = 57.3\,\text{km}^2,$$

Which represents the area of a rectangle proportional to 2% of the coastal strip considered.

The number of wind generators possible to be installed inside a rectangle which represents the area considered can be found by the expression:

$$n°of\ machines = (\frac{length\ of\ rectangle}{5D} + 1)(\frac{width\ of\ rectangle}{7D} + 1)$$

ENERCON: 5D = 201.7m ; 7D = 282.1m

$$n^o\ \text{of machines} = \left(\frac{81{,}034.4}{201.5} + 1\right)\left(\frac{707.1}{282.1} + 1\right) = 403.15x3.50$$

Only integer numbers must be considered, that is: n=403 x 3 = 1209 wind generators

TACKE: 5D = 215m; 7D = 301m

$$n^o\ \text{of machines} = \left(\frac{81{,}034.4}{215} + 1\right)\left(\frac{707.1}{301} + 1\right) = 377.9x3.3$$

Considering only integers: n = 377 x 3 = 1,131 wind generators

The above numbers represents a density of wind generators of 21.1/km^2, type Enercon, and 19.7/km^2 type Tacke.

The evaluation of the average wind potential generation is given by the expression:

$$E = h\ x\ A\ x\ a\ \ x\ n\ x \int_0^\infty f(v)\,P(v)\,dv \qquad \text{(XI)}$$

where:

h – is the number of hours considered

A- availability factor

a – wind farm efficiency

n – number of wind generators

$\int_0^{\infty} f(v)P(v)dv$ - average electric power (6-11)

For 10% of the adopted area, the results indicate a yearly energy production of 9,548.6 GWh, using Enercon E-40 turbines of 500 kW and a production of 9,406.4 GWh with wind generators Tacke TW600 of 600kW, in 10% of the considered area.

Graph 1 shows the electric power production, in one year, for the typical wind farm, using wind generators Enercon E-40.

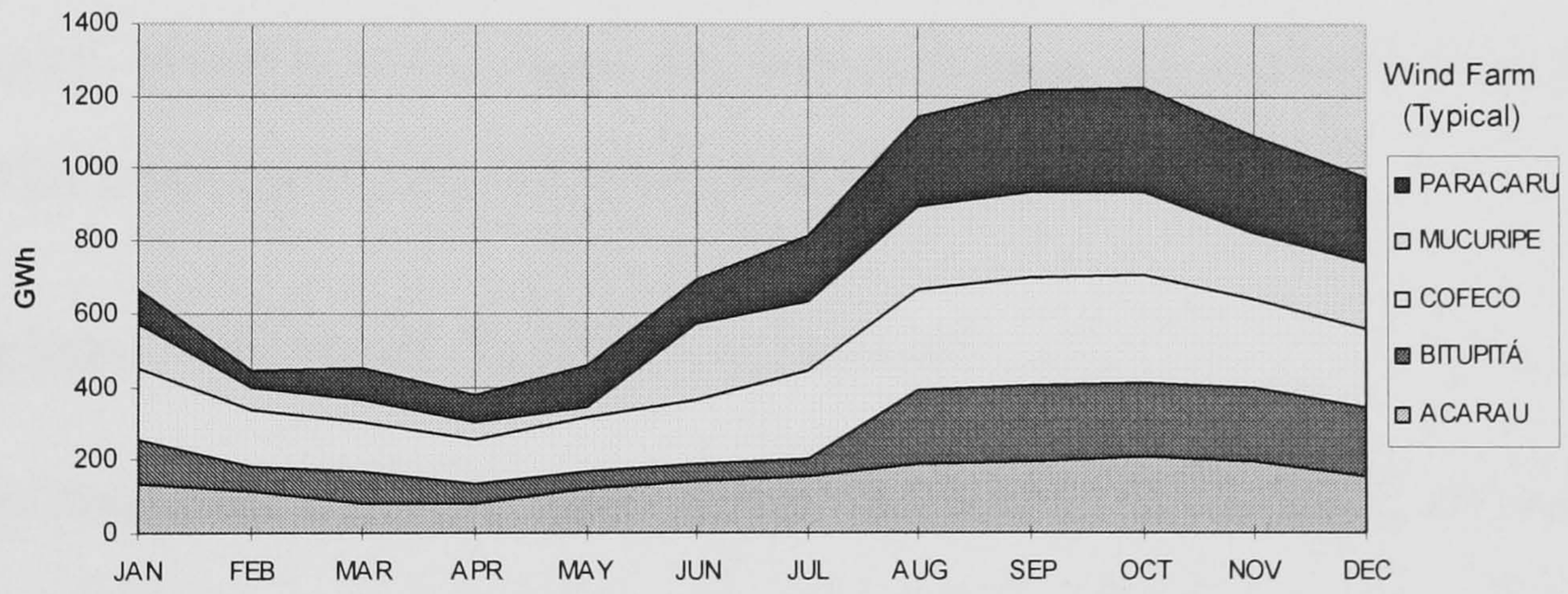


Figure 6-4 Energy generated for the simulation of five wind farms

CHAPTER SEVEN

7 The modelling Tool of System Dynamics

7.1 Introduction

System Dynamics is as its name implies a methodology used to analyse the dynamic of systems undergoing change. It is particularly well suited for the analysis of complex non-linear systems with stock and flows, with multiple feedback loops and subject to multiple exogenous stimuli, both systematic and stochastic, in different parts of the system. The methodology has been used extensively in the areas of business, engineering and the environment. It has not to my knowledge been applied to the analysis of hydro-electric systems using wind and thermal energy as complementary power sources; however, as it is hoped this thesis will show, it is a good tool for this purpose. This chapter provides a very brief introduction.

7.2 A short History of System Dynamics

The methodology was created by Jay Forrester in the 1960s for studying the world around us. System dynamicists look at world as a whole – "whole system" analysis - instead of studying it by breaking it up into smaller units as it is usually approached. The methodology is used through the principle how objects interact with each other. At the Massachusetts Institute of Technology. Forrester devised a way of modelling dynamics systems using non-linear control theory. Through this methodology, it became possible to model time delays and feedback existing in industrial systems, to cope with multiple

inputs (such as arise from rainfall, wind, and policy variables in the model used in this thesis), outputs and dynamic interconnections.

Initially this modelling technique was used for operational management decisions and inventory control. With the advances on computer processing power in the 1990s the simulation method extended to applications in industry and market. System dynamics later became an important discipline in the syllabus of the leading business schools (Larsen et al, 2001).

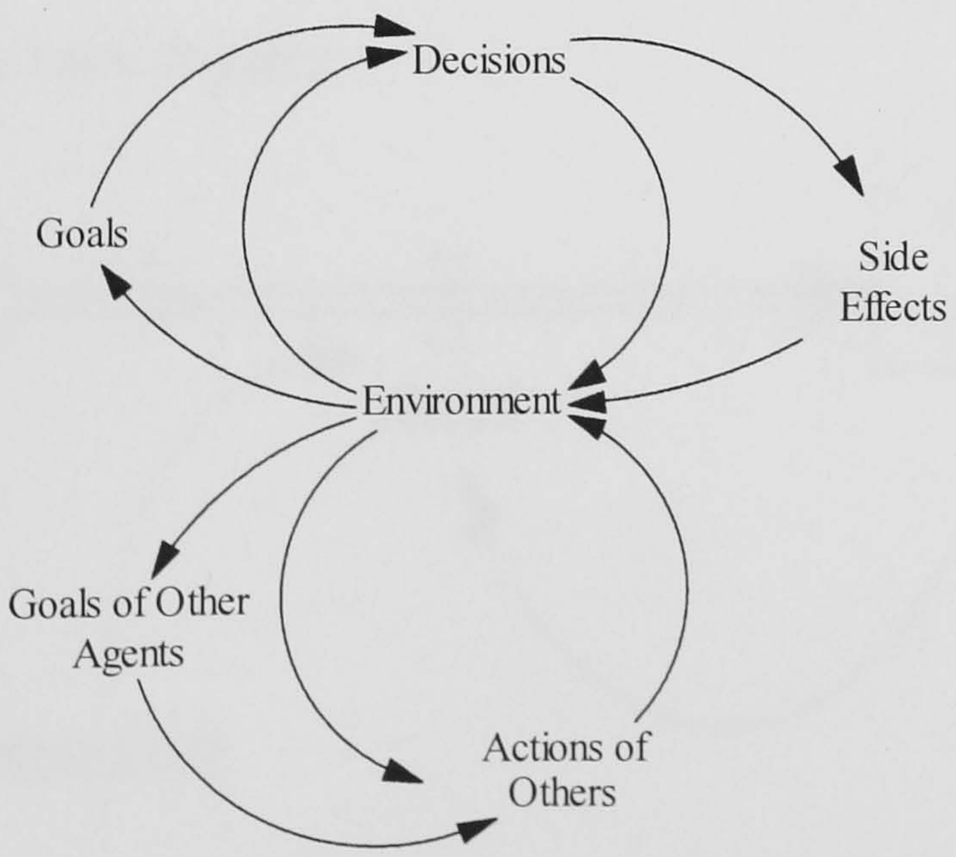
A computer simulation developed by Sterman (Senge et al, 1990) to analyse a specific company suggested that basic problems of that company were not caused by external factors, as was thought within the company but stemmed from within. Brilliant individual strategic ideas, it was observed, were frequently in conflict with each other. To avoid the problems managers needed to learn about the dynamics of organization they controlled. These computer models simulate the behaviour of the corporation based on the interactions in the firm with markets and with the competition. They showed that the survival of an organization required constant learning by decision-makers who will then understand the dynamics of the environment in which they operate and adapt to changes. The simulation method is now utilized as a tool to facilitate managers to understand their organization, develop scenarios, and understand future possibilities rather than to predict them (Larsen et al, 1997).

In the electric power industry, this has proven to be a useful tool to make high level managers understand the behaviour of companies in the new deregulated market (Gary et al, 2000) and assist them in the implementation of strategic policies.

7.3 Some applications

In the new competitive environment after deregulation where the former monopoly companies face increased competition the ability to learn faster than their competitors is the only source of advantage these companies can harness. (Lomi et al, 1999). The suggested approach as described by Ackere (Ackere et al, 1993) firstly analyses an issue at a very aggregate level, every element of the process being represented as either by a stock (store) or a continuous flow. These flows are regulated by converters, which represent policy functions.

SD has been extensively used in the policy area for its ability to represent feedback chains. Sterman (2000) exemplifies with the policy resistance feedback loop.



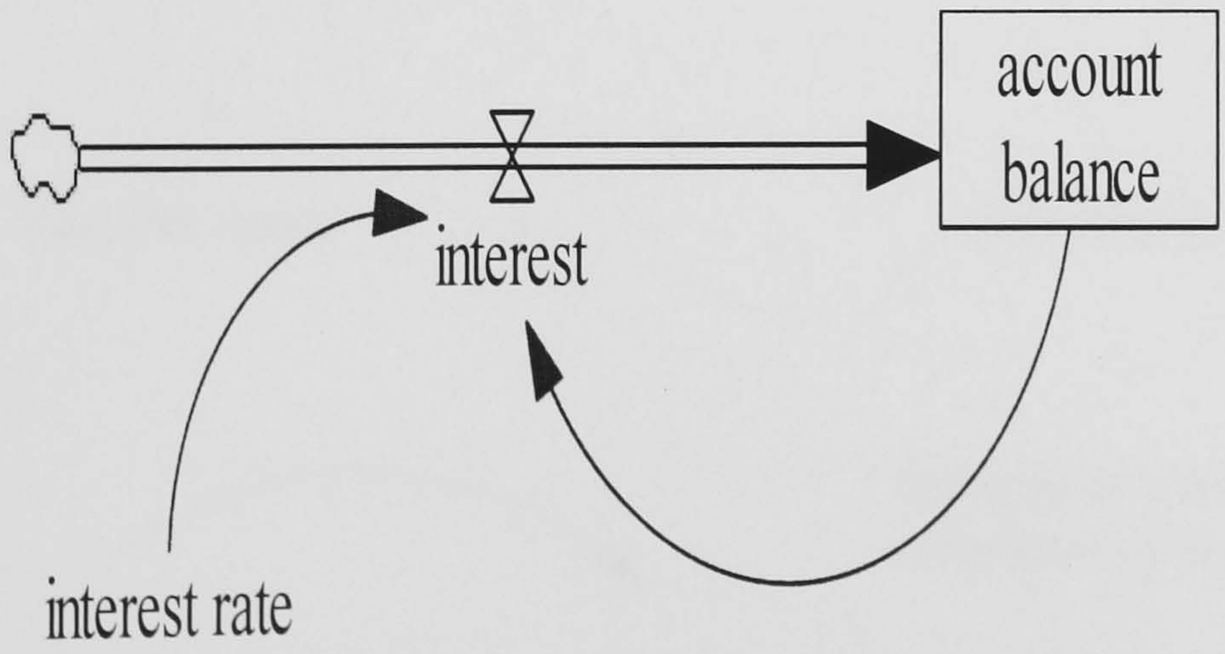
In the analysis of policies applied for transportation or energy option, example in the figure, it is seen that our goals influence our decisions, which by its turn influences the environment, which will cause changes to the goals of other agents and their actions. Our activities can also produce side effects. As in a time dependent process our decisions today will influence our goals in the future.

7.4 Planning the model

The development of the model begins with efforts to define the problem and the reasons of the analysis. Then the main variables and their characteristics are identified: some variables are stock and other flows. Next, the cause and effect relationships—the inter-connections—between the variables are explored. With these definitions, the stock and flow diagram can be built.

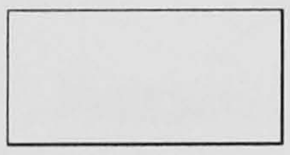
7.5 Stock and flow diagrams

The essential components of system dynamics models are stocks and flows. A classic example (Ford, 1999) (Ventana Systems, 2004) of a simple system dynamics model is the bank account.



This model represents the dynamics of a bank account where only the interest rate is added. The box variable or level represents the storage in this case balance, the valve or rate symbolizes the control of the flow in this case the interest accrued, the variable represents the interest rate. The parallel lines represent the flow of material in this case the money from the cloud to the stock. The line connecting interest rate to interest is called arrow or connector and transfers information from one variable to another. The key variables in a model are the stocks. In this example, the balance provides the feedback generating interest. The higher the balance more interest is generated causing an increase in balance and son on.

Symbols



Box Variable — used for Levels or Stocks. It is where the storage of flows are usually represented. It can be material, information, financial, etc…

Variable name

Variables (Constants, Auxiliaries and Data).



Straight or curved arrows transmit the information to Auxiliaries and rate equations.

7.6 Causal loop diagram

Causal loop diagrams (CLD) are used for representing the feedback structure of the problem under study. CLD is a way of communicating the most important components and interactions in a system (Richardson, 1986). CLD can be used to represent diagrammatically feedback loop in a system. They show links among variables to express the relationship cause and effect. The principles used to construct these diagrams are:

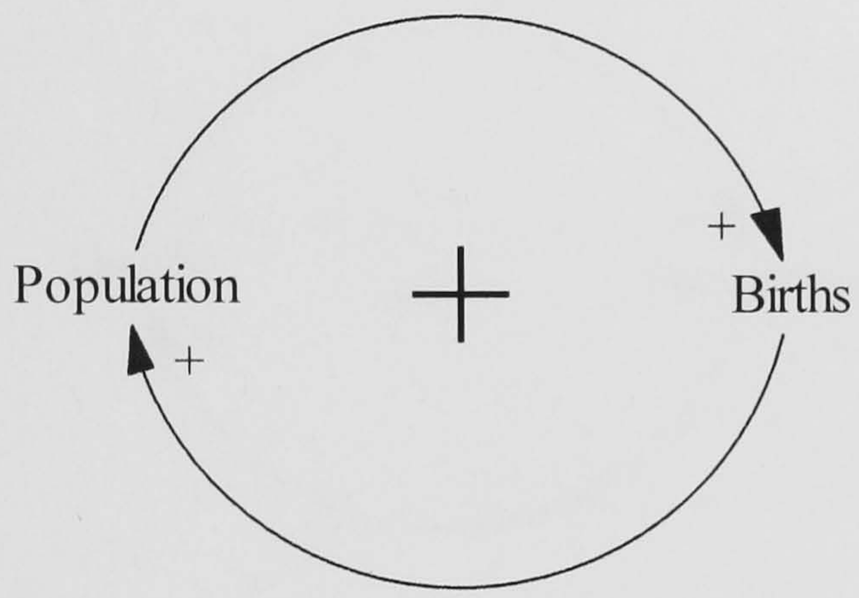
1) When a increases b increases, a positive effect related to the cause is indicated by the + sign. Thus, an increase in the population cases an increase in the number of births. The arrow shows the causal relationship.

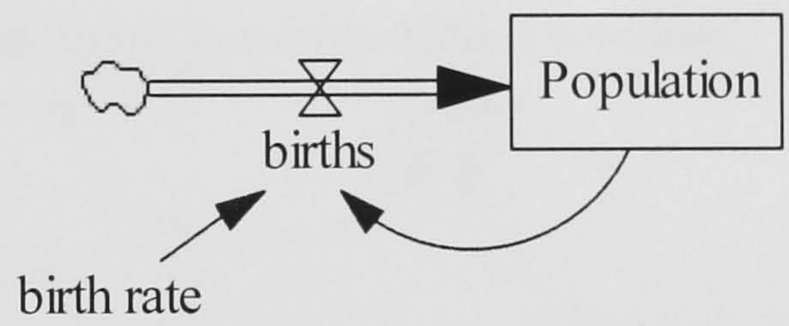


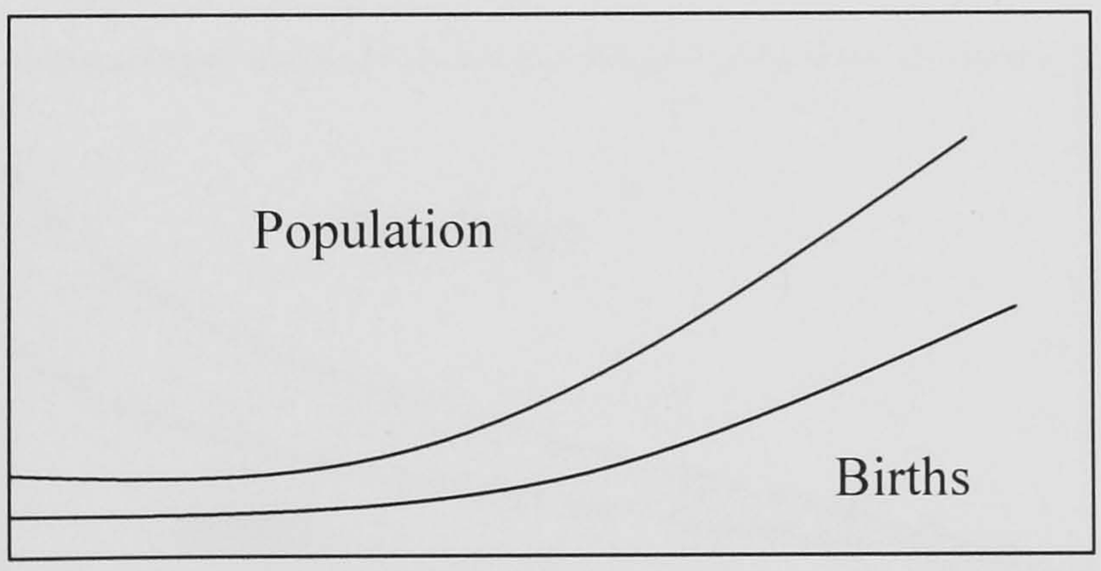
2) When a increases b decreases, a negative effect related to the cause is indicated by the – sign. Therefore, if only one factor is considered to cause deaths, the higher the number of deaths the lower the population.



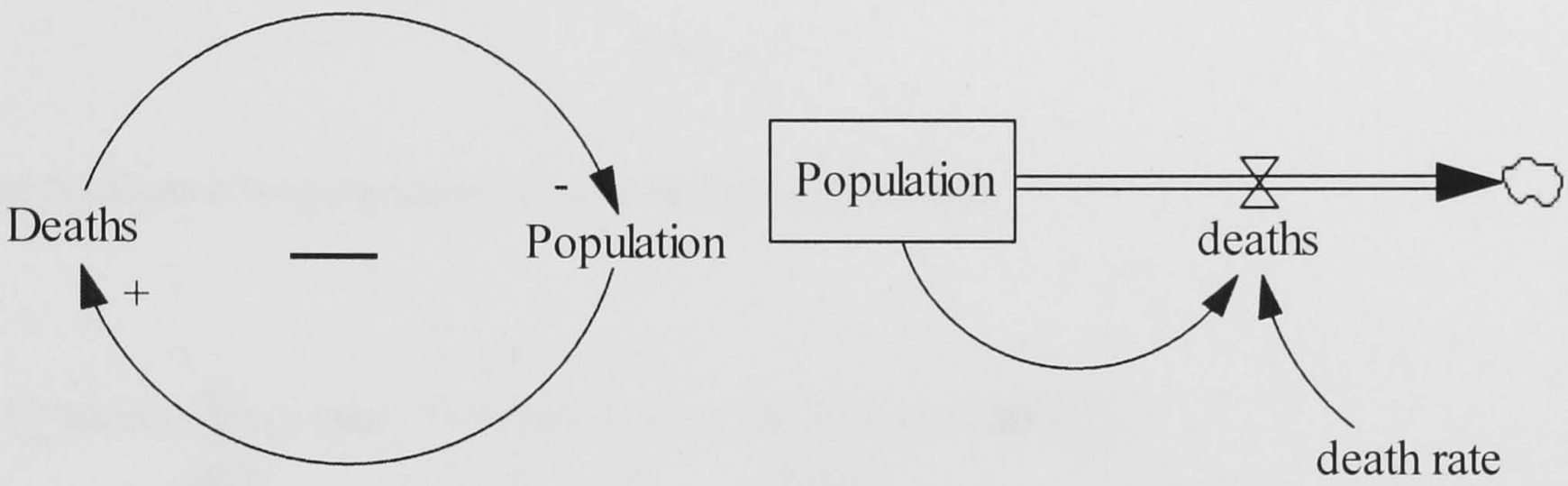
3) When all signs in a loop are positive or there is an even number of negative signs the loop is a positive feedback loop also denominated reinforcing loop. A higher population will have more offspring, which will add to the population, leading still to more births, and so on. A CLD summarizes the feedback relationship population and births. An increase in population leads to an increase in births a decrease in population leads to a lower numbers of births. The + signal in the loop indicates that it is a self-reinforcing loop.

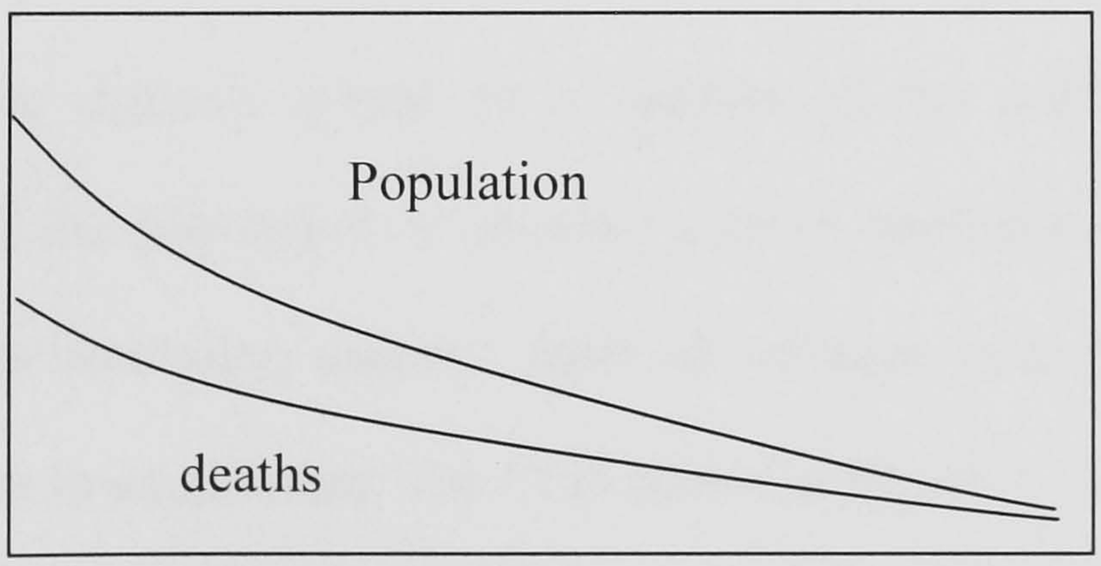






4) When there is an odd number of negative signs, the loop is a negative feedback loop also named balancing loop. As the population grows, other negative loops will cause the opposite effect of the births, e.g. space limitations, food availability, etc. These will increase the number of deaths. An increase in population leads to an increase in deaths, which reduces the populations. A – sign in the loop indicates that it is a balancing loop if the deaths loop were the only one the population would gradually decline.





SD is based on the fact that all systems are composed by a set of positive and negative loops and they interact with each other.

The complete model for this simplified case would be a combination of the two loops shown.

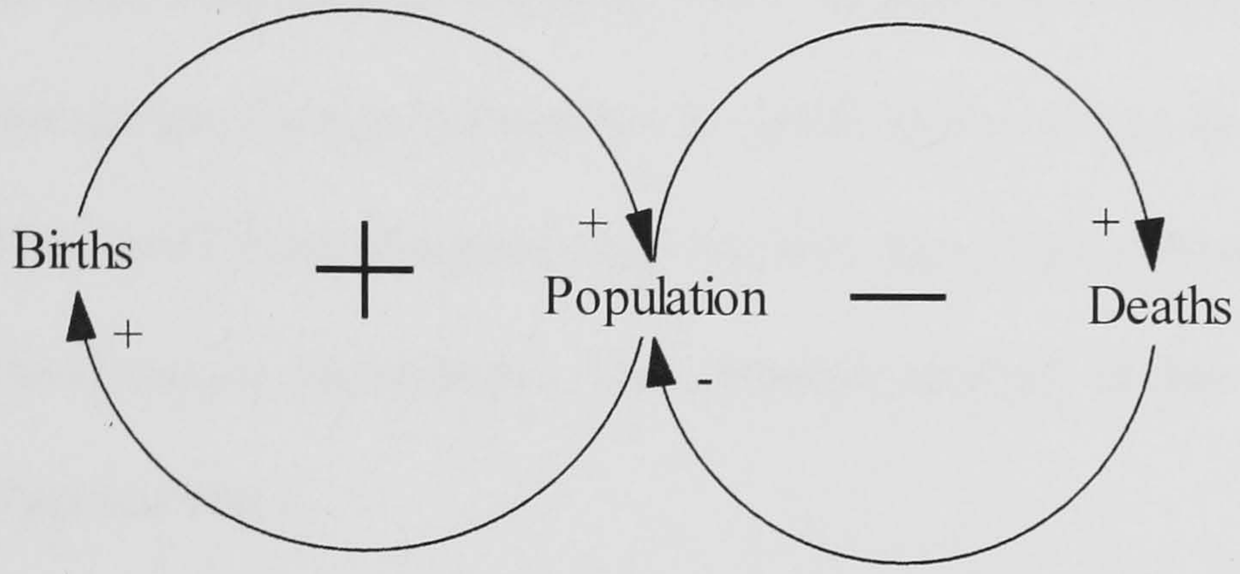


Figure 7-1 Causal loop diagram for the population dynamics

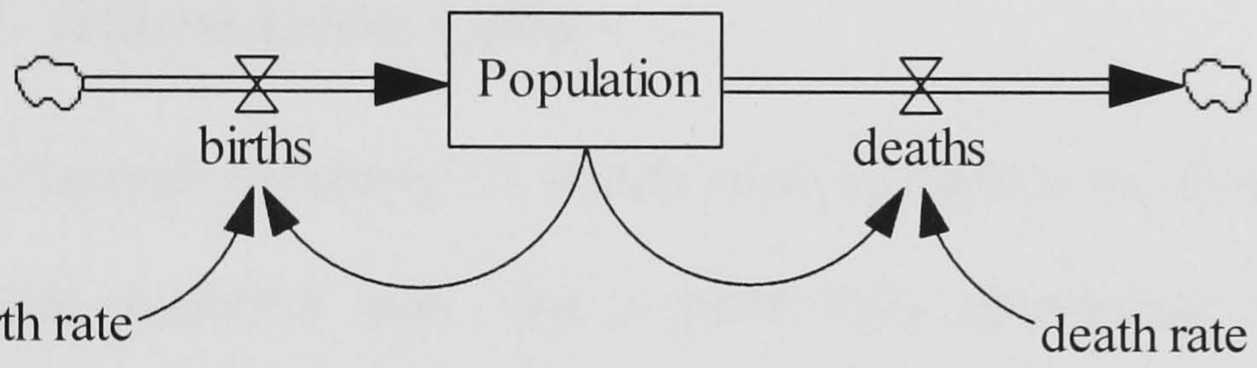


Figure 7-2 Vensim diagram for the population dynamics

The resulting diagram would be a function of the prevailing loop, which would determine if the population is growing positive feedback loop is stronger, or if the population is decreasing negative feedback stronger, or if the population is stable the two loops are in equilibrium. The CLD shown in Figure 7-1 can be used during analysis and discussion of the problem. Figure 7-2 shows the Vensim model for the same problem. Note that when the casual loop is used to plan the modelling of a system only the general ideas need to be inserted. This is not apparent in the example, as it is a very

simple one. Therefore, the model itself will include more details and variables than those shown in the CLD.

Several commercial software, such as Powersim (Powersim Software - The Business Simulation Company) and Stella (ISEE Systems) can be used for this type of modelling. They read these diagrams and convert them into differential equations, which describe the dynamic interactions. The software adopted in this research was Vensim (Ventana Systems Inc.).

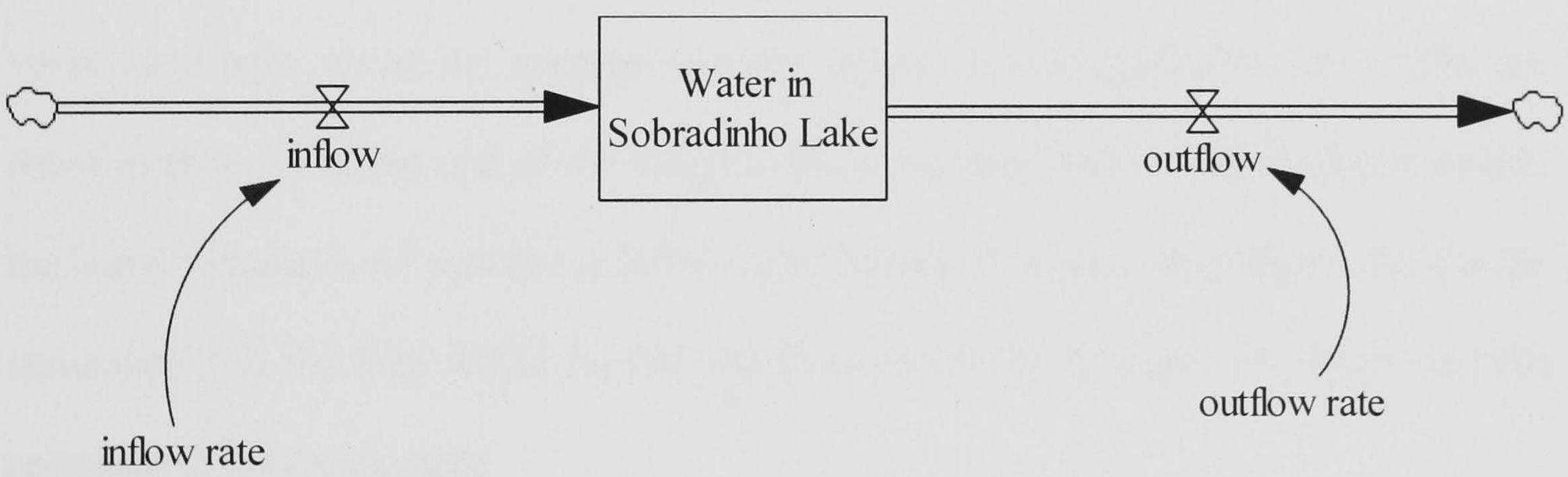
7.7 Sobradinho Lake

The 'bathtub metaphor' is widely used to explain the dynamics of stock and flow in System dynamics uses, and is particularly appropriate for hydro systems. Here a reservoir is going to be used for an example of a construction of a simplified model. It will be elaborated on at greater length and detail in the next chapter.

Sobradinho reservoir was built to regulate the São Francisco River in a several years basis. So it controls flooding of its neighbouring cities and stores water for electric power generation in dry seasons. Filling the reservoir flooded an area of approximately 4214 km^2. These areas included cities of Casa Nova, Remanso, Sento Sé e Pilão Arcado, and rural municipalities of Juazeiro and Xique-Xique. This caused social and environmental problems.

The inhabitants of these locations, approximately 70 thousands people needed to be resettled. The lake is one of the biggest artificial reservoirs in the world. It is used for fisheries, tourism, transportation and electric power production. In this model it will be assessed if the reservoir could keep a steady electric power generation to meet a constant demand for electricity for a 20-years-period (Portal do São Francisco, 2004). To simplify this initial exposition, water inflow will be considered constant and equal to the average historical value and the load will be that considered constant.

With January 2004 load considered as constant and all inflows being used only for electric power generation. The purpose of the model is to project the future water volumes available in the reservoir after 1 year operation starting with the reservoir with 50% of water stored.



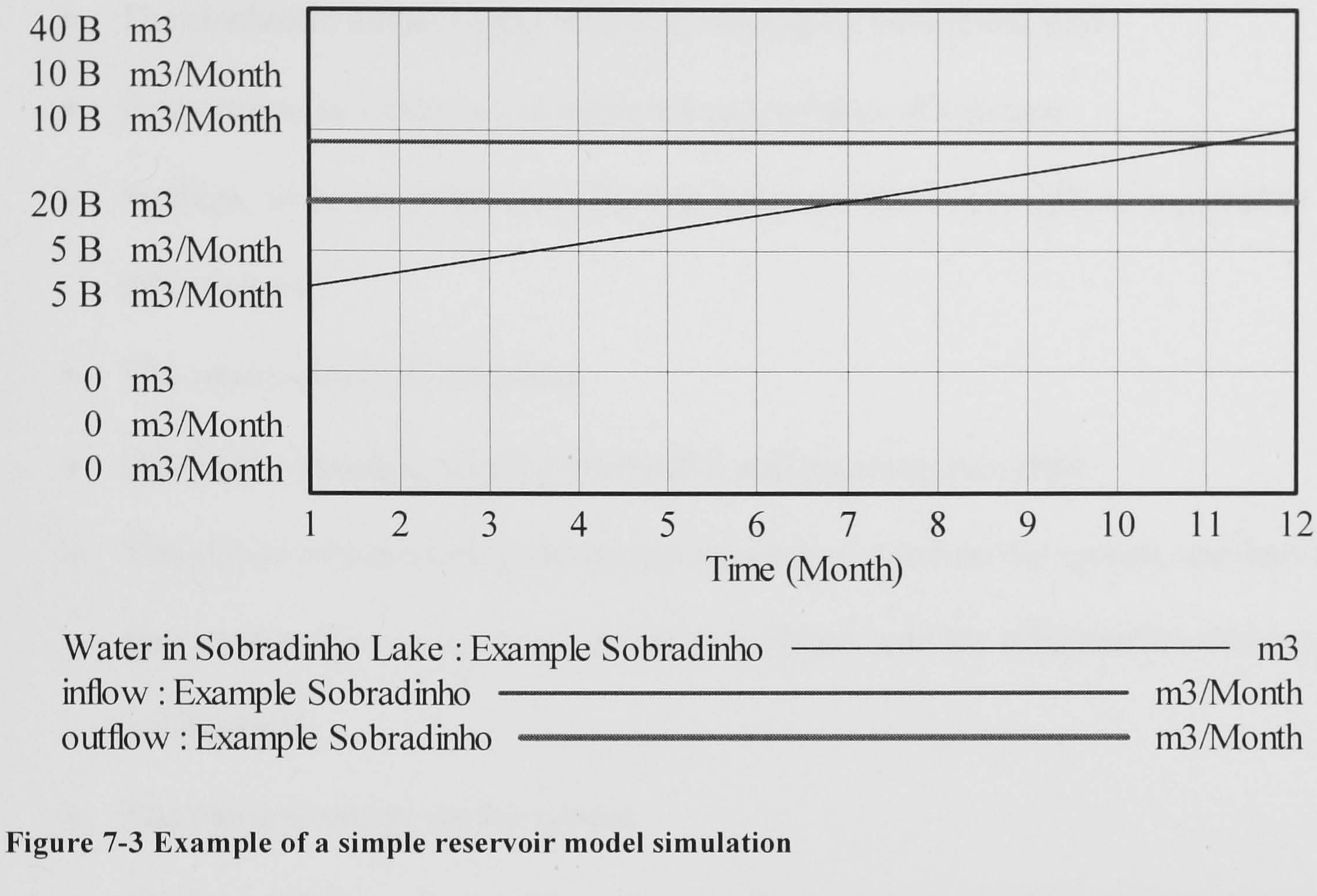


Figure 7-3 Example of a simple reservoir model simulation

The model does not include evaporation, precipitation and other flows. The numerical value have been set at the average monthly values. The equations for the model are listed in Box 7-1 at the end of the chapter. The time step used for the model is month, the water volume is m^3 and the in inflow is m^3/month. It is seen from figure that for the simulated case the lake would be full and there would be spillage. The latter was not represented in this example.

It is observed from the initial results that the model is a very poor representation of the system. The water in Sobradinho Lake increases steadily and if the simulation was extended to two years it would be higher than the lake capacity. This first model provides an idea of the modelling process only.

In practice it is necessary to allow for the following complications:

- The stochastic inputs (water inflows), varying by month and year
- Evaporation as a function of surface area (and thus of volume)
- Spillage, when the reservoir is full and inflows exceed the outflows required to meet demand
- The requirements of irrigation
- Stochastic demands, varying seasonally, and growing over time
- The effects of introducing increasing amounts of wind on the system, and how to characterize the energy from wind in accordance with the relationships discussed in Chapter 6.
- The thermal energy on the system
- The introduction of operating rules for the reservoir and the wind and thermal energy (which affect the use of the 'valves' on the system)
- Operating restrictions (minimum and maximum storage)
- How the system is regulated
- The estimates of quantities such as operating, capital and the present value of total costs
- And a large number of interconnections between the key variables,

These complications will be discussed in the following chapter.

(01) FINAL TIME = 12
Units: Month
The final time for the simulation.

(02) inflow=2.62656e+006*inflow rate
Units: m3/Month

(03) inflow rate=
2750
Units: m3/s

(04) INITIAL TIME = 1
Units: Month
The initial time for the simulation.

(05) outflow=2.62656e+006*outflow rate
Units: m3/Month

(06) outflow rate=2298.09
Units: m3/s

(07) SAVEPER = TIME STEP
Units: Month [0,?]
The frequency with which output is stored.

(08) TIME STEP = 1
Units: Month [0,?]
The time step for the simulation.

(09) Water in Sobradinho Lake= INTEG (inflow-outflow, 1.7e+010)
Units: m3

Box 7-1 List of equations used by the program

CHAPTER EIGHT

8 THE MODEL

8.1 Introduction

The need for a model to investigate the integration of wind and hydro power systems was identified from (i) the finding of complementarity's between Renewable energy and the hydro flow resource in the Northeast of Brazil (ii) the pressing need to find an alternative power generation source for the region (iii) a review of the available tools for analysis of the different options. The model provides a means for decision makers to evaluate the contribution of wind power generation to the electric power regional system.

The input data for wind and hydro energy have already been outlined in previous chapters. This chapter will also provide data on costs, demand and the data base used for calculating evaporation rates.

An attraction of the Systems Dynamic software is that the outputs are also very rich, since estimates of quantities are made at every nodal point in the model—of hydro in storage and all the quantities that bear on this, of energy outputs of wind and thermal plant, of demand met and demand not met (loss of load), and of both systems and plant costs for each year of the study and overall.

8.2 Model – Conceptual framework

In Figure 8-1 a flowchart of the basic idea is shown. The model simulates a system in which three different power sources are used. In the dispatching schedule, priority is given to Wind power in the sense that it is always used, either directly to meet demand or to reduce the drawdown of the reservoirs; the rationale for this is that it has zero marginal operating costs. This is followed by Hydro Power and then by thermal power according to availability. Only the availability is represented in this diagram but other factors are used in the final model to define the share of the power source to meet the demand.

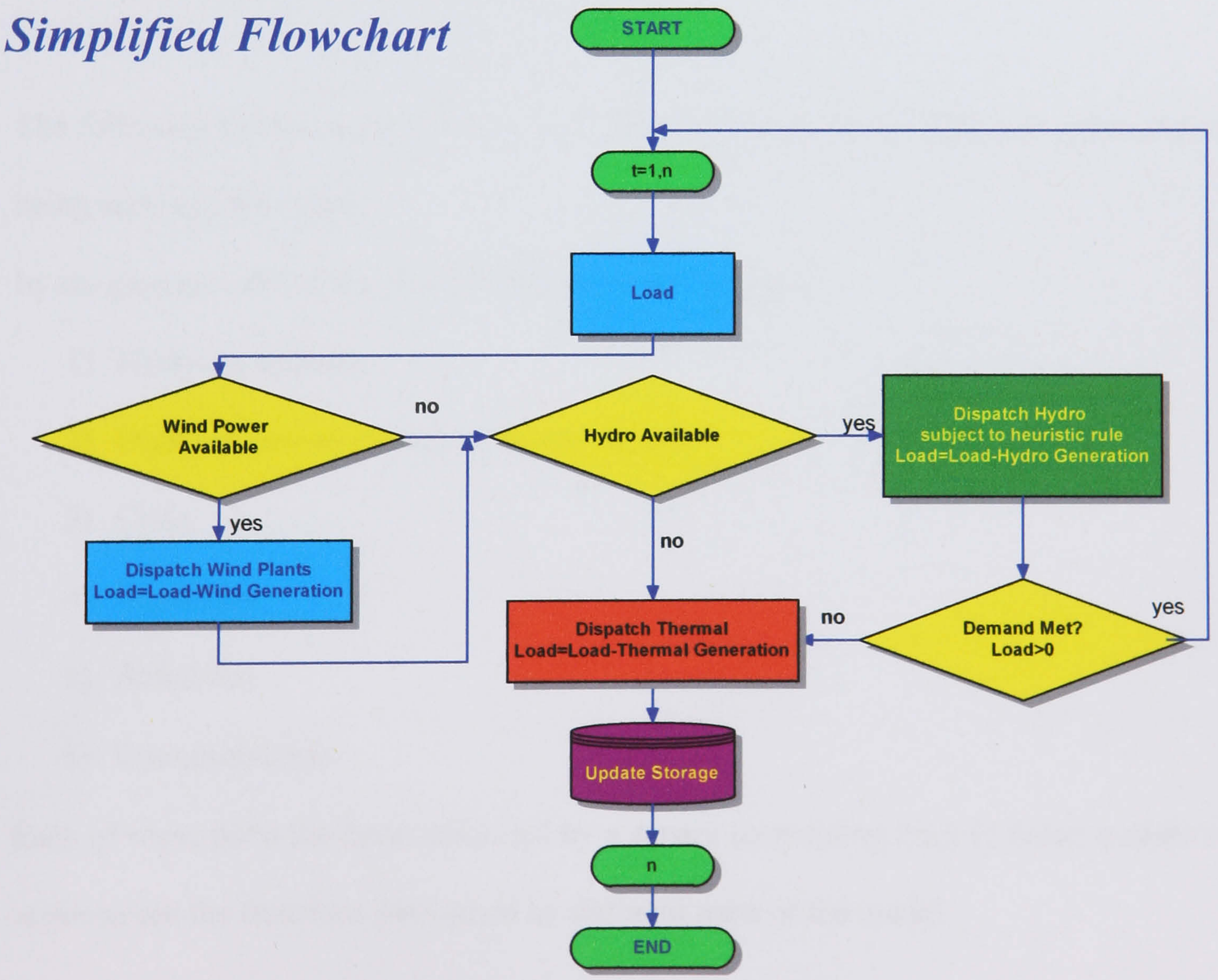


Figure 8-1 Simplified flowchart of the modelling idea

In the full model, the costs of alternative operating strategies are compared, and generation with lower costs is given priority subject to resource availability. In this way the potential for contribution of wind power is evaluated under different conditions taking into account the security of supply, represented by the water stored in the system.

A pseudocode to generate the results aimed is the following:

1. Read the demand data (Load).

2. Verify the sources available, compare generation availability for different shares in supply participation, and calculate the resulting storage

3. Decide on the share for each source to meet the load

4. Increase the time step by 1 if it its lower than n, return to step 1. Otherwise stop.

The following provides a full description of the processes for the different technologies being used and the outputs.

In the general view of the model is shown. It has six parts:

1) Hydro generation
2) Dispatch between wind, hydro and thermal
3) Costs
4) Capacities
5) Reliability
6) Operation costs

Each of these parts has been delimited by a square (containing box) in order to make it easier to see the functions performed by different parts of the model.

By definition, the loss of load probability (LOLP) is a reliability measure expressing the expected number of hours in a given period, usually a year, or the expected fraction of time during which the system has experienced a shortage of more than 0 MW. Expected energy not supplied (EENS) is the expected amount of energy demanded and not served (Juan et al, 1997). The ratio EENS to expected energy (EE) is equal to LOLP (Tina et al, 2000). EENS is in the dispatch's containing box.

A complication in the dispatching of hydro is that while this may save thermal energy at the time it is dispatched, this may lead to an increased use of thermal energy—and also a loss of load—later if there is a shortage of water arising from insufficient water being left in storage; this in turn will depend on the level of water already in storage at the time a dispatching decision is made; for example the more water that there is in storage, the lower the probability that extra thermal will be needed in subsequent periods, and the lower the loss of load probability, of using hydro in the present period. Thus there is a dynamic connection between hydro operating decisions in different periods. There is the further complication presented by the uncertainties in inflows, which in practical situations is dealt with by the use of heuristic operating rules regarding how much water may be used given the level of the reservoir; these rules vary with the reservoir levels and are embodied in the following model. (The model does of course calculate water levels and loss of load probabilities, following the application of these rules, for a large number of possibly inflow and wind regimes; in addition, it is possible to explore the effects of alternative heuristic operating rules—see Section 8.6.2).

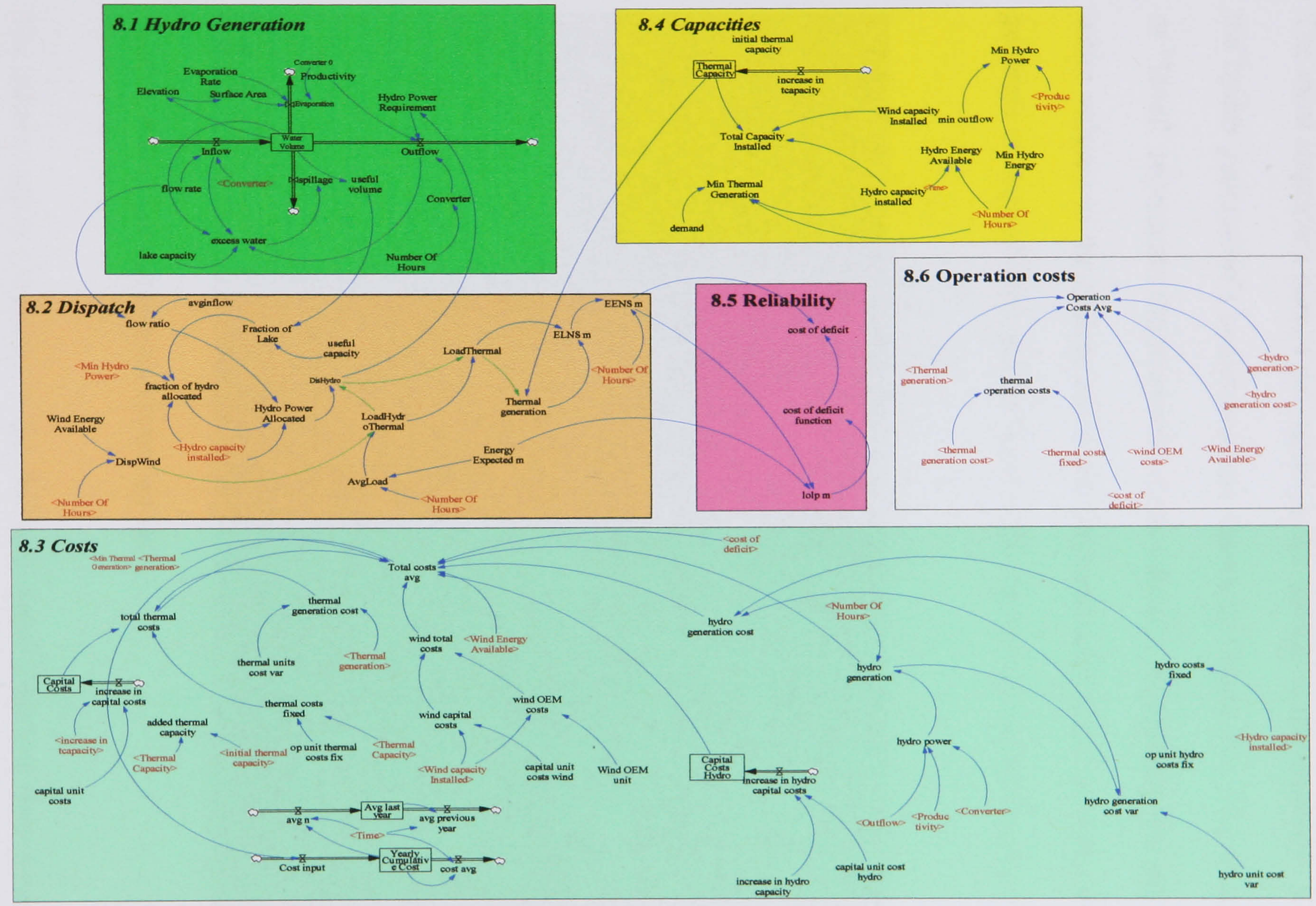


Figure 8-2 Overall structure of the model

8.3 Hydro Generation

The most important part of the model is the storage in the reservoir. It is contained in the hydro generation's containing box shown in Figure 8-3. The Water Volume box or "level" represents the reservoir of the cascade. It supplies the information of the water volume in the system along the time and calculates the water flow required to generate enough electric power to meet the dispatched demand using hydro.

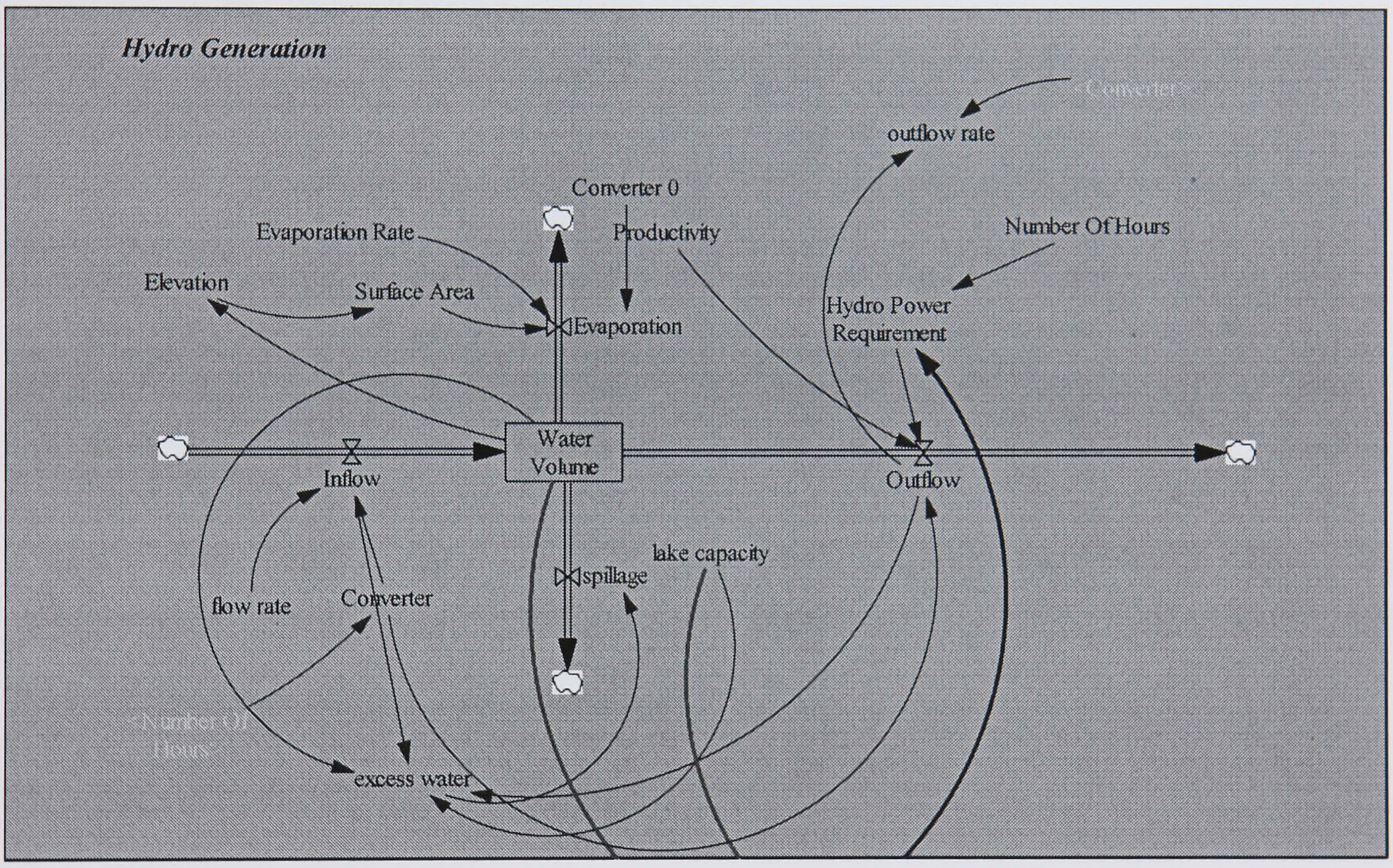


Figure 8-3 The hydro generation containing box

The inflow rate is connected to the Water Volume level and represents water inflows to the system. The outflow rate represents water outflow from the system through the electric power turbines. The spillage represents non-turbined water outflows i.e. excess of water beyond the capacity of the reservoir. Other uses of water as irrigation have been neglected in the simulations. Evaporation in the reservoir is estimated

using the equations discussed in Chapter 4 and the table on evaporation rates by volume in storage presented below. In the following paragraphs the calculation of these quantities are explained.

Flow rate

The flow rate is the monthly inflow of the river at Sobradinho reservoir in cubic meter per second. It is obtained through a Monte Carlo simulation, detailed in Chapter 5, using the historic inflow data for that location as input data.

A list of the equations used in the model is shown in Appendix 1. Flow rate is the average monthly water inflow in m3/s

flow rate:=

GET XLS DATA('model_data.xls' , 'inflow' , 'a' , 'k2')

*Units: m*m*m/s*

For the example in Table 8-1 the inflow of Sobradinho for the first scenario is shown starting from January

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4460	5988	4807	4251	2502	1717	1362	1101	872	1054	1946	4806

Table 8-1 First year inflow used for simulation

The expression for the stored energy is:

$$SE_t = \sum_{i=1}^{NPP_k} Volume_i \sum_{j \in J_i} \rho_j$$

Where

SE_t is the maximum energy stored in the system at the beginning of t (MWmonth).

J_i is the conjunct of the power plant i and all power plants downstream from i.

$\sum_{j \in J_i} \rho_j$ The summation of all productivities of the power plants downstream i inclusive i.

$$Volume_i = MaxVolume - MinVolume$$

where:

$Volume_i$ is the useful volume of water in the reservoir of the plant i (m^3).

Table 8.2 shows the productivity of the power plants considered.

Sobradinho

Productivity=2.713

*Units: (MW*s)/(m*m*m)*

Expresses how much energy contained in the water is converted to electric power.

2. **Inflow**

The variable *inflow* refers to the total monthly incoming water to the reservoir. It is calculated using as reference the average monthly flow multiplied by a constant, which depends on the month. The respective variables are *flow rate* and *Converter*. The latter converts the inflow in m^3/s to m^3/month.

*Converter= 3600*Number Of Hours*

Units: s/month

Number Of Hours:=GET XLS DATA('model_data.xls' , 'inflow' , 'a' , 'i2')

Units: h

Number of hours of the months

*Inflow= flow rate*Converter*

*Units: m*m*m/month*

3. *Water Volume= INTEG (+Inflow-Outflow-Evaporation-spillage, 1.4e+010)*

*Units: m*m*m*

http://www.ons.com.br/ons/operacao/boletim/segunda/page8.htm for Jan 2004 initial value 30%

$$WaterVolume(t) = WaterVolume(t_o) + \int_{t_o}^{t} (Inflow(t) - Outflow(t) - Spillage(t))dt$$

Units: m*m*m

This section of the model computes the total volume of water stored in the reservoir. The maximum energy stored represents the amount of energy obtained through the draw down of the reservoir up to a maximum of 16% of its capacity.

Power Plant	**MIN VOLUME (Hm^3)**	**Max. VOLUME (Hm^3)**	**MAX TUR. FLOW (m^3/s)**	**PROD. ($MW/m^3/s$)**
Sobradinho	5447	34116	4234	0,26
Itaparica	7238	10782	3263	0,45
P. Afonso	1275	1275	4186	1.00
Xingó	3944	3944	2772	1.07

Table 8-2. Power Plant Data (Aquino, 2001)

Water used to generate electricity will travel along the river and be available to generate electric power in all plants downstream. The principle of the equivalent reservoir methodology has been used. An equivalent reservoir is calculated to represent to storage of the cascade. Instead of using several reservoirs the calculation is simplified by the use of a single reservoir which represents all the reservoirs in the cascade. In this approach, the maximum energy stored is calculated summing up the volume of each reservoir by its cumulated accumulated productivity, where accumulated productivity is the sum of the productivity of each reservoir and of the river hydro plants downstream up to the final of the cascade (Cepel, 2002). For the

time period in study all power plants except Sobradinho have been considered to be run of the river. Their reservoirs cannot keep enough water for more than one month operation.

4.**Outflow** is a variable that represents the turbined water and is tested for the restrictions of the system. If the level of water in the reservoir is low it should be limited to a minimum. The other constraint is the max water turbined capacity (see Table 8-2). This is made indirectly by the variable *HydroPower Allocated.*

*Outflow=IF THEN ELSE(Hydro Power Requirement<0 , 1/0, Hydro Power Requirement/Productivity*Converter)*

*Units: m*m*m/month*

For Sobradinho the maximum volume is 34166hm3 and min 5447hm3

Hydro Power Requirement= DisHydro

Units: MW

5. **Evaporation**

If Sobradinho reservoir were shaped as a cylinder, its surface area would remain constant as the volume falls. Lakes, however, generally look much more like a shallow cup than a cylinder. In the case of Sobradinho its surface area declines quickly as the volume falls. In the model the surface area is an internal variable that will decline with a reduction in the water volume of the reservoir. Therefore, in the model the area of the reservoir is treated as an endogenous variable. To represent the surface area of the lake as a function of the volume of the reservoir with the appropriate function information was obtained from (Melo, 2003). This was necessary because the surface of the bottom of the reservoir is complicated. In the case of Sobradinho it was a natural landscape with three cities before it was flooded.

Fortunately, topographic surveys have been completed prior to the construction of the power plant and they were used to provide the information that is needed.

VOLUME (Hm^3)										
Elevation (m)	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
374.1	1098	1101	1105	1108	1111	1115	1118	1121	1124	1128
374.3	1164	1168	1171	1175	1178	1181	1185	1188	1192	1195
374.5	1233	1237	1240	1244	1247	1251	1254	1258	1261	1265
374.7	1304	1308	1311	1315	1319	1322	1326	1330	1333	1337
374.9	1378	1381	1385	1389	1392	1396	1400	1404	1408	1411
375.1	1454	1458	1462	1466	1470	1474	1478	1482	1486	1490
375.2	1494	1498	1502	1506	1510	1515	1519	1523	1527	1531
375.3	1535	1540	1544	1548	1552	1557	1561	1565	1569	1574
375.4	1578	1582	1587	1591	1595	1600	1604	1609	1613	1618
375.5	1622	1626	1631	1635	1640	1644	1649	1653	1658	1663
375.7	1714	1718	1723	1728	1733	1737	1742	1747	1752	1756
375.9	1810	1815	1820	1825	1830	1835	1840	1845	1850	1856
376.5	2131	2137	2143	2148	2154	2160	2166	2171	2177	2183
376.7	2248	2254	2260	2266	2272	2278	2284	2290	2296	2303
376.9	2370	2377	2383	2389	2395	2402	2408	2414	2421	2427
377.1	2498	2504	2511	2517	2524	2530	2537	2543	2550	2557
377.3	2630	2637	2644	2650	2657	2664	2671	2678	2684	2691
377.5	2768	2775	2782	2789	2796	2803	2810	2817	2824	2831
377.7	2910	2917	2925	2932	2939	2947	2954	2961	2969	2976
377.9	3058	3065	3073	3080	3088	3095	3103	3111	3118	3126
378.0	3134	3141	3149	3156	3164	3172	3180	3187	3195	3203

Table 8-3. Extract of the survey report for Elevation and Volume.

The data are summarized in Table 8-3. in terms of elevation of the reservoir. *Elevation* appears in the model as a converter that is linked to the *water volume* through a connector. So the *water volume* will define the elevation of the water in the reservoir as a function of the above table. Following the *Surface Area* is determined from the *elevation*.

Table 8-4 in terms of elevation and volume of the reservoir.

ÁREA (Km^2)										
Elevation (m)	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
374.1	320	321	322	323	324	324	325	326	327	328
374.3	338	338	339	340	341	342	343	344	345	346
374.5	356	357	358	359	359	360	361	362	363	364
374.7	375	376	376	377	378	379	380	381	382	383
374.9	394	395	396	397	398	399	400	401	402	403
375.1	413	414	415	416	417	418	419	420	421	421
375.2	422	423	424	425	426	427	428	429	430	431
375.3	432	433	434	435	436	437	438	438	439	440
375.4	441	442	443	444	445	446	447	448	449	450
375.5	451	452	453	454	455	456	457	458	459	460
375.7	471	472	473	474	475	476	477	478	479	480
375.9	491	492	494	495	496	497	498	499	500	501
376.5	556	558	559	560	561	562	563	564	565	567
376.7	579	580	582	583	584	585	586	587	589	590
376.9	603	604	605	606	607	609	610	611	612	613
377.1	627	628	629	630	632	633	634	635	636	638
377.3	651	653	654	655	656	658	659	660	661	663
377.5	677	678	679	680	682	683	684	686	687	688
377.7	702	704	705	706	708	709	710	712	713	714
377.9	729	730	731	733	734	735	737	738	739	741

Table 8-4. Extract of the survey report for Elevation and area

This information is included in the model through a connector from water volume to the surface area as can be seen in Figure 8-3.

Evaporation= Surface Area*Evaporation Rate*Converter 0

Units: m*m*m/month

Evaporation is given in mm and area in km^2. It is necessary to use the constant converter 0 to have the result in m^3.

Surface Area = WITH LOOKUP (Elevation, ([(350,0)-

(400,6000)],(370,105),(371,132),(372,176),(373,235),(375,404),(380,1042),

(381,1190),(382,1346),(385,1918),(389,2976),(390,3243),(396,5805)))

Units: Km*Km

Calculates the surface area of the lake as a function of the water level.

The resulting area is in Km^2

Converter 0=1000

Units: m3/ (mm x km2)

converts the product evaporation (mm)* area (km2) to m3 the value is 1000.

The Sobradinho lake capacity is used. For the long term study the energy can be calculated using the equivalent reservoir, which is a reservoir that represents the reservoirs of the system being studied.

Evaporation rate

An important factor is the evaporation rate of Sobradinho Lake as the water has different densities at different seasons. The variation in density results from the changing concentration of dissolved solids in the water, the higher the quantity of solids the denser the water. More saline water takes longer to evaporate than fresh water due to changes in the vapour pressure difference between the surface of the water and the air. Other solids dissolved in the water will affect its evaporation rate. These parameters are not included in the model. Instead, advantage has been taken of measurements made by the regional electric power utility in NE Brazil (Melo, 2003) and tabulated below. Specific gravity is not used in the model since the average

monthly evaporation rate is used directly from the measurements, calculation is not necessary. In the table, the influence of the different factors affecting the evaporation rate can be seen when the values for different months are compared. Total dissolved solids is not explicitly used in the model, the evaporation rate is presented per unit area. So embedded in the figures are all the factors which influence the value of evaporation for a given month. It is known that the heavier the unit volume of water the lower the evaporation rate. In the model volume of the lake area and elevation have been explicitly used.

1	2	3	4	5	6	7	8	9	10	11	12
118	106	81	132	153	142	158	181	197	189	114	98

Table 8-5. Evaporation rate in mm per month for each month.

Evaporation is then defined by the product *Evaporation Rate* and *Surface Area*.

The water reservoir is operated in such way that for higher levels of the lake more hydro power is generated to avoid losing water by spillage. *Excess water* is used to calculate the *spillage*. *Lake capacity* is an auxiliary to calculate *excess water* and for the dispatch containing box.

Evaporation Rate:=GET XLS DATA('Model_data.xls' , 'Evaporation' , 'a' , 'b2')

Units: mm/month

lake capacity=

3.4e+010

Units: m*m*m

Spillage is calculated from the constraints of the system

spillage=IF THEN ELSE(excess water>0, excess water ,0)

Units: **undefined**

8.4 Dispatch

Figure 8-4 shows the main variables in the dispatch containing box. The variables between <> are called shadow variables. It means that they have been defined elsewhere (in the same or in other containing box of the model) and a copy is reproduced on this part of the diagram to avoid overloading the figure with lines. The various linkages and nodes are now described in more detail.

The *load* must be met with the generation resources available so the model verifies its value first.

Load:= GET XLS DATA('model_data.xls', 'Load' , 'a', 'b2')

Units: MW*h

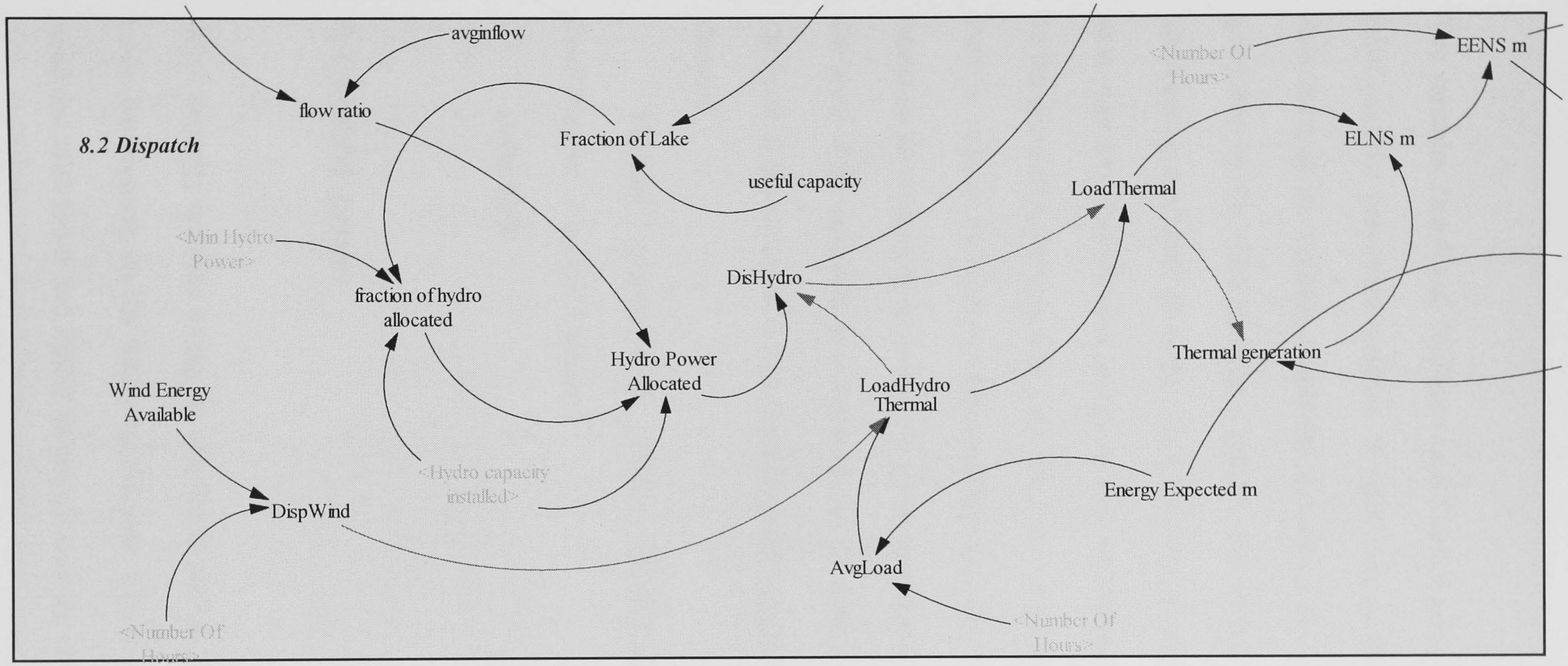


Figure 8-4. Dispatch's containing box

The variables *DispWind, DisHydro and Thermal generation are* control variables which prioritises the generation sources. Wind should be the first to be fully utilized this is done through the variable *DispWind;* it contains the wind electric power which can be generated by the wind installed capacity each month. The load is first deduced from wind power available. As in this system for the simulation period considered the load is always greater that the wind energy no tests are needed to carry out this first operation. In the simulation the aim is to meet the power demand, hydro and wind are used when there is water in the reservoir between the constrained limits. The dispatch is carried out based on the sum of hydro and wind power calculated by the wind power available and the level of the reservoir. It is assumed that all wind power is fed to the network. When the level of the reservoir is low thermal power supply the difference needed to meet the demand.

Thermal generation=IF THEN ELSE(LoadThermal<=Thermal Capacity, LoadThermal , Thermal Capacity)

Units: MW

8.4.1 Wind power

Wind capacity is added along the simulation period. This is shown schematically for a particular scenario on the following diagram, Figure 8-5; alternative scenarios without wind and with lower and higher values of wind are considered in the results sections in chapter 9. The time step used is month.

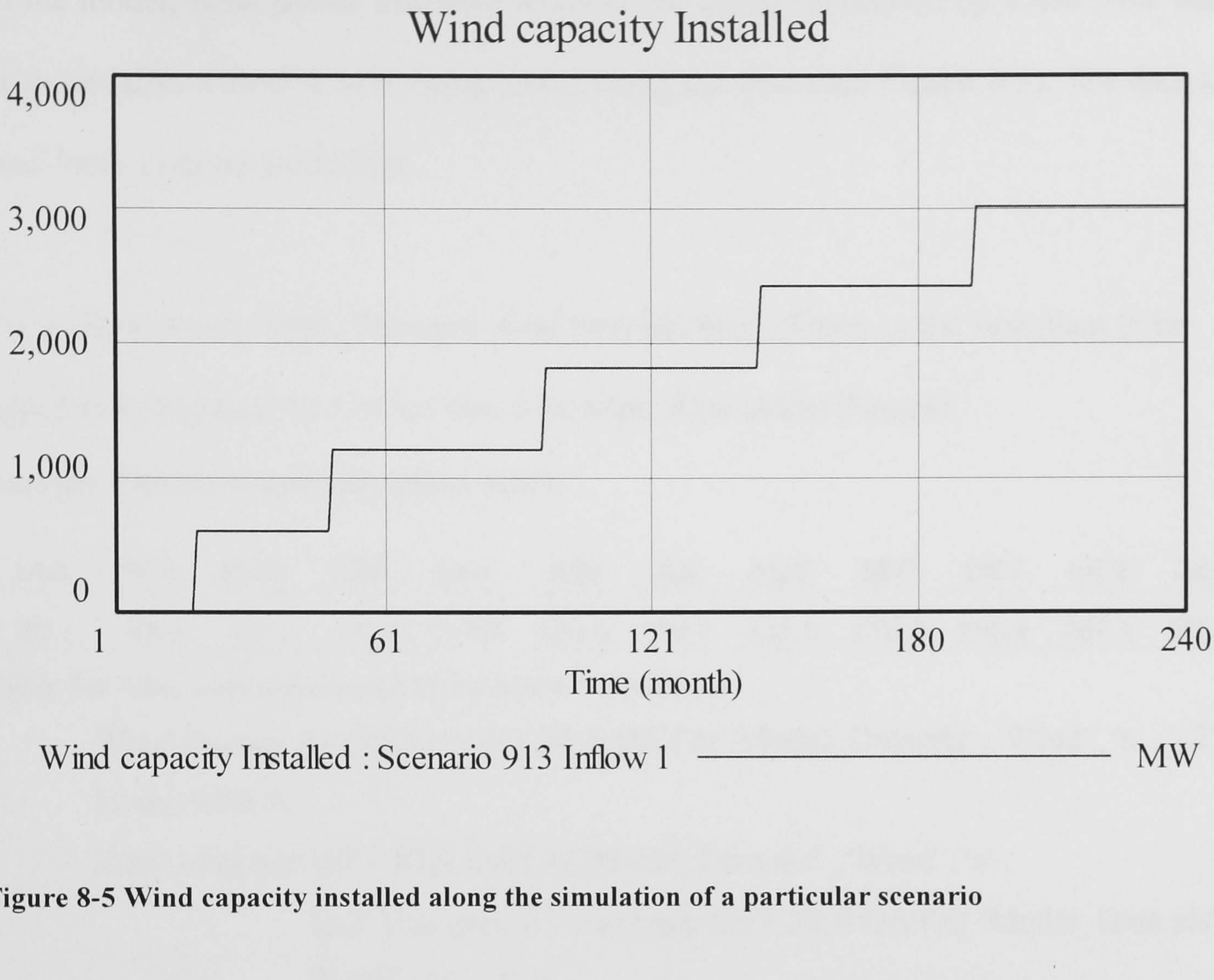


Figure 8-5 Wind capacity installed along the simulation of a particular scenario

A specific report for the Northeast Brazil has been written by the author of this work in a joint paper with two other researchers. At the time, the work was made in cooperation between the regional electric power utility and the state electric power utility. The latter was proprietor of the wind data which was specifically collected for wind power applications. These data have been used to produce that work. With the privatisation of the state utility these data became unavailable. So use of the results of the previous calculation has been made instead of recalculating wind power. The methodology has been detailed in chapter 5.

In the model, wind power available refers to the energy generated by a 600 MW wind farm initially, with 600 MW being added along the time (see Figure 8-5). The data are read from an excel worksheet.

From (Bittencourt, 1996) Paracurú wind farm has been chosen as the first plant to be added followed later by Cofeco then Mucuripe, Acaraú and Bitupitá.

Average Electric Power Generated (GWh)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
90.1	45.2	87.1	70.6	111.6	120.4	182.1	246.5	286.3	286.8	267.5	236.6

Table 8-6 Wind power generated by Paracurú Power Plant

Wind Energy Available:=GET XLS DATA('Model_Data.xls' , 'Wind' , 'a' , 'y2')

Units: MW*h

Zero wind gen GET XLS DATA('Model_Data.xls' , 'Wind' , 'a' , 'aa2') progressive wind gen GET XLS DATA('Model_Data.xls' , 'Wind' , 'a' , 'y2')

Units: MW*h

So wind is the first on the merit order of dispatch.

8.4.2 Hy dro power generation

Following a few tests must be made in order to allocate the hydro power generated. This is done in the variable *Hydro Gen Allocated*. Firstly *hydro capacity installed* and the *number of hours* of that month defines maximum *Hydro Energy Available*. The maximum energy is the product of these two variables. Then the state of the lake is

verified in order to decide how much hydro energy is feasible to generate. This is done through the variable *fraction of Lake*.

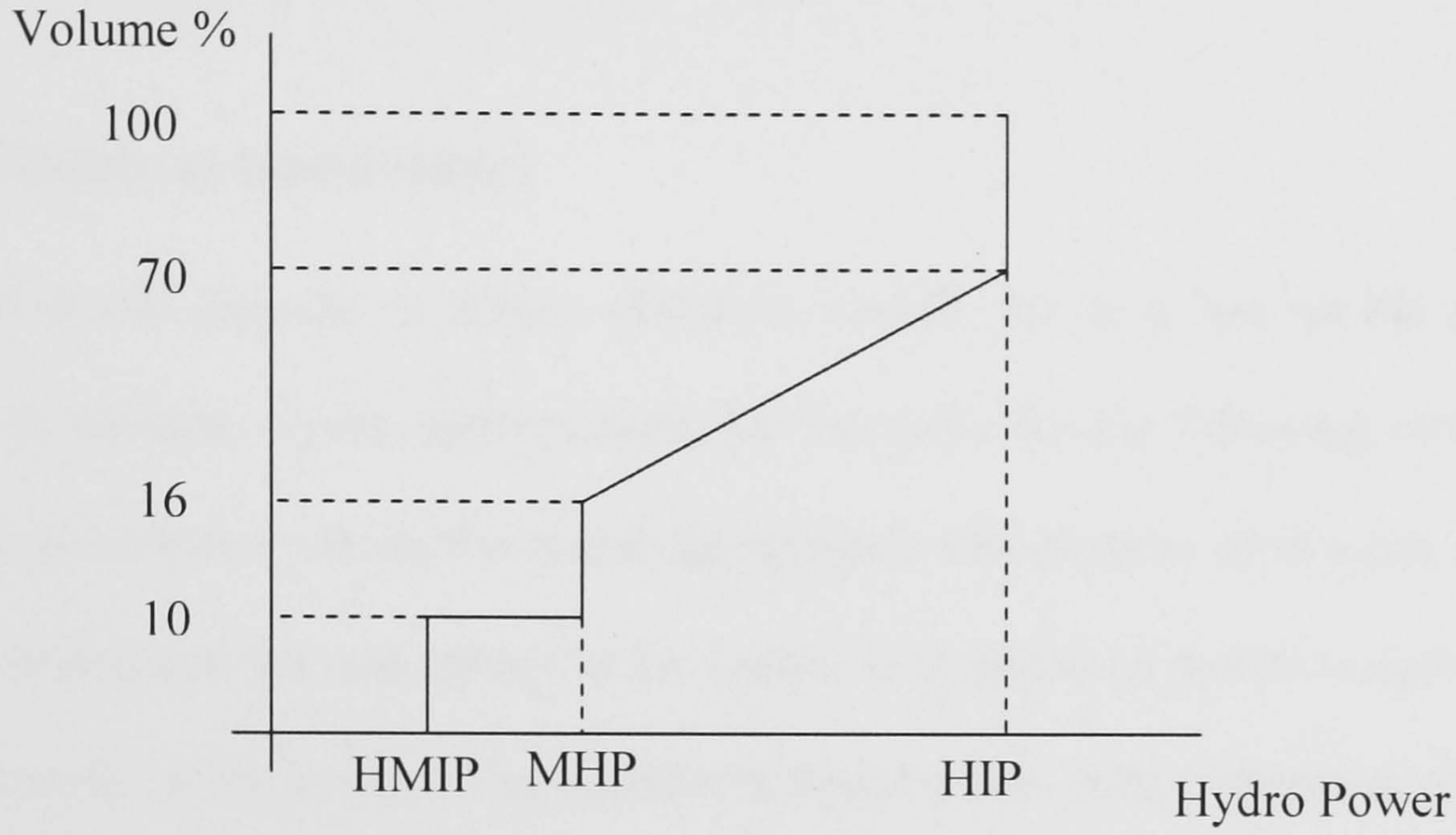


Figure 8-6 Heuristic function for the decision of hydro dispatch

As seen in Figure 8-6 the fraction of lake will define how much hydro power will made available for dispatch. The Y axis represents the volume of water in the lake and the X axis the hydro power defined by the function. HIP is total hydro power installed; MHP is minimum hydro power, defined by the minimum ecological inflow. HMIP is half of MHP. The model verifies what percentage of the lake is available at time *t* and finds the corresponding value of hydro power on the graph. After that a second test is performed by the variable hydro power allocated. It tests if the inflow for that month is higher than 1.5 times the average inflow of the historical inflow series. If the result is true this variable disregards the result of the previous test and allocates the full installed capacity to meet the load according to its value. If the result is false it allocates the value defined

by the variable fraction of hydro allocated. In this work the heuristic function explained has been used for the decision of hydro dispatch. It is worth noting that it is possible to use the model to asses the effects of alternative heuristic operating rules.

8.4.3 Therm al Generation

Thermal power capacity is added whenever needed; but it is last on the merit order subject to adequate hydro reserves being left available for the following month. Figure 8.6, discussed below, shows the operating rule used. The purpose of this rule is to ensure there is enough power and energy in the system to guarantee a power margin of 30% of extra capacity in the system. The decision is based on the water volume of the reservoir for the considered time step. Two different levels of thermal generation are possible. (i) Minimal thermal generation and (ii) a variable thermal generation depending on the situation of the reservoir water level. The variable, which implements this decision, is *Thermal generation.*

Thermal generation=IF THEN ELSE(LoadThermal<=Thermal Capacity, LoadThermal , Thermal Capacity)

Units: MW

Hydro Power Plants supply part of the electric power market, another share is supplied by thermal plants and wind power contributes in the electric power supply as well. Once all generation capacities are dispatched the variable *EENS* checks is there is any part of the load which has not been satisfied. If the volume of the lake is too low the hydro system will generate the min hydro energy and there may be a shortage of electricity.

8.5 Costs

Total generating costs can be expressed by;

$$TC = A.k_h.Q_h + O_h.Q_h + V_h.E_h + A.k_w.Q_w + O_w.Q_w + A.k_f.Q_f + O_f.Q_f + V_f.E_f$$ **Equation 8-1**

Where

A is annuity rate

Q is the capacity (MW)

h subscript for hydro

w subscript for wind

f subscript for fossil fuel

K is the capital costs

O is the fixed O&M costs

V is the variable O&M costs

E is the energy generated MWh/year

In order to calculate the average cost of energy the cost of deficit ($Cdef$) must be added to the generation costs.

The average annual total cost can be calculated by

$$ATC = \frac{TC + Cdef}{E_h + E_w + E_f}$$ **Equation 8-2**

Total cost

$$TC = \sum_{year=0}^{n} ATC(1+i)^{-t}$$ **Equation 8-3**

The cost of function uses as basis the following table to calculate the values of cost of deficit:

% of Market in deficit	Cost of deficit (R$/MWh)	Cost of deficit (US$/MWh)
0 to 5	749.52	243.55
5 to 10	1616.95	525.42
10 to 20	3378.93	1097.97
>20	3839.76	1247.71

Table 8-7 Explicit cost of deficit (ONS, 2004)

8.5.1 Therm al Costs

The following hypotheses have been adopted to calculate the costs for the thermal plant (Gouveia, 2004):

Nominal Power	240	MW
Capacity Factor	90%	
Operation type	Base	
Fuel	Natural Gas	
Efficiency	53%	
life time	20	years
Interest rate	15%	
Investment	550	US$/KWinstalled
Fixed O&M costs	18.3	/kW/year
Variable O&M	3.51	US$/MWh
Fuel Cost	2.581	US$/MMBTU
Retailer	0.15	US$/MMBTU

Table 8-8. Parameters used for the thermal power plant

Using the assumptions above the calculation of the operation costs was carried out for a 20 years period, Table 8-9.

Years	Capital	Capital Costs	O&M Fixed	O&M Variable	Fuel Cost	Total Op Cost Var
0	132,000,000.00					
1		21,088,514.09	4,392,000.00	6,641,481.60	33,276,678.91	39,918,160.51
2		21,088,514.09	4,392,000.00	6,641,481.60	33,276,678.91	39,918,160.51
.		=	=	=	=	=
20		21,088,514.09	4,392,000.00	6,641,481.60	33,276,678.91	39,918,160.51

Table 8-9 Spreadsheet of operation costs

The following equations have been used:

Capital costs

$Capital = No\min alPower \times Investment \times 1000$ (MW x US$/KWinstalled x 1000)

The annual value of an immediate annuity which lasts for N years, where the prevailing rate of discount is i, and which has a present value of 1US$, is given by:

$$\frac{i}{1-(1+i)^{-N}}$$ (Lumby, 1994)

The annual capacity costs are calculated by:

$$CapitalCosts = \frac{i}{1-(1+i)^{-N}} \times Capital$$

O&M Fixed costs were calculated using the expression:

$O\,\&\,MFixed$ = Nominal_Power * Fixed_O_M_costs *1000 (MW x /KW/year x 1000)

To determine the O&M variable cost the equation below is used:

$O\,\&\,MVariable$ = Nominal_Power * Capacity_factor * 8760 * Variable_O_M (MW x hours x US$/MWh)

capital costs=added thermal capacity*capital unit costs

Units: US$

Fuel costs are function of the total hours of operation and capacity factor, the expression

is:

FuelCosts = Nominal_Power * Capacity_factor * 8760 * (Fuel_Cost + Retailer) * 3.413 / Efficiency
(MW x hours x US$/MMBTU[25])

Total variable operating costs is expressed by:

$$TotalOpCostVar = O\&MVariable + FuelCost$$

This way the following unit costs have been determined for year n and it is recalculated for every year:

Unit Capital cost US/MW/Month	O&M Fixed US$/Mw/month	O&M Variable US$/MWh	Fuel Cost US$/MWh	Unit Op Cost Var US$/MWH
7,322.40	1,525.00	3.51	17.59	21.10

Table 8-10 Operation costs of thermal power plant

So **Capital per unit costs of energy is read by the model from** Table 8-10**.**

Capital unit costs = GET XLS DATA('model_data.xls' , 'costs' , 'b' , 'i3')

Increase in capital costs – for the time span considered represents the capital needed for an addition in capacity. The expression for the augment of capital cost is

Increase in capital costs = increase in tcapacity*capital unit costs

[25] MMBTU is One million British thermal units. 3413 BTUs = 1 kWh

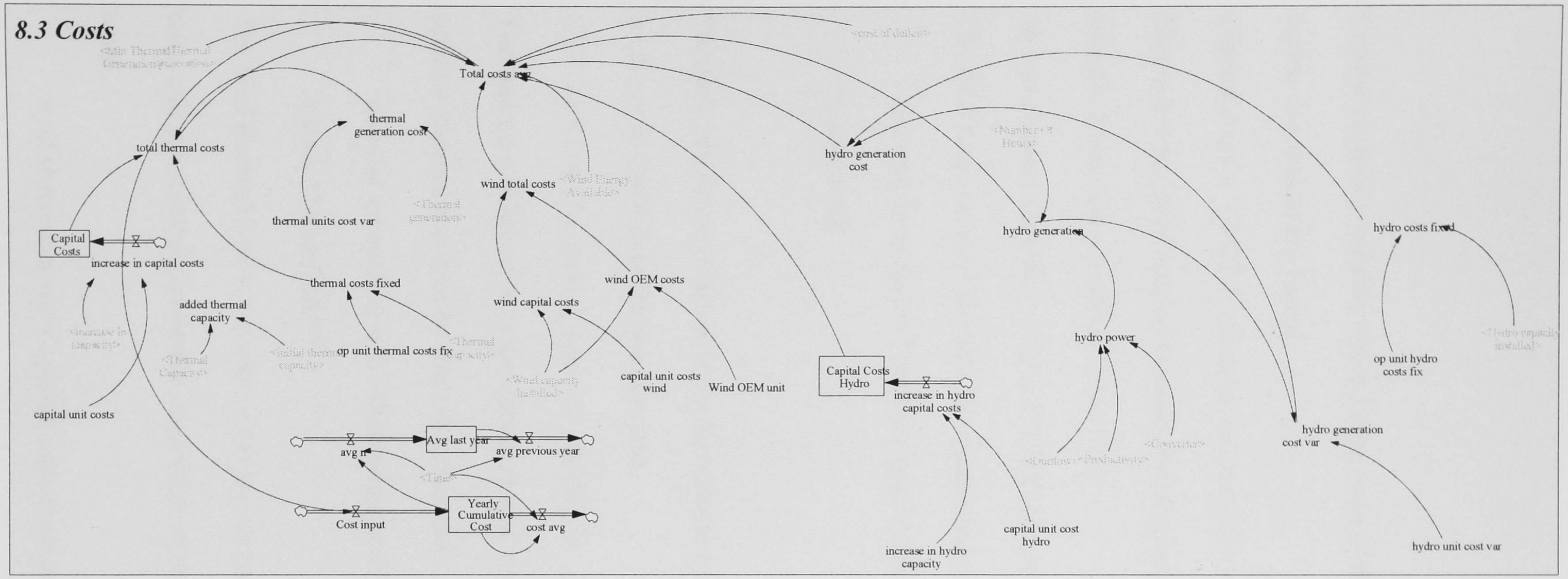


Figure 8-7. Costs containing box of the model

Capital costs is a variable which keeps track of the total capital cost of the thermal plant during the simulation period.

Capital costs = = INTEG (Increase in capital costs, 0)

Thermal units fixed operation costs are calculated through the variable *op unit thermal cost fix. It was obtained from* Table 8-10

op unit thermal cost fix = 1525 (US$/MW/Month)

The total fixed costs of thermal are represented by the variable *Thermal costs fixed.*

thermal costs fixed=Thermal Capacity*op unit thermal costs fix

Units: US$

Thermal generation units costs are represented by the variable *thermal units cost var*. It is shown in Table 8-10 for the first year.

GET XLS DATA('model_data.xls' , 'costs' , 'b' , 'j3')

Thermal generation costs is the operation cost in the time step considered then the product thermal unit cost by thermal generation.

thermal generation cost=Thermal generation*thermal units cost var

Units: **undefined**

The total thermal cost is the sum of the capital costs, the thermal generation variable costs and the thermal generation fixed costs represented by the variable *total thermal costs.*

total thermal costs=Capital Costs+thermal generation cost+thermal costs fixed

Units: US$

8.5.2 Wind costs

The basic assumptions for the wind plant are shown in table 8-11.

Based on the figures below the wind cost for a 20 years period was calculated.

The equation for the total capital costs

$TotalCapitalCosts = CapitalCosts \times 1000$ (Capital costs x 1000 US$/1000)

Yearly capital costs

$$CapitalCostsYear = \frac{i}{1-(1+i)^{-N}} \times Capital$$

Annual Fixed Operating and Maintenance Costs

$O\ \&\ MTotal = 2\% \times TotalCapitalCosts$

Life time of development	years	**20**
Capacity Factor	%	0.35
Production in 1st year	months	0
Size of WTG	MW	0.5
Number of WTG's		1209
WTG availability	%	95
Manufacturer	NEG-Micon 72C/1500kW, 80 m hub height	
Turbine cost	US$/kW capacity	975.52
Additional costs	%	20
Contingency (Physical)	%	10
Plant capital expenditure	US$ x 1000	766,611
Tax Rate	%	32
Investment support: exemption from 14% import duty	%	42,930
Discount Rate	%	15%
Additional costs		
land purchase	%	0.00
construction insurance	%	0.90
grid connection	%	10.00
pre-operational expenses: basic project, EIA, environmental licensing	%	2.50
	%	13.4
Capital Costs	US$x1000	723,681

Table 8-11 Wind costs

Total annual wind costs

$$TotalAnnualCost = CapitalCostYear \oplus O\ \&\ MTotal$$

The results of the calculation are shown in table 8-12.

Years	Capital total	Capital Costs Yearly	O&M Fixed	O&M Variable	Total Cost	Energy Generated
0	723,680,614					
1		115,616,279.05	7236806.144	256,695.48	123,109,780.68	2,566,954.85
2		115,616,279.05	7236806.144	256,695.48	123,109,780.68	2,566,954.85
-		-	-	-	-	-
20		115,616,279.05	7236806.144	256,695.48	123,109,780.68	2,566,954.85
		Unit Capital cost US/MW/Month	OP fix US$/Mw/month	US$/MWh	US$/MWh	$/MWH
		15,938.28	997.6297413	0.1		47.95946486

Table 8-12 Annual capital wind costs

The variables used in the model are explained below.

Wind unit capital costs is represented by the variable *capital unit cost wind* the values are obtained from Table 8-12. For the first year of simulation.

capital unit costs wind:=GET XLS DATA('model_data.xls' , 'wind' , 'a' , 'x2')

Units: US$/MW

Wind capital costs are obtained from the previous wind unit capital costs, the variable is *wind unit capital costs*.

wind capital costs=

capital unit costs wind*Wind capacity Installed

Units: **undefined**

Operation and Maintenance unit costs are obtained from Table 8-12 Annual capital wind costs, the variable is Wind OEM unit.

Wind OEM unit:=GET XLS DATA('model_data.xls' , 'wind' , 'a' , 'z2')

Units: US/MW

Wind Operation and Maintenance costs are obtained from the previous Wind OEM unit, the variable is *wind* OEM *costs*.

wind OEM costs=Wind capacity Installed*Wind OEM unit

Units: US$

Wind total costs is the sum of capital and O&M costs.

wind total costs=wind capital costs+wind OEM costs

Units: US$

The effective hourly generation of hydro power is reproduced by the variable *hydro power*.

hydro power =

Outflow*Productivity/Converter

Units: MW

In order to convert hydro power to hydro energy it is necessary to multiply it by the number of hours of the month, variable *hydro generation*.

hydro generation =hydro power*Number Of Hours

Units: **undefined**

For the simulation period it has been considered that the hydro operation costs is fixed.

It is represented by the variable *Hydro unit cost.*

hydro unit cost fixed cost=177.32

Units: US$/MW

hydro unit cost var cost= 0.0164

US$/MW*h

The total hydro electricity generated multiplied by the unit cost of hydro generation will give the *hydro generation cost*.

hydro total cost =Capital Costs Hydro+hydro gen operation cost

Units: US$

8.5.3 Tota l cost of alternatives

The method used to compare the different alternatives along the study time was the present worth. In this case the annual compounding is given by (Sepulveda et al. 1984):

$$PW = CF_0 + CF_1(P/F, i\%, 1) + CF_2(P/F, i\%, 2) + \ldots + CF_n(P/F, i\%, n)$$

$$PW = \sum_{j=0}^{n} CF_j(P/F, i\%, j) \qquad \textbf{Equation 8-4}$$

Where CF_j is the cash flow for the jth year, $(P/F, i\%, n) = (1+i)^{-j}$, and n the number of years. The interest rate is i[26].

The present value of total annual capital, operating and loss-of-load costs over the 20 year period was copied from the model to an excel worksheet. After the individual values have been added the total CF, PW was calculated. To calculate the cost of the alternatives[27] the following expression has been used:

$$CF_j = CostOfDeficit_j + WindTotalCosts_j + HydroTotalCosts_j + ThermalTotalCosts_j$$

The results of the calculation are shown in the next chapter table 9.4.

---

[26] It was assumed that the interest rate for all technologies is the same available for gas turbines.
[27] For the cost of the alternatives total costs implies that investments are computed.

8.6 Capacities

Hydro capacity in the first scenario is considered fixed since the hydro potential of the SF River is almost fully exhausted, so no construction of new hydro plants seems to be feasible. In an alternative scenario an expansion of the hydro power capacity is considered by the addition of turbines to existing power plants.

Hydro capacity installed:=GET XLS DATA('Model_Data.xls' , 'Hydro' , 'a' , 'b2')

Units: MW

Hydro capacity worksheet considering 4 x 500 additional capacity to Xingó

Wind capacity installed has been defined as increment of 600 MW as the load increases.

Wind capacity Installed:=

GET XLS DATA('model_data.xls' , 'wind' , 'a' , 't2')

Units: MW

GET XLS DATA('model_data.xls' , 'wind' , 'a' , 't2'

Thermal Capacity is defined by an initial value of thermal installed and an addition of capacity as the system needs it.

Thermal Capacity= INTEG (increase in tcapacity, initial thermal capacity)

Units: MW

Increase in thermal capacity will be necessary to maintain a system power margin, each increase value is 240 MW.

Increase in tcapacity= IF THEN ELSE(Total Capacity installed>1.3*Demand,0 , 240)

Units: MW

Initial thermal capacity is the existing thermal capacity in the generation power system.

initial thermal capacity=

469.5

Units: MW

Total Capacity Installed is the sum of wind, hydro and thermal capacities.

Total Capacity Installed=

Hydro capacity installed+Thermal Capacity+Wind capacity Installed

Units: MW

When the demand exceeds hydro capacity it has been considered necessary to have enough thermal capacity to guarantee the difference of power supply for the worst case, which is, even with wind power in the system a case in which wind is not available.

The **demand** data have been obtained from the market forecast of CHESF.

The table below shows the data for the first year (Ribas, 2005).

Demand (MW) 2004												
Market	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pessimistic	7,586	7,720	7,710	7,440	7,349	7,400	7,221	7,377	7,577	7,639	7,662	7,772
Reference	7,586	7,720	7,710	7,790	7,695	7,749	7,561	7,724	7,933	7,998	8,022	8,138
Optimistic	7,586	7,720	7,710	8,157	8,057	8,114	7,917	8,087	8,306	8,374	8,399	8,521

Table 8-13 Demand used for the first year of simulation[28]

The forecast was available until 2013 after this we used linear regression from excel.

Demand:=GET XLS DATA('Model_Data.xls' , 'Load' , 'a' , 'c2')

Units: MW

[28] Values for January, February and March are historic and form April to December are forecast.

Hydro Energy Available is the energy that can be generated when operating the Hydro capacity installed at rated power.

Hydro Energy Available = Hydro capacity installed *Number Of Hours

When the water level is very low the hydro system may be forced to generate the a minimum hydro electricity. This is expressed by the following expression:

Min Hydro Energy = Min Hydro Power*Number Of Hours.

Where minimum Hydro Power is the power generated by the minimum outflow determined by the operation of the system.

Min Hydro Power = min outflow*Productivity In order to convert the product

In this case the minimum outflow is the ecological minimum flow of the river.

min outflow = 1300 m/s

CHAPTER NINE

9 Scenario specification and results

9.1 Introduction

To analyse alternative uses of wind, hydro and thermal energy, the method of postulating alternative scenarios has been used. This method is now widely used by business and the research communities for exploring options, and is particularly useful when uncertainties are large, as they are with respect to the future of energy systems. Key questions are should wind energy be introduced into the predominantly hydroelectric system of NE Brazil, to provide a complementary source of energy as the system expands? What will be the costs relative to the thermal alternative? What will be the effects on storage volumes in the reservoirs and the reliability of supply? The final section of this chapter provides the answers of this thesis to these questions.

This chapter presents the core scenarios used in the model for the simulation. Additional scenarios to explore sensitivities to the market and other factors are discussed later as well.

9.2 Scenarios

There are three core scenarios: plus an extension to the first and an extension to the third:

1. A *Hydro-Thermal Scenario* in which there is hydro and thermal generation only to meet the demand. Since this leads to a high loss-of-load probability, with high costs of disruption, as experienced in the past, this scenario is extended to include more thermal back-up capacity.

1b. A *Hydro-Thermal Scenario* with extra thermal capacity introduced on the system to reduce the loss of load probability encountered in 1.

2. A scenario in which there is a mix of hydro, wind and thermal generation—a *Hydro-Thermal-Wind Scenario*- but using the existing MW generating capacity of the turbines of the reservoirs only. In this scenario, there is less use of thermal energy than in 1b.

3. A *Hydro-Thermal-Wind Scenario*, but with the MW generating capacity of the hydro reservoirs increased (the energy storage capacity of the reservoirs of course remains unchanged). The idea is to see if the extra MW of hydro can be used to provide the capacity back-up previously provided by thermal. It is interesting to note that the Hydro-Wind Scenario, with the MW generating capacity of the hydro reservoirs increased and with less investment in thermal capacity could be beneficial to the system as the capacity added improves the hydro power capacity for peak power generation. The savings in investment in thermal capacity equals the extra MW capacity of the reservoirs, and the overall capacity requirement equals the annual

system demand peak plus a margin of spare capacity to allow for demand uncertainties and plant outages (the margin is typically in the range 15-20%).

3b. A Hydro-Thermal-Wind Scenario, with the MW generating capacity of the hydro plants increased (the energy storage capacity of the reservoirs of course remains unchanged) but with the thermal capacity restricted to the levels assumed in 1 (720 MW) and wind capacity increased (instead of thermal capacity, as is done in 1b) to reduce the loss of load probability[29]. This enables us to observe the effects of replacing thermal by the hydro expansion capacity.

The quantitative features of these scenarios are described in sections 9.2.1, 9.2.2 and 9.2.3 respectively. Each scenario is analysed for 12 different hydro flow regimes. These inflows are independent series chosen at random using the procedure described in Chapter 5; the aim is to ascertain how robust each scenario is to changes in hydro inflows.

All scenarios include extra thermal generation. They all start with the actual hydro and thermal capacity existing in the region then extra wind, hydro and thermal capacity is added depending on the case, as the load requires. The reservoir storage capacity is the same for all scenarios, since this is a physical constraint of the existing hydro generating system. In the scenarios 2 and 3 wind capacities addition along the simulation period are of 605 MW. The increment in hydro energy installed capacity would be made through the installation of additional turbines to the existing plants which have provision for that.

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[29] An approximation on the capacity factor was adopted such that 720 MW of thermal power is equivalent to 3025 MW of wind power.

The load will be a projection made by CHESF for the regional market. The period used in the simulations is twenty years.

These scenarios have been idealised from the existing installations and future possible alternatives to supply electricity to the region. The base scenario for the NE Brazil is the utilisation of thermal plants to supplement the need for electric power generation.

9.2.1 T hermal and hydro scenario

In this scenario, the initial capacities for thermal and hydro are those of the region and no wind is considered to participate in the future generation matrix, for reference a 91 is added to the scenarios titles, so 1 will be 911 and so forth:

Scenario 911

Technology	Initial capacity, MW	Additional capacity MW
Wind	0	0
Hydro	10268	0
Thermal	469.5[30]	System supplement[31] case a—see Table 9-1

[30] The initial thermal capacity is the actual installed capacity at the beginning of the simulation, the additions follow the Scenarios assumptions.
[31] As the load increases along the years a total capacity is added to keep a total of 30% over the demand for the basis scenario 911.

Supplement thermal power									
Month	MW	Month	MW	Month	MW	Month	MW	Month	MW
1	469.5	57	3349.5	104	6229.5	150	9109.5	196	11989.5
13	709.5	60	3589.5	108	6469.5	154	9349.5	200	12229.5
15	949.5	66	3829.5	112	6709.5	158	9589.5	204	12469.5
21	1189.5	69	4069.5	116	6949.5	162	9829.5	208	12709.5
24	1429.5	73	4309.5	119	7189.5	166	10069.5	212	12949.5
33	1669.5	77	4549.5	123	.7429.5	169	10309.5	216	13189.5
34	1909.5	81	4789.5	127	7669.5	173	10549.5	219	13429.5
36	2149.5	85	5029.5	131	7909.5	177	10789.5	223	13669.5
45	2389.5	89	5269.5	135	8149.5	181	11029.5	227	13909.5
46	2629.5	93	5509.5	139	8389.5	185	11269.5	231	14149.5
48	2869.5	96	5749.5	142	8629.5	189	11509.5	235	14389.5
51	3109.5	100	5989.5	146	8869.5	192	11749.5	239	14629.5

Table 9-1 Thermal system supplement

Scenario 911b

Technology	Initial capacity, MW	Additional capacity MW
Wind	0	0
Hydro	10268	0
Thermal	469.5	System supplement case b See Table 9-2

Total capacity of the system is 30 percent of the market (demand) and 720 MW of thermal installed at the same time the wind plants of scenario 912 in (three machines of 240MW).

Supplement thermal power 1b									
Month	MW	Month	MW	Month	MW	Month	MW	Month	MW
1	469.5	51	3589.5	100	6709.5	150	9829.5	200	12949.5
13	709.5	57	3829.5	104	6949.5	154	10069.5	204	13189.5
15	949.5	60	4069.5	108	7189.5	158	10309.5	208	13429.5
19	1189.5	66	4309.5	112	7429.5	162	10549.5	212	13669.5
21	1429.5	69	4549.5	116	7669.5	166	10789.5	216	13909.5
24	1669.5	73	4789.5	119	7909.5	169	11029.5	219	14149.5
33	1909.5	77	5029.5	123	8149.5	173	11269.5	223	14389.5
34	2149.5	81	5269.5	127	8389.5	177	11509.5	227	14629.5
36	2389.5	85	5509.5	131	8629.5	181	11749.5	230	14869.5
45	2629.5	89	5749.5	135	8869.5	185	11989.5	231	14869.5
46	2869.5	93	5989.5	139	9109.5	189	12229.5	235	15109.5
48	3109.5	96	6229.5	142	9349.5	192	12469.5	239	15349.5
49	3349.5	97	6469.5	146	9589.5	196	12709.5	240	15349.5

Table 9-2 Thermal system supplement case 911b

Thermal generation policy adopted is consistent with the expansion plan of the Brazilian government to meet demand growth in the area of NE Brazil (Eletrobrás, 1992 and Eletrobrás, 2002).

9.2.2 Scen ario thermal, hydro and wind

In this scenario initial capacities for thermal and hydro are those of the region and wind is considered to participate in the future generation matrix:

Scenario 912

Technology	Initial capacity, MW	Additional capacity, MW
Wind	0	5 x 605
Hydro	10268	0
Thermal	469.5	System supplement see Table 9-1

Thermal generation is still needed to guarantee demand as wind capacity added is insufficient to meet the total energy demand increase along the time.

9.2.3 Scen ario thermal, hydro and wind

In this scenario, the initial capacities for thermal and hydro are those of the region, wind is considered to participate in the future generation matrix and additional hydro is used through the installation of turbines in Xingó existing power plant:

Scenario 913

Technology	Initial capacity, MW	Additional capacity, MW
Wind	0	5 x 605
Hydro	10268	4x500
Thermal	469.5	System supplement see Table 9-1

Scenario 913b

Technology	Initial capacity, MW	Additional capacity, MW
Wind	0	5 x 605
Hydro	10268	4x500
Thermal	469.5	System supplement see Table 9-3

Supplement thermal power									
Month	MW	Month	MW	Month	MW	Month	MW	Month	MW
1	469.5	57	2869.5	104	5509.5	150	8389.5	196	11269.5
13	709.5	60	3109.5	108	5749.5	154	8629.5	200	11509.5
15	949.5	66	3349.5	112	5989.5	158	8869.5	204	11749.5
21	949.5	69	3589.5	116	6229.5	162	9109.5	208	11989.5
24	1189.5	73	3829.5	119	6469.5	166	9349.5	212	12229.5
33	1429.5	77	4069.5	123	6709.5	169	9589.5	216	12469.5
34	1669.5	81	4309.5	127	6949.5	173	9829.5	219	12709.5
36	1909.5	85	4549.5	131	7189.5	177	10069.5	223	12949.5
45	2149.5	89	4789.5	135	7429.5	181	10309.5	227	13189.5
46	2389.5	93	5029.5	139	7669.5	185	10549.5	231	13429.5
48	2629.5	96	5269.5	142	7909.5	189	10789.5	235	13669.5
51	2629.5	100	5269.5	146	8149.5	192	11029.5	239	13909.5

Table 9-3 Thermal system supplement case 913b

Appendix 2 presents the inflow used in the simulations for the three scenarios described above.

9.2.3.1 Idea behind increased power capacity

Figure A shows the current practice (tradition) with large hydro power plants for daily operation.

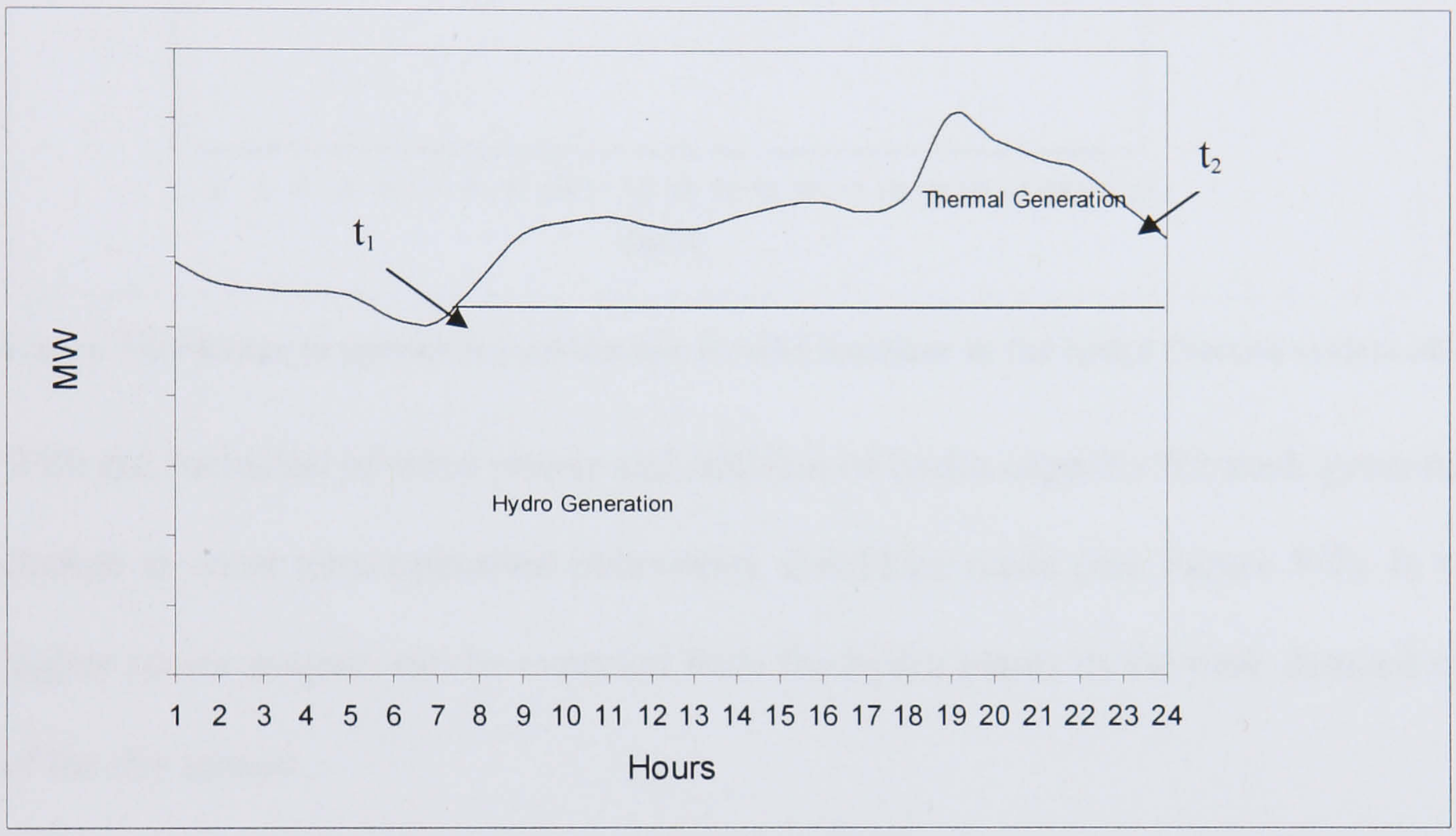


Figure 9-1 Operation practice with large hydrothermal plants

In the hydrothermal system, Hydro Power Generation meets the base load whilst peak load is met by thermal power. This is true for the Northeast region, especially during dry seasons. The dryer the season the higher is the participation of thermal generation. As the load increases with time and the thermal share is also increasing, the area on the top of the figure tends to get bigger in the future.

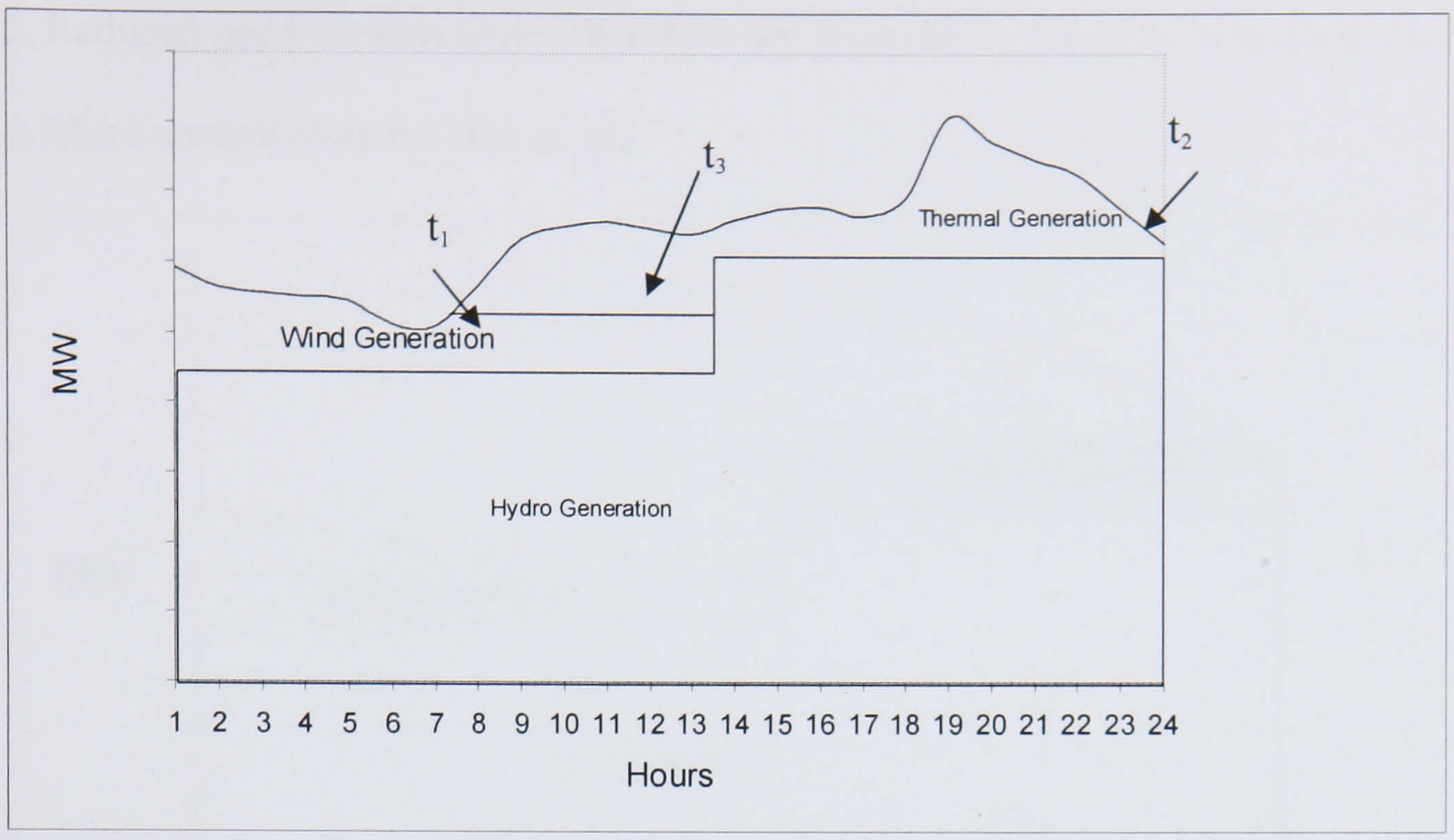


Figure 9-2 Change in operation practice due to wind insertion in the hydro thermal system off-peak

With the inclusion of wind power and addition of hydro capacity for peak generation, a change in short term operation philosophy should be made (see Figure 9-2). In which higher power outputs can be expected from the hydro plants in the peak demand course of the dry season

So by allowing the hydro scheme to operate with a lower load factor (higher MW/MWh ration) the wind power would enable hydro power to replace thermal generation used for power peak generation.

The introduction of wind power in the system would bring the following advantages:

1 .The same energy would be available to meet the load or more if the benefits of distributed generation were computed[32] (e.g. reduction in transmission losses).

2. Reduced thermal generation

4. Reduced fuel costs

[32] Wind generation would be closer to the loads than the hydro generation in NE. This would add benefits to transmission and distribution, which are not in the scope of this work.

5. Reduced need for new hydro therefore less inundation due to new hydro projects.

6. More control over the lake levels

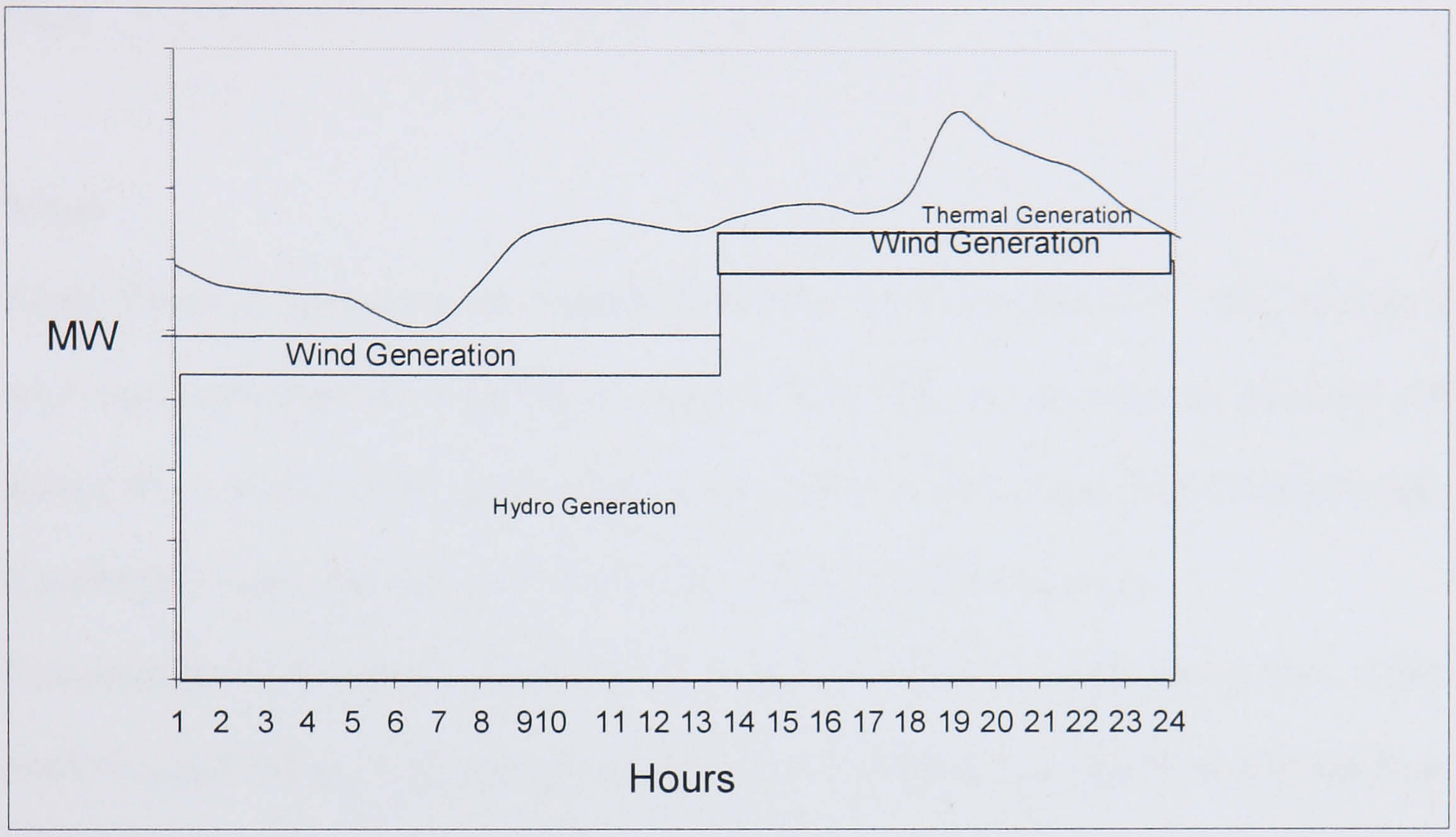


Figure 9-3 New operation practice, wind insertion in the hydro thermal system peak and off-peak

Figure 9-3 Shows an alternative way the system can be operated after the insertion of wind power in the hydrothermal system in NE Brazil.

There are some policy issues, which have to be addressed. The most important of them is the remuneration of the peak demand service. In the Brazilian electric power sector, there is no differential payment for hydro generation during peak hours; among other things, this reduces the incentive to invest in more peaking (MW) capacity on the hydro system, as explored under scenarios 3 and 3b. (There is however a minimum ecological flow which must guarantee the maintenance of the ecosystems and preservation of the aquatic biodiversity (CBHSF, 2004)).

Two options are available for the installation of addition hydro capacity in existing power plants: the first one Xingó Hydro Power plant and the second Itaparica Power Plant.

Xingó

Xingó Power Plant entered into operation in 1994 it has 6 units of 527 MW and has a civil works structure for 4 additional units of 527 MW. Its reservoir accumulates 3.8 billion m^3. It is one of the most modern power plants in Brazil and Chesf's largest one. It represents more than 25% of the company's entire installed capacity.

Downstream of this power plant there is a historical city. So, high fluctuations of the outflow could cause environmental damages. It was established that the maximum flow variation in day must be 500 m^3/day.

If additional units are installed on this plant it is necessary to build another power plant downstream of Xingó, the Pão de Açucar power plant. The latter would work as a damper to soften the flow fluctuation caused by the operation of the new units. Pão de Açucar power plant would be rated at 200 MW. The investment costs would be in the order of 1400 $/kW In order to install the additional machines an investment of approximately $300/kW would be needed.

The evolution of the firm energy with the installed power of Pão de Açucar – Reservoir Level at elevation 24.00 m.

Installed Power (Average-MW)	Firm Energy Local(Average-MW)	Firm Energy in the System (Average-MW)	Energy gain in the System (Average-MW)
0	0	5829,1	0
210	208,7	5922,5	93,4
220	214,2	5926,9	97,8
240	217,9	5930,2	101,1
270	221,5	5933,8	104,8
300	224,7	5937,0	107,9
330	226,9	5939,2	110,1
360	228,3	5940,6	111,5

Itaparica

Itaparica Power Plant entered into operation in 1988. It has 6 units of 246.6 MW and has civil works structure for 4 additional units of 246.6 MW. Its reservoir accumulates 10.7 million m^3 of water. The lake formation flooded areas of the States of Bahia and Pernambuco inhabited by 10500 families, who were resettled in three new towns and one village, where several irrigation projects have been developed.

There is no flow variation restriction for this power plant. According to information provided by one member of the Company during interview the cost of addition of capacity would be R$300/kW, (Estadão, 2005) 282.86 $/kW[33] .

[33] Abril 1997 – exchange rate 1.0606 .

Choice of addition priority

Comparing the two power plants one notices that Itaparica has a much larger reservoir than Xingó. It has fewer constraints regarding the outflow. It has lower cost associated to the additional capacity to be installed, since the unit installation costs of the plants in the power plant are approximately the same. However, Itaparica does not requires the construction of an additional plant to smooth the outflow variations. This way, the unit costs will become higher for Xingó. The lake of Itaparica power plant is almost three times higher than that of Xingó. Itaparica is the second power plant in the São Francisco river cascade and Xingó the last one.

So it can be concluded that Itaparica would be the least cost alternative for the installation of additional capacity for hydro power peak generation. Operationally it would be more advantageous to install peak capacity in Itaparica for its reservoir capacity and physical location. The only disadvantage is that the capacity aggregated to the system which would be lower than that added by Xingó.

In this work, the hydro capacity added was prioritised in relation to the total capacity added instead of cost, so Xingó expansion was included in the simulations instead of Itaparica.

The scenarios described in 9.2.1, 9.2.2 and 9.2.3 will be tested for three different markets. The reference market (i) described in 9.2 as regional market, a pessimistic market (ii) with loads lower than those of the reference market and the optimistic

market, with loads higher than those of the reference market. Figure 9-4 shows the loads for these markets.

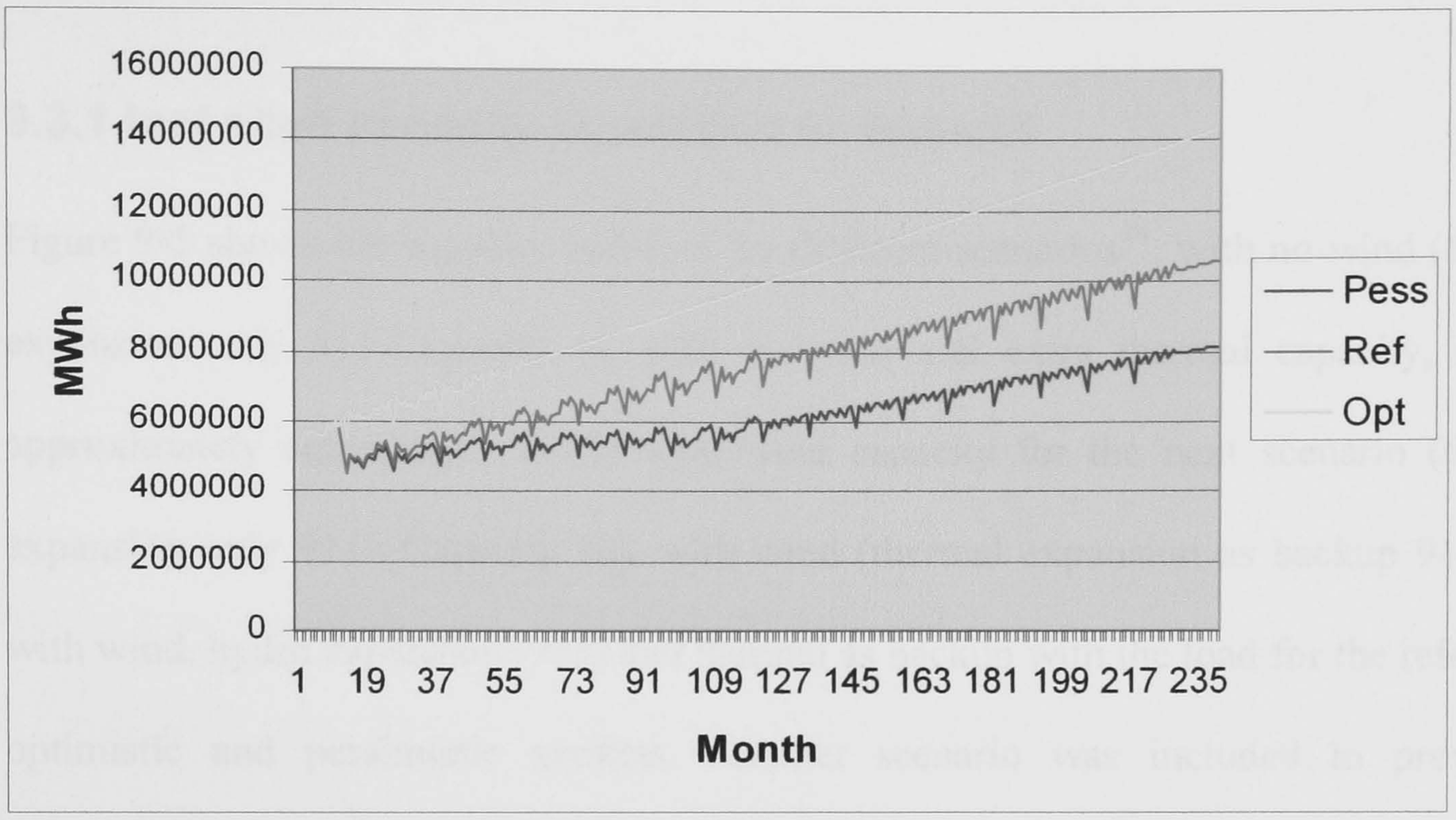


Figure 9-4 Loads for the pessimistic, reference and optimistic market.

9.3 Results

9.3.1 Inst alled capacity in relation to demand

Figure 9-5 shows the capacity installed for different scenarios[34], with no wind (thermal expansion only 911-Capacity 1), with no wind and extra thermal capacity, a total approximately equivalent[35] to the total wind capacity for the next scenario (thermal expansion only 911b-Capacity 1b), with wind (thermal expansion as backup 912) and with wind, hydro expansion (913) and thermal as backup with the load for the reference, optimistic and pessimistic markets. Another scenario was included to provide a comparison of the thermal wind alternatives for scenario 913. It the scenario 913b, the difference between this and the latter is that the amount of wind used in 913 is deduced from the thermal capacity in this scenario this way the same aggregate capacity 1b and 3b can be compared. The capacity values are in the table presented in Appendix 3.

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[34] For reference a 91 was added to the numbering of all scenarios. So, scenario 1 became 911 and so forth.
[35] As the total wind capacity in scenario 912 is 3000MW it was adopted a total of 720 MW thermal power.

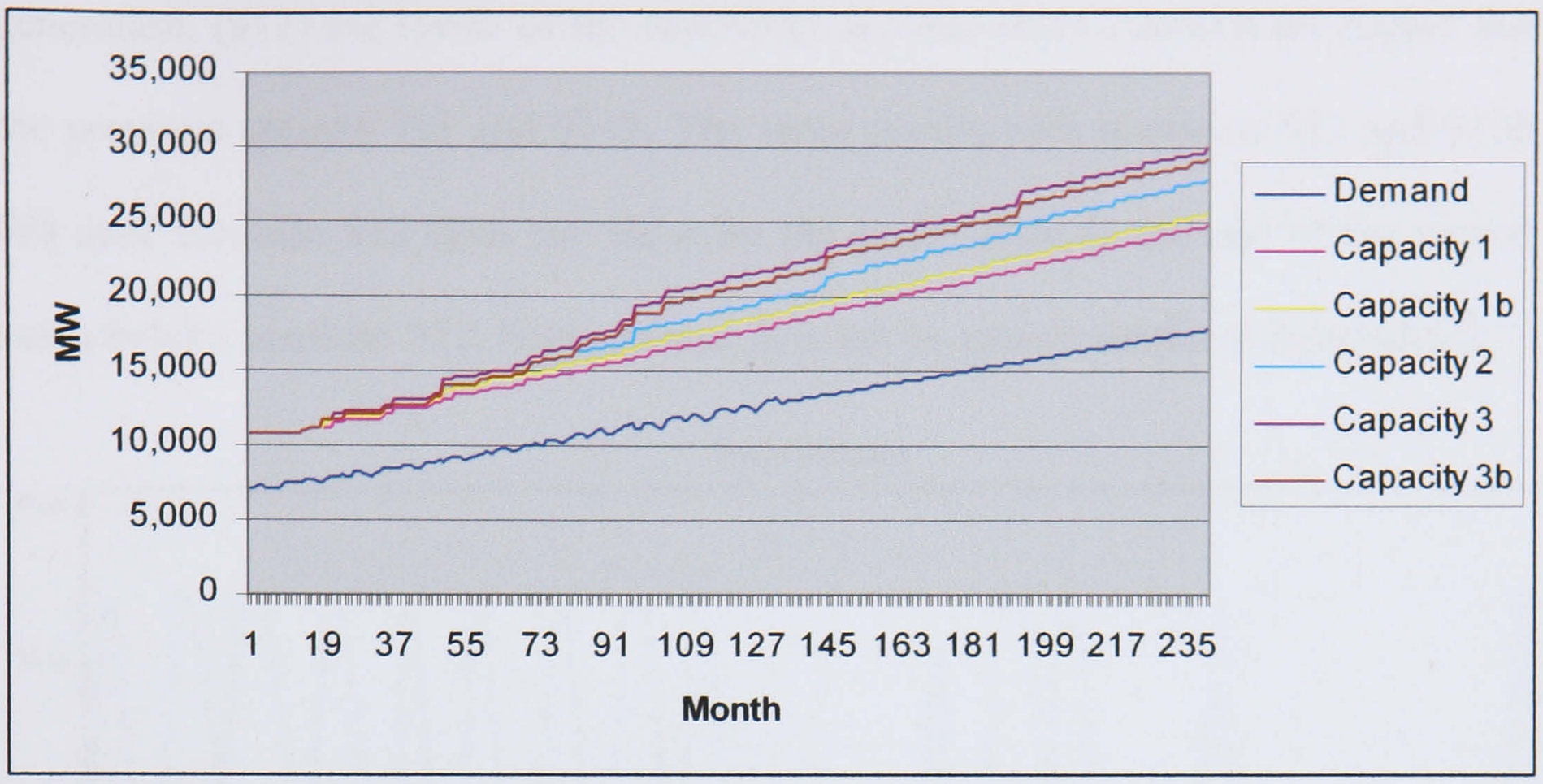


Figure 9-5 Installed capacity in relation demand – case inflow 1

It can be seen from the figure that, under the assumptions, the total installed capacities will be a function only of the demand for the reference market[36]. These capacities will be the same for the three markets presented in the last topic. The idea is to observe the sensitivity of adding wind to the system in relation to the different markets. Although the nominal capacities are different when considering the capacity factor of wind and hydro expansion, effective capacities of scenarios 911b, 912 and 913b are equivalent. Capacity credit for wind in Brazil has not been studied in detail. The amount of wind power installed is very small 28,625 kW in Brazil from which 19,725 kW in NE Brazil (see Appendix 4). So far no work assessing the capacity credit of these plants have been carried out. Therefore, there is no availability of data to back the assumption of wind for capacity replacement through wind generation.

Figure 9-6 shows the level of the reservoir for inflow 1, three scenarios explained above, and the load for the reference market. It can be seen that with the insertion of the wind

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[36] Capacity 1 refers to the scenario thermal and hydro, capacity 2 to thermal, hydro and wind and capacity 3 to thermal, hydro, wind and hydro addition.

generation, (912) the levels of the reservoirs at some short intervals are higher than in the previous options 911 and 911b. The same occurs with scenarios 913 and 913b. In this case scenario 912 does not show on the graph towards the end of the period for being behind scenario 911. Nevertheless, this can be seen in details in Appendix 5.

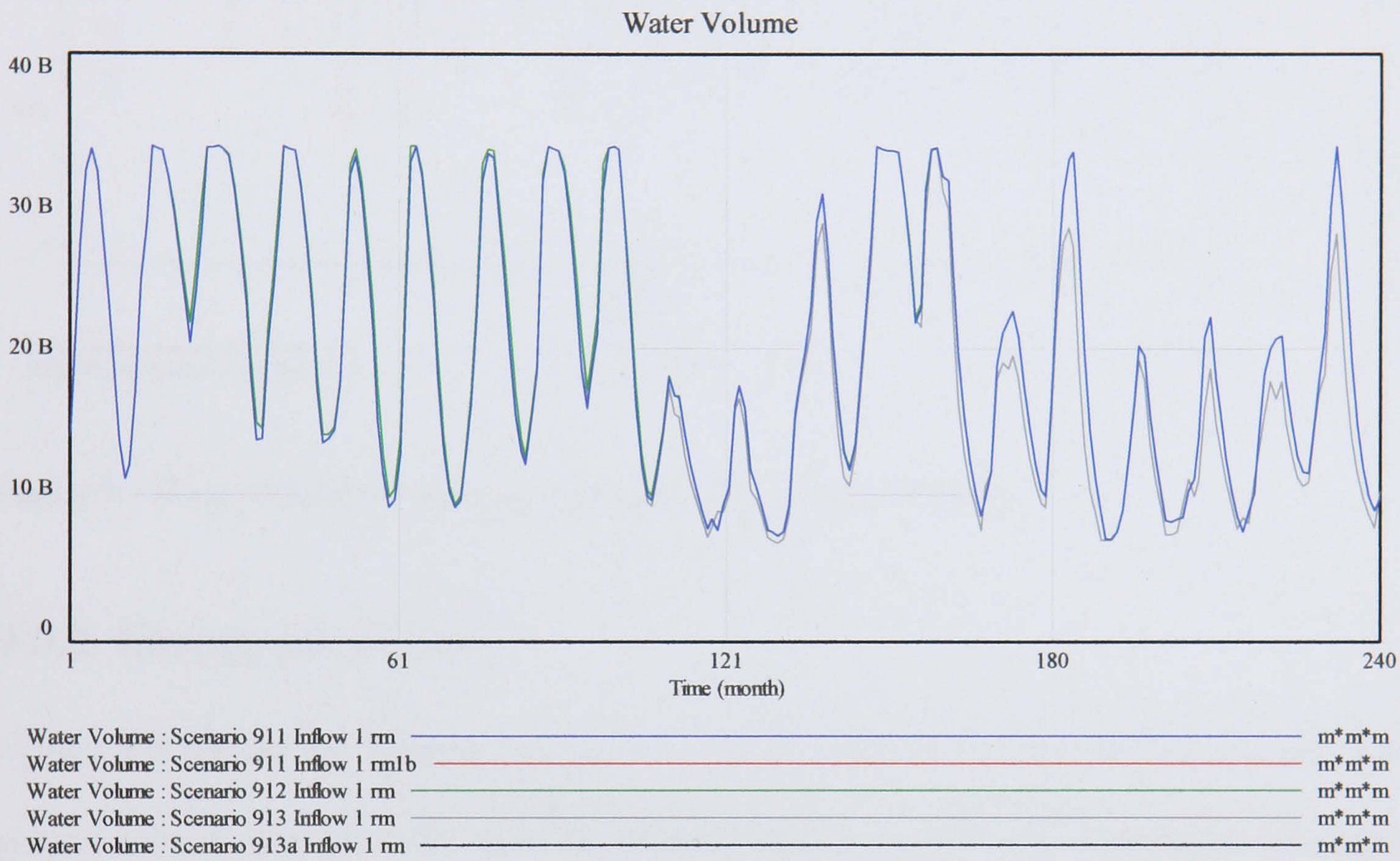


Figure 9-6 Reservoir level for inflow1 and the three scenarios

The figure shows that wind power contribution can lead to a slower drawdown of the reservoir. This can be managed by the system operator to provide a higher security of the system and even to allow other uses of water more intensively. For a better comparison Figure 9-7 showing scenarios 911b and 912 is depicted.

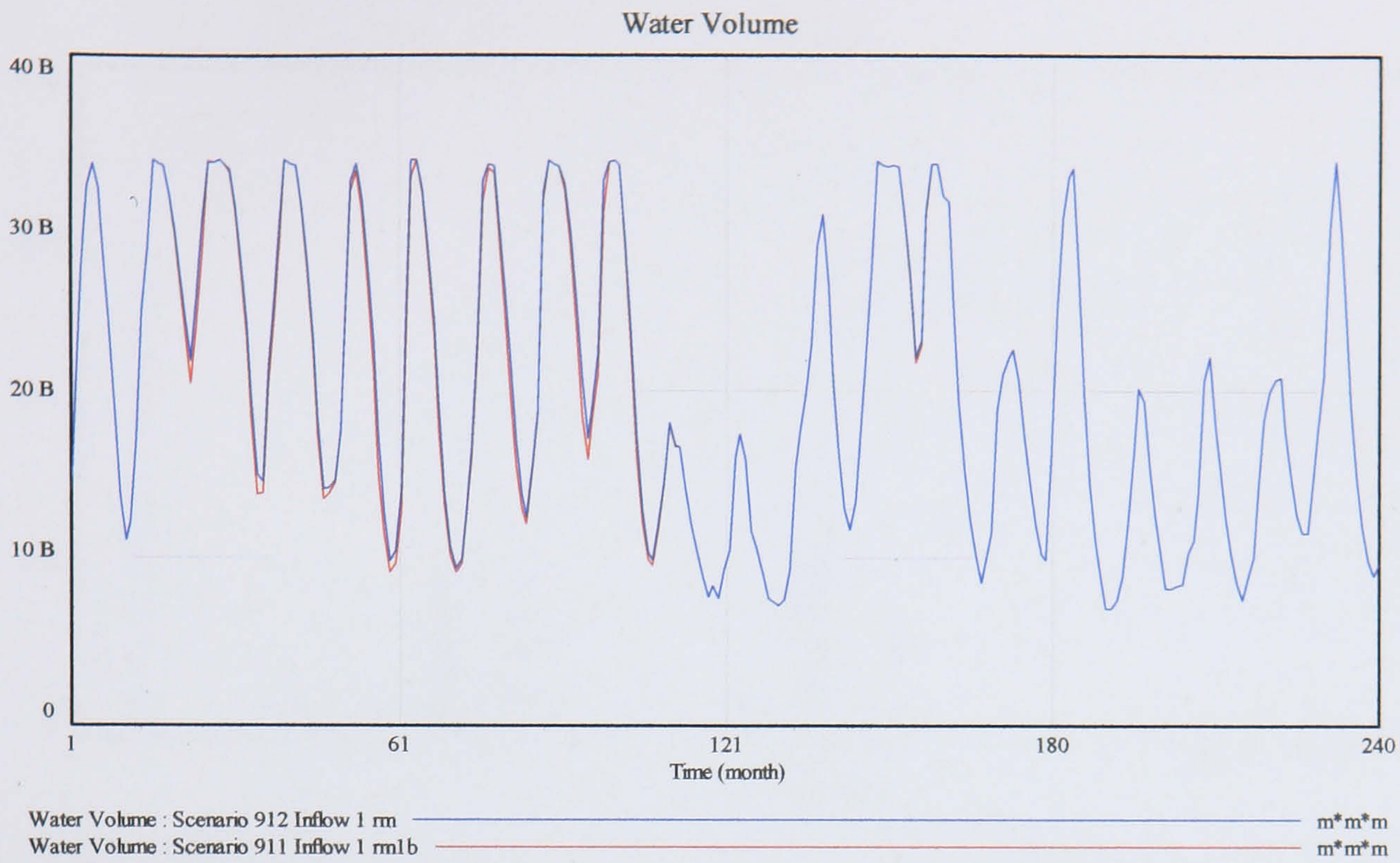


Figure 9-7 Water volume for scenario 911b and 912 – reference market.

9.3.2 Energy not served

Figure 9-8 shows the electric energy not served (EENS) for the 20 year period. The graphs indicate that after the insertion of wind power (912) EENS is reduced. The same behaviour is noted after the electric power expansion most of the time. At times this does not happen, once the model was not designed to take advantage of the extra capacity. This would require a simulation using a shorter time step and the use of optimisation. Energy shortages are considered in the cost of the energy as cost of deficit.

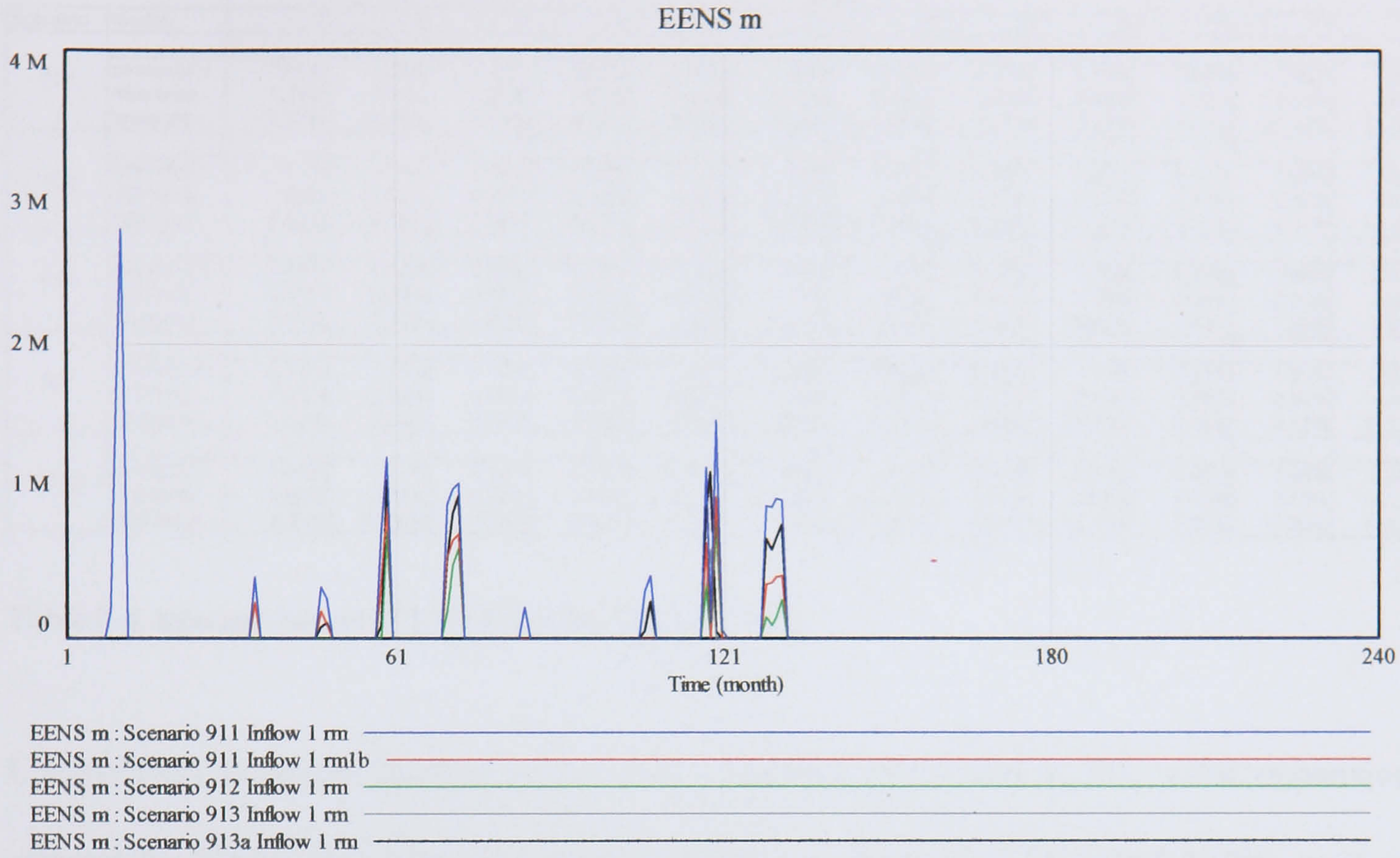


Figure 9-8 Electric Energy not Served

It is important to note that the in scenario 911b in which addition of thermal power is used instead of wind power, when compared with scenario 912, presents higher ENNS. This shows that comparing these two scenarios the wind option provides higher safety to the system.

Base on the results for EENS presented in Appendix 6 and EE in Appendix 7, LOLP has been calculated for all periods. They are tabulated in Appendix 8. Their average values are shown in Table 9-4. From the tables, it can be seen that LOLP are higher for higher loads as spinning reserve is lower.

		Inflow											
Scenario	Market	1	2	3	4	5	6	7	8	9	10	11	12
911													
	pessimistic	0.43%	1.94%	0.19%	0.32%	0.48%	1.58%	1.44%	0.47%	2.13%	0.62%	2.06%	2.80%
	reference	1.23%	3.12%	1.21%	1.05%	1.81%	2.10%	2.65%	0.93%	3.99%	1.01%	2.94%	4.62%
	optimisitc	9.05%	12.66%	7.64%	8.05%	9.22%	9.48%	10.13%	7.17%	15.23%	8.27%	12.44%	14.56%
911b													
	pessimistic	0.41%	1.78%	0.16%	0.21%	0.31%	1.47%	1.31%	0.42%	1.84%	0.57%	1.93%	2.54%
	reference	0.83%	2.61%	0.81%	0.69%	1.27%	1.78%	2.12%	0.70%	3.04%	0.71%	2.37%	3.83%
	optimisitc	6.57%	9.08%	5.82%	6.11%	7.09%	6.79%	6.95%	5.20%	11.65%	5.76%	9.11%	10.49%
912													
	pessimistic	0.40%	1.64%	0.10%	0.15%	0.26%	1.36%	1.20%	0.38%	1.70%	0.54%	1.84%	2.41%
	reference	0.63%	2.23%	0.56%	0.56%	0.92%	1.63%	1.81%	0.59%	2.70%	0.59%	2.20%	3.45%
	optimisitc	5.53%	7.95%	4.87%	5.14%	6.02%	5.77%	5.92%	4.22%	10.62%	4.61%	7.99%	9.35%
913													
	pessimistic	0.40%	1.64%	0.10%	0.15%	0.26%	1.36%	1.22%	0.38%	1.70%	0.54%	1.84%	2.28%
	reference	0.62%	2.24%	0.60%	0.57%	0.93%	1.69%	1.91%	0.59%	2.80%	0.59%	2.21%	3.43%
	optimisitc	6.16%	8.49%	5.62%	5.79%	6.76%	6.63%	6.55%	4.96%	11.23%	5.28%	8.52%	10.23%
913b													
	pessimistic	0.40%	1.77%	0.12%	0.23%	0.36%	1.48%	1.33%	0.43%	1.93%	0.56%	1.94%	2.58%
	reference	0.93%	2.63%	0.97%	0.86%	1.43%	1.99%	2.42%	0.81%	3.68%	0.70%	2.59%	4.12%
	optimisitc	8.67%	12.09%	7.45%	7.82%	8.92%	9.42%	9.71%	7.02%	14.74%	7.83%	11.88%	14.38%

Table 9-4 Average values of LOLP for the four scenarios.

Comparison between thermal expansion alternative (911 and 911b), wind expansion alternative (912), and wind and hydro expansion alternative (913 and 913b), cost of energy supplied during 20 years for 12 different inflows is supplied in Table 9-5.

As the market increases wind becomes a more interesting option in terms of the cost of the alternative (912/911b). The addition of hydro power without a correspondent addition of energy in the long term simulation does not bring better results than the addition of equivalent thermal capacity in any of the scenarios (913b/911b).

In the short term there might be situations where it cannot displace thermal completely due the vulnerability caused by wind fluctuations but in the long term operation it could replace it using the long term capacity factor.

Pessimistic market									
	911	911b	912	913	913b	911/911b	912/911b	913/912	913b/911b
	US$			Exp. Xingó	Exp Xingo-thermal				
Inflow	No wind		wind	wind and hydro	wind and hydro				
1	5,816,692,411	5,694,481,693	9,596,580,223	9,673,356,519	9,416,560,121	102%	169%	101%	165%
2	26,354,467,794	22,185,828,419	25,051,409,819	25,061,427,694	25,854,591,651	119%	113%	100%	117%
3	4,800,439,671	4,255,134,170	4,977,578,889	5,054,355,114	4,953,462,243	113%	117%	102%	116%
4	5,420,009,044	4,707,591,998	5,253,500,993	5,330,279,527	5,726,116,089	115%	112%	101%	122%
5	6,832,256,533	6,034,049,015	6,676,423,360	6,753,197,955	7,299,214,293	113%	111%	101%	121%
6	23,290,977,472	22,157,131,457	21,752,799,321	21,829,575,860	22,913,743,019	105%	98%	100%	103%
7	21,269,740,064	20,275,781,321	20,440,250,178	20,600,784,402	21,533,696,998	105%	101%	101%	106%
8	8,506,191,030	7,975,094,893	8,672,668,852	8,749,445,346	9,105,921,570	107%	109%	101%	114%
9	27,904,211,534	25,312,191,644	25,106,602,237	25,183,383,366	26,749,272,599	110%	99%	100%	106%
10	10,650,077,226	10,673,613,757	11,511,649,791	11,588,425,331	11,517,159,916	100%	108%	101%	108%
11	29,792,512,418	28,466,582,516	28,479,906,232	28,556,685,875	29,459,324,048	105%	100%	100%	103%
12	37,643,411,757	35,787,286,973	36,094,274,393	36,171,055,170	37,223,670,223	105%	101%	100%	104%
Avg	17,356,748,913	16,127,063,988	16,967,803,691	17,045,997,680	17,646,061,064	108%	105%	100%	109%

Reference market								
	911	911b	912	913	911/911b	912/911b	913/912	
	US$			Exp. Xingó				
Inflow	No wind		wind	wind and hydro				
1	13,418,392,741	10,699,142,177	10,677,355,370	10,596,393,358	12,267,971,977	125%	100%	99%	115%
2	36,772,802,328	32,805,313,285	29,919,358,312	29,903,596,854	32,806,710,868	112%	91%	100%	100%
3	11,650,723,027	11,571,147,881	7,494,630,928	7,686,208,731	10,444,333,574	101%	65%	103%	90%
4	11,309,262,170	9,191,072,804	8,607,625,247	8,699,735,849	11,128,394,193	123%	94%	101%	121%
5	17,452,612,876	13,058,218,402	11,543,012,646	11,633,827,993	11,631,218,391	134%	88%	101%	89%
6	27,003,484,503	25,957,952,341	24,867,808,497	25,207,361,919	27,174,320,797	104%	96%	101%	105%
7	29,978,291,269	25,958,157,468	24,682,709,658	25,179,726,625	28,759,820,935	115%	95%	102%	111%
8	12,036,222,032	10,370,946,207	10,223,859,087	10,300,422,242	11,795,452,586	116%	99%	101%	114%
9	41,936,089,583	34,529,559,148	32,504,951,857	33,095,401,433	39,519,824,001	121%	94%	102%	114%
10	12,880,213,221	11,552,031,345	11,808,416,116	11,885,178,073	12,126,586,219	111%	102%	101%	105%
11	35,567,535,636	32,208,334,277	31,529,981,247	31,611,538,709	33,940,769,086	110%	98%	100%	105%
12	52,429,193,001	46,494,757,207	43,775,541,578	43,806,061,859	49,073,212,789	113%	94%	100%	106%
Avg	25,202,901,866	22,033,052,712	20,636,270,879	20,800,454,471	23,389,051,285	114%	94%	101%	106%

Optmistic market								
	911	911b	912	913	911/911b	912/911b	913/912	
	US$			Exp. Xingó				
Inflow	No wind		wind	wind and hydro				
1	66,355,886,297	54,153,501,499	49,597,596,931	52,428,492,753	63,996,815,087	123%	92%	106%	118%
2	103,645,288,943	87,306,223,663	83,127,434,988	85,392,463,506	101,233,616,798	119%	95%	103%	116%
3	59,001,997,819	47,387,982,917	43,872,542,304	47,878,014,006	57,396,293,391	125%	93%	109%	121%
4	60,455,605,487	48,362,239,870	43,689,544,214	46,329,790,999	59,030,486,527	125%	90%	106%	122%
5	70,296,024,330	67,936,690,910	52,347,172,838	56,384,038,832	68,870,605,684	103%	77%	108%	101%
6	82,565,124,907	82,829,560,015	65,882,142,027	70,280,372,464	81,848,688,875	100%	80%	107%	99%
7	82,705,715,630	69,733,883,732	64,760,738,035	67,544,725,639	80,025,449,275	119%	93%	104%	115%
8	52,284,931,910	41,831,242,844	38,343,606,992	41,664,970,175	52,056,123,235	125%	92%	109%	124%
9	129,752,015,932	110,739,240,867	106,233,776,464	109,772,056,187	127,153,000,037	117%	96%	103%	115%
10	61,761,598,857	49,850,307,028	44,235,216,215	47,110,575,097	58,903,537,876	124%	89%	107%	118%
11	102,794,792,799	87,069,841,452	82,469,874,141	85,465,525,904	98,623,851,186	118%	95%	104%	113%
12	126,374,403,660	110,810,875,599	105,945,287,020	109,597,765,813	125,110,172,272	114%	96%	103%	113%
Avg	83,166,115,548	71,500,965,866	65,042,077,681	68,320,732,615	81,187,386,687	116%	91%	105%	114%

Table 9-5 Cost of the alternatives for pessimistic, reference and optimistic market

9.3.3 Tota l Average Costs of Energy

Tables 9-6 through 9-16 show the average costs for electric power generation for the four studied scenarios and twelve inflows considered applied to meet the demand of the pessimistic, the reference and the optimistic markets respectively. The detailed calculation results are shown in Appendix 9. It can be see from the tables that the participation of wind power reduces the average operation costs of electric power production in the time period analysed under the assumptions adopted. Scenario 911, no wind, has the highest average cost compared to both 912 and 913 with progressive wind participation. One can note comparing the three tables that for higher loads the contribution of wind to the reduction of costs is higher. The benefits from the contribution of wind for reduction of the costs are clearly shown. In the first market in which the installed capacity is much higher than the load the wind contribution was relatively lower. This can be explained by the excess capacity, or backup, available. The more backup is available, the less important is the contribution of RE to the system, especially in hydro systems which have a very low operation costs. Figure 9-9 and Table 9-17 show the probability of costs not exceeding the values indicated on the Y-axis.

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 911							
1	146.36	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.67	11.673	3.22	0.68	0.67	98.039	8.49	104.95	295.08	31.27	410.18	481.61	
3	0.86	509.470.8	4	0.85	0.88	369.530.8	6	0.84	0.86	0.86	352.18	24.55	
4	1.09	90.54	1.10	54.69	1.78	1.08	1.03	1.03	40.16	1.08	1.07	40.87	
5	9.21	1.35	1.26	159.15	439.15	1.33	1.29	1.26	445.631.3	4	1.31	168.60	
6	1.78	1.48	1.90	1.48	1.85	1.53	1.74	1.77	111.211.4	9	1.46	2.17	
7	1.72	1.97	1.74	1.66	2.01	1.66	124.37	65.80	2.17	1.69	1.95	1.81	
8	1.82	32.89	2.32	1.98	33.16	1.79	31.63	1.79	2.57	1.81	2.19	17.95	
9	2.44	3.93	4.65	3.33	2.31	2.30	2.52	2.40	3.10	2.60	2.32	2.29	
10	4.63	2.39	2.91	2.29	2.51	4.08	4.15	2.52	3.85	2.57	3.93	5.31	
11	6.26	2.62	3.09	2.95	3.93	2.79	3.20	2.71	5.83	3.00	4.03	3.94	
12	2.66	3.13	2.66	3.47	4.94	3.15	2.53	3.50	4.75	3.42	4.19	4.82	
13	2.44	3.48	2.57	5.00	2.89	3.41	3.33	3.48	5.46	4.97	7.96	3.04	
14	3.36	4.82	2.65	3.89	2.97	3.90	3.13	3.80	3.75	6.38	3.63	4.40	
15	3.73	5.42	3.86	4.23	3.11	3.50	3.48	4.72	3.09	4.72	6.40	4.80	
16	6.64	6.32	4.47	3.12	4.81	3.28	7.41	4.85	5.39	3.55	3.27	3.57	
17	7.62	5.84	5.37	3.27	4.87	4.34	5.78	4.65	5.79	5.06	5.15	8.96	
18	6.06	7.05	3.91	5.52	6.41	6.54	3.77	6.37	6.01	4.52	7.91	6.61	
19	4.81	6.37	5.16	5.45	7.30	7.82	5.44	5.53	5.44	5.07	4.29	5.42	
20	5.36	5.71	6.21	6.83	5.43	4.70	5.22	4.88	3.77	6.49	6.24	5.29	
Average	10.98	55.40	5.25	13.52	26.57	41.633	6.47	13.88	61.3113	.03	61.22	71.10	34.19

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 911b							
1	146.30	401.69	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.70	7.68	12.09	0.71	0.70	82.308	2.94	88.65	267.66	24.65	372.68	441.80	
3	0.94	464.400.9	2	0.92	0.96	327.890.9	3	0.92	0.93	0.93	316.51	16.21	
4	1.16	65.76	1.17	33.74	1.17	1.15	1.10	1.10	14.64	1.15	1.15	32.30	
5	2.50	1.50	1.39	116.35	347.06	1.47	1.43	1.39	336.961.4	8	1.44	117.72	
6	1.95	1.62	1.86	1.62	2.02	1.68	1.90	1.94	73.34	1.64	1.60	1.86	
7	1.86	2.13	1.88	1.80	2.18	1.80	37.59	21.26	2.35	1.83	2.11	1.96	
8	1.95	6.42	2.49	2.12	6.33	1.92	5.93	1.92	2.76	1.94	2.35	4.55	
9	2.68	4.30	5.09	3.65	2.52	2.52	2.76	2.64	3.40	2.85	2.54	2.51	
10	5.04	2.60	3.16	2.50	2.73	4.45	4.51	2.74	4.20	2.80	4.28	5.78	
11	6.77	2.84	3.34	3.19	4.25	3.02	3.46	2.93	6.30	3.25	4.36	4.26	
12	2.86	3.36	2.86	3.73	5.31	3.38	2.72	3.77	5.11	3.68	4.50	5.18	
13	2.61	3.73	2.74	5.35	3.09	3.64	3.56	3.72	5.84	5.32	8.51	3.25	
14	3.58	5.13	2.82	4.14	3.17	4.15	3.33	4.04	4.00	6.79	3.86	4.69	
15	3.95	5.74	4.09	4.48	3.29	3.71	3.69	5.00	3.28	5.01	6.79	5.10	
16	7.02	6.68	4.73	3.30	5.08	3.47	7.84	5.12	5.70	3.75	3.46	3.78	
17	8.03	6.15	5.66	3.44	5.13	4.57	6.09	4.90	6.10	5.33	5.42	9.45	
18	6.37	7.41	4.11	5.80	6.74	6.87	3.96	6.70	6.31	4.75	8.31	6.94	
19	5.05	6.68	5.41	5.72	7.65	8.20	5.71	5.80	5.71	5.32	4.50	5.68	
20	5.60	5.97	6.50	7.15	5.68	4.92	5.46	5.11	3.94	6.79	6.53	5.54	
Average	10.85	5.97	4.37	10.51	20.78	38.953	0.25	11.02	51.5412	.90	57.78	65.22	26.68

Table 9-6 Average electric power operating costs pessimistic market - Hydrothermal (911) and with addition of "wind equivalent thermal" (911b).

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 912							
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.73	0.89	1.83	0.73	0.73	46.215	2.92	68.43	227.42	14.94	302.27	371.05	
3	0.96	370.620.9	6	0.96	0.97	258.270.9	6	0.96	0.96	0.96	242.95	17.15	
4	1.16	47.86	1.17	12.03	1.17	1.15	1.13	1.13	5.76	1.16	1.16	22.77	
5	1.55	1.47	1.45	76.05	207.47	1.46	1.45	1.45	200.641.4	7	1.45	76.58	
6	1.81	1.62	1.75	1.62	1.83	1.63	1.78	1.81	44.42	1.62	1.62	1.74	
7	1.82	1.99	1.84	1.79	2.03	1.79	5.33	11.64	2.14	1.81	1.97	1.87	
8	1.97	3.20	2.29	2.00	2.68	1.96	3.40	1.96	2.44	1.96	2.17	2.40	
9	2.43	3.55	3.79	3.00	2.42	2.34	2.46	2.41	2.63	2.39	2.35	2.33	
10	3.95	2.48	2.79	2.46	2.51	3.30	3.56	2.52	3.47	2.54	3.44	4.25	
11	5.04	2.58	2.90	2.80	3.41	2.72	2.98	2.65	4.65	2.86	3.56	3.46	
12	2.64	2.89	2.63	3.16	4.13	2.91	2.56	3.22	4.36	3.15	3.72	4.03	
13	2.68	3.20	2.68	4.03	2.82	3.01	3.09	3.20	4.36	3.74	5.92	2.90	
14	3.15	4.02	2.74	3.47	2.88	3.42	2.99	3.46	3.37	4.97	3.25	3.85	
15	3.28	3.97	3.51	3.66	2.99	3.24	3.19	3.68	2.97	3.66	5.06	3.67	
16	5.02	5.26	3.89	3.00	4.15	3.10	5.63	4.02	4.35	3.25	3.11	3.29	
17	5.73	4.66	4.24	3.13	4.16	3.77	4.86	3.90	4.53	4.09	4.17	6.24	
18	4.73	5.51	3.51	4.30	4.97	5.09	3.43	5.02	4.39	3.91	6.14	5.15	
19	4.19	5.40	4.29	4.54	5.75	5.80	4.56	4.36	4.67	4.26	3.79	4.64	
20	4.51	4.78	5.21	5.34	4.71	4.10	4.39	4.17	3.48	5.13	4.89	4.57	
Average	10.18	43.87	3.43	6.93	13.11	33.152	6.53	9.03	40.1611	.83	49.88	58.39	25.54

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 913							
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.73	0.89	1.83	0.73	0.73	46.215	2.92	68.43	227.42	14.94	302.27	371.05	
3	0.96	370.620.9	6	0.96	0.97	258.270.9	6	0.96	0.96	0.96	242.95	17.15	
4	1.16	47.86	1.17	12.03	1.17	1.15	1.13	1.13	5.76	1.16	1.16	22.77	
5	1.55	1.47	1.45	76.05	207.47	1.46	1.45	1.45	200.641.4	7	1.45	76.58	
6	1.81	1.62	1.76	1.62	1.83	1.62	1.78	1.81	44.42	1.62	1.62	1.74	
7	1.83	2.00	1.85	1.81	2.05	1.81	14.59	11.67	2.17	1.82	1.99	1.89	
8	2.00	3.25	2.34	2.02	2.72	1.99	3.41	1.99	2.49	1.99	2.20	2.45	
9	2.47	3.65	3.88	3.09	2.47	2.37	2.51	2.45	2.68	2.42	2.37	2.36	
10	4.06	2.52	2.86	2.53	2.55	3.56	3.62	2.57	3.54	2.58	3.74	4.38	
11	5.21	2.61	2.95	2.87	3.52	2.78	3.07	2.69	4.75	2.93	3.63	3.74	
12	2.66	2.99	2.66	3.24	4.25	2.97	2.60	3.32	4.70	3.21	3.83	4.08	
13	2.73	3.28	2.73	4.07	2.84	3.07	3.15	3.27	4.41	3.82	6.04	2.91	
14	3.20	4.10	2.79	3.57	2.90	3.49	3.01	3.49	3.46	5.06	3.33	3.96	
15	3.38	4.32	3.55	3.76	3.00	3.26	3.22	4.02	2.98	4.03	5.41	4.04	
16	5.09	5.28	4.00	3.02	4.55	3.07	5.70	4.07	4.43	3.30	3.13	3.33	
17	6.11	4.74	4.31	3.15	4.20	3.82	5.19	4.01	4.63	4.14	4.24	6.69	
18	5.06	5.61	3.57	4.36	5.32	5.44	3.45	5.12	4.72	3.95	6.23	5.43	
19	4.24	5.76	4.38	4.71	5.80	6.11	4.99	4.45	4.74	4.38	3.86	4.63	
20	4.84	4.90	5.33	5.44	4.80	4.16	4.78	4.28	3.47	5.22	4.99	4.73	
Average	10.27	43.95	3.48	6.97	13.18	33.222	7.08	9.09	40.2311	.89	49.96	58.49	25.65

Table 9-7 Average electric power operating costs pessimistic market - Hydrothermal with wind addition (912) and Hydrothermal with wind addition and hydro capacity expansion (913).

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 913b							
1	146.36	401.69	15.13	0.47	0.47	307.91	420.16	50.70	272.38	168.78	394.85	626.13	
2	0.71	1.71	5.39	0.71	0.71	63.627	0.92	79.25	240.28	19.67	320.39	395.94	
3	0.89	405.440.8	8	0.88	0.90	288.720.8	8	0.88	0.88	0.88	276.61	21.91	
4	1.09	62.08	1.10	25.84	1.10	1.08	1.06	1.06	11.09	1.08	1.08	29.31	
5	1.42	1.35	1.33	99.22	267.93	1.34	1.33	1.33	272.321.3	5	1.33	105.36	
6	1.66	1.48	1.61	1.48	1.67	1.49	1.64	1.66	70.12	1.48	1.48	1.59	
7	1.69	1.85	1.71	1.68	1.90	1.68	68.91	39.07	2.01	1.68	1.84	1.75	
8	1.86	6.69	2.18	1.88	5.68	1.86	8.06	1.86	2.33	1.86	2.06	2.29	
9	2.28	3.36	3.57	2.85	2.28	2.19	2.32	2.26	2.48	2.23	2.19	2.18	
10	3.74	2.32	2.63	2.33	2.35	3.28	3.34	2.37	3.26	2.38	3.45	4.04	
11	4.83	2.42	2.74	2.66	3.27	2.58	2.85	2.49	4.41	2.72	3.37	3.47	
12	2.47	2.78	2.48	3.02	3.96	2.76	2.42	3.10	4.38	2.99	3.57	3.80	
13	2.56	3.07	2.56	3.82	2.66	2.88	2.95	3.07	4.13	3.58	5.66	2.73	
14	3.01	3.86	2.63	3.36	2.73	3.29	2.83	3.28	3.26	4.77	3.13	3.73	
15	3.19	4.08	3.35	3.55	2.84	3.07	3.04	3.80	2.82	3.81	5.11	3.81	
16	4.83	5.00	3.79	2.86	4.31	2.91	5.40	3.86	4.20	3.12	2.96	3.16	
17	5.80	4.50	4.10	2.99	3.99	3.63	4.93	3.81	4.40	3.93	4.04	6.36	
18	4.82	5.35	3.40	4.15	5.07	5.18	3.29	4.88	4.49	3.77	5.93	5.18	
19	4.05	5.50	4.19	4.50	5.54	5.84	4.76	4.25	4.53	4.18	3.69	4.42	
20	4.64	4.69	5.10	5.20	4.60	3.98	4.57	4.09	3.32	5.00	4.77	4.53	
Average	10.09	46.46	3.49	8.67	16.20	35.463	0.78	10.85	45.8511	.96	52.38	61.58	27.82

Table 9-8 Average electric power operating costs pessimistic market - Hydrothermal with wind addition and hydro capacity expansion (913b).

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12
						Scenario 911						
1	146.30	401.69	15.13	0.47	0.47	307.78	420.01	0.50	272.26	168.72	394.70	625.89
2	0.66	36.374	7.04	0.68	0.66	119.08	130.47	0.69	319.44	59.54	436.98	515.50
3	5.76	614.720.8	0	2.06	20.96	448.521.9	2	0.85	1.95	5.32	447.64	57.18
4	6.72	359.58	18.59	143.78	36.41	6.35	0.98	1.00	139.98	17.32	24.52	112.27
5	69.85	38.16	1.13	314.80	828.12	6.41	1.25	1.10	767.47	10.80	1.95	540.58
6	106.47	1.42	94.86	2.12	89.26	9.57	89.85	446.53	298.312.5	9	8.77	229.41
7	2.99	61.121	2.46	1.57	210.01	1.96	399.67	1.31	66.06	8.07	66.19	56.96
8	1.63	334.94	188.03	9.61	329.28	1.59	341.71	1.85	44.16	1.64	28.36	335.23
9	12.17	149.58	509.80	278.46	4.30	10.53	150.67	27.88	278.03	12.80	8.88	10.44
10	195.54	3.76	110.78	2.10	4.73	187.77	208.90	1.69	111.394.3	4	104.06	387.89
11	266.47	2.64	3.19	3.11	69.99	2.70	71.53	4.04	260.723.1	7	71.79	138.06
12	2.73	3.36	2.79	3.68	47.66	27.70	2.44	1.98	4.77	23.00	82.43	47.51
13	2.13	3.46	2.43	32.64	2.88	3.60	3.30	6.19	26.0726	.47	64.82	3.13
14	3.40	6.50	2.53	3.94	2.98	4.07	3.08	6.61	3.79	15.58	3.75	4.50
15	3.83	5.58	4.00	4.36	3.06	3.53	3.61	7.03	3.08	4.90	6.42	4.93
16	6.66	6.40	4.52	3.09	4.84	3.28	7.44	2.56	5.44	3.64	3.25	3.57
17	7.65	5.86	5.41	3.25	4.90	4.35	5.81	7.29	5.84	5.08	5.16	9.00
18	6.07	7.07	3.92	5.54	6.43	6.55	3.78	8.29	6.02	4.53	7.93	6.62
19	4.83	6.38	5.18	5.47	7.32	7.84	5.45	3.04	5.45	5.08	4.30	5.43
20	5.37	5.72	6.22	6.84	5.44	4.71	5.24	8.78	3.78	6.50	6.25	5.30
Average	42.86	102.72	51.94	41.38	83.99	58.409	2.85	26.96	131.20	19.45	88.91	154.97	74.64

Table 9-9 Average electric power operating costs reference market - Hydrothermal (911)

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 911b							
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.69	27.783	8.02	0.71	0.69	103.03	76.49	106.89	292.02	43.23	402.78	475.69	
3	2.25	563.340.8	7	1.23	7.44	408.930.9	3	0.87	1.13	2.05	407.78	46.31	
4	2.61	320.567.0	4	124.79	30.11	2.60	1.06	1.04	115.676.6	5	19.59	97.77	
5	39.15	11.51	1.25	239.57	686.08	1.45	1.36	1.24	592.402.8	6	1.40	434.39	
6	59.66	1.56	41.68	1.56	24.27	3.07	13.48	58.28	211.471.6	0	2.70	171.54	
7	1.81	16.68	4.21	1.71	154.27	1.71	181.91	157.45	18.32	2.33	18.50	16.50	
8	1.75	255.80	136.69	2.83	256.46	1.71	142.44	1.67	11.08	1.76	6.52	256.54	
9	2.70	80.36	312.14	164.18	2.53	2.59	2.56	2.68	164.013.1	1	2.71	2.63	
10	96.28	2.68	72.68	2.29	2.83	87.545	2.87	2.66	73.35	2.87	65.15	215.51	
11	46.77	2.86	3.45	3.36	18.16	2.92	6.01	2.94	45.14	3.42	19.05	33.18	
12	2.94	3.61	3.00	3.96	8.66	6.93	2.38	3.87	5.13	4.99	10.45	8.50	
13	2.28	3.70	2.60	6.07	3.08	3.85	3.01	3.88	5.90	5.43	8.49	3.34	
14	3.62	5.20	2.69	4.19	3.17	4.33	2.88	4.07	4.04	6.81	3.99	4.79	
15	4.06	5.92	4.24	4.62	3.25	3.75	3.31	5.00	3.27	5.20	6.81	5.23	
16	7.04	6.77	4.78	3.27	5.12	3.47	5.68	5.23	5.75	3.85	3.44	3.77	
17	8.06	6.18	5.70	3.42	5.16	4.59	4.91	4.98	6.16	5.36	5.44	9.48	
18	6.38	7.43	4.12	5.82	6.76	6.88	3.41	6.71	6.33	4.76	8.33	6.96	
19	5.06	6.69	5.43	5.73	7.67	8.21	4.58	5.81	5.72	5.33	4.51	5.69	
20	5.62	5.98	6.51	7.16	5.69	4.93	4.41	5.12	3.95	6.80	6.54	5.55	
Average	22.25	86.813	3.61	29.35	61.59	48.514	6.68	21.55	92.1614	.36	69.94	121.46	54.02

Table 9-10 Average electric power operating costs reference market - With addition of "wind equivalent thermal" (911b).

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 912							
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.72	4.85	9.58	0.72	0.72	80.507	6.49	83.13	249.85	22.12	324.91	399.70	
3	0.93	449.440.9	1	0.92	1.83	332.580.9	3	0.91	0.93	0.93	328.84	28.31	
4	1.13	120.711.8	9	80.09	19.70	1.13	1.06	1.05	69.39	2.30	5.13	65.65	
5	23.35	3.18	1.30	138.34	343.05	1.41	1.36	1.30	392.271.4	1	1.37	260.19	
6	18.82	1.51	10.23	1.50	13.49	1.61	13.48	18.20	115.731.5	3	1.52	110.45	
7	1.70	4.48	1.71	1.63	105.12	1.64	181.91	96.23	5.21	1.65	9.72	3.87	
8	1.69	137.53	76.74	2.14	139.80	1.66	142.44	1.63	5.13	1.70	3.12	139.83	
9	2.38	38.79	150.46	85.06	2.28	2.28	2.56	2.35	84.90	2.69	2.37	2.29	
10	44.24	2.36	39.84	2.12	2.43	19.295	2.87	2.37	40.37	2.48	15.88	73.48	
11	11.18	2.52	2.95	2.87	4.85	2.57	6.01	2.59	11.42	2.99	6.25	7.71	
12	2.62	3.11	2.67	3.35	4.17	3.30	2.38	3.30	4.38	3.62	15.27	4.03	
13	2.14	3.12	2.37	4.38	2.72	3.27	3.01	3.27	4.42	4.05	5.93	2.93	
14	3.08	4.07	2.47	3.57	2.81	3.59	2.88	3.42	3.44	4.92	3.38	3.98	
15	3.43	4.39	3.54	3.80	2.89	3.25	3.31	3.90	2.90	4.04	5.09	4.06	
16	4.99	5.28	3.97	2.91	4.19	3.10	5.68	4.06	4.44	3.30	3.04	3.27	
17	5.77	4.70	4.27	3.02	4.21	3.75	4.91	4.06	4.64	4.04	4.15	6.32	
18	4.76	5.58	3.48	4.36	5.04	5.11	3.41	5.06	4.71	3.88	6.18	5.18	
19	4.22	5.40	4.37	4.62	5.76	5.83	4.58	4.38	4.62	4.30	3.76	4.68	
20	4.51	4.83	5.23	5.36	4.73	4.10	4.41	4.20	3.49	5.13	4.89	4.58	
Average	14.40	60.371	7.16	17.56	33.51	39.394	6.68	14.81	64.2312	.29	57.28	87.82	38.79

Table 9-11 Average electric power operating costs reference market b) - Hydrothermal with wind addition (912)

Inflow → / Year	Scenario 913												
	1	2	3	4	5	6	7	8	9	10	11	12	
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	0.72	4.85	9.58	0.72	0.72	80.507	6.49	83.13	249.85	22.12	324.91	399.70	
3	0.93	449.440.9	1	0.92	1.83	332.580.9	3	0.91	0.93	0.93	328.84	28.31	
4	1.13	120.711.8	9	80.09	19.70	1.13	1.06	1.05	69.39	2.30	5.13	65.65	
5	23.35	3.18	1.30	138.34	343.05	1.41	1.36	1.30	392.271.4	1	1.37	260.19	
6	18.83	1.50	10.23	1.50	13.41	1.61	10.96	18.20	115.711.5	3	1.52	110.46	
7	1.72	5.06	1.78	1.64	105.15	1.65	182.02	96.26	5.47	1.67	9.74	3.90	
8	1.70	128.61	76.80	2.20	139.87	1.67	142.51	1.64	75.45	1.71	3.75	139.89	
9	2.44	38.89	164.76	85.17	2.36	2.34	49.41	2.44	84.95	2.78	2.45	2.38	
10	19.79	2.44	39.92	2.15	2.50	56.526	9.74	2.44	32.70	2.59	19.52	66.06	
11	11.35	2.58	3.02	5.87	7.83	5.51	6.05	2.67	13.16	3.11	8.62	7.85	
12	2.72	3.27	2.79	3.68	4.24	3.66	2.41	3.72	4.60	3.75	3.90	4.42	
13	2.11	3.43	2.37	4.44	2.77	3.38	3.34	3.36	4.49	4.19	6.07	3.01	
14	3.43	4.14	2.42	3.74	2.98	3.93	2.93	3.73	3.57	5.02	3.56	4.12	
15	3.54	4.88	4.04	4.26	2.87	3.43	3.51	4.22	2.91	4.52	5.43	4.48	
16	5.54	5.34	4.10	2.88	4.62	3.13	5.74	4.14	4.89	3.42	3.06	3.50	
17	6.12	4.85	4.70	3.18	4.34	4.10	5.32	4.37	4.77	4.55	4.64	6.83	
18	5.21	5.84	3.45	4.87	5.50	5.46	3.50	5.21	4.89	4.11	6.20	5.52	
19	4.36	5.72	5.05	4.89	5.82	6.18	5.04	4.87	4.88	4.55	3.99	4.74	
20	5.03	5.11	5.31	5.51	4.88	4.33	4.94	4.49	3.41	5.24	5.17	4.76	
Average	13.32	60.071	7.98	17.83	33.75	41.524	9.86	14.94	67.5312	.41	57.13	87.58	39.49

Table 9-12 Average electric power operating costs reference market - Hydrothermal with wind addition and hydro capacity expansion (913).

Inflow → / Year	Scenario 913b												
	1	2	3	4	5	6	7	8	9	10	11	12	
1	146.36	401.69	15.13	0.47	0.47	307.91	420.16	50.70	272.38	168.78	394.85	626.13	
2	0.70	9.30	21.61	0.70	0.70	95.069	0.13	98.15	262.71	29.65	343.02	424.60	
3	0.86	486.210.8	4	0.85	4.67	367.520.8	6	0.84	0.86	0.86	363.61	44.65	
4	1.89	152.875.0	3	113.81	24.40	1.68	0.99	0.99	92.17	5.61	7.13	82.18	
5	33.98	18.59	1.19	202.14	435.94	1.29	1.24	1.19	525.122.4	5	1.26	348.69	
6	62.84	1.38	34.44	1.38	50.55	2.24	46.91	61.36	195.041.4	0	1.39	146.22	
7	1.59	18.26	6.25	1.52	134.36	1.53	249.57	128.24	23.62	1.95	33.79	12.57	
8	1.59	198.38	116.48	4.00	206.71	1.56	218.52	1.53	110.871.6	0	16.97	208.00	
9	4.07	66.06	331.48	143.93	3.51	3.72	85.44	5.12	143.724.3	8	3.82	4.92	
10	90.63	2.51	63.82	1.98	2.57	151.25	173.21	2.51	112.312.6	5	90.38	194.21	
11	62.76	2.39	2.80	20.22	34.68	19.892	0.39	2.48	78.93	2.88	37.26	34.70	
12	2.54	3.05	2.60	7.32	16.69	16.43	2.24	7.36	8.18	7.39	12.76	20.76	
13	1.98	3.22	2.22	4.19	2.60	3.17	4.18	3.15	4.24	3.96	7.05	2.82	
14	3.23	3.90	2.28	3.52	2.81	3.70	2.76	3.51	3.36	4.72	3.35	3.88	
15	3.34	4.61	3.82	4.03	2.71	3.24	3.31	3.99	2.75	4.27	5.13	4.24	
16	5.25	5.06	3.89	2.73	4.38	2.96	5.43	3.92	4.64	3.24	2.90	3.32	
17	5.82	4.61	4.47	3.03	4.12	3.90	5.06	4.16	4.54	4.32	4.41	6.49	
18	4.96	5.57	3.28	4.64	5.24	5.20	3.34	4.96	4.66	3.92	5.91	5.26	
19	4.16	5.46	4.83	4.67	5.55	5.90	4.81	4.65	4.66	4.35	3.81	4.52	
20	4.82	4.89	5.08	5.28	4.67	4.15	4.73	4.30	3.27	5.01	4.95	4.55	
Average	22.17	69.903	1.58	26.52	47.37	50.116	7.16	19.65	92.9013	.17	67.19	109.14	51.41

Table 9-13 Average electric power operating costs reference market - Hydrothermal with wind addition and hydro capacity expansion (913b).

Inflow / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 911							
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	115.27	269.44	293.07	136.29	82.53	477.17	409.73	657.33	731.73	340.44	1061.15	964.84	
3	188.83	1335.77	55.22	241.95	254.34	862.89	153.30	57.78	286.31	178.31	861.44	402.69	
4	230.87	724.28	363.32	410.47	246.54	203.51	67.20	50.38	742.33	180.22	219.45	558.23	
5	602.46	315.16	25.70	736.81	1514.88	280.78	124.58	0.93	1643.46	238.68	186.35	1101.23	
6	636.63	137.10	660.39	144.56	374.92	250.29	601.81	412.61	832.09	195.26	216.75	785.18	
7	219.39	607.65	206.34	116.26	599.47	147.15	1018.06	704.01	375.37	147.04	540.91	331.91	
8	42.38	998.07	666.60	229.57	894.70	43.74	1056.05	7.06	492.46	98.84	333.28	936.03	
9	289.16	834.55	1327.68	845.92	252.36	263.97	580.84	294.68	848.80	348.09	283.64	269.13	
10	944.98	195.27	534.20	42.60	240.26	866.78	808.91	206.59	663.58	249.92	677.37	1335.62	
11	1392.45	148.97	286.40	273.24	581.15	202.04	527.19	167.17	1244.30	272.22	545.93	719.16	
12	64.35	204.87	83.46	293.92	688.67	428.829.8	3	266.07	526.00	508.08	734.78	721.49	
13	2.14	219.86	11.16	874.79	50.66	202.21	176.10	217.27	747.02	674.13	1462.70	78.58	
14	156.42	478.784.7	6	194.03	47.05	216.30	49.66	190.65	165.23	856.35	171.88	294.17	
15	146.23	575.48	173.78	228.42	11.87	33.585	5.83	397.42	15.15	409.30	632.30	414.89	
16	742.26	523.36	139.46	6.29	231.05	6.38	773.86	363.27	412.70	78.15	13.75	31.46	
17	607.36	285.20	308.12	12.36	128.29	95.39	173.30	96.32	373.00	313.14	271.99	917.27	
18	324.00	397.05	55.71	309.22	313.43	321.99	18.18	296.49	326.52	88.75	499.38	350.99	
19	26.69	137.63	98.62	92.79	300.73	448.84	104.63	235.59	92.3090	.17	60.95	92.32	
20	69.61	57.896	8.91	246.66	24.19	26.956	1.72	36.75	3.79	235.46	232.72	35.08	
Average	347.39	442.40	268.90	271.83	341.88	284.33	359.54	235.45	539.72	283.56	470.07	548.31	366.11

Inflow / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 911b							
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	98.45	248.18	271.06	122.43	69.98	477.17	383.62	623.59	704.28	315.92	1061.15	924.33	
3	173.49	1266.40	35.23	220.87	233.32	862.89	139.09	45.99	259.45	163.32	861.44	373.71	
4	210.21	678.95	327.57	382.06	222.68	203.51	51.60	39.48	697.60	162.03	219.45	527.21	
5	533.29	263.74	18.32	632.94	1358.03	280.78	91.83	1.03	1447.55	191.44	186.35	963.40	
6	557.11	86.76	566.96	94.92	291.53	250.29	525.59	349.16	706.02	149.67	216.75	693.10	
7	169.64	517.98	164.62	74.46	512.27	147.15	875.45	581.01	296.10	119.89	540.91	276.74	
8	13.66	858.83	563.07	181.09	770.62	43.74	905.11	2.61	384.73	57.86	333.28	810.33	
9	194.25	579.96	1074.64	653.36	165.04	263.97	429.58	195.42	653.22	214.11	283.64	163.45	
10	727.33	90.35	398.33	11.84	154.31	866.78	630.49	142.17	471.71	161.10	677.37	1071.10	
11	1103.88	79.33	197.47	189.00	418.64	202.04	397.72	78.50	1001.01	171.33	545.93	534.29	
12	18.64	105.48	24.21	179.17	514.63	428.822.9	6	166.74	347.38	376.95	734.78	548.84	
13	2.29	120.993.8	2	702.25	14.33	202.21	83.75	98.00	553.97	501.45	1462.70	23.54	
14	76.91	332.662.7	1	83.86	13.36	216.30	13.91	87.30	77.65	653.69	171.88	145.24	
15	70.71	403.85	79.05	96.92	4.23	33.581	5.85	253.35	5.63	257.27	632.30	282.68	
16	521.90	290.91	48.85	3.60	97.61	6.38	530.76	238.60	253.59	25.71	13.75	9.26	
17	381.06	190.15	182.11	4.61	47.27	95.395	9.23	28.42	226.77	201.74	271.99	659.87	
18	194.65	218.09	19.14	191.24	178.15	321.997.2	5	192.34	195.69	28.00	499.38	202.35	
19	8.87	42.722	9.28	29.26	191.09	448.84	31.86	172.69	28.3727	.70	60.95	28.09	
20	27.85	24.252	9.42	171.23	8.46	26.952	6.29	20.57	3.97	168.93	232.72	19.65	
Average	261.52	340.06	202.55	201.28	263.30	284.33	281.10	168.38	429.35	205.84	470.07	444.15	295.99

Table 9-14 Average electric power operating costs optimistic market - Hydrothermal (911) and with addition of "wind equivalent thermal" (911b).

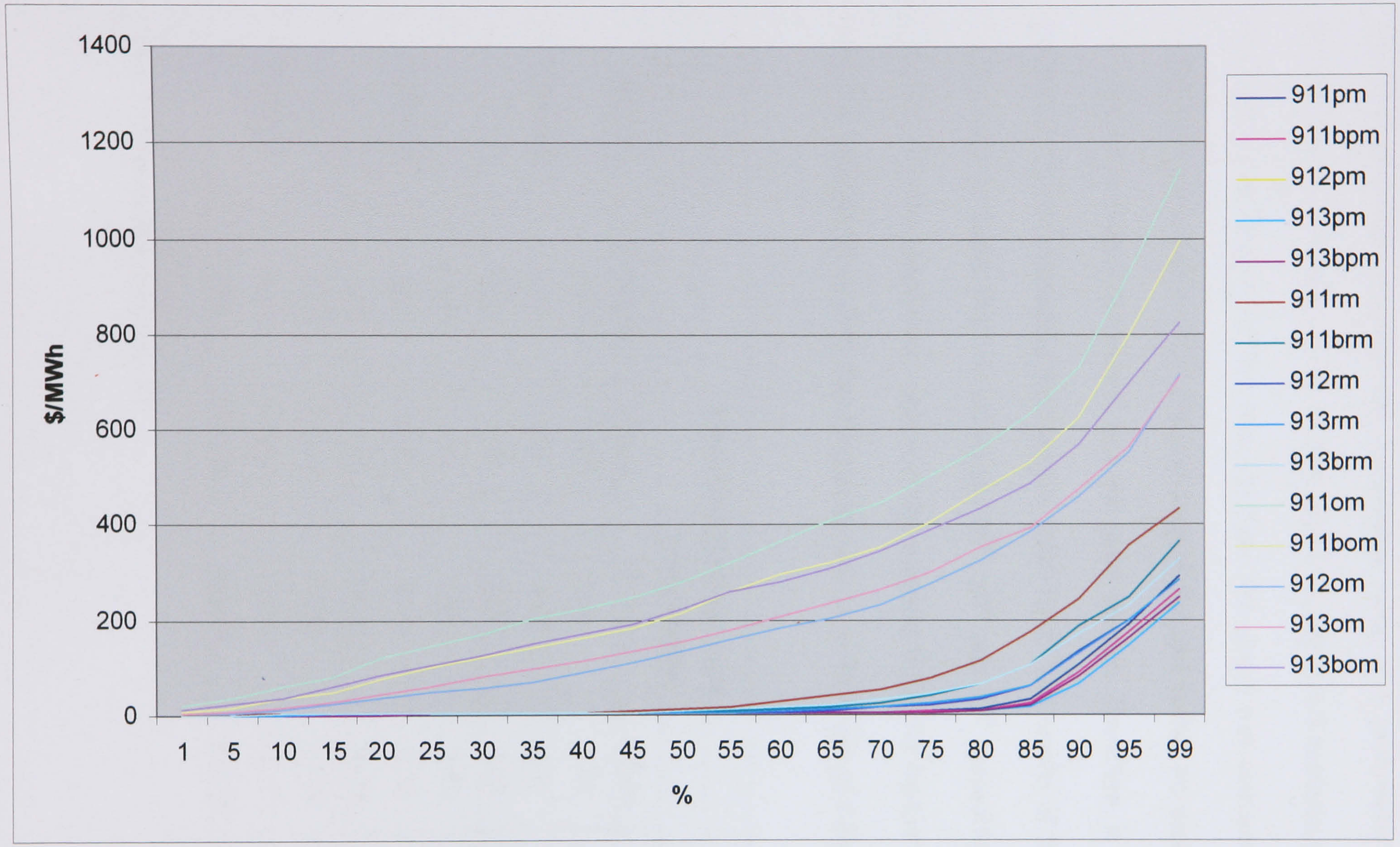
Inflow / Year	Scenario 912												
	1	2	3	4	5	6	7	8	9	10	11	12	
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	76.58	205.46	224.89	98.44	55.21	392.25	333.83	520.02	642.47	272.39	1018.66	816.67	
3	134.05	1057.08	24.49	191.80	178.20	698.73	98.95	25.34	213.57	115.45	796.43	328.04	
4	175.89	574.77	281.74	330.66	184.19	149.85	33.85	29.31	597.98	133.82	198.27	428.13	
5	366.77	188.892.7	0	461.37	950.84	156.36	41.11	1.06	1097.36	129.54	136.72	683.35	
6	383.67	66.63	406.17	71.53	217.55	130.53	364.14	256.78	526.95	93.03	158.28	470.52	
7	114.83	365.06	112.98	45.23	353.63	72.69	614.46	427.51	215.38	87.85	467.00	199.14	
8	9.64	597.59	398.09	129.04	542.32	10.69	659.44	1.76	288.04	42.47	273.50	564.72	
9	131.90	408.44	658.77	401.77	117.96	99.77	273.60	125.43	401.99	131.70	167.08	102.52	
10	460.26	64.89	251.29	11.35	93.95	406.38	385.74	84.40	319.25	107.52	483.91	663.62	
11	712.03	53.53	120.04	117.26	245.52	82.23	253.45	50.54	607.69	109.65	402.15	317.06	
12	11.76	42.001	2.24	98.59	304.48	188.882.3	9	92.74	259.28	217.86	555.94	315.15	
13	2.15	36.00	2.39	308.10	4.48	27.882	8.24	31.24	247.67	218.10	1141.92	11.62	
14	19.17	150.392.4	8	34.27	4.36	33.86	4.70	28.21	24.34	273.42	53.31	71.33	
15	17.19	176.99	24.72	32.66	2.90	4.72	5.34	107.91	3.05	113.41	436.77	114.71	
16	246.84	163.13	16.88	2.92	27.76	3.11	248.59	102.91	106.76	13.60	4.24	4.47	
17	118.86	72.343	9.53	3.04	7.55	6.73	10.19	6.04	89.6574	.90	172.81	227.82	
18	73.66	90.54	5.18	72.45	30.92	30.98	3.42	73.30	73.66	6.46	324.43	77.40	
19	4.23	9.38	6.55	6.80	72.49	89.98	6.77	68.35	8.20	6.48	20.78	8.69	
20	6.29	5.89	7.02	66.58	4.75	4.56	6.20	5.75	3.50	66.35	167.84	6.06	
Average	160.60	236.53	130.66	124.22	169.98	144.90	189.72	104.46	299.95	119.14	368.74	301.85	195.90

Inflow / Year	Scenario 913												
	1	2	3	4	5	6	7	8	9	10	11	12	
1	146.30	401.54	15.13	0.47	0.47	307.78	420.01	50.68	272.26	168.72	394.70	625.89	
2	76.58	205.46	224.89	98.44	55.21	392.25	333.83	520.02	642.47	272.39	853.31	816.67	
3	134.05	1057.08	24.49	191.80	178.20	698.73	98.95	25.34	213.57	115.45	690.27	328.04	
4	175.89	574.77	281.74	330.66	184.19	149.85	33.85	29.31	597.98	133.82	165.59	428.13	
5	366.77	188.892.7	0	461.37	950.84	156.36	41.11	1.06	1097.36	129.54	88.83	683.35	
6	383.57	63.91	406.17	69.22	217.34	129.66	363.14	256.78	526.96	90.95	114.22	470.52	
7	144.57	376.04	134.18	49.49	507.94	95.81	738.80	427.91	224.07	96.17	340.34	334.42	
8	13.04	602.73	528.96	142.27	683.14	31.67	638.55	3.26	421.43	75.30	315.87	582.09	
9	240.79	403.54	779.06	416.87	119.28	149.51	269.71	160.36	435.91	156.45	140.76	149.63	
10	460.37	96.31	271.58	18.23	143.66	524.44	515.51	235.62	437.84	234.38	397.80	695.85	
11	734.15	83.11	217.68	251.66	357.39	216.45	243.17	88.13	727.68	145.42	361.85	346.60	
12	45.73	88.332	4.38	200.37	310.04	299.173.8	7	210.43	320.78	236.16	344.45	433.94	
13	1.96	142.404.4	4	410.70	15.70	49.59	120.31	44.94	235.39	226.97	565.54	27.47	
14	115.64	144.043.2	2	56.70	17.01	107.89	13.48	122.50	33.98	271.20	32.78	183.64	
15	24.02	271.65	113.32	113.45	3.87	9.56	12.68	179.20	5.35	179.30	258.19	181.66	
16	324.98	157.21	20.41	3.18	92.14	5.38	243.18	87.70	169.58	15.77	4.97	14.04	
17	184.24	77.79	133.45	4.49	9.08	75.338	1.43	7.87	75.95	107.20	140.20	302.96	
18	90.67	93.04	6.02	94.09	94.32	85.22	5.57	74.52	30.9671	.81	159.53	95.92	
19	4.57	28.633	1.76	7.97	71.20	142.51	69.54	89.02	9.43	7.56	6.18	8.71	
20	66.87	6.90	7.71	25.58	4.90	6.12	66.78	6.28	3.43	25.31	25.24	6.55	
Average	186.74	253.17	161.56	147.35	200.80	181.66	215.67	131.05	324.12	137.99	270.03	335.80	212.16

Table 9-15 Average electric power operating costs optimistic market - Hydrothermal with wind addition (912) and Hydrothermal with wind addition and hydro capacity expansion (913).

Inflow → / Year	1	2	3	4	5	6	7	8	9	10	11	12	
						Scenario 913b							
1	146.36	401.69	15.13	0.47	0.47	307.91	420.16	50.70	272.38	168.78	394.85	626.13	
2	84.83	221.61	241.55	114.85	63.14	410.79	353.13	538.21	655.52	289.55	876.93	841.74	
3	147.71	1117.72	29.51	211.38	203.30	753.59	114.05	38.99	232.77	139.14	743.59	354.78	
4	194.84	623.02	312.90	357.94	200.89	167.43	49.38	35.95	637.79	148.40	180.54	461.79	
5	427.19	237.237.4	8	546.90	1070.22	205.98	80.72	0.97	1241.91	163.04	129.26	788.79	
6	454.14	92.78	482.15	102.81	280.15	193.29	430.63	318.74	643.61	136.68	146.26	541.64	
7	189.13	456.42	170.31	89.35	587.18	129.86	853.79	547.61	301.45	121.53	406.77	397.48	
8	31.69	737.63	631.44	192.74	799.89	47.44	773.12	8.47	522.94	113.89	384.05	688.25	
9	341.56	613.13	952.23	565.55	187.79	218.91	392.20	239.21	585.50	254.26	214.44	230.34	
10	627.18	179.79	369.46	61.99	214.80	680.68	657.73	322.22	579.78	323.25	569.57	891.18	
11	955.15	133.59	318.01	331.79	508.40	278.17	347.49	149.79	900.41	236.93	484.99	467.33	
12	95.69	180.55	79.57	312.52	453.77	401.68	16.98	347.61	490.53	371.73	470.15	587.88	
13	1.84	239.28	12.41	588.77	54.33	165.98	217.80	150.27	401.95	372.20	811.51	97.72	
14	201.67	275.259.4	5	135.70	58.64	205.24	46.99	228.69	113.86	438.74	96.76	324.12	
15	65.25	407.03	173.44	206.22	10.41	36.503	4.51	271.33	15.59	298.66	376.36	280.13	
16	463.38	287.83	72.03	6.17	187.17	13.72	358.61	166.09	271.89	54.76	15.20	37.13	
17	314.51	118.32	184.96	11.61	30.12	105.93	131.97	29.24	151.38	178.40	192.39	471.78	
18	171.52	181.54	17.55	167.93	168.28	164.12	13.97	114.03	100.10	100.91	230.91	178.76	
19	8.86	90.549	2.28	22.82	107.85	226.89	95.66	156.91	31.7023	.06	19.13	27.70	
20	92.62	20.902	1.34	77.14	7.64	16.929	2.92	19.70	3.28	76.48	76.81	16.49	
Average	250.76	330.79	209.66	205.23	259.72	236.55	274.09	186.74	407.72	200.52	341.02	415.56	276.53

Table 9-16 Average electric power operating costs optimistic market - Hydrothermal with wind addition and hydro capacity expansion (913b).



Key to symbols - 911 - Hydrothermal; 911b - Hydrothermal with addition of "wind equivalent thermal", 912 - Hydrothermal with wind addition, 913pm - Hydrothermal with wind addition and hydro capacity expansion, pm – pessimistic market, rm – reference market, om – optimistic market

Figure 9-9 Probability of costs not exceeding the values on Y-axis for pessimistic market.

Based on the average costs of electric power, the percentile[37] was calculated and Figure 9-9. The percentile describes the cumulative value of a probability distribution of a function (Ang and Tang 1975). In this case it is calculated between 0 and the number indicated in the X-axis for the cost function. The graph was constructed based on the values from table 9-6 to 9-16. The meaning of the plot is that the cost should be inside the interval indicated between 0 and the point chosen. Therefore, it is referred as the probability of not exceeding the superior value limit. The results of the graph has been summarized in **Table 9-17**. It shows the 25th, 50th and 75th percentiles of energy costs obtained. For the pessimistic market in the scenario 911b, for instance, it is shown that there is a probability of 50% that the energy cost is in the range of 0 and 4.14 $/MWh.

Percentiles of energy costs						
		Costs $/MWh				
Market	Probability	911pm	911bpm	912pm	913pm	913bpm
Pessimistic	25%	2.44	2.64	2.32	2.35	2.22
	50%	3.96	4.14	3.37	3.44	3.27
	75%	7.64	6.45	4.87	5.05	5.11
Reference	25%	3.98	3.55	2.79	2.93	3.08
	50%	10.63	6.13	4.20	4.51	6.56
	75%	77.76	39.58	20.61	23.26	43.35
Optimistic	25%	146.31	102.90	47.99	61.28	105.52
	50%	279.62	215.31	133.71	152.32	222.31
	75%	502.43	405.44	276.64	301.64	388.92

Table 9-17 Percentiles of energy cost.

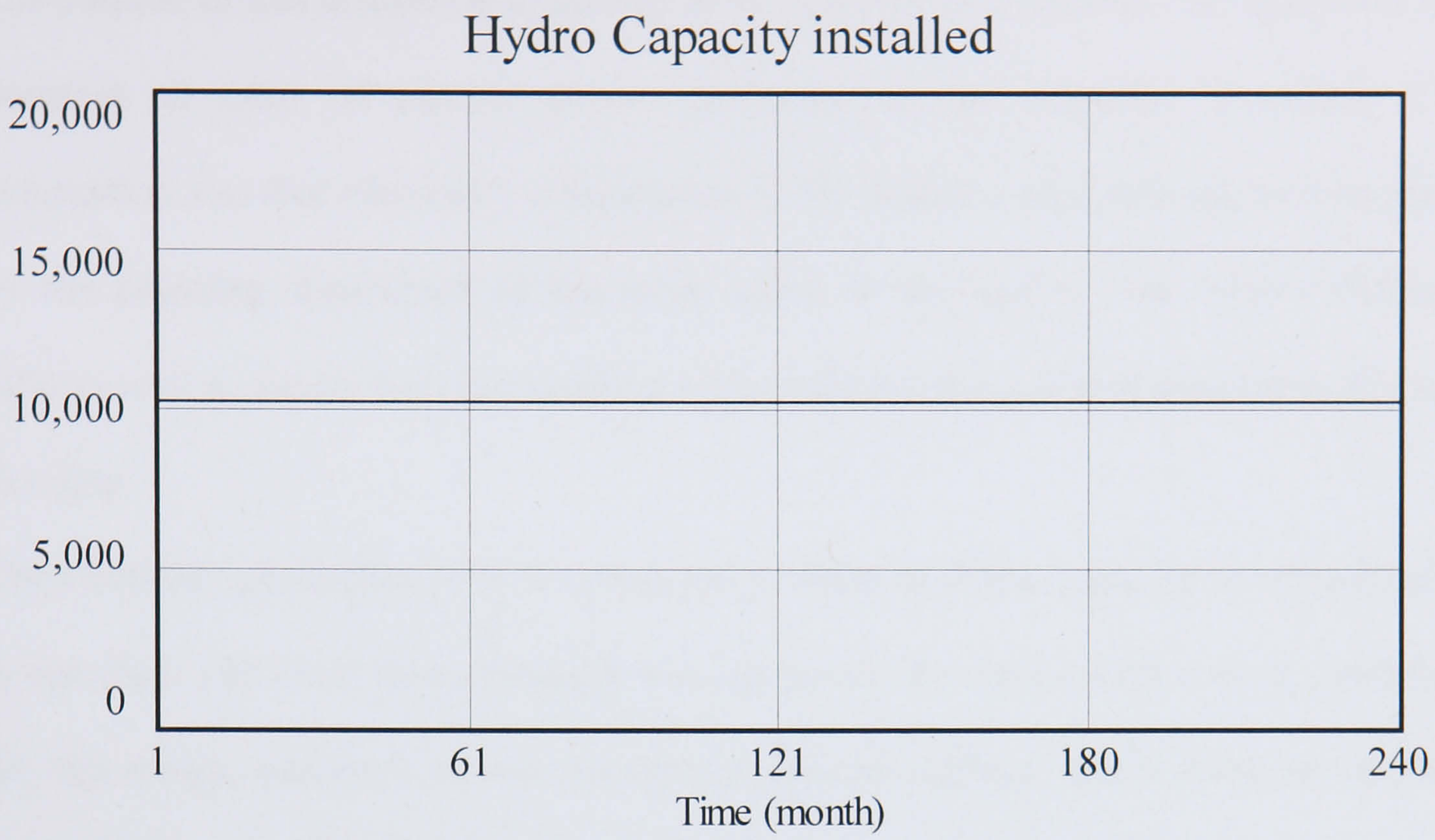


Figure 9-10 Hydro capacity installed for scenario 911 and 912 – reference scenario.

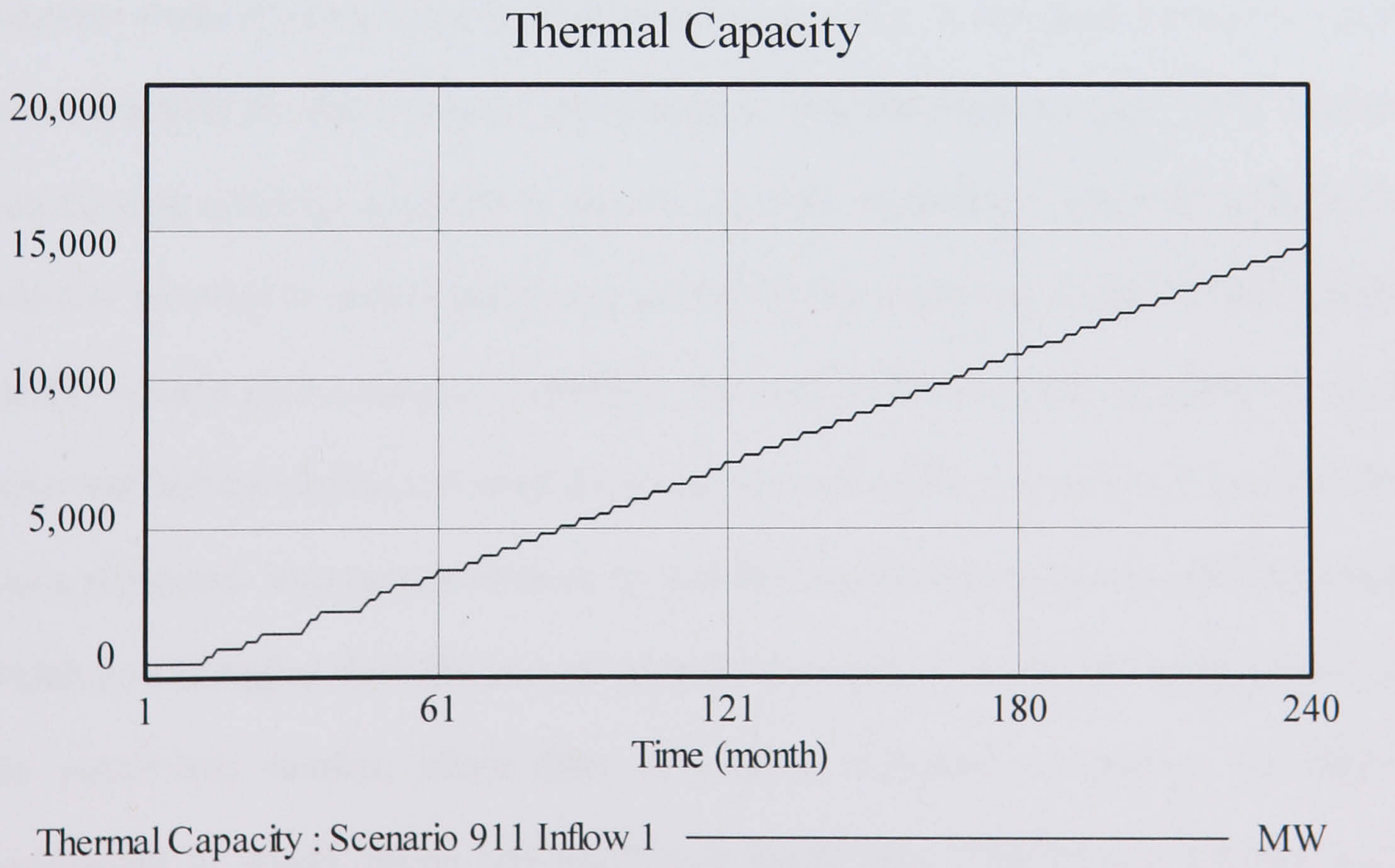


Figure 9-11 Thermal capacity installed for scenario 911, 912 and 913

The purpose of this analysis is to identify how wind, the key element, will determine the variation in costs of electric power generation in the scenarios described. The assumption was that electricity consumption in NE Brazil would develop as forecasted by the planning department of the main utility in the region. The twelve different inflows used represent well the variation of the inflows, presenting at times draughts and flooding.

The electricity production will be dependent on these conditions and on how the system is operated. The short term operation was not part of the scope of this work, however, for the results obtained, it was considered that the system would have an optimal operation in the short term. This would justify the extra investment in the capacity expansion of the hydro power plant

It is important to observe that wind is added as a complementary source of energy. It could partially replace thermal for an amount of power which would be equivalent to the capacity credit of wind. Data to determine this capacity, as has been mentioned earlier, is not available for Brazil. On the other hand, to consider replacing thermal by wind in a non thermal scenario, would be to assume the risks of having a year with a bad inflow and rely on wind to supply the power needed by the system at a critical time which is usually backed up by thermal. Therefore, this option has not been simulated. It can be observed that the addition of wind decreases the cost of the alternative in several of the cases presented. This occurs because its addition would reduced greatly the loss of load which cost is higher than the cost of generation of any of the power sources used. For the pessimistic market, when there is a good provision of energy, the thermal (equivalent to wind) option has resulted in lower cost. This occurs because in this

scenario wind contribution to the security of the system is less important than in the other scenarios.

As the market increases, reference and optimistic market, (i)wind contribution to reduce the loss of load causes a considerable reduction in the costs and (ii) its complementarity with the hydro system is another factor why the reduction in total costs is felt. Although in terms of average energy wind the "equivalent thermal" would have the same contribution. The fact that there is more wind power in those months when loads are higher and inflows are lower produces an effect that results in a better use of the system. In practice, this is the complementarity of wind contributing to a better capacity factor of the hydro/wind system. These results suggest that wind can contribute to an improvement the hydro thermal system while the thermal backup, or other firm type of generation, continues to be needed. Therefore, wind is an ideal complementary source of power for theses type of systems. Scenario 3, the expansion of hydro to make use of an available source of extra power, in the case of this region, would represent and interesting alternative to improving the use of the system during peak power. The model having a monthly step could only in few cases capture the benefits produced by this option. An hourly model would be needed to perform a thorough analysis of this option. In scenario 913b it has been seen that investment in expansion capacity of existing plants partially displacing thermal could be advantageous in a pessimistic market. Extra hydro capacity in Xingó appears not to aggregate extra capacity of energy generation in the long term though. For other markets the wind option appears to be a better solution.

9.4 Summary

The results can best be summarised by reference to the four questions posed at the beginning of this chapter:

- Should wind energy be introduced into the predominantly hydroelectric system?
- What will be the costs relative to the thermal alternative?
- Will it enable Brazil to reduce its dependence on thermal back up in dry years?
- What will be the effects on storage volumes in the reservoirs and the reliability of supply?

The results have shown that more wind energy on the system would reduce costs without impairing reliability, and that wind energy will provide a good source of energy in dry years. In other words it is a good and promising substitute for thermal energy as a backup to hydro in systems, such as that in NE Brazil, in which the predominant source of electricity is hydro. Introducing wind does not seem to increase costs—and in high demand scenarios, may reduce them. Another benefit does seem to be that extra wind on the system, though it may not increase the firm capacity on the system due to intermittency, would allow more MW capacity to be installed on the hydro reservoirs, and for the more hydro to be used in the peak periods of dry seasons, without increasing the loss of load probability. Correspondingly, if sufficient wind is put on the system investments in thermal energy can be reduced without increasing the loss of load probability (Please see Figure 9-12, which compares the runs of scenario 913 b and

913b with extra wind[38]-913bew). In other words, in mixed hydro-wind systems, the hydro can be reconfigured to overcome the problem of intermittency. Depending on unit costs, this may also reduce costs overall, as the preceding analysis has indicated.

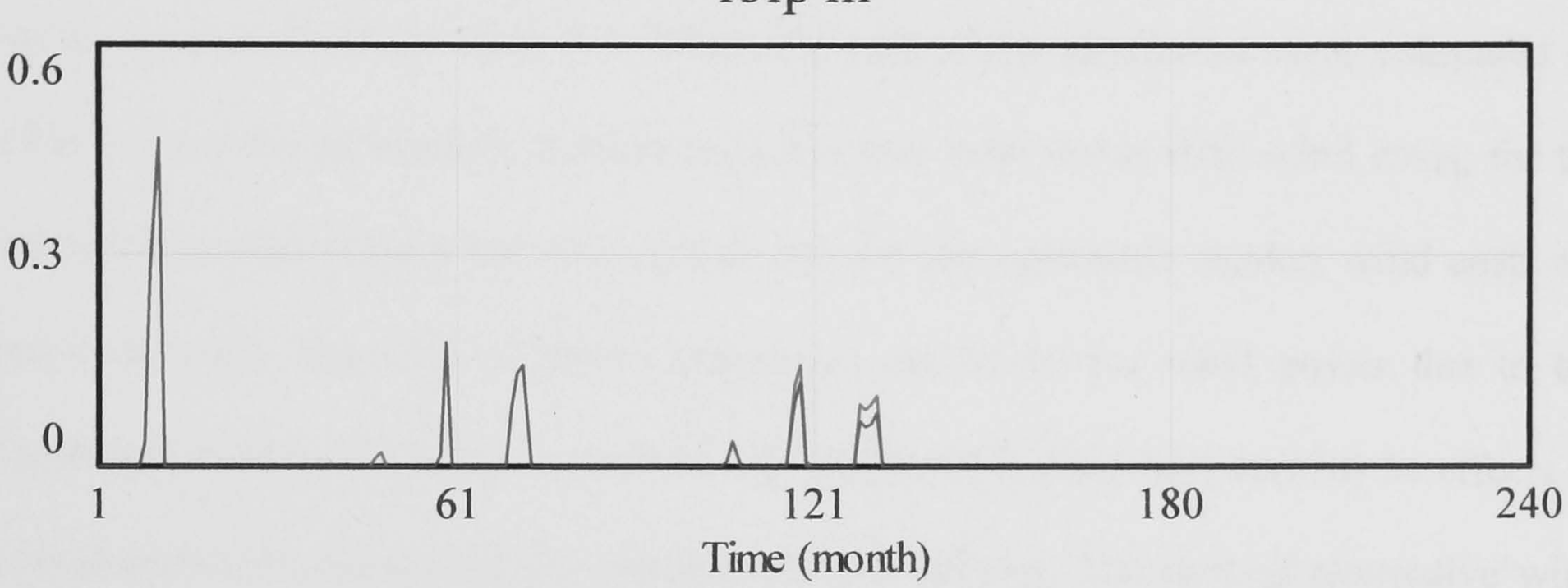


Figure 9-12 LOLP comparison reference market, inflow 1, scenario 913b.

What differences do alternative assumptions on unit costs make to the amount of wind that should be on the system as opposed to the thermal alternative? Limiting factors to the share of wind energy on the system are mainly two: (i) the limitations of the grid to dispersed distributed generating plants imposed by the electric power grid characteristics and (ii) stability of the system and its effects on the power quality. Both would should be subject of study by the planners on the specific grid of the region under study. A suggestion until these issues are solved is to keep wind on 10% of the total generating capacity. In terms energy contribution the results obtained here have shown that wind

[38] To run the scenario 913 bew, the wind plants of scenario 913b started operation earlier (the 2nd plant one year earlier, the 3rd 2 years and so on), increasing, in this way, wind energy contribution.

can contribute to the improvement in the total cost of energy. Regarding the reliability of the system positive results have also been found.

What will be the costs relative to the thermal alternative? On the pessimist, reference or optimistic markets operation cost of the wind option are lower than those of the thermal option as was shown in table 9-4. When the cost of the alternative were compared on table 9-5 for the pessimistic market thermal costs were lower than wind costs, for the reference market wind costs were lower and for the optimistic market wind costs are lower as well. The cost of power generation are lower for wind power due to the combination of two factors (i) the fuel cost of the wind plant (air) and (ii) its effects of complementarity smoothing the variation of the inflows. The cost of alternative wind cost option was higher only for the pessimistic scenario only. This is explained by the fact that when there is excess capacity installed in the system, wind would not bring benefits in cost of the alternative at the present price of the technology. Nevertheless it could reduce the cost of the energy generated.

What will be the effects on storage volumes in the reservoirs and the reliability of supply? Storage when there is wind generation for subsequent use in times of lower inflows is fundamental for the efficient use of the water resources; the management of the reservoirs can be facilitated with the introduction of wind power generation in the electric power system. In order to obtain a precise picture of the storage benefits a backward calculation process would be needed. However, using the simple heuristic function adopted in the model this advantage could be identified in some simulations.

Regarding the reliability of the system, the results have shown that wind can help to improve reliability when a storage means is available, as in the case of NE Brazil. This

reflected in the prices of the alternatives especially for a high market (optimistic scenario). As seen in table 9-1 comparing the system configuration 911 with the configuration 912, the values of LOLP are lower with the wind option for all scenarios. Comparing the equivalent wind thermal addition (911b and 912), it has been found that thermal can contribute better to the safety of the system. This can be explained by its greater flexibility and less dependence on the level of the reservoir to be used. In other words, when the inflow is over the average thermal can provide the same contribution to the total power generation whilst, if inflow year were excellent, wind contribution would be lower as the availability of water could lead to spillage.

CHAPTER TEN

10 Conclusions

10.1 Introduction

The development of financial tools and partnerships with the financial service sector is vital if wind technology is to be adopted in large scale. In this work a methodology has been used which will allow potential investors in wind power in NE Brazil to analyse the consequences of the increase in participation of the technology in the energy mixture of the region. This added to a good measurement of the wind resources should facilitate the financial service's decision to support investment in this area. This research covered a lack in the studies on the effects of renewable energy technology provision in NE Brazil. This thesis aimed at the development of a model which enables us to examine the benefits brought by renewable energy to a hydrothermal system. Wind power was the choice of generation alternative to carry out this work. This tool will help to mitigate the barriers presented to invest on wind power mainly regarding the costs. The results allowed to identify improvements in security as a reduction of the losses of load, translated into average costs of energy in the period analysed.

10.2 Discussion

The results indicated that wind energy can compete in the long run with thermal plants in a hydrothermal system where there is a reservoir with enough capacity to store the energy during the time of high availability, to be used during the time of high load demand. The reduction in costs of using wind power is further increased by the benefit

of no emission of gases in the energy conversion process, a topic not analysed in this thesis. Although capital costs are still high for wind power generating equipment utilising the social costs of deficits - the costs of loss of loads- used by the regional planners lead to results in which the cost of energy generated with wind added to the system are lower than the costs for the same system without wind power. Encouraging results were for the costs of the alternatives (i.e. all costs considered operation and investment costs). Even in these cases the costs of the alternative with wind power were lower than those without. The high costs presented in the tables are mainly due to the financing burdens. Interest rates in the country for electric power installation (thermal and wind) are high. The high cost of fuel for thermal plants was a factor that favoured the operation costs of wind which are very low. As the study is for a long term, 20-year-period, the learning curves for wind power made its advantage improve with time.

This work has shown that even with a low level of penetration of wind (approximately 5% for the first wind power plant), in a system with "free" storage the benefits of wind contributions are considerable. For lower interest rates the much higher penetration could be justified.

Technical limits to the participation of wind in the grid are not well established. In the absence of studies in this area 10% is an indicative value, though experience in Europe—e.g. in Nordpool—suggest that the figure may be considerably higher than this. With the storage available in the region a higher penetration can be expected to be possible as the intermittency problem is mitigated. Although this seems like a very low

penetration, it is expected that the penetration of wind power in the region increase slowly. Therefore, the time to reach the present technical limit would be long.

The storage cost in the case is minimum (the extra evaporation that the higher level of the lake will have) and the space needed for storage is already available for the dam considered for this project. These are usually great difficulties in storage systems. The energy spent in this type of storage can be considered nil when compared with alternative in which electric power has to be converted into other means of storage (e.g. Hydrogen) and reconverted back to electricity later when it is needed. The inefficiencies involved in other forms of storage represent a considerable use of energy.

The method used to access how wind power contributes to the conventional system for capacity expansion is very important for determining the degree to which it would be economically interesting. In this work, using a simple heuristic function, the participation of a limited wind capacity proved to be beneficial to the system. For a broader analysis, the optimisation of dispatch for wind and a hydrothermal system could lead to a higher participation and better economic benefits.

10.3 Further work

Basing capacity expansion on complementing intermittent wind power can reduce the amount of installed capacity. But it is necessary to carry out studies on capacity credit of wind plants for NE Brazil. It is critical that the following point be solved in order to guarantee a smooth change in the sector. Hydro power plants project have encountered difficulties to be approved, when the environmental impact report is not accepted. This problem could happen to wind plants projects as well and should be avoided. Studies in

the environmental impacts caused by the deployment of wind plants in large scale in the NE of Brazil are necessary. The lack of data for a more precise analysis of wind was clearly identified in this work.

It is urgent to establish a network of measuring and data collection equipments in the most promising areas in order to have enough information for financial decision in the area.

The complementarity of wind and hydro in the region has been studied from the energetic point of view. Research in the electric power area regarding interferences due to the variability of the source and implications of frequencies variations need to be known in depth. There is research available for smoothing caused by the dispersion of wind farms for Europe. This effect should be studied for the case of Brazil.

In this work the NE electric power system was treated as an isolated system. As previously stated in Brazil the electric power system is interconnected. The system operator takes advantage of the fact to operate it more efficiently. A research including this characteristic would provide more information regarding the benefits that wind could bring not only to NE but to the whole country. The system would be more reliable as there are several reservoirs and in the periods when Sobradinho presented a low level the energy could be imported from a region with a higher water level. That would considerably reduce the average cost of electric power.

Optimisation technique is applied in the electric power sector for dispatch decision for the interconnected hydrothermal power system. The development of a model which includes the different regional systems and optimisation of the system considering the different reservoirs and wind power is desirable. That model should be constructed for a

short term simulations. This would require detailed information of the different regional companies in the country.

Wind capacity credit has been studied for other countries. In this research it was not possible to use this in favour of the alternative energy chosen, as this information is not available for Brazil. Investigation in this area could prove that wind can bring a higher benefit for the system then those encountered here.

The incentives set out to promote investment on wind power via Proinfa seem to be a good starting point. But it is necessary to establish rules which will be valid for a longer period of time, as has happened in other countries where wind power is being used. Especially considering that, in Brazil, fossil fuel (Natural Gas) which is already commercially available for electric power generation has mechanisms to encourage its use.

In NE Brazil in the areas where the potential for wind power generation are best, the locations are resorts or close to resorts and activities linked to tourism and recreation are high. It would be desirable to invest in research on the public perception and awareness of the deployment of wind farms in the region and the environmental integration of this technology.

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APPENDIX 1

THE WORKBENCH VARIABLE. EQUATIONS, UNITS OF MEASURES AND DEFINITIONS

(01) added thermal capacity=
Thermal Capacity-initial thermal capacity
Units: **undefined**

(02) Avg last year= INTEG (
avg n-avg previous year,
0)
Units: **undefined**

(03) avg n=
IF THEN ELSE(MODULO(Time, 12)=0, Yearly Cumulative Cost/12 ,
0)
Units: **undefined**

(04) avg previous year=
IF THEN ELSE(MODULO(Time, 12)=0, Avg last year , 0)
Units: **undefined**

(05) avginflow=
2750
Units: m*m*m/s

(06) AvgLoad=
Energy Expected m/Number Of Hours
Units: MW

(07) Capital Costs= INTEG (
increase in capital costs,
0)
Units: US$

(08) Capital Costs Hydro= INTEG (
increase in hydro capital costs,
0)
Units: **undefined**

(09) capital unit cost hydro=
1197.83
Units: US$/MW

(10) capital unit costs:=
GET XLS DATA('model_data.xls' , 'costs' , 'b' , 'i3')
Units: US$/MW
Monthly (Unit Capital Cost,custo termica.xls - D40)

(11) capital unit costs wind:=
GET XLS DATA('model_data.xls' , 'wind' , 'a' , 'x2')
Units: US$/MW
per month per mw installed

(12) Converter=
3600*Number Of Hours
Units: s/month

(13) Converter 0=
1000
Units: m3/(mmxkm*Km)
converts the product evaporation (mm)* area (km2) to m3 the
value is 1000.

(14) cost avg=
IF THEN ELSE(MODULO(Time, 12)=0, Yearly Cumulative Cost , 0)
Units: **undefined**

(15) Cost input=
Total costs avg
Units: **undefined**

(16) cost of deficit=
EENS m*cost of deficit function
Units: US$

(17) cost of deficit function = WITH LOOKUP (
lolp m*100,
([(0,0)-
(100,4000)],(0,243.55),(5,243.55),(5.01,525.42),(10,525.42),(10.01
,1097.97),(20,1097.97),(20.01,1247),(100,1247.71)))
Units: $/MWh

(18) demand:=
GET XLS DATA('Model_Data.xls' , 'Load' , 'a' , 'c2')
Units: MW

(19) DisHydro=
IF THEN ELSE(Hydro Power Allocated>LoadHydroThermal,
LoadHydroThermal, Hydro Power Allocated
)
Units: MW

(20) DispWind=
Wind Energy Available/Number Of Hours

Units: MW

(21) EENS m=
ELNS m*Number Of Hours
Units: MW*h

(22) Elevation = WITH LOOKUP (
Water Volume/1e+006,
([(0,0)-
(60000,400)],(268,370),(315,370.5),(378,371),(547,372),(777,373)
,(1415,375),(4916,380),(12089,385),(21817,389),(24927,390),(51586,396),(573
66
,397)))
Units: m

(23) ELNS m=
IF THEN ELSE(Thermal generation>=LoadThermal, 0, LoadThermal-
Thermal generation
)
Units: MW

(24) Energy Expected m:=
GET XLS DATA('model_data.xls', 'Load' , 'a', 'b2')
Units: MW*h

(25) Evaporation=
Surface Area*Evaporation Rate*Converter 0
Units: m*m*m/month

(26) Evaporation Rate:=
GET XLS DATA('Model_data.xls' , 'Evaporation' , 'a' , 'b2')
Units: m/s

(27) excess water=
Water Volume+Inflow-Outflow-lake capacity
Units: **undefined**
If greater than zero spillage is needed.

(28) FINAL TIME = 240
Units: month
The final time for the simulation.

(29) flow rate:=
GET XLS DATA('model_data.xls' , 'inflow' , 'a' , 'k2')
Units: m*m*m/s
Coluna para o time e celula onde comecam os dados (k inflow 1,l

inflow 2, inflow3 n,4 o,5 p,6q.7r,8s,9t,10u,11v.12) DO NOT USE
m

(30) flow ratio=
flow rate/avginflow
Units: **undefined**

(31) fraction of hydro allocated=
IF THEN ELSE(Fraction of Lake>0.16 , IF THEN ELSE(Fraction of
Lake>0.7
, Hydro capacity installed , (Hydro capacity installed-Min Hydro Power)/0.54
*(Fraction of Lake-0.16)+Min Hydro Power) , IF THEN ELSE(Fraction of Lake
>0.1, Min Hydro Power
, Min Hydro Power/2))
Units: MW
Check volume of lake and dicides hydro dispatch between 0.2 and
0.7 use the function of lake fraction. under 0.2 min. over 0.7
supply the total load possible {must test if it is less than
hydro power for all cases}

(32) Fraction of Lake=
useful volume/useful capacity
Units: Dmnl

(33) Hydro capacity installed:=
GET XLS DATA('Model_Data.xls' , 'Hydro' , 'a' , 'e2')
Units: MW
Hydro capacity worksheet considering 4 x 500 additional capacity
to Xingo

(34) hydro costs fixed=
Hydro capacity installed*op unit hydro costs fix
Units: **undefined**

(35) Hydro Energy Available=
Hydro capacity installed*Number Of Hours
Units: MW*h

(36) hydro generation =
hydro power*Number Of Hours
Units: **undefined**

(37) hydro generation cost=
hydro costs fixed+hydro generation cost var
Units: US$

(38) hydro generation cost var=
hydro generation*hydro unit cost var
Units: US$

(39) hydro power =
Outflow*Productivity/Converter
Units: MW

(40) Hydro Power Allocated=
IF THEN ELSE(flow ratio>1.5, Hydro capacity installed,fraction of hydro allocated
)
Units: MW

(41) Hydro Power Requirement=
DisHydro
Units: MW

(42) hydro unit cost var=
0.0164
Units: $/MWh

(43) increase in capital costs=
increase in tcapacity*capital unit costs
Units: **undefined**

(44) increase in hydro capacity:=
GET XLS DATA('Model_Data.xls' , 'Hydro' , 'a' , 'c2')
Units: MW
For Xingo

(45) increase in hydro capital costs=
capital unit cost hydro*increase in hydro capacity
Units: **undefined**

(46) increase in tcapacity:=
GET XLS DATA('Model_Data.xls' , 'Load' , 'a' , 'm2')
Units: MW

(47) Inflow=
flow rate*Converter
Units: m*m*m/month

(48) initial thermal capacity=
469.5
Units: MW

2004

(49) INITIAL TIME = 1
Units: month
The initial time for the simulation.

(50) lake capacity=
3.4e+010
Units: m*m*m

(51) LoadHydroThermal=
AvgLoad-DispWind
Units: MW*h

(52) LoadThermal=
LoadHydroThermal-DisHydro
Units: MW

(53) lolp m=
EENS m/Energy Expected m
Units: Dmnl

(54) Min Hydro Energy=
Min Hydro Power*Number Of Hours
Units: MW*h

(55) Min Hydro Power=
min outflow*Productivity
Units: MW

(56) min outflow=
1300
Units: m*m*m/s
Vazao minima ecologica

(57) Min Thermal Generation=
IF THEN ELSE((demand-Hydro capacity installed)<0, 0, (demand-Hydro capacity installed
)*Number Of Hours)
Units: MW*h
IF THEN ELSE((Load-Hydro Energy Available-Wind Power
Available)<0, 0, Load-Hydro Energy Available-Wind Power
Available)

(58) Number Of Hours:=
GET XLS DATA('model_data.xls' , 'inflow' , 'a' , 'i2')

Units: h
Number of hours of the months

(59) op unit hydro costs fix=
177.32
Units: US$/MW

(60) op unit thermal costs fix=
1525
Units: US$/MW
per month (Thermal cost -custo termica.xls E40)

(61) Operation Costs Avg=
(thermal operation costs+wind OEM costs+hydro generation cost+cost of deficit
)/(hydro generation+Thermal generation
+Wind Energy Available)
Units: **undefined**

(62) Outflow=
IF THEN ELSE(Hydro Power Requirement<0 , 1/0, Hydro Power Requirement/Productivity
*Converter)
Units: m*m*m/month
For Sobradinho the maximum volume is 34166hm3 and min 5447hm3

(63) Productivity=
2.713
Units: (MW*s)/(m*m*m)
2.713 cumulative productivity - with addition of 4 machines in
xingo 3.384GET XLS DATA('model_data.xls' , 'hydro' , 'a' , 'e2'
)

(64) SAVEPER =
TIME STEP
Units: month [0,?]
The frequency with which output is stored.

(65) spillage=
IF THEN ELSE(excess water>0, excess water ,0)
Units: **undefined**

(66) Surface Area = WITH LOOKUP (
Elevation,
([(350,0)-
(400,6000)],(370,105),(371.132),(372,176),(373.235),(375,404),

(380,1042),(381,1190),(382,1346),(385,1918),(389,2976),(390,3243),(396,5805
)))
Units: Km*Km

(67) Thermal Capacity= INTEG (
increase in tcapacity,
initial thermal capacity)
Units: MW

(68) thermal costs fixed=
Thermal Capacity*op unit thermal costs fix
Units: US$

(69) Thermal generation=
IF THEN ELSE(LoadThermal<=Thermal Capacity, LoadThermal ,
Thermal Capacity
)
Units: MW
If power neeeded is lower than hydro capacity installed all load
can be met by hydro IF THEN ELSE(power needed< , {ontrue} ,
{onfalse})IF THEN ELSE(volume gradient>0, IF THEN ELSE(
Water
Volume<0.4*lake capacity , Thermal Capacity*Max fraction of
thermal capacity *Number Of Hours, IF THEN ELSE(Water
Volume>0.7*lake capacity, Min Thermal Generation, Thermal
Capacity*Max fraction of thermal capacity *Number Of Hours/2)
),IF THEN ELSE(Water Volume>0.5*lake capacity,IF THEN
ELSE(
Water Volume>0.8*lake capacity,Min Thermal Generation
,Thermal
Capacity*Max fraction of thermal capacity *Number Of
Hours/2),Thermal Capacity*Max fraction of thermal capacity))

(70) thermal generation cost=
Thermal generation*thermal units cost var
Units: **undefined**

(71) thermal operation costs=
thermal costs fixed+thermal generation cost
Units: **undefined**

(72) thermal units cost var:=
GET XLS DATA('model_data.xls' , 'costs' , 'b' , 'j3')
Units: US$/MW*h
21.1

(73) TIME STEP = 1
Units: month [0,?]
The time step for the simulation.

(74) Total Capacity Installed=
Hydro capacity installed+Thermal Capacity+Wind capacity Installed
Units: MW

(75) Total costs avg=
(total thermal costs+wind total costs+hydro generation cost+cost of deficit
+Capital Costs Hydro)/(hydro generation+Thermal generation
+Wind Energy Available)
Units: $/MWh

(76) total thermal costs=
Capital Costs+thermal generation cost+thermal costs fixed
Units: US$

(77) useful capacity=
2.85e+010
Units: m*m*m

(78) useful volume=
Water Volume-5.477e+009
Units: m*m*m

(79) Water Volume= INTEG (
+Inflow-Outflow-Evaporation-spillage,
1.4e+010
)
Units: m*m*m
http://www.ons.com.br/ons/operacao/boletim/segunda/page8.htm for
Jan 2004 initial value 30%

(80) Wind capacity Installed:=
GET XLS DATA('model_data.xls' , 'wind' , 'a' , 't2')
Units: MW
GET XLS DATA('model_data.xls' , 'wind' , 'a' , 't2')
Capacidade progressivaGET XLS DATA('model_data.xls' , 'wind' ,
'a' , 'aa2')0

(81) wind capital costs=
capital unit costs wind*Wind capacity Installed
Units: **undefined**

(82) Wind Energy Available:=
GET XLS DATA('Model_Data.xls' , 'Wind' , 'a' , 'y2')
Units: MW*h
Zero wind gen GET XLS DATA('Model_Data.xls' , 'Wind' , 'a' ,
'aa2') progressive wind gen GET XLS DATA('Model_Data.xls' ,
'Wind' , 'a' , 'y2')

(83) wind OEM costs=
Wind capacity Installed*Wind OEM unit
Units: US$
2% fraction per year

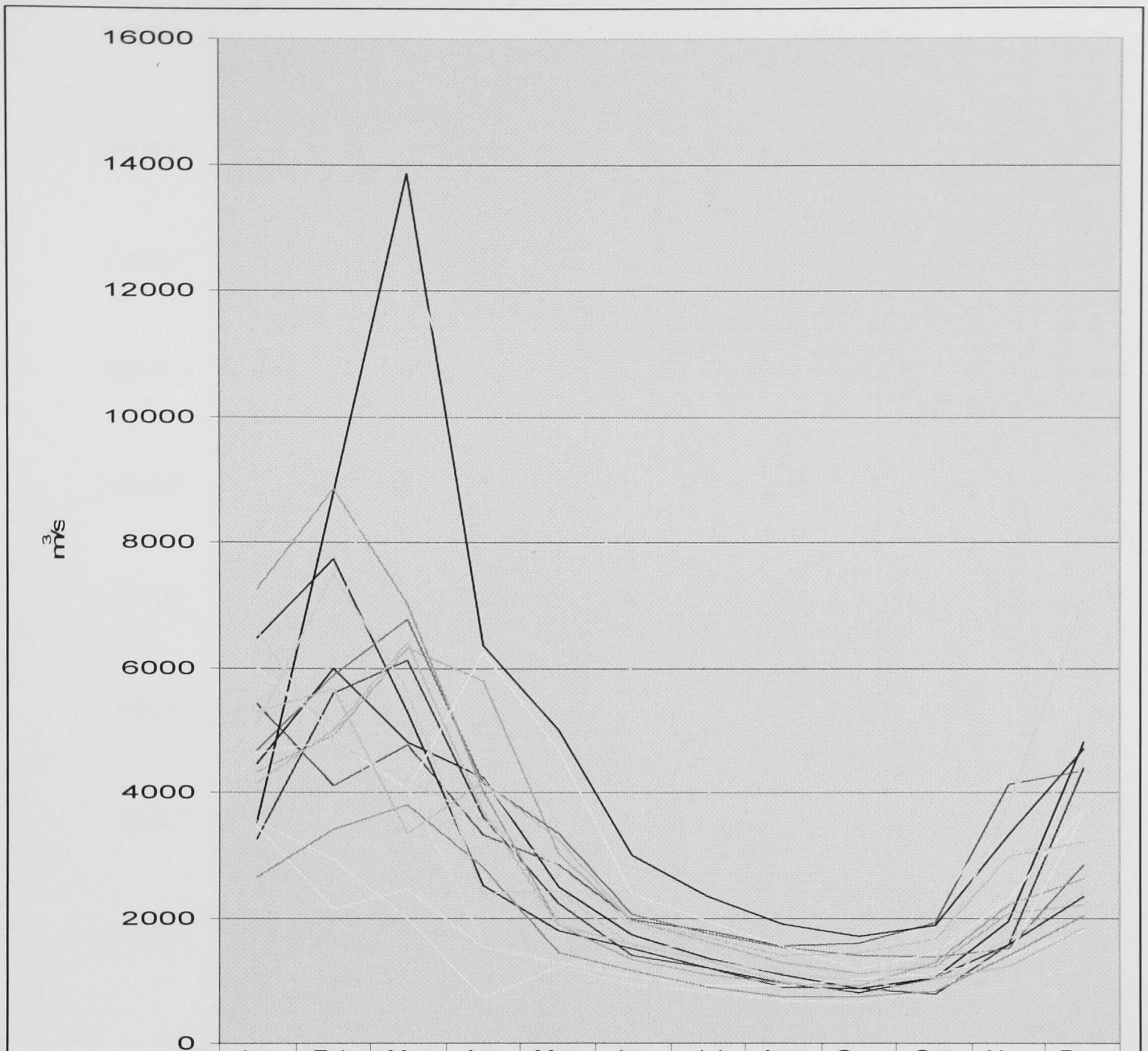
(84) Wind OEM unit:=
GET XLS DATA('model_data.xls' , 'wind' , 'a' , 'z2')
Units: US/MW
US/MW per month (Month is the time unit used)

(85) wind total costs=
wind capital costs+wind OEM costs
Units: US$

(86) Yearly Cumulative Cost= INTEG (
+Cost input-cost avg,
0)
Units: **undefined**

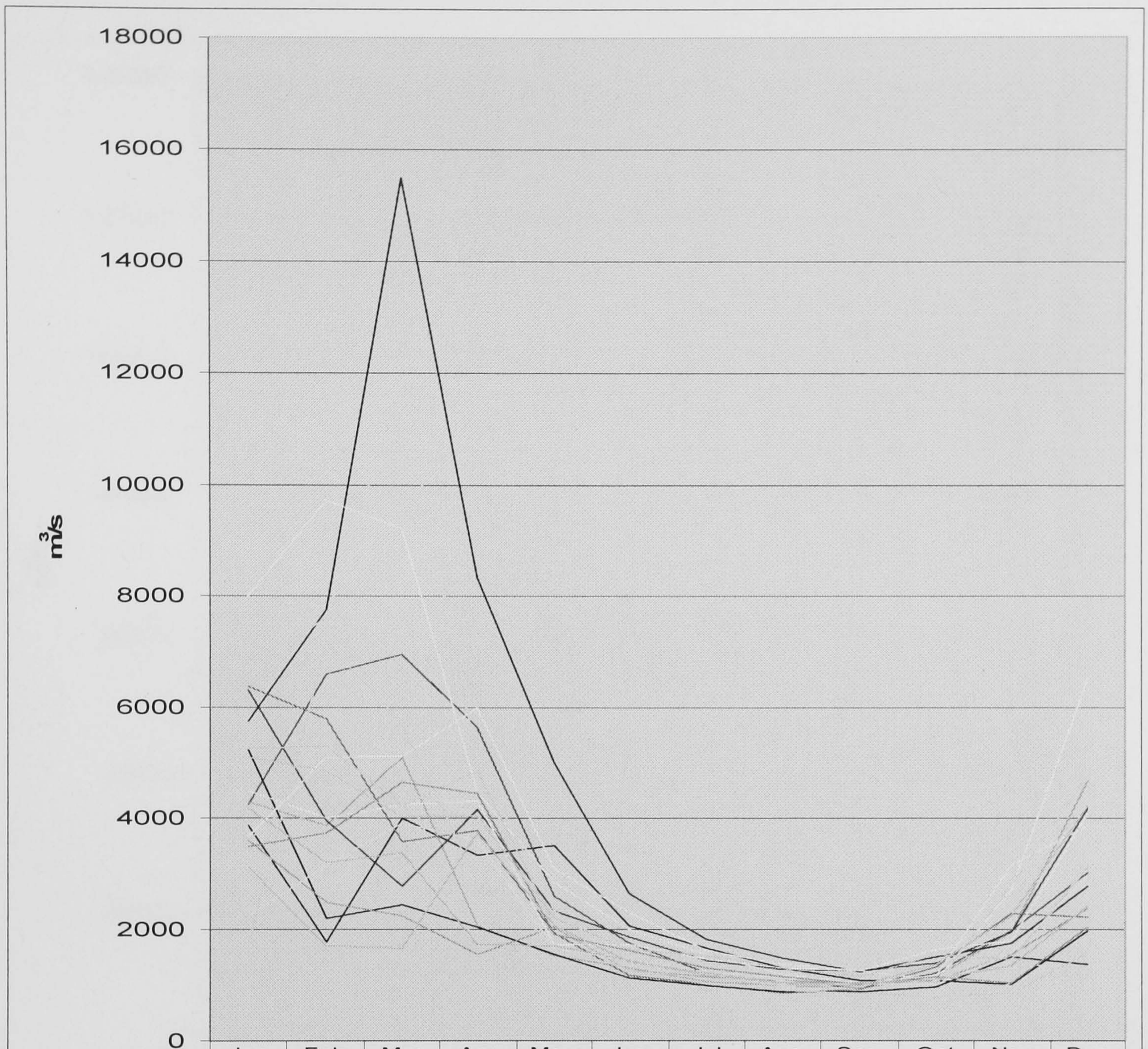
APPENDIX 2

INFLOWS



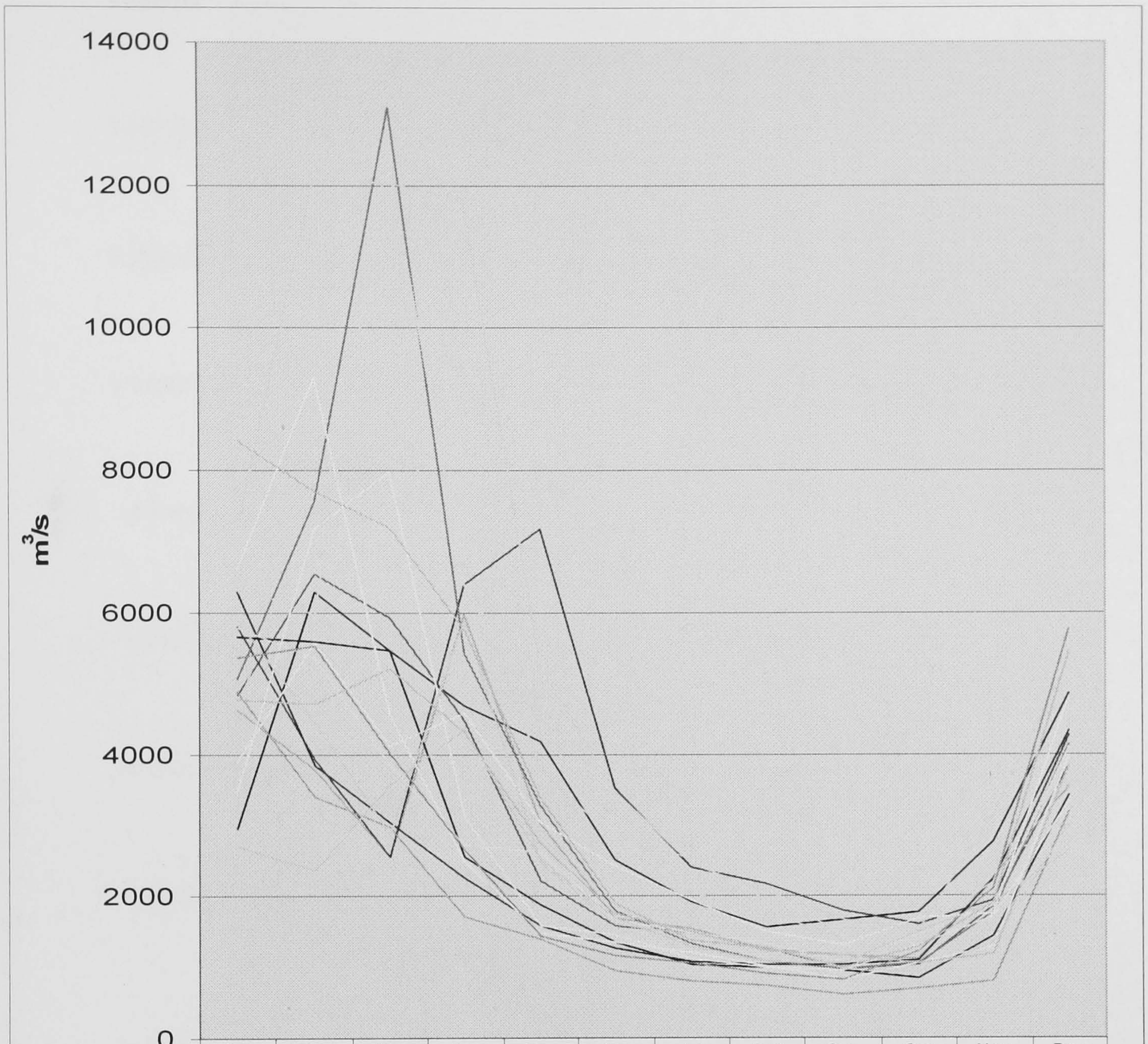
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4460	5988	4807	4251	2502	1717	1362	1101	872	1054	1946	4806
2	5411	4117	4768	3317	2850	1977	1803	1558	1595	1921	4122	4355
3	6529	6770	5060	4220	2643	1860	1500	1360	1065	1127	2031	5324
4	4336	4916	6318	5785	3027	1951	1616	1284	1116	1234	2070	2214
5	3255	5590	6112	3610	2240	1399	1198	905	875	783	1584	4385
6	6476	7747	5282	2514	1801	1519	1204	968	809	1043	1570	2349
7	4687	5884	6771	4156	3343	2056	1740	1541	1408	1387	1502	2833
8	3510	8796	13869	6351	4996	3005	2339	1895	1694	1870	3320	4706
9	7256	8851	7027	4030	1890	1332	1095	970	916	1297	2203	2624
10	3463	2146	2438	1534	1300	1081	918	919	1020	1122	1369	1786
11	3543	2924	1991	727	1227	951	805	688	656	849	1397	3680
12	4628	4841	4047	6241	4681	2373	1954	1557	1188	1446	2297	3732
13	5294	6058	12596	9198	11971	5864	4016	2949	2655	2155	3725	6811
14	5846	5110	3178	3868	1848	1605	1492	1175	999	811	1873	4475
15	6600	4809	4202	3573	2827	1884	1563	1261	1078	1312	3810	7091
16	6002	4944	4087	1626	1221	926	861	703	757	748	901	1252
17	2653	3413	3802	2801	1442	1148	888	748	744	823	1403	2037
18	4163	5004	6394	3694	1870	1575	1321	989	778	1034	1220	1826
19	5300	5663	3348	4183	3240	1942	1684	1388	1437	1657	2965	3214
20	5086	7492	5634	2393	2417	1545	1324	1117	973	1053	1659	2399

Inflow 1



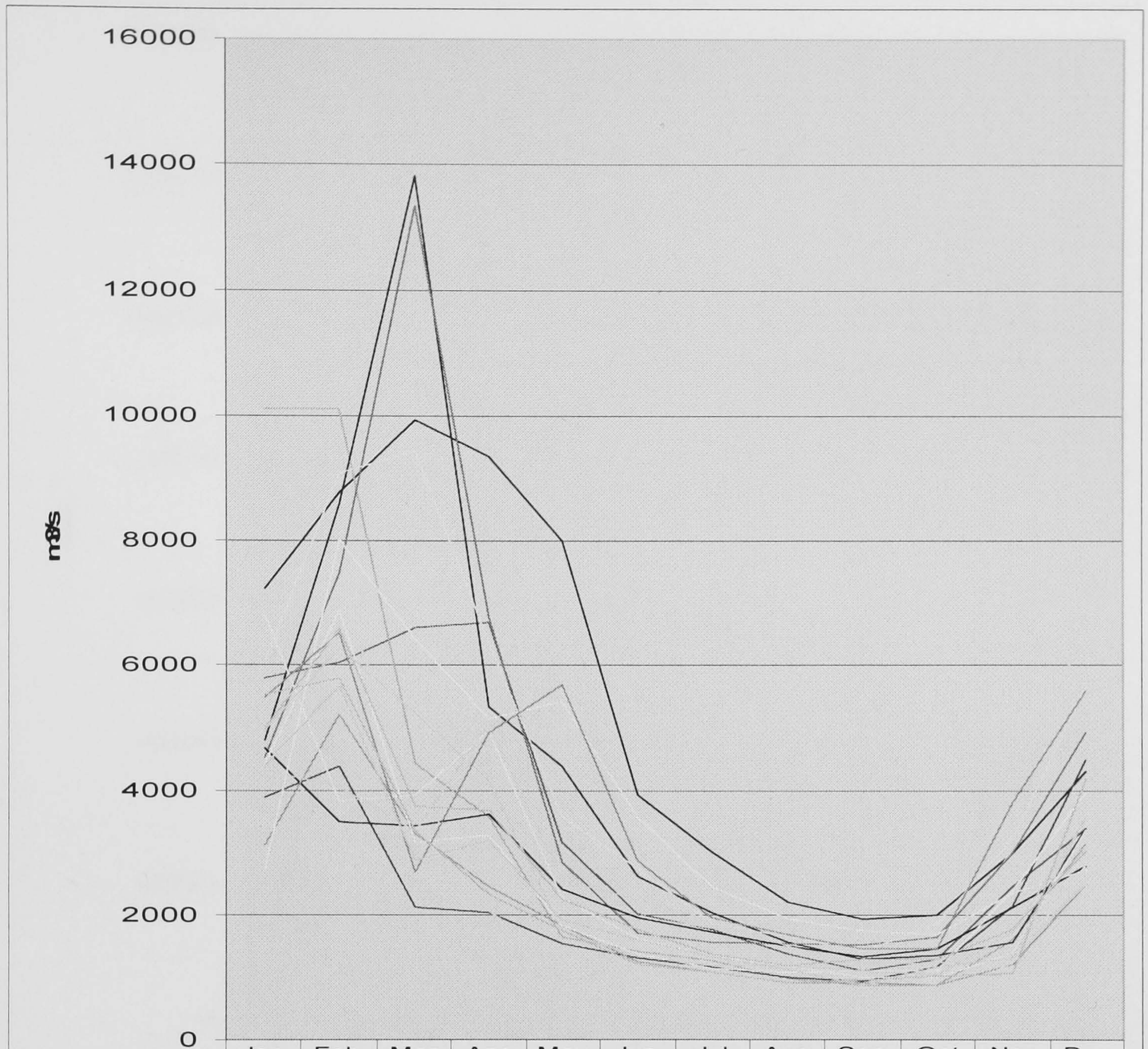
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3866	1774	4000	3340	3518	2050	1665	1300	1079	1080	1004	1969
2	4259	6590	6955	5642	2592	1743	1217	1030	950	1218	1975	3018
3	3606	4814	4687	1606	1253	1056	896	823	764	620	1022	3256
4	4302	3868	5106	2050	1527	1288	1042	988	947	1139	1943	4665
5	6306	3956	2764	4156	2323	1857	1420	1266	1254	1386	1950	4187
6	5741	7754	15506	8341	5002	2645	1811	1484	1240	1501	1747	2779
7	6382	5791	3583	3774	1913	1167	1005	857	918	1322	2291	2214
8	5232	2197	2448	2040	1543	1128	973	876	881	952	1494	1362
9	3594	2471	2228	1546	2039	1249	1144	1074	1039	1084	1544	2379
10	3674	5108	5119	5994	3076	2296	1614	1354	1251	1082	2701	6500
11	7998	9726	9212	4478	2848	1991	1535	1182	1028	1158	3158	3875
12	4500	4013	4242	4319	1725	1722	1458	1299	1263	1627	1781	4083
13	6625	7625	11830	5023	2329	1517	1216	1074	891	1111	1355	1329
14	1703	7171	5696	2842	1715	1248	1120	985	1008	998	2804	4766
15	5253	5294	4229	4847	2050	1257	1016	894	857	781	848	1575
16	2225	3151	3909	3591	1653	1428	1224	1107	1018	996	1560	2961
17	3479	3744	4654	4457	1900	1613	1303	1130	1008	1142	1025	2033
18	4178	3206	3376	1721	1700	1422	1167	1024	1028	1092	1352	2422
19	3106	1693	1647	3736	2059	1417	1216	1021	977	1358	2226	4219
20	5103	4847	4035	4057	2186	1630	1517	1288	1134	1533	1464	3103

Inflow 2



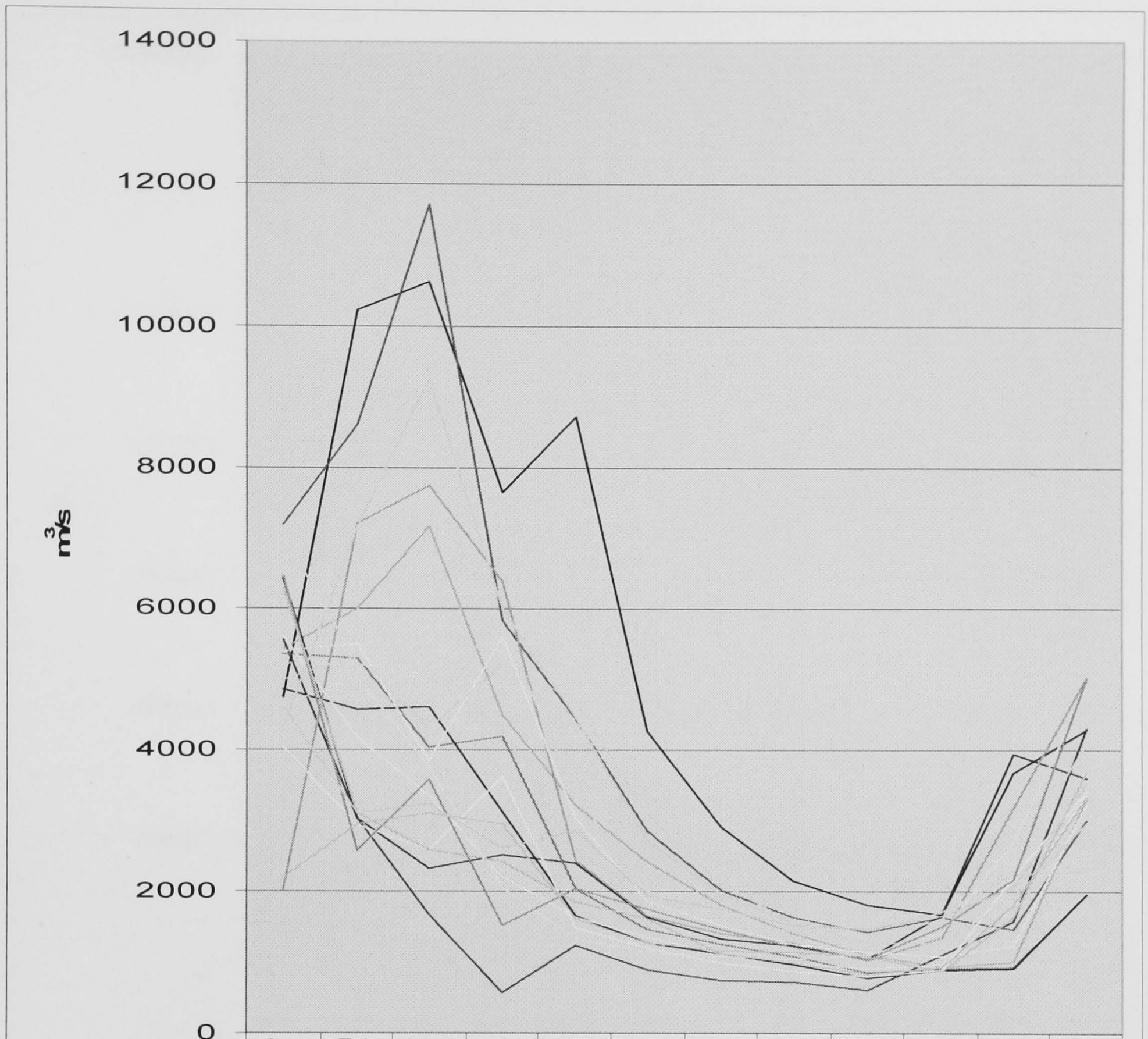
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2966	6292	5480	4687	4172	2515	1918	1569	1663	1765	2775	4846
2	4835	6552	5928	4478	2217	1581	1483	1267	972	1029	1856	3853
3	4622	7767	8836	6696	3803	2789	2052	1783	1401	1721	2639	2774
4	4625	3789	2559	5977	3011	1697	1539	1236	1153	1120	2267	3549
5	5805	3938	2548	6408	7189	3522	2412	2174	1805	1606	1952	4274
6	6285	3845	3036	2265	1591	1259	1081	1039	1029	1097	2236	4324
7	5071	7552	13099	5432	3281	1797	1331	1073	980	1051	1764	4137
8	5656	5600	5473	2565	1884	1342	1033	993	946	849	1437	3418
9	4884	3399	2969	1715	1387	944	797	735	615	694	799	3182
10	6600	9311	4563	2495	1481	1346	1196	1018	822	1049	1294	3975
11	3477	7184	7985	3122	1591	1448	1115	994	944	1318	1721	3338
12	3904	5574	4119	4586	3050	2431	1943	1491	1317	1692	1745	4807
13	6386	5967	12457	6399	4394	2933	2508	1938	1492	1508	2194	5274
14	7167	12088	12043	11813	5246	3487	2456	2078	1661	1512	3149	5350
15	5894	4446	2862	5887	2480	1602	1448	1292	971	936	1338	3023
16	5785	5367	3847	2721	2613	1666	1481	1340	1078	1458	1854	4100
17	5362	5530	4020	2650	1437	1163	1055	899	833	1220	2115	5761
18	8423	7697	7210	5757	3370	1898	1383	1260	996	1284	1907	5451
19	4764	4714	5210	4303	2735	1750	1508	1227	1169	1060	1179	3836
20	2695	2359	3560	4358	2520	1691	1279	1067	1059	1509	1907	2631

Inflow 3



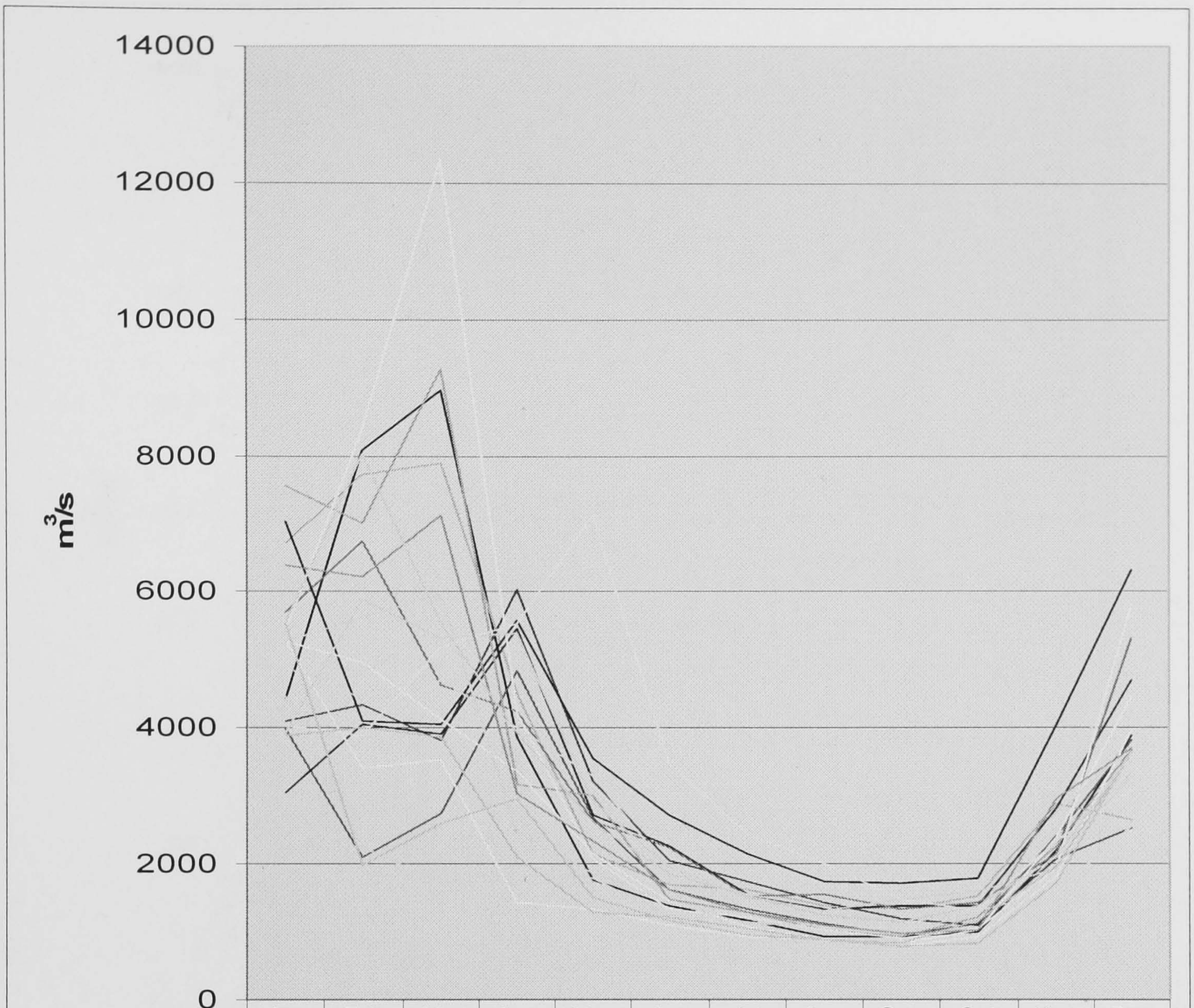
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7241	8775	9933	9345	7997	3918	3010	2210	1938	1988	2990	4311
2	5800	6046	6607	6686	3160	2006	1768	1362	1098	1292	2458	3389
3	4647	3337	3223	3869	2824	1974	1794	1621	1587	1288	3060	6853
4	10093	10090	4421	3568	1648	1410	1258	973	875	864	1610	3139
5	3887	4379	2119	2039	1535	1312	1171	990	930	1158	2130	4478
6	4808	8589	13822	5345	4392	2619	2043	1558	1297	1353	1550	3393
7	4531	7482	13343	6766	2850	1708	1551	1529	1526	1632	2991	4922
8	4681	3494	3437	3610	2406	1956	1719	1490	1320	1449	2110	2794
9	3108	5224	3308	2446	1832	1255	1087	922	907	869	1200	2496
10	2732	8029	6424	5159	5432	3575	2448	1927	1740	1688	2346	2723
11	6824	3823	3929	4955	2264	1616	1338	1178	1007	997	1389	3366
12	4428	6876	3164	3284	1825	1363	1146	1075	1091	1097	2381	3976
13	4202	7104	4150	2065	1293	999	868	820	734	596	1244	2795
14	4315	4044	3353	5063	2561	2239	1908	1499	1234	1221	1379	2502
15	4960	6270	5246	4166	1745	1320	1177	1191	1104	1035	1719	3529
16	6069	9083	9439	6368	3570	2735	1873	1637	1404	1853	3221	5654
17	5487	6526	2680	4933	5684	2860	1959	1676	1462	1454	3795	5598
18	5524	5807	3349	2325	1745	1201	1074	914	956	1011	1064	4167
19	4996	6588	3736	3678	2242	1767	1372	1194	1298	1292	1757	3040
20	4415	5663	2871	3196	1902	1600	1335	1130	878	1167	1306	3577

inflow 4



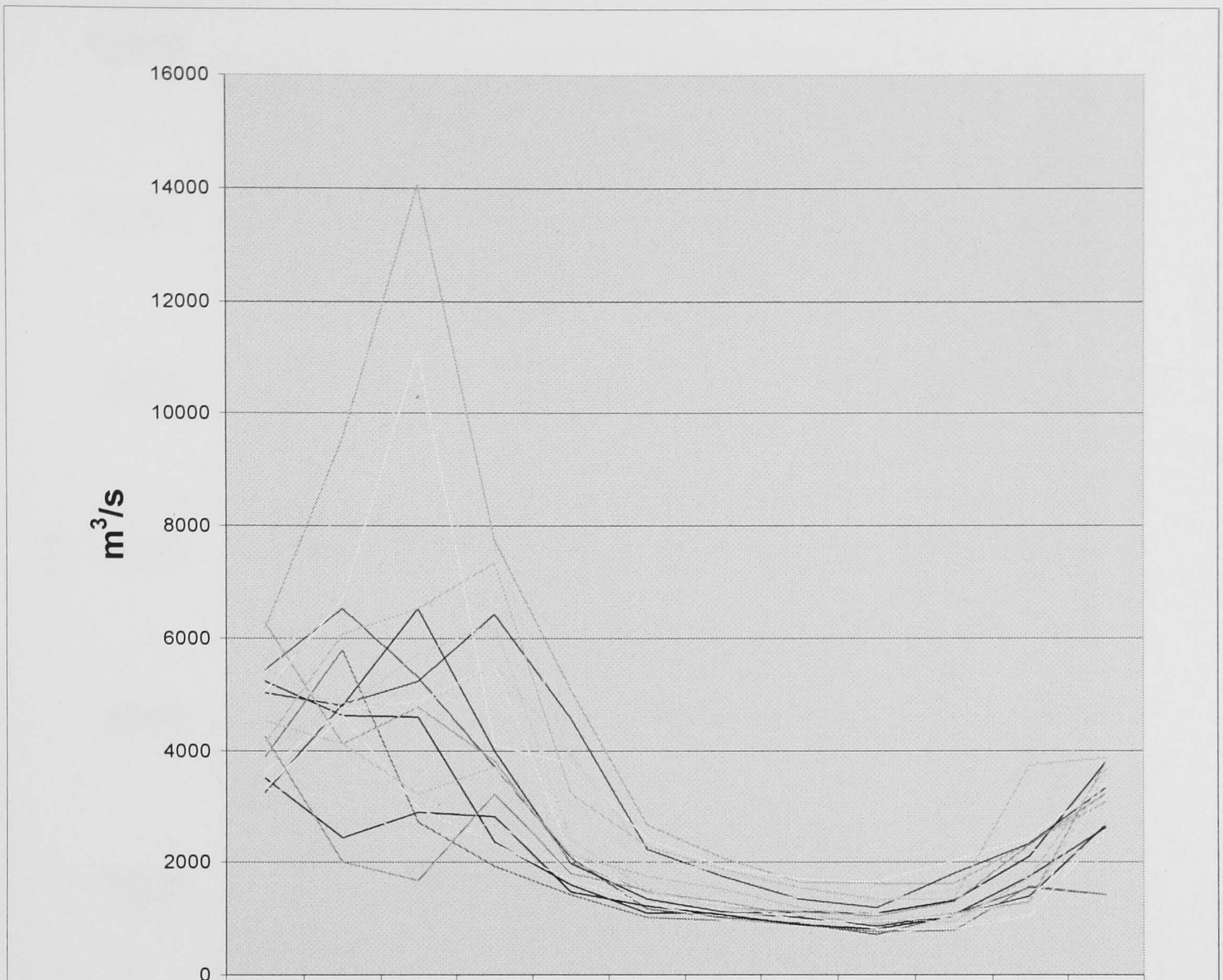
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4759	10229	10621	7652	8714	4269	2923	2146	1814	1682	3691	4297
2	7193	8604	11711	5834	4443	2861	2014	1633	1435	1644	1465	3016
3	5193	5674	5044	4307	2529	2030	1481	1346	1207	1200	1630	3484
4	5427	6008	7178	4498	3225	2427	1811	1418	1108	926	1009	3327
5	5577	3028	1685	577	1239	888	744	717	612	1105	1592	4313
6	6421	3040	2331	2512	2394	1642	1336	1245	1040	1680	3957	3609
7	5368	5293	4050	4199	2040	1465	1253	1082	859	906	933	1969
8	4857	4585	4609	3119	1661	1285	1125	978	786	894	909	1970
9	2013	7219	7743	6392	2446	1668	1409	1269	1036	1347	3186	5043
10	5399	5510	3855	5608	3036	1860	1517	1253	1149	1097	1243	3235
11	5608	4182	3348	2214	1637	1348	1129	994	909	974	1786	3402
12	4037	2935	2586	3620	1491	1193	989	882	803	899	2208	3411
13	7047	5221	4959	5742	3368	2006	1651	1422	1315	1623	2421	4100
14	4995	5336	4302	5220	4708	3092	2124	1560	1281	1286	1931	2974
15	4310	7173	9259	6015	4459	2721	1973	1557	1469	1708	2251	2288
16	4636	5026	3765	2065	1335	1148	1078	1057	1111	1436	2709	4888
17	6469	2569	3595	1528	2044	1754	1464	1221	1057	1502	2167	5018
18	6285	3114	2585	2430	1846	1613	1130	998	834	938	1820	3333
19	2189	2948	3115	2948	1630	1287	1162	1144	1086	881	1635	3697
20	4621	3118	3246	2615	2870	1943	1748	1535	1459	1651	2057	3530

Inflow 5



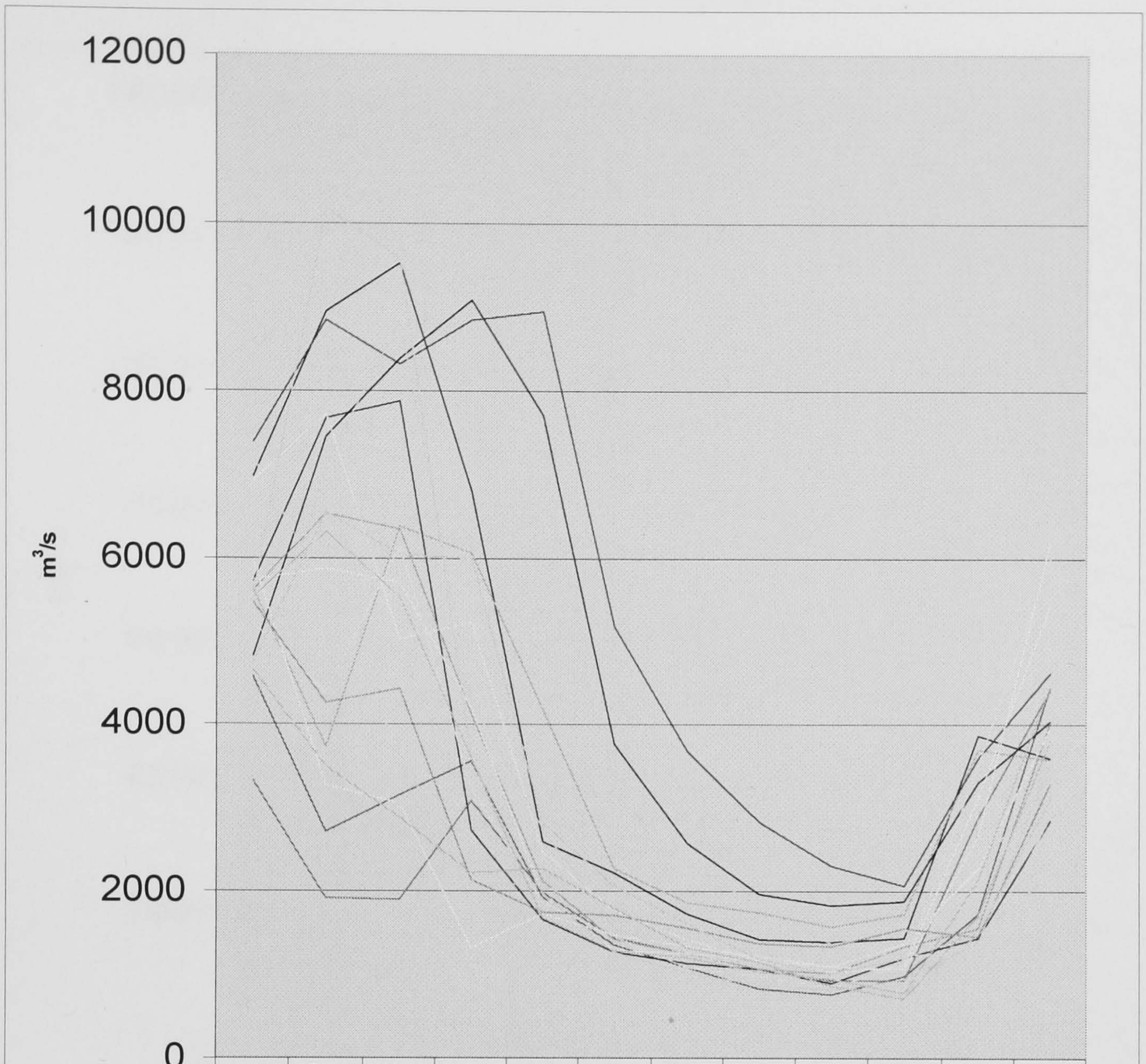
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4428	8095	8961	3857	1766	1376	1158	921	928	991	2194	3894
2	3994	2105	2735	4852	2681	1619	1345	1124	963	1121	2399	3817
3	4465	2246	1722	1988	1778	1239	1139	1079	904	1038	2361	5855
4	6723	7730	7899	4500	2148	1686	1611	1390	1333	1527	2896	2641
5	4107	4350	3821	6035	3211	2057	1751	1439	1184	1098	2082	2522
6	3063	4048	3908	5451	2727	2264	1550	1337	1377	1387	2826	4696
7	5700	6742	4619	4248	2618	2230	1528	1549	1346	1435	2152	5327
8	7037	4111	4044	5581	3547	2713	2146	1742	1720	1792	4022	6332
9	7556	7006	9288	3183	2997	1468	1295	1034	921	1210	2269	3669
10	5264	3422	3533	1424	1338	1101	939	891	795	929	1812	3957
11	5432	8399	12327	4225	2083	1346	1207	1014	895	1046	1930	5815
12	5278	4959	4135	3374	2136	1451	1062	880	824	1028	2383	4463
13	4897	4440	4699	4011	3300	1918	1560	1357	1113	1302	1593	2545
14	5269	5619	5951	2468	1860	1439	1118	1086	954	1307	2731	3730
15	3933	5881	5308	5401	2913	1951	1504	1305	1474	1588	1930	3341
16	4038	3885	5192	5541	7129	3492	2422	2003	1490	1310	2338	3086
17	6386	6225	7136	3025	2341	1613	1278	1091	984	1014	2958	3698
18	3882	4016	3871	2102	1284	1228	1040	873	836	1169	1963	3630
19	5523	1988	2604	2957	1505	1165	961	879	786	835	1728	3645
20	5552	8028	5543	3937	2610	1856	1538	1251	1140	1387	2097	3636

Inflow 6



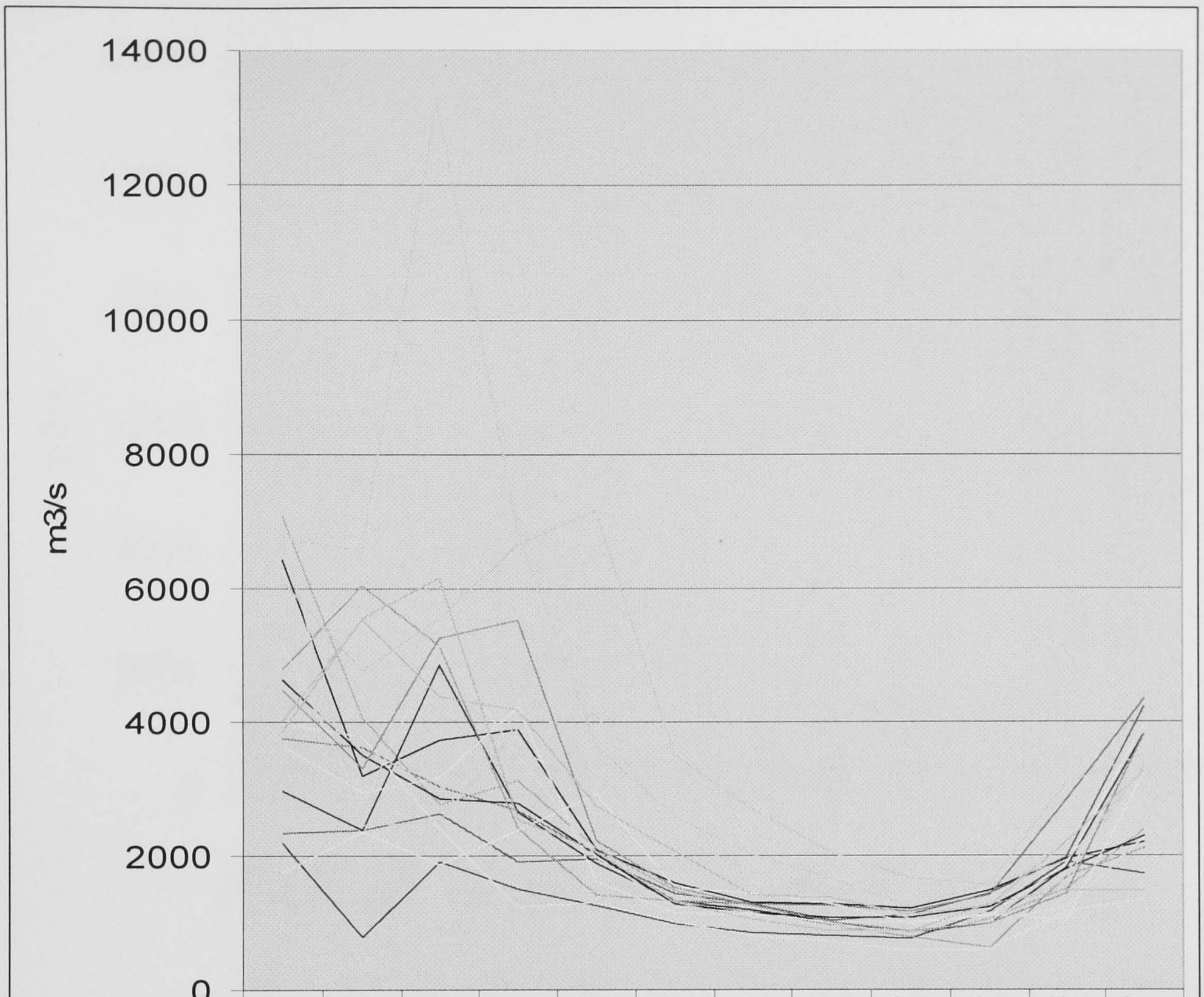
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5229	4617	4600	2369	1596	1098	1098	1110	1085	1325	2115	3789
2	5438	6518	5313	3697	2091	1173	1018	909	719	1066	1561	1424
3	4911	8599	10671	5533	3096	1965	1549	1189	1076	1303	2500	5113
4	6177	9556	14051	7752	5075	2665	2079	1654	1628	1617	2339	3080
5	3260	4835	5222	6414	4567	2237	1743	1343	1198	1801	2325	3339
6	5031	4799	6537	3981	1988	1348	1122	1009	864	1062	1751	2628
7	3887	5790	2706	1923	1426	1022	962	897	773	789	1564	1426
8	3507	2446	2907	2821	1471	1222	1076	899	825	1053	1402	2666
9	6280	4116	4769	3815	2012	1474	1285	1038	910	1087	1306	3777
10	3318	4627	2970	2343	1682	1275	1101	1061	814	805	1041	2600
11	3626	4717	4874	5500	2104	1392	1272	972	928	1040	1365	2482
12	5049	6680	11094	4079	3763	2405	1941	1708	1643	2042	2447	3412
13	5476	6853	7793	5358	3123	1585	1382	1235	1081	983	891	2165
14	4877	6912	7726	7679	3880	2115	1485	1378	1293	1484	2188	2666
15	3964	4861	4744	5540	3942	2146	1804	1540	1332	1519	1738	2469
16	3324	3125	2351	2719	1860	1268	955	861	683	891	1070	3454
17	4235	2004	1677	3225	1799	1509	1206	1114	1036	1290	2316	3224
18	4152	6067	6514	7335	3214	2294	1875	1557	1357	1341	3734	3863
19	4518	4121	3226	3698	2133	1745	1519	1196	986	946	1725	3654
20	5456	4735	5707	6280	2403	1487	1184	1076	961	1072	1258	3562

Inflow 7



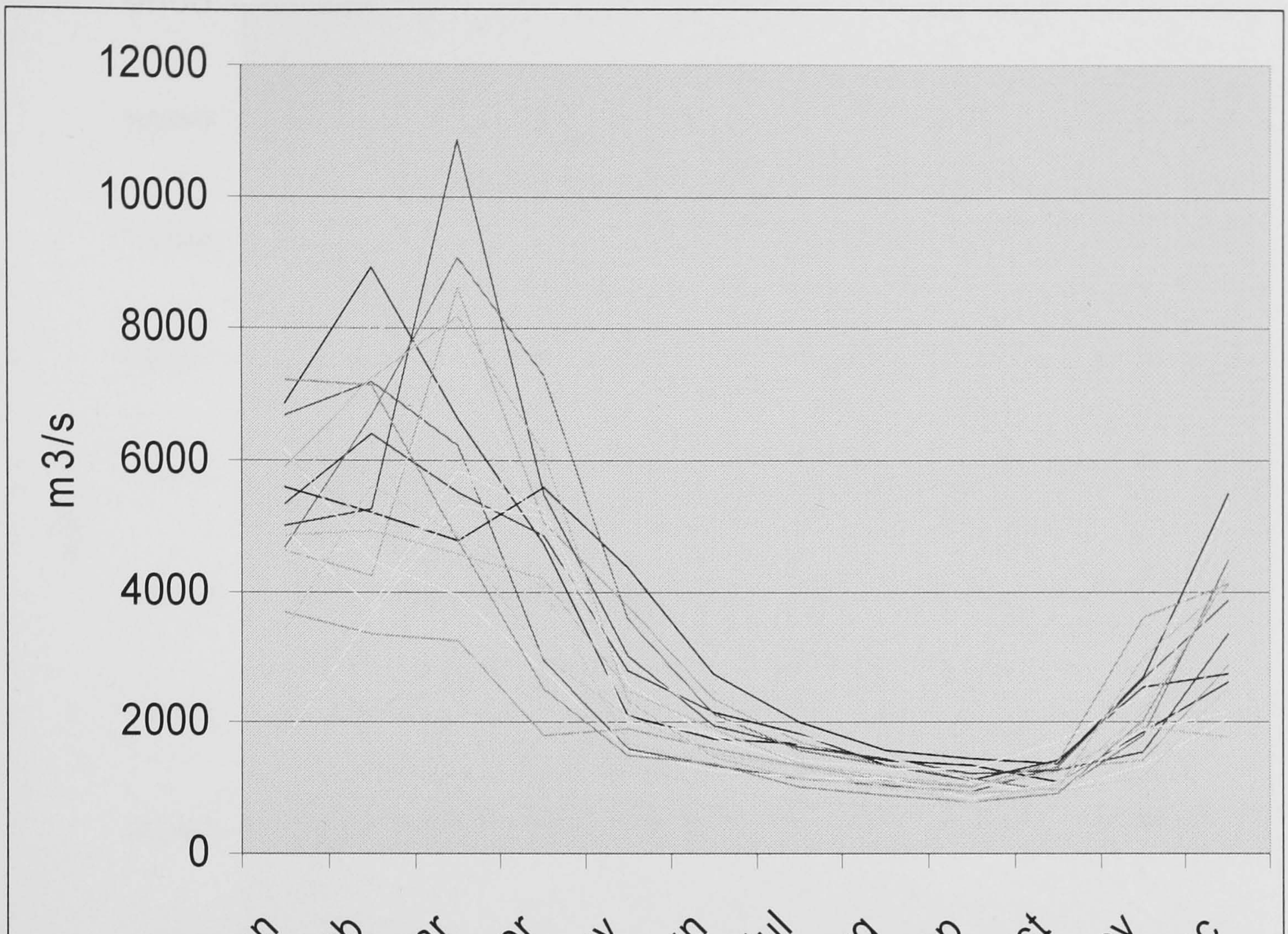
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	6981	8937	9519	6808	2605	2219	1731	1433	1398	1437	3868	3598
2	4562	2718	3163	3561	1936	1366	1094	837	763	982	1728	4444
3	6200	6739	6749	4862	3308	3161	2393	1803	1367	1505	2280	3374
4	5611	3737	6387	6063	4174	2272	1868	1744	1585	1735	3696	3580
5	7382	8847	8317	8838	8937	5184	3679	2830	2316	2070	3601	4621
6	5722	7665	7884	2736	1661	1268	1142	1074	907	1199	1438	2847
7	3322	1925	1895	3092	1978	1439	1248	1071	937	939	2880	4411
8	4827	7452	8391	9082	7705	3774	2585	1966	1829	1892	3305	4040
9	5623	6537	6347	4120	2117	1421	1253	1066	1020	1337	1561	4028
10	5743	5875	5708	4198	1954	1297	1263	1168	1043	1098	3129	5439
11	6933	7725	5024	5232	2470	1772	1433	1176	1102	1380	2268	3960
12	5961	3277	3062	1320	1735	1475	1348	1224	1110	1076	2657	6194
13	7189	5583	3648	2090	2091	1625	1552	1357	1287	1235	1279	2882
14	4120	7120	8847	4284	2749	1556	1244	1109	846	778	1502	2214
15	5566	10192	9567	3574	1973	1271	1020	887	812	944	1395	3536
16	5210	4371	6140	3250	1871	1460	1091	983	846	1116	3506	5986
17	5473	4266	4428	2143	1748	1708	1568	1375	1334	1564	1452	3290
18	4654	3496	2880	2219	2278	1795	1318	1160	863	719	1722	3810
19	5541	6321	5525	3597	1684	1282	1203	1031	955	775	2135	4470
20	4746	6554	6047	5996	2824	2066	1607	1182	1023	1211	1518	3111

Inflow 8



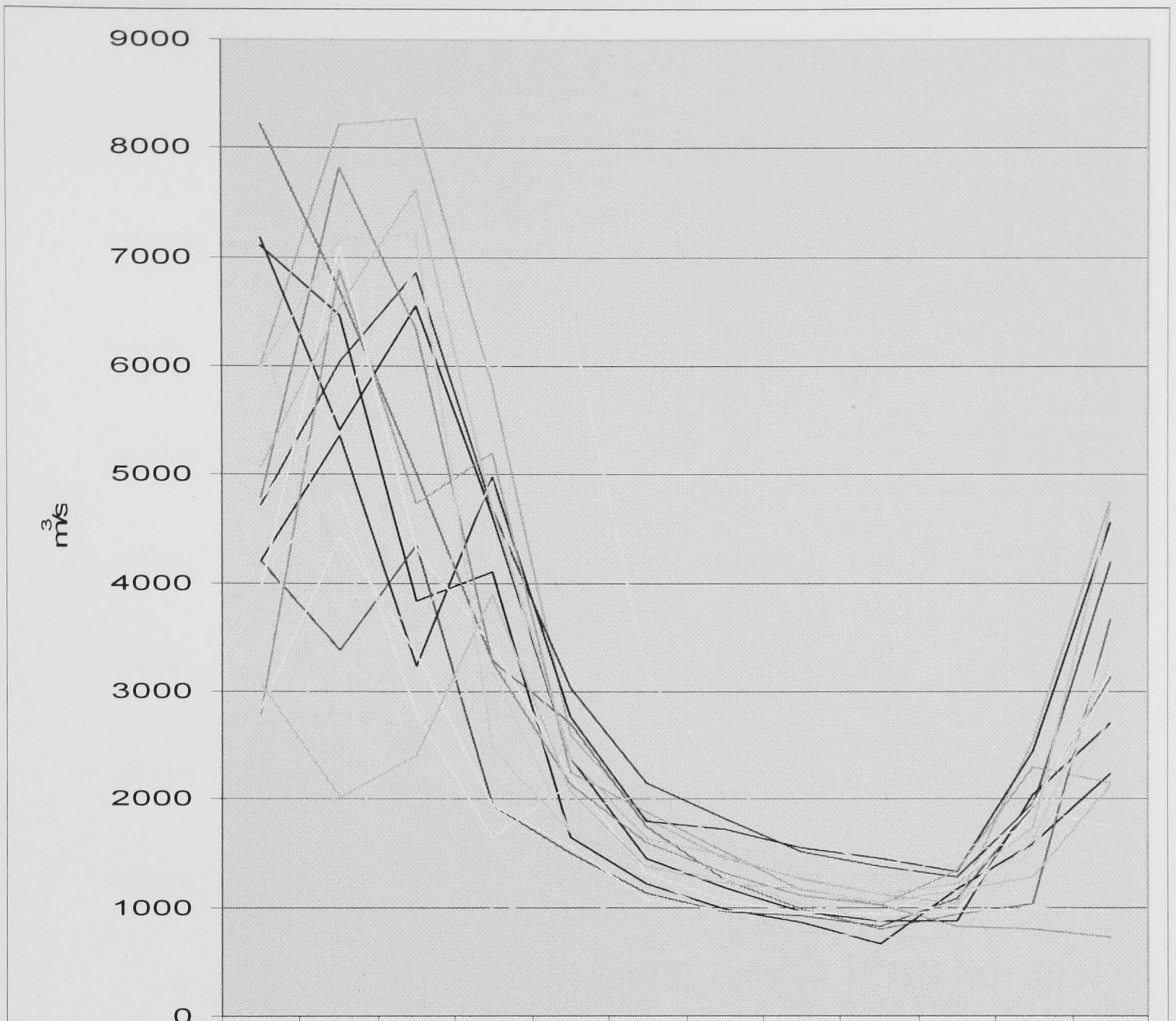
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	6426	3194	3720	3881	2099	1586	1308	1286	1216	1474	1952	2209
2	2334	2375	2639	1910	1965	1431	1286	1033	1120	1434	1981	4233
3	5290	2240	6743	3645	2852	1972	1517	1290	1108	1256	2283	4425
4	7089	4078	2756	3118	2120	1478	1165	937	785	1050	1498	2384
5	2188	788	1904	1509	1257	996	859	816	767	1163	1909	1741
6	2959	2381	4854	2658	1894	1324	1198	1020	858	995	1823	3813
7	3743	3612	3028	2676	2018	1333	1270	1259	1169	1423	2822	4344
8	4623	3513	2860	2795	2032	1285	1141	1089	1071	1230	1807	2285
9	4778	6041	5152	2394	1415	1317	1141	964	778	638	1684	2111
10	3635	2935	3176	4232	1619	1137	1120	1011	1015	1135	1044	3230
11	3968	3784	2411	1232	1303	1021	809	709	575	596	1165	1351
12	1751	2364	1863	2379	2915	1533	1441	1273	983	1102	1871	3965
13	4553	3578	3086	1656	1471	1077	1002	877	846	1012	1739	3370
14	6776	2439	2515	3911	4112	2271	1771	1405	1057	1138	1632	3367
15	6765	6568	13231	6881	3648	2574	2034	1671	1243	1601	3079	3496
16	5176	2732	5173	3504	1968	1231	1139	950	877	1019	1230	2275
17	4478	3306	5249	5539	2219	1524	1262	1018	871	995	1442	3823
18	3860	5556	6148	2534	2073	1310	1055	879	880	1273	1489	1491
19	4016	5530	4383	4173	2744	2060	1411	1364	1123	1265	2194	3268
20	6107	4754	5551	6646	7168	3512	2688	2046	1671	1576	1910	3307

Inflow 9



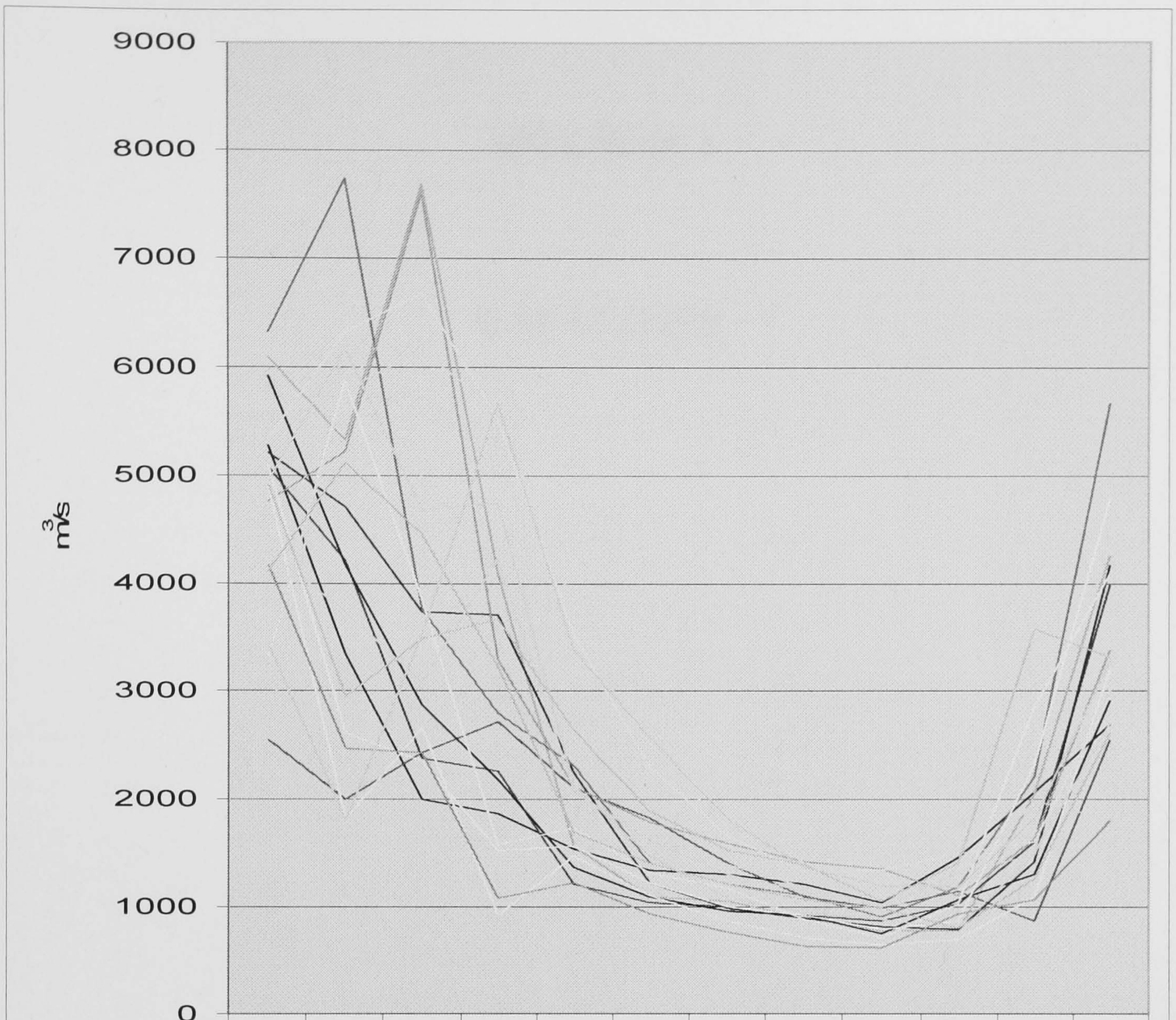
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	6863	8933	6627	4739	2106	1767	1671	1426	1342	1089	1844	2631
2	6698	7183	6218	2947	1598	1357	1153	1046	938	1333	2658	3857
3	4945	8092	7483	3950	2322	2000	1675	1379	1266	1051	1619	4308
4	4635	4252	8624	5061	3782	2364	1716	1346	1218	1291	1415	2863
5	5019	5269	10853	5489	3032	1955	1630	1445	1218	1276	1554	3366
6	5339	6412	5517	4854	2791	2157	1824	1339	1110	1415	2547	2740
7	4679	6694	9082	7304	3574	2137	1577	1346	1148	942	1804	4477
8	5602	5214	4777	5592	4382	2748	1996	1574	1448	1367	2686	5503
9	3685	3368	3265	1803	1914	1597	1351	1118	1028	1387	3620	4107
10	4931	3771	5849	5241	2604	1778	1370	1144	851	1090	1893	2165
11	1747	3672	5324	5149	2007	1835	1416	1306	1293	1713	2409	5398
12	6183	4470	3940	2801	1588	1272	1176	1135	1074	938	1339	2048
13	4574	5183	6160	3393	1536	1219	1050	932	715	778	1529	3119
14	3198	2076	3150	2231	1335	992	785	715	753	964	2893	4945
15	6086	5034	4911	4070	1680	1363	1167	1004	938	935	1179	2555
16	4511	4732	7885	4775	2927	2064	1816	1467	1124	913	1924	5066
17	7213	7142	4781	2525	1511	1379	1015	890	798	913	2023	4264
18	5902	7252	8177	6119	2341	1469	1144	1055	925	993	2991	4084
19	4853	4942	4564	4206	2492	1899	1372	1170	1052	1243	1944	1773
20	3399	5609	4863	3007	2122	1527	1322	1028	780	1061	2167	4284

Inflow 10



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7102	6463	3838	4105	1645	1221	980	865	663	1165	1587	2235
2	4201	3380	4356	1940	1505	1126	959	917	821	1084	1930	4190
3	4782	1721	2550	3665	1912	1423	1241	1034	930	1031	1844	3400
4	5999	8216	8269	5832	2593	1825	1454	1269	1125	1033	2543	4756
5	4721	6042	6856	4682	3031	2153	1819	1511	1371	1277	1953	3141
6	4208	5364	3234	4978	2761	1799	1720	1544	1453	1324	2450	4561
7	8220	6707	5017	3281	2705	1750	1254	986	803	933	1030	3662
8	7186	5408	6558	4628	2385	1452	1179	961	868	871	2044	2699
9	2797	6888	4738	5206	2255	1875	1514	1153	1023	1337	2302	2155
10	2844	4422	3346	1941	1556	1075	970	948	947	1208	1946	3160
11	4103	4814	2788	1646	2143	1596	1306	1145	1049	956	995	954
12	3942	7112	4310	3415	2207	1317	1063	963	940	961	1911	1743
13	2201	2266	2751	965	1108	851	723	656	580	664	1456	3526
14	6271	4111	3567	4949	1894	2047	1609	1299	1242	1482	1641	3062
15	2701	2803	2660	3184	1701	1258	935	774	729	717	1558	2759
16	4771	5634	6897	5955	6485	3177	2176	1639	1386	1530	1764	3089
17	4780	7814	6346	3267	2140	1604	1317	1103	1018	826	801	731
18	3078	2020	2411	3894	2063	1380	1215	1172	1041	1152	1283	2131
19	5072	6537	7618	4689	2380	1631	1476	1249	1118	1218	1737	4680
20	5976	7151	7211	2471	1697	1384	1248	1031	875	1025	1611	3294

Inflow 11



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5279	3345	2000	1865	1541	1342	1304	1204	1038	1457	2057	2684
2	2547	1996	2430	2717	2098	1821	1409	1090	987	1136	869	2543
3	2619	6287	5003	4178	2095	1642	1388	1185	1012	1059	1333	4551
4	6090	5327	7688	4087	1564	1088	1051	894	772	768	2050	4268
5	5072	4208	2378	2253	1201	1043	998	922	866	1018	1607	3994
6	5208	4709	3733	3713	2241	1222	978	895	818	787	1411	4176
7	6319	7738	3762	2795	2303	1402	1212	1104	906	1187	2204	5672
8	5917	4176	2870	2175	1366	1092	954	920	747	1067	1293	2911
9	4761	5227	7606	3297	2109	1784	1583	1416	1345	1104	1622	3387
10	4902	1816	2666	914	1473	1101	868	711	649	702	1091	3196
11	3327	5879	3861	1577	1732	1317	1168	884	713	1025	2866	4088
12	5088	2605	2350	1526	1555	1220	998	918	790	860	2322	4782
13	3389	5779	6149	5607	3787	2279	1820	1401	1121	1257	1979	1810
14	4293	3743	3088	4234	2072	1609	1294	1142	994	1311	1487	3010
15	4948	6172	4685	4745	2128	1471	1074	940	877	798	1499	2707
16	5341	6322	6680	5525	3533	2297	1648	1325	1335	1493	1600	2953
17	4170	2468	2432	1078	1216	938	763	636	614	931	1062	1796
18	4119	5115	4463	3225	1695	1398	1212	1067	985	800	1266	2610
19	4921	2951	3494	3668	2639	1895	1516	1395	1052	1398	3583	3316
20	3439	1795	3533	5671	3389	2566	1811	1366	1195	1185	1813	3278

Inflow 12

APPENDIX 3

CAPACITIES

Installed capacities and demand (MW)													
Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Capacity 1	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738
	Capacity 1b	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738
	Capacity 2	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738
	Capacity 3	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738
	Capacity 3b	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738	10738
	Demand	7019	7049	7240	7288	7206	7102	7065	7197	7336	7464	7467	7545
2	Capacity 1	10738	10978	10978	11218	11218	11218	11218	11218	11218	11458	11458	11458
	Capacity 1b	10738	10978	10978	11218	11218	11218	11218	11458	11458	11698	11698	11698
	Capacity 2	10738	10978	10978	11218	11218	11218	11823	11823	11823	12063	12063	12063
	Capacity 3	10738	10978	10978	11218	11218	11218	11823	11823	11823	12063	12063	12063
	Capacity 3b	10738	10978	10978	11218	11218	11218	11823	11823	11823	11823	11823	11823
	Demand	7485	7516	7720	7771	7684	7573	7534	7674	7822	7959	7962	8045
3	Capacity 1	11698	11698	11698	11698	11698	11698	11698	11698	11698	11938	12178	12178
	Capacity 1b	11938	11938	11938	11938	11938	11938	11938	11938	11938	12178	12418	12418
	Capacity 2	12303	12303	12303	12303	12303	12303	12303	12303	12303	12543	12783	12783
	Capacity 3	12303	12303	12303	12303	12303	12303	12303	12303	12303	12543	12783	12783
	Capacity 3b	12063	12063	12063	12063	12063	12063	12063	12063	12063	12303	12543	12543
	Demand	7926	7960	8175	8229	8137	8019	7978	8127	8284	8428	8432	8520
4	Capacity 1	12418	12418	12418	12418	12418	12418	12418	12418	12418	12658	12898	12898
	Capacity 1b	12658	12658	12658	12658	12658	12658	12658	12658	12658	12898	13138	13138
	Capacity 2	13023	13023	13023	13023	13023	13023	13023	13023	13023	13263	13503	13503
	Capacity 3	13023	13023	13023	13023	13023	13023	13023	13023	13023	13263	13503	13503
	Capacity 3b	12783	12783	12783	12783	12783	12783	12783	12783	12783	13023	13263	13263
	Demand	8401	8436	8665	8722	8625	8499	8456	8613	8780	8933	8937	9030
5	Capacity 1	13138	13138	13138	13378	13378	13378	13378	13378	13378	13618	13618	13618
	Capacity 1b	13378	13618	13618	13858	13858	13858	13858	13858	13858	14098	14098	14098
	Capacity 2	14348	14348	14348	14588	14588	14588	14588	14588	14588	14828	14828	14828
	Capacity 3	14348	14348	14348	14588	14588	14588	14588	14588	14588	14828	14828	14828
	Capacity 3b	14108	14108	14108	14108	14108	14108	14108	14108	14108	14348	14348	14348
	Demand	8915	8953	9195	9256	9153	9020	8974	9141	9318	9480	9484	9583
6	Capacity 1	13858	13858	13858	13858	13858	13858	14098	14098	14098	14338	14338	14338
	Capacity 1b	14338	14338	14338	14338	14338	14338	14578	14578	14578	14818	14818	14818
	Capacity 2	15068	15068	15068	15068	15068	15068	15308	15308	15308	15548	15548	15548
	Capacity 3	15068	15068	15068	15068	15068	15068	15308	15308	15308	15548	16048	16048
	Capacity 3b	14588	14588	14588	14588	14588	14588	14828	14828	14828	15068	15568	15568
	Demand	9485	9525	9783	9848	9738	9596	9547	9725	9913	10086	10090	10195
7	Capacity 1	14338	14578	14578	14578	14578	14818	14818	14818	14818	15058	15058	15058
	Capacity 1b	14818	15058	15058	15058	15058	15298	15298	15298	15298	15538	15538	15538
	Capacity 2	15548	15788	15788	15788	15788	16028	16028	16028	16028	16268	16268	16268
	Capacity 3	16048	16288	16288	16288	16288	16528	16528	16528	16528	16768	17268	17268
	Capacity 3b	15568	15808	15808	15808	15808	16048	16048	16048	16048	16288	16788	16788
	Demand	10053	10095	10369	10437	10321	10171	10119	10307	10507	10690	10694	10806
8	Capacity 1	15058	15298	15298	15298	15298	15538	15538	15538	15538	15778	15778	15778
	Capacity 1b	15538	15778	15778	15778	15778	16018	16018	16018	16018	16258	16258	16258
	Capacity 2	16268	16508	16508	16508	16508	16748	16748	16748	16748	16988	16988	16988
	Capacity 3	17268	17508	17508	17508	17508	17748	17748	17748	18248	18488	18488	18488
	Capacity 3b	16788	17028	17028	17028	17028	17268	17268	17268	17768	18008	18008	18008
	Demand	10655	10700	10990	11063	10939	10780	10725	10925	11136	11330	11335	11453
9	Capacity 1	16018	16018	16018	16018	16258	16258	16258	16258	16498	16498	16498	16498
	Capacity 1b	16498	16738	16738	16738	16978	16978	16978	16978	17218	17218	17218	17218
	Capacity 2	17833	17833	17833	17833	18073	18073	18073	18073	18313	18313	18313	18313
	Capacity 3	19333	19333	19333	19333	19573	19573	19573	20073	20313	20313	20313	20313
	Capacity 3b	18853	18853	18853	18853	18853	18853	18853	19353	19593	19593	19593	19593
	Demand	11145	11192	11495	11571	11442	11276	11218	11427	11648	11851	11857	11980
10	Capacity 1	16738	16738	16738	16738	16978	16978	16978	16978	17218	17218	17218	17458
	Capacity 1b	17458	17458	17458	17458	17698	17698	17698	17698	17938	17938	17938	18178
	Capacity 2	18553	18553	18553	18553	18793	18793	18793	18793	19033	19033	19033	19273
	Capacity 3	20553	20553	20553	20553	20793	20793	20793	20793	21033	21033	21033	21273
	Capacity 3b	19833	19833	19833	19833	20073	20073	20073	20073	20313	20313	20313	20553
	Demand	11689	11738	12056	12136	12001	11826	11765	11985	12216	12430	12435	12564

Installed capacities and demand (MW)													
Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
11	Capacity 1	17458	17458	17458	17698	17698	17698	17698	17938	17938	17938	17938	18178
	Capacity 1b	18178	18178	18178	18418	18418	18418	18418	18658	18658	18658	18658	18898
	Capacity 2	19273	19273	19273	19513	19513	19513	19513	19753	19753	19753	19753	19993
	Capacity 3	21273	21273	21273	21513	21513	21513	21513	21753	21753	21753	21753	21993
	Capacity 3b	20553	20553	20553	20793	20793	20793	20793	21033	21033	21033	21033	21273
	Demand	12303	12355	12690	12774	12631	12448	12384	12615	12859	13083	13089	13225
12	Capacity 1	18178	18178	18178	18418	18418	18418	18418	18658	18658	18658	18898	18898
	Capacity 1b	18898	18898	18898	19138	19138	19138	19138	19378	19378	19378	19618	19618
	Capacity 2	19993	19993	19993	20233	20233	20233	20233	20473	20473	20473	20713	20713
	Capacity 3	21993	21993	21993	22233	22233	22233	22233	22473	22473	22473	22713	22713
	Capacity 3b	21273	21273	21273	21513	21513	21513	21513	21753	21753	21753	21993	21993
	Demand	12914	12960	13005	13051	13097	13143	13189	13235	13281	13327	13372	13418
13	Capacity 1	18898	18898	19138	19138	19138	19138	19378	19378	19378	19378	19618	19618
	Capacity 1b	19618	19618	19858	19858	19858	19858	20098	20098	20098	20098	20338	20338
	Capacity 2	21318	21318	21558	21558	21558	21558	21798	21798	21798	21798	22038	22038
	Capacity 3	23318	23318	23558	23558	23558	23558	23798	23798	23798	23798	24038	24038
	Capacity 3b	22598	22598	22838	22838	22838	22838	23078	23078	23078	23078	23318	23318
	Demand	13464	13510	13556	13602	13648	13693	13739	13785	13831	13877	13923	13969
14	Capacity 1	19618	19618	19858	19858	19858	19858	20098	20098	20098	20098	20338	20338
	Capacity 1b	20338	20338	20578	20578	20578	20578	20818	20818	20818	20818	21058	21058
	Capacity 2	22038	22038	22278	22278	22278	22278	22518	22518	22518	22518	22758	22758
	Capacity 3	24038	24038	24278	24278	24278	24278	24518	24518	24518	24518	24758	24758
	Capacity 3b	23318	23318	23558	23558	23558	23558	23798	23798	23798	23798	24038	24038
	Demand	14014	14060	14106	14152	14198	14244	14290	14335	14381	14427	14473	14519
15	Capacity 1	20338	20578	20578	20578	20578	20818	20818	20818	20818	21058	21058	21058
	Capacity 1b	21058	21298	21298	21298	21298	21538	21538	21538	21538	21778	21778	21778
	Capacity 2	22758	22998	22998	22998	22998	23238	23238	23238	23238	23478	23478	23478
	Capacity 3	24758	24998	24998	24998	24998	25238	25238	25238	25238	25478	25478	25478
	Capacity 3b	24038	24278	24278	24278	24278	24518	24518	24518	24518	24758	24758	24758
	Demand	14565	14611	14656	14702	14748	14794	14840	14886	14932	14978	15023	15069
16	Capacity 1	21058	21298	21298	21298	21298	21538	21538	21538	21538	21778	21778	21778
	Capacity 1b	21778	22018	22018	22018	22018	22258	22258	22258	22258	22498	22498	22498
	Capacity 2	23478	23718	23718	23718	23718	23958	23958	23958	23958	24198	24198	24198
	Capacity 3	25478	25718	25718	25718	25718	25958	25958	25958	25958	26198	26198	26198
	Capacity 3b	24758	24998	24998	24998	24998	25238	25238	25238	25238	25478	25478	25478
	Demand	15115	15161	15207	15253	15299	15344	15390	15436	15482	15528	15574	15620
17	Capacity 1	22018	22018	22018	22018	22258	22258	22258	22258	22498	22498	22498	22498
	Capacity 1b	22738	22738	22738	22738	22978	22978	22978	22978	23218	23218	23218	23218
	Capacity 2	25043	25043	25043	25043	25283	25283	25283	25283	25523	25523	25523	25523
	Capacity 3	27043	27043	27043	27043	27283	27283	27283	27283	27523	27523	27523	27523
	Capacity 3b	26323	26323	26323	26323	26563	26563	26563	26563	26803	26803	26803	26803
	Demand	15665	15711	15757	15803	15849	15895	15941	15986	16032	16078	16124	16170
18	Capacity 1	22738	22738	22738	22738	22978	22978	22978	22978	23218	23218	23218	23218
	Capacity 1b	23458	23458	23458	23458	23698	23698	23698	23698	23938	23938	23938	23938
	Capacity 2	25763	25763	25763	25763	26003	26003	26003	26003	26243	26243	26243	26243
	Capacity 3	27763	27763	27763	27763	28003	28003	28003	28003	28243	28243	28243	28243
	Capacity 3b	27043	27043	27043	27043	27283	27283	27283	27283	27523	27523	27523	27523
	Demand	16216	16262	16308	16353	16399	16445	16491	16537	16583	16629	16674	16720
19	Capacity 1	23458	23458	23458	23698	23698	23698	23698	23938	23938	23938	23938	24178
	Capacity 1b	24178	24178	24178	24418	24418	24418	24418	24658	24658	24658	24658	24898
	Capacity 2	26483	26483	26483	26723	26723	26723	26723	26963	26963	26963	26963	27203
	Capacity 3	28483	28483	28483	28723	28723	28723	28723	28963	28963	28963	28963	29203
	Capacity 3b	27763	27763	27763	28003	28003	28003	28003	28243	28243	28243	28243	28483
	Demand	16766	16812	16858	16904	16950	16995	17041	17087	17133	17179	17225	17271
20	Capacity 1	24178	24178	24178	24418	24418	24418	24418	24658	24658	24658	24658	24898
	Capacity 1b	24898	24898	24898	25138	25138	25138	25138	25378	25378	25378	25378	25618
	Capacity 2	27203	27203	27203	27443	27443	27443	27443	27683	27683	27683	27683	27923
	Capacity 3	29203	29203	29203	29443	29443	29443	29443	29683	29683	29683	29683	29923
	Capacity 3b	28483	28483	28483	28723	28723	28723	28723	28963	28963	28963	28963	29203
	Demand	17316	17362	17408	17454	17500	17546	17592	17637	17683	17729	17775	17821

APPENDIX 4

WIND PLANTS IN BRAZIL

Wind Power Plants in Operation		
Wind Plant	**Installed Power (kW)**	**Municipality**
Eólica	75	Fernando de Noronha - PE
Eólica de Prainha	10,000	Aquiraz - CE
Eólica de Taíba	5,000	São Gonçalo do Amarante - CE
Eólica-Elétrica Experimental do Morro do Camelinho	1,000	Gouveia - MG
Eólio - Elétrica de Palmas	2,500	Palmas - PR
Eólica de Fernando de Noronha	225	Fernando de Noronha - PE
Mucuripe	2,400	Fortaleza - CE
Eólica de Bom Jardim	600	Bom Jardim da Serra - SC
Eólica Olinda	225	Olinda - PE
Parque Eólico do Horizonte	4,800	Água Doce - SC
Macau	1,800	Macau - RN
Total	28625	kW

Source (ANEEL – Jan 2005)

APPENDIX 5

RESERVOIR VOLUMES FOR INFLOW 1 – REFERENCE MARKET

SCENARIOS 911, 911B, 912, 913 AND 913B

(m^3)

Water volume of the reservoir (m^3)													
Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Scenario 911	1.40E+10	1.98E+10	2.85E+10	3.37E+10	3.35E+10	3.34E+10	3.16E+10	2.87E+10	2.49E+10	2.05E+10	1.65E+10	1.52E+10
	Scenario 911b	1.4E+10	1.98E+10	2.71E+10	3.21E+10	3.35E+10	3.2E+10	2.85E+10	2.41E+10	1.91E+10	1.36E+10	1.1E+10	1.21E+10
	Scenario 912	1.40E+10	1.98E+10	2.85E+10	3.37E+10	3.35E+10	3.34E+10	3.16E+10	2.87E+10	2.49E+10	2.05E+10	1.65E+10	1.52E+10
	Scenario 913	1.40E+10	1.98E+10	2.85E+10	3.37E+10	3.35E+10	3.34E+10	3.16E+10	2.87E+10	2.49E+10	2.05E+10	1.65E+10	1.52E+10
	Scenario 913b	1.4E+10	1.98E+10	2.71E+10	3.21E+10	3.35E+10	3.2E+10	2.85E+10	2.41E+10	1.91E+10	1.36E+10	1.1E+10	1.21E+10
2	Scenario 911	2.14E+10	2.92E+10	3.31E+10	3.37E+10	3.35E+10	3.34E+10	3.19E+10	2.98E+10	2.70E+10	2.41E+10	2.19E+10	2.56E+10
	Scenario 911b	1.7E+10	2.46E+10	2.82E+10	3.37E+10	3.35E+10	3.34E+10	3.16E+10	2.92E+10	2.6E+10	2.29E+10	2.04E+10	2.38E+10
	Scenario 912	2.14E+10	2.92E+10	3.31E+10	3.37E+10	3.35E+10	3.34E+10	3.19E+10	3.01E+10	2.75E+10	2.50E+10	2.32E+10	2.73E+10
	Scenario 913	2.14E+10	2.92E+10	3.31E+10	3.37E+10	3.35E+10	3.34E+10	3.19E+10	3.01E+10	2.75E+10	2.50E+10	2.32E+10	2.73E+10
	Scenario 913b	1.7E+10	2.46E+10	2.82E+10	3.37E+10	3.35E+10	3.34E+10	3.16E+10	2.95E+10	2.66E+10	2.38E+10	2.17E+10	2.54E+10
3	Scenario 911	3.01E+10	3.36E+10	3.36E+10	3.37E+10	3.35E+10	3.33E+10	3.12E+10	2.81E+10	2.44E+10	1.98E+10	1.53E+10	1.47E+10
	Scenario 911b	2.8E+10	3.36E+10	3.36E+10	3.37E+10	3.35E+10	3.3E+10	3.06E+10	2.71E+10	2.31E+10	1.82E+10	1.37E+10	1.38E+10
	Scenario 912	3.21E+10	3.35E+10	3.36E+10	3.37E+10	3.35E+10	3.34E+10	3.15E+10	2.85E+10	2.51E+10	2.10E+10	1.68E+10	1.56E+10
	Scenario 913	3.21E+10	3.35E+10	3.36E+10	3.37E+10	3.35E+10	3.34E+10	3.15E+10	2.85E+10	2.51E+10	2.10E+10	1.68E+10	1.56E+10
	Scenario 913b	2.99E+10	3.36E+10	3.36E+10	3.37E+10	3.35E+10	3.31E+10	3.09E+10	2.76E+10	2.39E+10	1.95E+10	1.49E+10	1.45E+10
4	Scenario 911	2.16E+10	2.59E+10	3.12E+10	3.37E+10	3.35E+10	3.34E+10	3.12E+10	2.80E+10	2.38E+10	1.91E+10	1.45E+10	1.44E+10
	Scenario 911b	2.03E+10	2.43E+10	2.91E+10	3.37E+10	3.35E+10	3.34E+10	3.08E+10	2.71E+10	2.24E+10	1.72E+10	1.35E+10	1.38E+10
	Scenario 912	2.27E+10	2.72E+10	3.25E+10	3.37E+10	3.35E+10	3.34E+10	3.14E+10	2.84E+10	2.45E+10	2.01E+10	1.59E+10	1.52E+10
	Scenario 913	2.27E+10	2.72E+10	3.25E+10	3.37E+10	3.35E+10	3.34E+10	3.14E+10	2.84E+10	2.45E+10	2.01E+10	1.59E+10	1.52E+10
	Scenario 913b	2.13E+10	2.53E+10	3.02E+10	3.37E+10	3.35E+10	3.34E+10	3.09E+10	2.75E+10	2.31E+10	1.83E+10	1.41E+10	1.41E+10
5	Scenario 911	1.47E+10	1.77E+10	2.42E+10	3.27E+10	3.35E+10	3.14E+10	2.74E+10	2.27E+10	1.70E+10	1.25E+10	9.69E+09	1.02E+10
	Scenario 911b	1.44E+10	1.75E+10	2.36E+10	3.18E+10	3.3E+10	3.06E+10	2.62E+10	2.11E+10	1.5E+10	1.14E+10	9.08E+09	9.64E+09
	Scenario 912	1.52E+10	1.79E+10	2.47E+10	3.35E+10	3.35E+10	3.18E+10	2.82E+10	2.40E+10	1.90E+10	1.40E+10	1.05E+10	1.09E+10
	Scenario 913	1.52E+10	1.79E+10	2.47E+10	3.35E+10	3.35E+10	3.18E+10	2.82E+10	2.40E+10	1.90E+10	1.40E+10	1.05E+10	1.09E+10
	Scenario 913b	1.46E+10	1.76E+10	2.4E+10	3.24E+10	3.35E+10	3.14E+10	2.74E+10	2.28E+10	1.74E+10	1.27E+10	9.81E+09	1.04E+10
6	Scenario 911	1.38E+10	2.31E+10	3.37E+10	3.37E+10	3.20E+10	2.84E+10	2.44E+10	1.93E+10	1.39E+10	1.06E+10	9.34E+09	9.87E+09
	Scenario 911b	1.27E+10	2.17E+10	3.27E+10	3.37E+10	3.17E+10	2.77E+10	2.33E+10	1.79E+10	1.31E+10	1.02E+10	9.1E+09	9.63E+09
	Scenario 912	1.50E+10	2.47E+10	3.37E+10	3.37E+10	3.23E+10	2.90E+10	2.54E+10	2.08E+10	1.57E+10	1.16E+10	9.87E+09	1.04E+10
	Scenario 913	1.50E+10	2.47E+10	3.37E+10	3.37E+10	3.23E+10	2.90E+10	2.54E+10	2.08E+10	1.57E+10	1.16E+10	9.87E+09	1.04E+10
	Scenario 913b	1.4E+10	2.34E+10	3.37E+10	3.37E+10	3.19E+10	2.83E+10	2.43E+10	1.94E+10	1.4E+10	1.06E+10	9.36E+09	9.88E+09
7	Scenario 911	1.25E+10	1.67E+10	2.32E+10	3.27E+10	3.35E+10	3.34E+10	3.03E+10	2.62E+10	2.14E+10	1.63E+10	1.34E+10	1.23E+10
	Scenario 911b	1.23E+10	1.61E+10	2.22E+10	3.13E+10	3.32E+10	3.3E+10	2.95E+10	2.5E+10	1.98E+10	1.55E+10	1.29E+10	1.2E+10
	Scenario 912	1.29E+10	1.74E+10	2.42E+10	3.37E+10	3.35E+10	3.34E+10	3.07E+10	2.71E+10	2.30E+10	1.86E+10	1.46E+10	1.30E+10
	Scenario 913	1.29E+10	1.74E+10	2.42E+10	3.37E+10	3.35E+10	3.34E+10	3.07E+10	2.71E+10	2.30E+10	1.86E+10	1.44E+10	1.26E+10
	Scenario 913b	1.25E+10	1.67E+10	2.31E+10	3.25E+10	3.35E+10	3.34E+10	3.03E+10	2.64E+10	2.19E+10	1.7E+10	1.36E+10	1.22E+10
8	Scenario 911	1.52E+10	1.86E+10	3.18E+10	3.37E+10	3.35E+10	3.34E+10	3.24E+10	2.94E+10	2.51E+10	2.02E+10	1.68E+10	1.89E+10
	Scenario 911b	1.44E+10	1.8E+10	1.67E+10	1.67E+10	1.42E+10	1.21E+10	1.04E+10	8.94E+09	7.64E+09	8.34E+09	7.6E+09	9.31E+09
	Scenario 912	1.56E+10	1.89E+10	3.23E+10	3.37E+10	3.35E+10	3.34E+10	3.28E+10	3.04E+10	2.68E+10	2.26E+10	1.86E+10	2.00E+10
	Scenario 913	1.52E+10	1.83E+10	3.18E+10	3.37E+10	3.35E+10	3.34E+10	3.28E+10	3.04E+10	2.68E+10	2.26E+10	1.86E+10	1.92E+10
	Scenario 913b	1.5E+10	1.82E+10	3.12E+10	3.37E+10	3.35E+10	3.34E+10	3.23E+10	2.95E+10	2.54E+10	2.08E+10	1.64E+10	1.81E+10
9	Scenario 911	2.19E+10	3.20E+10	3.36E+10	3.37E+10	3.35E+10	2.89E+10	2.31E+10	1.66E+10	1.24E+10	1.00E+10	9.72E+09	1.19E+10
	Scenario 911b	1.51E+10	1.86E+10	3.13E+10	3.37E+10	3.35E+10	3.34E+10	3.19E+10	2.86E+10	2.38E+10	1.85E+10	1.59E+10	1.84E+10
	Scenario 912	2.35E+10	3.36E+10	3.36E+10	3.37E+10	3.35E+10	2.92E+10	2.42E+10	1.84E+10	1.34E+10	1.06E+10	1.00E+10	1.22E+10
	Scenario 913	2.28E+10	3.34E+10	3.36E+10	3.37E+10	3.35E+10	2.92E+10	2.42E+10	1.84E+10	1.24E+10	9.72E+09	9.41E+09	1.16E+10
	Scenario 913b	2.12E+10	3.15E+10	3.36E+10	3.37E+10	3.35E+10	2.89E+10	2.35E+10	1.74E+10	1.19E+10	9.53E+09	9.22E+09	1.14E+10
10	Scenario 911	1.44E+10	1.81E+10	1.67E+10	1.67E+10	1.42E+10	1.21E+10	1.04E+10	8.94E+09	7.64E+09	8.34E+09	7.60E+09	9.31E+09
	Scenario 911b	2.09E+10	3.06E+10	3.36E+10	3.37E+10	3.35E+10	2.85E+10	2.24E+10	1.61E+10	1.21E+10	9.89E+09	9.57E+09	1.17E+10
	Scenario 912	1.46E+10	1.82E+10	1.68E+10	1.67E+10	1.42E+10	1.21E+10	1.04E+10	8.94E+09	7.65E+09	8.34E+09	7.60E+09	9.31E+09
	Scenario 913	1.41E+10	1.74E+10	1.54E+10	1.53E+10	1.27E+10	1.09E+10	9.62E+09	8.35E+09	7.07E+09	7.78E+09	8.79E+09	8.80E+09
	Scenario 913b	1.4E+10	1.73E+10	1.54E+10	1.53E+10	1.27E+10	1.09E+10	9.62E+09	8.35E+09	7.07E+09	7.78E+09	8.79E+09	8.8E+09

Water volume of the reservoir (m^3)													
Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
11	Scenario 911	1.05E+10	1.61E+10	1.74E+10	1.59E+10	1.16E+10	1.05E+10	9.14E+09	7.57E+09	7.43E+09	7.19E+09	7.48E+09	9.27E+09
	Scenario 911b	1.05E+10	1.61E+10	1.74E+10	1.59E+10	1.16E+10	1.05E+10	9.14E+09	7.57E+09	7.43E+09	7.19E+09	7.48E+09	9.27E+09
	Scenario 912	1.05E+10	1.61E+10	1.74E+10	1.59E+10	1.16E+10	1.05E+10	9.14E+09	7.57E+09	7.43E+09	7.19E+09	7.48E+09	9.27E+09
	Scenario 913	9.95E+09	1.58E+10	1.65E+10	1.46E+10	1.03E+10	9.71E+09	8.58E+09	7.03E+09	6.90E+09	6.67E+09	6.97E+09	8.76E+09
	Scenario 913b	9.95E+09	1.58E+10	1.65E+10	1.46E+10	1.03E+10	9.71E+09	8.58E+09	7.03E+09	6.9E+09	6.67E+09	6.97E+09	8.76E+09
12	Scenario 911	1.55E+10	1.75E+10	1.98E+10	2.27E+10	2.87E+10	3.05E+10	2.63E+10	2.09E+10	1.64E+10	1.30E+10	1.17E+10	1.34E+10
	Scenario 911b	1.55E+10	1.75E+10	1.98E+10	2.27E+10	2.87E+10	3.05E+10	2.63E+10	2.09E+10	1.64E+10	1.3E+10	1.17E+10	1.34E+10
	Scenario 912	1.55E+10	1.79E+10	2.04E+10	2.30E+10	2.91E+10	3.10E+10	2.72E+10	2.22E+10	1.71E+10	1.34E+10	1.19E+10	1.35E+10
	Scenario 913	1.50E+10	1.74E+10	1.99E+10	2.15E+10	2.76E+10	2.95E+10	2.57E+10	2.08E+10	1.49E+10	1.15E+10	1.07E+10	1.27E+10
	Scenario 913b	1.5E+10	1.7E+10	1.91E+10	2.12E+10	2.69E+10	2.84E+10	2.42E+10	1.89E+10	1.41E+10	1.12E+10	1.06E+10	1.27E+10
13	Scenario 911	1.82E+10	2.20E+10	2.72E+10	3.37E+10	3.35E+10	3.34E+10	3.34E+10	3.34E+10	3.04E+10	2.67E+10	2.17E+10	2.28E+10
	Scenario 911b	1.82E+10	2.2E+10	2.72E+10	3.37E+10	3.35E+10	3.34E+10	3.34E+10	3.34E+10	3.04E+10	2.67E+10	2.17E+10	2.28E+10
	Scenario 912	1.83E+10	2.22E+10	2.74E+10	3.37E+10	3.35E+10	3.34E+10	3.34E+10	3.34E+10	3.09E+10	2.77E+10	2.32E+10	2.36E+10
	Scenario 913	1.75E+10	2.15E+10	2.66E+10	3.37E+10	3.35E+10	3.34E+10	3.34E+10	3.34E+10	3.09E+10	2.77E+10	2.32E+10	2.30E+10
	Scenario 913b	1.75E+10	2.1E+10	2.59E+10	3.37E+10	3.35E+10	3.34E+10	3.34E+10	3.33E+10	3.04E+10	2.69E+10	2.2E+10	2.14E+10
14	Scenario 911	3.06E+10	3.36E+10	3.36E+10	3.16E+10	3.13E+10	2.55E+10	1.94E+10	1.54E+10	1.24E+10	1.02E+10	8.52E+09	9.84E+09
	Scenario 911b	3.06E+10	3.36E+10	3.36E+10	3.16E+10	3.13E+10	2.55E+10	1.94E+10	1.54E+10	1.24E+10	1.02E+10	8.52E+09	9.84E+09
	Scenario 912	3.16E+10	3.35E+10	3.36E+10	3.16E+10	3.13E+10	2.55E+10	1.94E+10	1.54E+10	1.24E+10	1.02E+10	8.52E+09	9.84E+09
	Scenario 913	3.10E+10	3.35E+10	3.36E+10	3.11E+10	3.02E+10	2.39E+10	1.76E+10	1.35E+10	1.08E+10	9.28E+09	7.68E+09	1.07E+10
	Scenario 913b	2.9E+10	3.34E+10	3.36E+10	3.07E+10	2.94E+10	2.27E+10	1.62E+10	1.29E+10	1.06E+10	9.17E+09	7.57E+09	1.06E+10
15	Scenario 911	1.15E+10	1.89E+10	2.10E+10	2.19E+10	2.25E+10	2.07E+10	1.74E+10	1.45E+10	1.21E+10	1.03E+10	9.88E+09	1.62E+10
	Scenario 911b	1.15E+10	1.89E+10	2.1E+10	2.19E+10	2.25E+10	2.07E+10	1.74E+10	1.45E+10	1.21E+10	1.03E+10	9.88E+09	1.62E+10
	Scenario 912	1.15E+10	1.89E+10	2.10E+10	2.19E+10	2.25E+10	2.07E+10	1.74E+10	1.45E+10	1.21E+10	1.03E+10	9.88E+09	1.62E+10
	Scenario 913	1.21E+10	1.88E+10	2.02E+10	2.02E+10	2.02E+10	1.82E+10	1.49E+10	1.25E+10	1.07E+10	9.41E+09	9.15E+09	1.55E+10
	Scenario 913b	1.16E+10	1.79E+10	1.9E+10	1.85E+10	1.95E+10	1.79E+10	1.48E+10	1.25E+10	1.06E+10	9.4E+09	9.14E+09	1.55E+10
16	Scenario 911	2.48E+10	3.04E+10	3.28E+10	3.33E+10	2.71E+10	1.97E+10	1.43E+10	1.10E+10	8.64E+09	6.94E+09	6.97E+09	7.48E+09
	Scenario 911b	2.48E+10	3.04E+10	3.28E+10	3.33E+10	2.71E+10	1.97E+10	1.43E+10	1.1E+10	8.64E+09	6.94E+09	6.97E+09	7.48E+09
	Scenario 912	2.48E+10	3.04E+10	3.28E+10	3.33E+10	2.71E+10	1.97E+10	1.43E+10	1.10E+10	8.64E+09	6.94E+09	6.97E+09	7.48E+09
	Scenario 913	2.34E+10	2.80E+10	2.93E+10	2.85E+10	2.10E+10	1.42E+10	1.07E+10	8.87E+09	7.00E+09	7.03E+09	7.05E+09	7.56E+09
	Scenario 913b	2.3E+10	2.72E+10	2.81E+10	2.69E+10	1.91E+10	1.34E+10	1.03E+10	8.71E+09	6.85E+09	6.88E+09	6.91E+09	7.42E+09
17	Scenario 911	8.96E+09	1.24E+10	1.64E+10	2.01E+10	1.94E+10	1.53E+10	1.24E+10	9.97E+09	8.19E+09	8.16E+09	8.36E+09	8.47E+09
	Scenario 911b	8.96E+09	1.24E+10	1.64E+10	2.01E+10	1.94E+10	1.53E+10	1.24E+10	9.97E+09	8.19E+09	8.16E+09	8.36E+09	8.47E+09
	Scenario 912	8.96E+09	1.24E+10	1.64E+10	2.01E+10	1.94E+10	1.53E+10	1.24E+10	9.97E+09	8.19E+09	8.16E+09	8.36E+09	8.47E+09
	Scenario 913	9.04E+09	1.25E+10	1.61E+10	1.92E+10	1.78E+10	1.34E+10	1.09E+10	9.04E+09	7.28E+09	7.27E+09	7.49E+09	9.29E+09
	Scenario 913b	8.9E+09	1.23E+10	1.61E+10	1.92E+10	1.78E+10	1.34E+10	1.09E+10	9.04E+09	7.28E+09	7.27E+09	7.49E+09	9.29E+09
18	Scenario 911	1.03E+10	1.11E+10	1.39E+10	2.07E+10	2.21E+10	1.79E+10	1.50E+10	1.25E+10	1.03E+10	8.49E+09	7.51E+09	8.83E+09
	Scenario 911b	1.03E+10	1.11E+10	1.39E+10	2.07E+10	2.21E+10	1.79E+10	1.5E+10	1.25E+10	1.03E+10	8.49E+09	7.51E+09	8.83E+09
	Scenario 912	1.03E+10	1.11E+10	1.39E+10	2.07E+10	2.21E+10	1.79E+10	1.50E+10	1.25E+10	1.03E+10	8.49E+09	7.51E+09	8.83E+09
	Scenario 913	1.11E+10	1.02E+10	1.13E+10	1.61E+10	1.87E+10	1.50E+10	1.27E+10	1.09E+10	9.28E+09	7.63E+09	8.40E+09	8.03E+09
	Scenario 913b	1.11E+10	9.94E+09	1.09E+10	1.58E+10	1.86E+10	1.49E+10	1.27E+10	1.09E+10	9.28E+09	7.62E+09	8.4E+09	8.03E+09
19	Scenario 911	1.01E+10	1.40E+10	1.83E+10	2.00E+10	2.07E+10	2.08E+10	1.76E+10	1.49E+10	1.27E+10	1.15E+10	1.15E+10	1.50E+10
	Scenario 911b	1.01E+10	1.4E+10	1.83E+10	2E+10	2.07E+10	2.08E+10	1.76E+10	1.49E+10	1.27E+10	1.15E+10	1.15E+10	1.5E+10
	Scenario 912	1.01E+10	1.40E+10	1.83E+10	2.00E+10	2.07E+10	2.08E+10	1.76E+10	1.49E+10	1.27E+10	1.15E+10	1.15E+10	1.50E+10
	Scenario 913	1.10E+10	1.29E+10	1.55E+10	1.77E+10	1.65E+10	1.77E+10	1.49E+10	1.28E+10	1.11E+10	1.05E+10	1.09E+10	1.45E+10
	Scenario 913b	1.1E+10	1.29E+10	1.55E+10	1.77E+10	1.65E+10	1.77E+10	1.49E+10	1.28E+10	1.11E+10	1.05E+10	1.09E+10	1.45E+10
20	Scenario 911	1.78E+10	2.09E+10	2.96E+10	3.37E+10	2.96E+10	2.53E+10	1.91E+10	1.48E+10	1.19E+10	9.88E+09	8.91E+09	9.67E+09
	Scenario 911b	1.78E+10	2.09E+10	2.96E+10	3.37E+10	2.96E+10	2.53E+10	1.91E+10	1.48E+10	1.19E+10	9.88E+09	8.91E+09	9.67E+09
	Scenario 912	1.78E+10	2.09E+10	2.96E+10	3.37E+10	2.96E+10	2.53E+10	1.91E+10	1.48E+10	1.19E+10	9.88E+09	8.91E+09	9.67E+09
	Scenario 913	1.69E+10	1.82E+10	2.51E+10	2.78E+10	2.18E+10	1.77E+10	1.38E+10	1.14E+10	9.83E+09	8.66E+09	7.73E+09	1.02E+10
	Scenario 913b	1.69E+10	1.82E+10	2.51E+10	2.78E+10	2.18E+10	1.77E+10	1.38E+10	1.14E+10	9.83E+09	8.66E+09	7.73E+09	1.02E+10

APPENDIX 6

ELECTRIC ENERGY NOT SERVED MONTHLY

(MWh)

Pessimistic market -scenario hydrothermal - inflow 1 (911in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	459632.6	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equvialent to wind in 912 - inflow 1 (911bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	114032.6	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 1 (912in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 2 (911in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	0	0	450440.9	505824.8
3	0	0	0	0	0	0	0	0	1058529	1419889	2534758	2614137
4	0	0	0	0	0	0	0	0	621464.8	1063885	922256.6	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	413602	0	440016.3	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 2 (911bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	0	0	277640.9	327264.8
3	0	0	0	0	0	0	0	0	885728.7	1241329	2361958	2435577
4	0	0	0	0	0	0	0	0	448664.8	885324.9	749456.6	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	68002.03	0	94416.33	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 2 (912in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	0	0	0	28777.32
3	0	0	0	0	0	0	0	0	597942.8	1133104	2267271	2377494
4	0	0	0	0	0	0	0	0	132091.5	777099.1	654769.5	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	0	0	0	28777.32
3	0	0	0	0	0	0	0	0	597942.8	1133104	2267271	2377494
4	0	0	0	0	0	0	0	0	132091.5	777099.1	654769.5	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 2 (913bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	0	0	0	207337.3
3	0	0	0	0	0	0	0	0	770742.8	1311664	2440071	2556054
4	0	0	0	0	0	0	0	0	304891.5	955659.1	827569.5	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	175602.7	162180.4	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 3 (911in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	601771.3	695366.8
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	25718.91	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 3 (911bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	428971.3	516806.8
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 3 (912in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	0	218320.4
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 3 (913in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	0	218320.4
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 3 (913bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	98296.88	396880.4
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 4 (911in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	63399.84	862350.5	711700.3
5	0	0	0	0	0	0	0	0	488531.8	1771306	510780.1	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 4 (911bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	689550.5	533140.3
5	0	0	0	0	0	0	0	0	142931.8	1414186	165180.1	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 4 (912in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	403501.8	363064.4
5	0	0	0	0	0	0	0	0	0	0	1270776	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 4 (913in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	403501.8	363064.4
5	0	0	0	0	0	0	0	0	0	0	1270776	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 4 (913bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	576301.8	541624.4
5	0	0	0	0	0	0	0	0	250532.4	236137.4	1616376	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 5 (911in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	116360.1
5	0	0	0	0	0	0	192879.8	378915.3	1758216	1771306	1780464	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	440016.3	446129
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 5 (911bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	21795.24	1412616	1414186	1434864	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	94416.33	89008.99
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 5 (912in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	1174616	1191024	1270776	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 5 (913in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	1174616	1191024	1270776	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 5 (913bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	213433.7	1520216	1548144	1616376	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	275928.1	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 6 (911in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	823582.2	1488821	757370.2
3	0	0	0	0	0	0	345582.6	1062224	1423924	2731896	1265074	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 6 (911bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	645022.2	1316021	578810.2
3	0	0	0	0	0	0	167022.5	883663.7	1251124	2553336	1092274	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 6 (912in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	319944.3	1106540	453544.7
3	0	0	0	0	0	0	46875.63	751553	1137607	1133104	2267271	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	319944.3	1106540	453544.7
3	0	0	0	0	0	0	46875.63	751553	1137607	1133104	2267271	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 6 (913bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	498504.3	1279340	632104.6
3	0	0	0	0	0	0	225435.6	930113	1310407	1311664	2440071	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 7 (911in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	392205.3	1306620	1358105
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	838683.1	878422.5	0
8	0	0	0	0	0	0	0	0	0	385342.2	440016.3	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 7 (911bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	213645.3	1133820	1179545
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	481563.1	532822.5	0
8	0	0	0	0	0	0	0	0	0	28222.23	94416.33	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 7 (912in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	0	878218.6	1027288
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	258401.2	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	0	878218.6	1027288
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	258401.2	368734.2	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 6 (913bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	0	1051019	1205848
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	615521.3	714334.3	0
8	0	0	0	0	0	0	0	0	0	162180.4	275928.1	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 8 (911in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	1085517	1690626	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	878422.5	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 8 (911bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	906957.4	1517826	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	532822.5	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 8 (912in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	651199.8	1398669	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	368734.2	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	651199.8	1398669	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	368734.2	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 8 (913bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	829759.8	1571469	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	714334.3	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 9 (911in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	828638.8	332598.3	223006.4	0	0	127036.8	736102.3	1267801	1679224	1681824	1690626	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	589017.5	646162.2
5	0	0	352910.1	0	0	124123	309522.7	1690922	1758216	1771306	510780.1	343679.7
6	0	0	0	0	0	0	0	0	35908.77	0	1329181	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 9 (911bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911bin9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	828638.8	332598.3	223006.4	0	0	127036.8	736102.3	1089241	1506424	1503264	1517826	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	416217.5	467602.2
5	0	0	0	0	0	0	0	1333802	1412616	1414186	165180.1	0
6	0	0	0	0	0	0	0	0	0	0	983580.5	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 9 (912in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	828638.8	332598.3	223006.4	0	0	127036.8	554012.3	1021314	1392907	1395038	1423139	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	110721.4	286144.7
5	0	0	113783	0	0	0	0	1168321	1174616	1191024	1092.129	0
6	0	0	0	0	0	0	0	0	0	0	819492.2	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	828638.8	332598.3	223006.4	0	0	127036.8	554012.3	1021314	1392907	1395038	1423139	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	110721.4	286144.7
5	0	0	113783	0	0	0	0	1168321	1174616	1191024	1092.129	0
6	0	0	0	0	0	0	0	0	0	0	819492.2	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 9 (913bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	828638.8	332598.3	223006.4	0	0	127036.8	554012.3	1021314	1392907	1573598	1595939	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	283521.4	464704.7
5	0	0	292343	0	0	169302.7	244968.7	1525441	1520216	1548144	346692.1	247720.8
6	0	0	0	0	0	0	0	0	0	0	1165092	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 10 (911in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	231053	995420.4	249776.2
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 10 (911bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	52493.05	822620.4	71216.2
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 10 (912in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	0	567019.7	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	0	567019.7	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 10 (913bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	0	739819.7	97061.84
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	1053880	1679224	2993830	1690626	0
3	0	0	0	0	0	0	0	481026.9	1284290	1419889	2534758	1010028
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911bin11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	875320	1506424	2815270	1517826	0
3	0	0	0	0	0	0	0	302466.9	1111490	1241329	2361958	831468.3
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	807393.3	1392907	2707044	1423139	0
3	0	0	0	0	0	0	0	61451.93	906200.1	1133104	2267271	722822.9
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	807393.3	1392907	2707044	1423139	0
3	0	0	0	0	0	0	0	61451.93	906200.1	1133104	2267271	722822.9
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	807393.3	1392907	2885604	1595939	0
3	0	0	0	0	0	0	0	240011.9	1079000	1311664	2440071	901382.9
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	645905	73291.97	350087.3	0	0	0	172972.7	850580.6	1546882	1681824	1690626	3054395
3	685994.1	0	0	0	0	0	0	0	0	0	357650.2	0
4	0	0	0	0	0	0	0	0	0	475542.8	922256.6	0
5	0	0	0	0	0	0	0	96199.78	488531.8	1771306	510780.1	521393.8
6	0	0	0	0	0	0	0	0	0	0	59496.33	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	440016.3	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	645905	73291.97	350087.3	0	0	0	172972.7	672020.6	1374082	1503264	1517826	2875835
3	507434.2	0	0	0	0	0	0	0	0	0	184850.2	0
4	0	0	0	0	0	0	0	0	0	296982.8	749456.6	0
5	0	0	0	0	0	0	0	0	142931.8	1414186	165180.1	164273.8
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	94416.33	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	645905	73291.97	350087.3	0	0	0	0	604093.9	1260565	1395038	1423139	2817752
3	595859.4	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	31835.06	654769.5	0
5	0	0	0	0	0	0	0	0	0	0	1270776	70276.94
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	645905	73291.97	350087.3	0	0	0	0	425533.8	1087765	1216478	1250339	2639192
3	417299.3	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	481969.5	0
5	0	0	0	0	0	0	0	0	0	0	925176.1	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	645905	73291.97	350087.3	0	0	0	0	604093.9	1260565	1573598	1595939	2996312
3	774419.4	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	210395.1	827569.5	0
5	0	0	0	0	0	0	0	0	250532.4	236137.4	1616376	427396.9
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 1 (911in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	416028.2	0
4	0	0	0	0	0	0	0	0	0	0	351114.6	268954.2
5	0	0	0	0	0	0	0	0	0	739625.4	1237987	0
6	0	0	0	0	0	0	0	0	0	908933.3	1016111	1061384
7	0	0	0	0	0	0	0	0	0	0	0	213064.5
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	319815.4	420648.8	0
10	0	0	0	0	0	0	0	0	1163685	100572.2	1482802	55299.4
11	0	0	0	0	0	0	0	900179	895737.6	951012.2	944931.1	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 1 (911bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	243228.2	0
4	0	0	0	0	0	0	0	0	0	0	178314.6	90394.19
5	0	0	0	0	0	0	0	0	0	382505.4	892386.6	0
6	0	0	0	0	0	0	0	0	0	551813.3	670510.6	704263.6
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	645284.5	0	964402	0
11	0	0	0	0	0	0	0	364499	377337.7	415332.2	426531.1	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 1 (912in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	728298.3	0
6	0	0	0	0	0	0	0	0	0	176819.9	506422.3	610266.8
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	346126.6	0	792829	0
11	0	0	0	0	0	0	0	144702.9	78179.77	139189	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	728298.3	0
6	0	0	0	0	0	0	0	0	0	176819.9	506422.3	610266.8
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	346126.6	600756	0	0
11	0	0	0	0	0	0	0	144702.9	78179.77	139189	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 1 (913bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	68919.61	100600.6
5	0	0	0	0	0	0	0	0	0	78788.08	1073898	0
6	0	0	0	0	0	0	0	0	0	533939.9	852022.3	967386.8
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	43672.22	249075.7	0
10	0	0	0	0	0	0	0	0	864526.6	1136436	41544.84	0
11	0	0	0	0	0	0	0	680382.9	596579.8	674869	773358.1	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 2 (911in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in2												
1	179850	0	719553	0	0	0	03	59213.22	1939607.3	2452912	3090960	2886038.5
2	0	0	0	0	0	0	0	0	0	07	13727.44	738488.69
3	0	0	0	0	0	0	05	34404.13	1626817.1	1727540.9	2850736	2955422.8
4	0	0	0	0	0	0	06	21644.31	1465494.6	1571626.6	2705420.50	
5	0	0	0	0	0	0	0	0	05	37371.06	924071.5	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	02	73055.78	738752.75	816503.88	330738.5
8	0	0	0	0	0	0	03	68879.41	1804396	568008.38	1926303	691100.44
9	151279.8	0	0	0	0	0	02	0680.875	114321.09	1631822.4	420648.75	447760.84
10	0	0	0	0	0	0	0	0	0	01	65596.480	
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	01	02415.080	
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 2 (911bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in2												
1	179850	0	719553	0	0	0	03	59213.22	1939607.3	2452912	3090960	2886038.5
2	0	0	0	0	0	0	0	0	0	05	40927.44	559928.69
3	0	0	0	0	0	0	03	55844.16	1454017.1	1548980.9	2677936	2776862.8
4	0	0	0	0	0	0	04	43084.34	1292694.6	1393066.6	2532620.50	
5	0	0	0	0	0	0	0	0	01	80251.08	578471.5	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	03	81632.75	470903.910	
8	0	0	0	0	0	0	01	1759.414	1458796	210888.41	1580703	333980.44
9	0	0	0	0	0	0	0	0	01	096142.40		0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 2 (912in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in2												
1	179850	0	719553	0	0	0	03	59213.22	1939607.3	2452912	3090960	2886038.5
2	0	0	0	0	0	0	0	0	0	01	46833.59	325768.47
3	0	0	0	0	0	0	0	0	1175962	1440755.1	2583249	2718780.3
4	0	0	0	0	0	0	02	44143.89	1109713.1	1284840.8	1168249.30	
5	0	0	0	0	0	0	0	0	0	02	94740.160	
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	07	2824.086	306815.630	
8	0	0	0	0	0	0	0	01	220796.501		416614.8	239983.59
9	0	0	0	0	0	0	0	0	08	19999.190		0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in2												
1	179850	0	719553	0	0	0	03	59213.22	1939607.3	2452912	3090960	2886038.5
2	0	0	0	0	0	0	0	0	0	01	46833.59	325768.47
3	0	0	0	0	0	0	0	0	1175962	1440755.1	2583249	2718780.3
4	0	0	0	0	0	0	02	44143.89	1109713.1	1284840.8	1168249.30	
5	0	0	0	0	0	0	0	0	0	02	94740.160	
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	01	58470.55	306815.630	
8	0	0	0	0	0	0	0	01	220796.5	1299733.9	146930.63	239983.59
9	0	0	0	0	0	0	0	0	08	19999.190		0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 2 (913bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin2												
1	179850	0	719553	0	0	0	0	59213.22	1939607.3	2452912	3090960	2886038.5
2	0	0	0	0	0	0	0	0	0	0	19633.59	504328.47
3	0	0	0	0	0	0	0	56150.27	1348762	1619315.1	2756049	2897340.3
4	0	0	0	0	0	0	0	22703.88	1282513.1	1463400.8	1341049.30	
5	0	0	0	0	0	0	0	0	0	8011.422	640340.130	
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	15590.56	652415.630	
8	0	0	0	0	0	0	0	03397.53	1566396.5	1656853.9	492530.63	597103.63
9	100581.7	0	0	0	0	0	0	0	0	355679.1	249075.7	352554.28
10	0	0	0	0	0	0	0	0	0	0	1544.8440	
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 3 (911in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in3												
1	179850.020		0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	868755.9	930206.4
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	598627.3	248179.9
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	706789	949931.8	1016111	0
7	0	0	0	0	0	0	0	0	0	0	664195.1	0
8	0	0	0	0	0	0	0	0	439313.6	568008.4	1926303	691100.4
9	0	0	0	0	0	0	0	105793.3	1384005	1631822	1690333	1759768
10	0	0	0	0	0	0	0	0	0	100572.2	1482802	55299.4
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 3 (911bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in3												
1	179850.020		0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	695955.9	751646.4
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	425827.3	69619.95
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	361189	592811.8	670510.6	0
7	0	0	0	0	0	0	0	0	0	0	318595.1	0
8	0	0	0	0	0	0	0	0	93713.55	210888.4	1580703	333980.4
9	0	0	0	0	0	0	0	0	865605.3	1096142	1171933	1224088
10	0	0	0	0	0	0	0	0	0	0	964402	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 3 (912in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in3												
1	179850.020		0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	298163	515309.7
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	140643.3	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	206034.2	506422.3	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	1416615	239983.6
9	0	0	0	0	0	0	0	0	566447.4	819999.2	1000360	1128881
10	0	0	0	0	0	0	0	0	0	0	792829	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 3 (913in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in3												
1	179850.020		0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	298163	515309.7
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	140643.3	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	206034.2	506422.3	0
7	0	0	0	0	0	0	0	0	0	0	10156.64	0
8	0	0	0	0	0	0	0	0	0	0	1416615	239983.6
9	0	0	0	0	0	0	0	662324.2	566447.4	819999.2	1000360	1128881
10	0	0	0	0	0	0	0	0	0	0	792829	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 3 (913bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin3												
1	179850.020		0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	0	0	470963	693869.8
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	313443.3	78068.05
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	563154.3	852022.3	0
7	0	0	0	0	0	0	0	0	0	0	355756.6	0
8	0	0	0	0	0	0	0	0	122742.4	344846.9	1762215	597103.6
9	0	0	0	0	0	0	0	1198004	1084847	1355679	1518760	1664561
10	0	0	0	0	0	0	0	0	0	0	1311229	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 4 (911in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	234074.5	0
4	0	0	0	0	0	0	0	0	0	971394.8	1435736	1447799
5	0	0	0	0	0	0	189789.8	821972.1	1156147	2495785	1237987	0
6	0	0	0	0	0	0	0	0	0	0	0	123138.2
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	149046.3	408548.7	0
9	0	0	0	0	0	0	0	0	114321.1	1631822	1690333	447760.8
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	489652.3	325653.8	361926.2
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 4 (911bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	61274.53	0
4	0	0	0	0	0	0	0	0	0	792834.8	1262936	1269239
5	0	0	0	0	0	0	0	464852.2	810547	2138665	892386.6	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	62948.67	0
9	0	0	0	0	0	0	0	0	0	1096142	1171933	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 4 (912in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	527721.9	1168249	1126945
5	0	0	0	0	0	0	0	252887.9	572547.8	1915503	728298.3	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	819999.2	1000360	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 4 (913in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	527721.9	1168249	1126945
5	0	0	0	0	0	0	0	252887.9	572547.8	1915503	728298.3	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	819999.2	1000360	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 4 (913bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	706281.9	1341049	1305505
5	0	0	0	0	0	0	40780.14	610007.9	918147.8	2272623	1073898	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	1169.402	309723.4	0
9	0	0	0	0	0	0	0	0	0	1355679	1518760	352554.3
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	773358.1	0
12	0	0	0	0	0	0	0	0	0	0	377319.4	0
13	0	0	0	0	0	0	0	0	0	3015.234	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 5 (911in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	282911.5	664247.8
4	0	0	0	0	0	0	0	0	0	0	264367.6	1113462
5	0	0	0	0	0	466340.4	941515.3	2348005	2425831	2495785	2507671	0
6	0	0	0	0	0	0	0	0	645420.9	949931.8	950691.8	0
7	0	0	0	0	0	0	0	0	0	480969.8	816503.9	2167691
8	0	0	0	0	0	0	0	0	534711.8	1880015	1926303	691100.4
9	30759.02	0	0	0	0	0	0	0	0	0	236485.5	0
10	0	0	0	0	0	0	0	0	0	0	213117.9	55299.4
11	0	0	0	0	0	0	0	0	0	951012.2	0	0
12	0	0	0	0	0	0	0	0	0	720332.3	548892.4	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 5 (911bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	110111.5	485687.8
4	0	0	0	0	0	0	0	0	0	0	91567.62	934902.1
5	0	0	0	0	0	120740.5	584395.3	1990884	2080231	2138665	2162071	0
6	0	0	0	0	0	0	0	0	299820.9	592811.8	605091.8	0
7	0	0	0	0	0	0	0	0	0	123849.8	470903.9	1810571
8	0	0	0	0	0	0	0	0	189111.8	1522895	1580703	333980.4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	415332.2	0	0
12	0	0	0	0	0	0	0	0	0	184652.2	30492.42	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 5 (912in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	175279.9
4	0	0	0	0	0	0	0	0	0	0	0	694678.8
5	0	0	0	0	0	2468.672	519841.1	1825403	1842232	1915503	728298.3	0
6	0	0	0	0	0	0	0	0	59277.48	369650.3	439627.2	0
7	0	0	0	0	0	0	0	0	0	0	306815.6	1716574
8	0	0	0	0	0	0	0	0	0	1299734	1416615	239983.6
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	139189	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 5 (913in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	175279.9
4	0	0	0	0	0	0	0	0	0	0	0	694678.8
5	0	0	0	0	0	2468.672	519841.1	1825403	1842232	1915503	728298.3	0
6	0	0	0	0	0	0	0	0	59277.48	369650.3	434672.6	0
7	0	0	0	0	0	0	0	0	0	0	306815.6	1716574
8	0	0	0	0	0	0	0	0	0	1299734	1416615	239983.6
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	139189	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 5 (913bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	353839.9
4	0	0	0	0	0	0	0	0	0	0	0	873238.8
5	0	0	0	0	0	348068.7	876961.1	2182523	2187832	2272623	1073898	0
6	0	0	0	0	0	0	0	0	404877.5	726770.3	780272.6	0
7	0	0	0	0	0	0	0	0	0	170281.5	652415.6	2073694
8	0	0	0	0	0	0	0	0	296712.4	1656854	1762215	597103.6
9	72526.2	0	0	0	0	0	0	0	0	0	140426	0
10	0	0	0	0	0	0	0	0	0	0	41544.84	0
11	0	0	0	0	0	0	0	0	0	674869	773358.1	0
12	0	0	0	0	0	0	0	0	373341.1	444189.1	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 6 (911in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	1060244	1687476	951869.2
3	0	0	0	0	0	0	757091.2	1417438	1700555	3039548	1581052	0
4	0	0	0	0	0	0	0	0	0	0	428565.6	0
5	0	0	0	0	0	0	0	0	0	0	333320.6	160346.5
6	0	0	0	0	0	0	0	0	0	10915.15	546393.5	0
7	0	0	0	0	0	0	0	0	0	0	61447.15	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	129951.9	420648.8	0
10	0	0	0	0	0	0	0	0	1163685	1412579	213117.9	55299.4
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	720332.3	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 6 (911bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	881683.6	1514676	773309.2
3	0	0	0	0	0	0	578531.2	1238878	1527755	2860988	1408252	0
4	0	0	0	0	0	0	0	0	0	0	255765.6	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	200793.5	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	645284.5	876899.2	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	184652.2	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 6 (912in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	670523.1	1365499	683337.1
3	0	0	0	0	0	0	530853.1	1146653	1414238	2752762	1313565	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	346126.6	600756	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	670523.1	1365499	683337.1
3	0	0	0	0	0	0	530853.1	1146653	1414238	2752762	1313565	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	346126.6	600756	792829	0
11	0	0	0	0	0	0	0	0	0	0	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 6 (913bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	0	0	0	0	0	0	0	0	0	849083.1	1538299	861897.1
3	0	0	0	0	0	0	709413.1	1325213	1587038	2931322	1486365	0
4	0	0	0	0	0	0	0	0	0	0	122889.4	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	140387	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	249075.7	0
10	0	0	0	0	0	0	0	0	864526.6	1136436	1311229	0
11	0	0	0	0	0	0	0	0	0	0	773358.1	0
12	0	0	0	0	0	0	0	0	0	444189.1	377319.4	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 7 (911in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	707520.8	1546912	1576972
3	0	0	0	0	0	0	0	0	0	0	208054.3	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	687474.5	1016111	905958.1
7	0	0	0	0	0	0	0	558527.5	709346.9	2050760	2086188	855683.6
8	597973.3	0	0	0	0	0	0	270171.5	534711.8	1880015	1926303	691100.4
9	0	0	0	0	0	0	0	0	0	319815.4	1690333	447760.8
10	0	0	0	0	0	0	0	0	0	1412579	1482802	55299.4
11	0	0	0	0	0	0	0	0	0	0	944931.1	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 7 (911bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	528960.8	1374112	1398412
3	0	0	0	0	0	0	0	0	0	0	35254.34	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	330354.5	670510.6	548838.1
7	0	0	0	0	0	0	0	201407.5	363746.9	1693640	1740588	498563.6
8	240853.3	0	0	0	0	0	0	0	189111.8	1522895	1580703	333980.4
9	0	0	0	0	0	0	0	0	0	0	1171933	0
10	0	0	0	0	0	0	0	0	0	876899.2	964402	0
11	0	0	0	0	0	0	0	0	0	0	426531.1	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 7 (912in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	116760.8	1118511	1246156
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	506422.3	339647.6
7	0	0	0	0	0	0	0	24047.04	125747.6	1470478	1576500	404566.7
8	313667.9	0	0	0	0	0	0	0	0	1299734	1416615	239983.6
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	600756	792829	0
11	0	0	0	0	0	0	0	0	0	0	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	116760.8	1118511	1246156
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	506422.3	319574.9
7	0	0	0	0	0	0	0	35926.34	125747.6	1470478	1576500	404566.7
8	313667.9	0	0	0	0	0	0	0	0	1299734	1416615	239983.6
9	0	0	0	0	0	0	0	0	0	0	1000360	0
10	0	0	0	0	0	0	0	0	0	600756	792829	736419.8
11	0	0	0	0	0	0	0	0	0	0	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 7 (913bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	0	295320.8	1291311	1424716
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	248685.6	852022.3	676694.9
7	0	0	0	0	0	0	0	393046.3	471347.6	1827598	1922100	761686.7
8	670787.9	0	0	0	0	0	0	203397.5	296712.4	1656854	1762215	597103.6
9	0	0	0	0	0	0	0	0	0	43672.22	1518760	352554.3
10	0	0	0	0	0	0	0	0	0	1136436	1311229	1272100
11	0	0	0	0	0	0	0	0	0	0	773358.1	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	109137.7
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 8 (911in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	1322120	1834458	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	837396.7	1016111	1061384
7	0	0	0	0	0	0	0	117547.6	709346.9	738752.8	2086188	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	145690.3	395680.8	273737.9
10	0	0	0	0	0	0	0	0	0	0	213117.9	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 8 (911bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	1143560	1661658	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	480276.7	670510.6	704263.6
7	0	0	0	0	0	0	0	0	363746.9	381632.8	1740588	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 8 (912in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	932400.6	1566971	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	104542.9	506422.3	600062.5
7	0	0	0	0	0	0	0	0	125747.6	158470.5	1576500	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	932400.6	1566971	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	104542.9	506422.3	599305.8
7	0	0	0	0	0	0	0	0	125747.6	158470.5	1576500	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 8 (913bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	0	0	0	1110961	1739771	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	461662.9	852022.3	956425.8
7	0	0	0	0	0	0	0	23082.89	471347.6	515590.6	1922100	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	1840.383	249075.7	216460.4
10	0	0	0	0	0	0	0	0	0	0	41544.84	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	377319.4	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 9 (911in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	841025.5	355246.5	261109.5	0	41536.13	198417.3	823047.1	1368764	1792063	1814921	1834458	0
3	0	0	0	0	0	0	0	0	0	0	214613.8	0
4	0	0	0	0	0	0	0	0	0	974980.4	1431494	1385391
5	150427.1	0	974458.4	351581.5	489933.8	721265.6	941515.3	2348005	2425831	2495785	1237987	1115479
6	419605.8	0	0	0	0	0	0	361877.9	922070.4	2261939	1016111	1047185
7	0	0	0	0	0	0	0	0	543721.3	738752.8	816503.9	0
8	0	0	0	0	0	0	0	0	534711.8	568008.4	656618.9	691100.4
9	0	0	0	0	0	0	0	0	114321.1	1631822	1690333	433541.3
10	0	0	0	0	0	0	0	0	0	100572.2	1482802	55299.4
11	0	0	0	0	0	0	0	0	895737.6	951012.2	944931.1	823285.4
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	449260.3	0	325653.8	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 9 (911bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	841025.5	355246.5	261109.5	0	41536.13	198417.3	823047.1	1190204	1619263	1636361	1661658	0
3	0	0	0	0	0	0	0	0	0	0	41813.79	0
4	0	0	0	0	0	0	0	0	0	796420.4	1258694	1206831
5	0	0	617338.4	5981.484	132813.8	375665.6	584395.3	1990884	2080231	2138665	892386.6	758359.1
6	62485.83	0	0	0	0	0	0	4757.895	576470.4	1904819	670510.6	690064.8
7	0	0	0	0	0	0	0	0	198121.3	381632.8	470903.9	0
8	0	0	0	0	0	0	0	0	189111.8	210888.4	311018.9	333980.4
9	0	0	0	0	0	0	0	0	0	1096142	1171933	0
10	0	0	0	0	0	0	0	0	0	0	964402	0
11	0	0	0	0	0	0	0	0	377337.7	415332.2	426531.1	287605.4
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 9 (912in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	841025.5	355246.5	261109.5	0	41536.13	198417.3	640957.1	1122277	1505746	1528136	1566971	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	412929.1	1018609	1063655
5	0	0	742372.5	151307.6	226468.1	422020	519841.1	1825403	1842232	1915503	728298.3	663010.4
6	134550.7	0	0	0	0	0	0	0	338471	1681657	506422.3	591425.5
7	0	0	0	0	0	0	0	0	0	158470.5	306815.6	0
8	0	0	0	0	0	0	0	0	0	0	146930.6	239983.6
9	0	0	0	0	0	0	0	0	0	819999.2	1000360	0
10	0	0	0	0	0	0	0	0	0	0	792829	0
11	0	0	0	0	0	0	0	0	78179.77	139189	254958	192398.8
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	841025.5	355246.5	261109.5	0	41536.13	198417.3	640957.1	1122277	1505746	1528136	1566971	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	412929.1	1018609	1063655
5	0	0	742372.5	151307.6	226468.1	422020	519841.1	1825403	1842232	1915503	728298.3	663010.4
6	134550.7	0	0	0	0	0	0	0	338471	1681657	506422.3	590027.9
7	0	0	0	0	0	0	0	0	35971.88	158470.5	306815.6	0
8	0	0	0	0	0	0	0	0	0	0	1416615	0
9	0	0	0	0	0	0	0	0	0	819999.2	1000360	0
10	0	0	0	0	0	0	0	0	0	600756	0	736419.8
11	0	0	0	0	0	0	0	144702.9	78179.77	139189	254958	192398.8
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 9 (913bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	841025.5	355246.5	261109.5	0	41536.13	198417.3	640957.1	1122277	1505746	1706696	1739771	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	591489.1	1191409	1242215
5	0	0	920932.5	496907.6	583588.1	767620	876961.1	2182523	2187832	2272623	1073898	1020130
6	491670.7	0	0	0	0	0	0	187261.3	684071	2038777	852022.3	947147.9
7	0	0	0	0	0	0	0	0	381571.9	515590.6	652415.6	0
8	0	0	0	0	0	0	0	0	296712.4	344846.9	1762215	243345
9	0	0	0	0	0	0	0	0	0	1355679	1518760	352554.3
10	0	0	0	0	0	0	0	0	0	1136436	41544.84	1272100
11	0	0	0	0	0	0	0	680382.9	596579.8	674869	773358.1	728078.8
12	0	0	0	0	0	0	0	0	0	0	377319.4	0
13	0	0	0	0	0	0	0	0	0	3015.234	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 10 (911in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	546369.2	1235713	468779.9
3	0	0	0	0	0	0	0	0	0	0	382547.1	0
4	0	0	0	0	0	0	0	0	0	0	8823.164	620267.9
5	0	0	0	0	0	0	0	0	0	0	300891.4	587669.6
6	0	0	0	0	0	0	0	0	0	0	186604.8	0
7	0	0	0	0	0	0	0	0	0	0	433125.7	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	32943.52	319815.4	420648.8	0
10	0	0	0	0	0	0	0	0	0	0	213117.9	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	548892.4	0
13	0	0	0	0	0	0	0	0	0	489652.3	325653.8	0
14	0	0	0	0	0	0	0	0	226021.6	258972.3	102415.1	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 10 (911bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	367809.2	1062913	290219.9
3	0	0	0	0	0	0	0	0	0	0	209747.1	0
4	0	0	0	0	0	0	0	0	0	0	0	441707.9
5	0	0	0	0	0	0	0	0	0	0	0	230549.5
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	87525.7	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	30492.42	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 10 (912in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	0	807311.3	137642.5
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	226124.4
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	0	807311.3	137642.5
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	226124.4
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 10 (913bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	0	134168.5	980111.3	316202.5
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	404684.4
5	0	0	0	0	0	0	0	0	0	0	0	230574.3
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	73496.95	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	43672.22	249075.7	0
10	0	0	0	0	0	0	0	0	0	0	41544.84	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	377319.4	0
13	0	0	0	0	0	0	0	0	0	3015.234	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	13209.63	1208044	1792063	3126928	1834458	0
3	0	0	0	0	0	0	59549.43	944276.9	1665932	1727541	2850736	1409170
4	0	0	0	0	0	0	0	0	0	0	811953.3	0
5	0	0	0	0	0	0	0	0	0	0	33513.05	93425.77
6	0	0	0	0	0	0	0	0	0	0	508055.6	0
7	0	0	0	0	0	0	0	0	0	351386.3	816503.9	855683.6
8	0	0	0	0	0	0	0	0	0	428872.8	656618.9	517875.6
9	0	0	0	0	0	0	0	0	0	101335.9	372872.1	0
10	0	0	0	0	0	0	0	0	0	1412579	213117.9	47391.49
11	0	0	0	0	0	0	0	0	0	0	944931.1	0
12	848702	0	0	0	0	0	0	0	0	0	548892.4	0
13	0	0	0	0	0	0	0	438819.1	449260.3	489652.3	325653.8	361926.2
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	13209.63	1029484	1619263	2948368	1661658	0
3	0	0	0	0	0	0	0	765716.9	1493132	1548981	2677936	1230610
4	0	0	0	0	0	0	0	0	0	0	639153.3	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	162455.6	0
7	0	0	0	0	0	0	0	0	0	0	470903.9	498563.6
8	0	0	0	0	0	0	0	0	0	71752.77	311018.9	160755.6
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	876899.2	0	0
11	0	0	0	0	0	0	0	0	0	0	426531.1	0
12	313022	0	0	0	0	0	0	0	0	0	30492.42	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	961556.8	1505746	2840142	1566971	0
3	0	0	0	0	0	0	0	616295	1336405	1440755	2583249	1148721
4	0	0	0	0	0	0	0	0	0	0	333649	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	306815.6	404566.7
8	0	0	0	0	0	0	0	0	0	0	146930.6	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	600756	0	0
11	0	0	0	0	0	0	0	0	0	0	254958	0
12	440883.9	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	961556.8	1505746	2840142	1566971	0
3	0	0	0	0	0	0	0	616295	1336405	1440755	2583249	1148721
4	0	0	0	0	0	0	0	0	0	0	333649	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	306815.6	404566.7
8	0	0	0	0	0	0	0	0	0	0	146930.6	92123.77
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	346126.6	600756	0	0
11	0	0	0	0	0	0	0	0	0	0	254958	192398.8
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	0	0	0	0	0	0	961556.8	1505746	3018702	1739771	0
3	0	0	0	0	0	0	0	794855	1509205	1619315	2756049	1327281
4	0	0	0	0	0	0	0	0	0	0	506449	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	652415.6	761686.7
8	0	0	0	0	0	0	0	0	0	283499.6	492530.6	449243.8
9	0	0	0	0	0	0	0	0	0	0	249075.7	0
10	0	0	0	0	0	0	0	0	864526.6	1136436	41544.84	0
11	0	0	0	0	0	0	0	0	0	0	773358.1	728078.8
12	0	0	0	0	0	0	0	0	0	444189.1	0	0
13	0	0	0	0	0	0	0	31678.13	0	3015.234	0	109137.7
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal - inflow 12 (911in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	658291.8	95940.14	388190.3	0	0	0	259917.6	951543.7	1659721	1814921	1834458	3216809
3	855178.6	0	0	0	0	0	0	0	0	167347.7	1059491	0
4	0	0	0	0	0	0	0	0	254543.2	1382747	1435736	0
5	0	0	0	0	0	0	525949.3	1035998	1156147	2495785	2507671	1290135
6	0	0	0	0	0	0	0	0	526635.7	949931.8	2285795	0
7	0	0	0	0	0	0	0	0	0	738752.8	816503.9	0
8	0	0	0	0	0	0	0	355280.7	534711.8	1880015	1926303	691100.4
9	0	0	0	0	0	0	0	0	0	0	384229.7	215190.7
10	0	0	0	0	0	0	0	0	1163685	1412579	1482802	1367306
11	0	0	0	0	0	0	0	0	0	951012.2	944931.1	0
12	0	0	0	0	0	0	0	0	0	720332.3	548892.4	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 12 (911bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	658291.8	95940.14	388190.3	0	0	0	259917.6	772983.7	1486921	1636361	1661658	3038249
3	676618.6	0	0	0	0	0	0	0	0	0	886690.9	0
4	0	0	0	0	0	0	0	0	81743.2	1204187	1262936	0
5	0	0	0	0	0	0	168829.3	678877.5	810547	2138665	2162071	933014.5
6	0	0	0	0	0	0	0	0	181035.7	592811.8	1940195	0
7	0	0	0	0	0	0	0	0	0	381632.8	470903.9	0
8	0	0	0	0	0	0	0	0	189111.8	1522895	1580703	333980.4
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	645284.5	876899.2	964402	831626.4
11	0	0	0	0	0	0	0	0	0	415332.2	426531.1	0
12	0	0	0	0	0	0	0	0	0	184652.2	30492.42	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition - inflow 12 (912in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	658291.8	95940.14	388190.3	0	0	0	77827.56	705057	1373404	1528136	1566971	2980167
3	765043.8	0	0	0	0	0	0	0	0	0	538628.2	0
4	0	0	0	0	0	0	0	0	0	939068.4	1168249	0
5	0	0	0	0	0	0	0	513396.2	572547.8	1915503	1997982	740640.8
6	0	0	0	0	0	0	0	0	0	369650.3	1776106	0
7	0	0	0	0	0	0	0	0	0	0	306815.6	0
8	0	0	0	0	0	0	0	0	0	1299734	1416615	239983.6
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	346126.6	600756	792829	736419.8
11	0	0	0	0	0	0	0	0	0	139189	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	658291.8	95940.14	388190.3	0	0	0	77827.56	705057	1373404	1528136	1566971	2980167
3	765043.8	0	0	0	0	0	0	0	0	0	538628.2	0
4	0	0	0	0	0	0	0	0	0	939068.4	1168249	0
5	0	0	0	0	0	0	0	513396.2	572547.8	1915503	1997982	740640.8
6	0	0	0	0	0	0	0	0	0	369650.3	1776106	0
7	0	0	0	0	0	0	0	0	0	0	306815.6	0
8	0	0	0	0	0	0	0	0	0	1299734	1416615	239983.6
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	426689.1	346126.6	600756	792829	0
11	0	0	0	0	0	0	0	0	0	139189	254958	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583783
2	658291.8	95940.14	388190.3	0	0	0	77827.56	705057	1373404	1706696	1739771	3158727
3	943603.8	0	0	0	0	0	0	0	0	0	711428.2	0
4	0	0	0	0	0	0	0	0	0	1117628	1341049	0
5	0	0	0	0	0	0	263534	870516.1	918147.8	2272623	2343583	1097761
6	0	0	0	0	0	0	0	0	0	726770.3	2121707	0
7	0	0	0	0	0	0	0	0	0	255642.8	652415.6	0
8	0	0	0	0	0	0	0	198132.5	296712.4	1656854	1762215	597103.6
9	0	0	0	0	0	0	0	0	0	0	249075.7	196223.8
10	0	0	0	0	0	0	0	962369.1	864526.6	1136436	1311229	0
11	0	0	0	0	0	0	0	0	0	674869	773358.1	0
12	0	0	0	0	0	0	0	0	373341.1	444189.1	377319.4	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal - inflow 1 (911in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	1118935	1412788	1963724	0
3	0	0	0	0	0	0	0	0	1247901	1930896	2769347	0
4	0	0	0	0	0	0	0	0	1218170	1800711	2581527	2E+06
5	1464326	0	0	0	0	0	92325.75	1217316	2761055	2382758	4091244	0
6	0	0	0	0	0	0	226367.8	1420378	2498368	2352200	3841496	2E+06
7	0	0	0	0	0	0	0	56171.27	1266642	1510603	2129505	2E+06
8	908766.2	0	0	0	0	0	0	0	0	17717.95	906798.5	0
9	0	0	0	0	0	0	0	508625	1768157	2087917	2359369	2E+06
10	657096.6	448392	0	292323.5	647532.1	1639517	1958634	2103784	3483641	1999822	3558239	2E+06
11	1796716	962871	0	291142.6	1383597	2069385	1978391	3149137	3412827	3223735	3487424	2E+06
12	0	0	0	0	0	0	0	0	78975	873443.6	1449139	631610
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	1197615	1586361	1832497	0
15	0	0	0	0	0	0	0	30190.85	1218365	1305920	1761681	0
16	0	0	0	0	0	0	0	1098535	1789069	2604703	2960552	3E+06
17	1226032	1665778	0	0	0	0	499960	1308564	2815140	2516608	1620052	1E+06
18	0	0	0	0	0	0	0	403698.5	1401413	1116506	2818924	1E+06
19	0	0	0	0	0	0	0	0	578678.2	543945.4	1020214	0
20	0	0	0	0	0	0	0	0	757929.4	940317.2	1407610	836355

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 1 (911bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	946134.9	1234228	1790924	0
3	0	0	0	0	0	0	0	0	1075101	1752336	2596547	0
4	0	0	0	0	0	0	0	0	1045370	1622151	2408727	2E+06
5	1285766	0	0	0	0	0	0	860196.3	2415455	2025638	3745644	0
6	0	0	0	0	0	0	0	1063258	2152768	1995080	3495896	2E+06
7	0	0	0	0	0	0	0	0	921042.1	1153483	1783905	2E+06
8	551646.2	0	0	0	0	0	0	0	0	0	561198.5	0
9	0	0	0	0	0	0	0	0	1249757	1552237	1840969	1E+06
10	121416.6	0	0	0	111852.1	1121117	1422954	1568104	2965241	1464142	3039839	1E+06
11	1261036	479031	0	0	847916.6	1550985	1442711	2613457	2894427	2688055	2969024	1E+06
12	0	0	0	0	0	0	0	0	0	337763.7	930739.3	95930
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	679214.5	1050681	1314097	0
15	0	0	0	0	0	0	0	0	699965.1	770239.8	1243281	0
16	0	0	0	0	0	0	0	562854.9	1270669	2069023	2442152	2E+06
17	690352.1	1181938	0	0	0	0	0	772883.8	2296740	1980928	1101652	743518
18	0	0	0	0	0	0	0	0	883013.2	580825.7	2300524	655425
19	0	0	0	0	0	0	0	0	60278.2	8265.375	501814	0
20	0	0	0	0	0	0	0	0	239529.4	404637.2	889209.9	300675

Optimistic market -scenario hydrothermal with wind addition - inflow 1 (912in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	654766.5	1023068	1641747	0
3	0	0	0	0	0	0	0	0	689948.4	1486897	2418636	0
4	0	0	0	0	0	0	0	0	811758.5	1444419	2277246	2E+06
5	1168028	0	0	0	0	0	0	576929.1	2115005	1802477	3581556	0
6	0	0	0	0	0	0	0	771790.3	1847970	1771919	3331808	2E+06
7	0	0	0	0	0	0	0	0	676334.5	926439.1	1617762	2E+06
8	623793.5	0	0	0	0	0	0	0	0	0	397110.3	0
9	0	0	0	0	0	0	0	0	950599	1276094	1669396	1E+06
10	249278.5	183194.8	0	50989.92	361602.2	1138129	1346769	1348308	2666083	1187999	2868266	1E+06
11	1388898	697673.8	0	49809.02	1097667	1567996	1366526	2393661	2595269	2411912	2797451	1E+06
12	0	0	0	0	0	0	0	0	0	61620.49	759166.9	722.93
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	187368.8	564044.3	949090.8	0
15	0	0	0	0	0	0	0	0	208119.4	283602.8	878274.9	0
16	0	0	0	0	0	0	0	155714	778822.8	1582386	2077146	2E+06
17	561422.1	1221085	0	0	0	0	0	163862.4	1595831	1293180	530559.9	304306
18	0	0	0	0	0	0	0	0	182104.5	0	1729431	216213
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	654766.5	1023068	1641747	0
3	0	0	0	0	0	0	0	0	689948.4	1486897	2418636	0
4	0	0	0	0	0	0	0	0	811758.5	1444419	2277246	2E+06
5	1168028	0	0	0	0	0	0	576929.1	2115005	1802477	3581556	0
6	0	0	0	0	0	0	0	771790.3	1847970	1771919	3331808	2E+06
7	0	0	0	0	0	0	0	0	897392.1	1091560	1706643	2E+06
8	480608.4	0	0	0	0	0	0	0	0	0	666118.8	0
9	0	0	0	0	0	0	0	436388.7	1467214	1276094	2939080	656123
10	0	0	0	0	560858.7	1410690	1454621	1348308	2666083	2500006	1598581	1E+06
11	1525340	288641.1	0	40431.09	1494529	1702657	1366526	2393661	2595269	2411912	2797451	1E+06
12	0	0	0	0	0	0	0	0	223485.5	811111.9	1171375	24777
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	882566	625127.1	2218775	0
15	0	0	0	0	0	0	0	0	622209.4	358472.9	878274.9	0
16	0	0	0	0	0	0	593757.1	453837.1	2048507	1582386	2077146	2E+06
17	561422.1	1098034	0	0	0	0	94477.83	163862.4	1595831	1293180	1800244	304306
18	0	0	0	0	0	0	0	0	255331.4	1205084	459746.7	2E+06
19	0	0	0	0	0	0	0	0	0	0	38923.59	0
20	0	0	0	0	0	0	0	0	113702.3	0	1587803	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 1 (913bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin1												
1	0	0	0	0	0	0	0	0	177533.4	1608016	2776954	0
2	0	0	0	0	0	0	0	0	654766.5	1201628	1814547	0
3	0	0	0	0	0	0	0	0	862748.4	1665457	2591436	0
4	0	0	0	0	0	0	0	0	984558.5	1622979	2450046	2E+06
5	1346588	0	0	0	0	0	0	934049.1	2460605	2159597	3927156	0
6	0	0	0	0	0	0	0	1128910	2193570	2129039	3677408	2E+06
7	0	0	0	0	0	0	0	192205.6	1242992	1448680	2052243	2E+06
8	837728.4	0	0	0	0	0	0	0	0	144761.8	1011719	0
9	0	0	0	0	0	0	0	972068.7	1985614	1811774	3457480	1E+06
10	345966.9	167564.9	52995.47	502456.6	1096539	1929090	1990301	1883988	3184483	3035686	2116982	2E+06
11	2061020	772481.1	0	558831.1	2030209	2221057	1902206	2929341	3113669	2947592	3315851	2E+06
12	0	0	0	0	0	0	0	0	741885.5	1346792	1689775	560457
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	428772.1	1400966	1160807	2737175	0
15	0	0	0	56903.91	0	0	0	103317.9	1140609	894152.9	1396675	0
16	0	0	0	0	0	494192.8	1129437	989517.1	2566907	2118066	2595546	2E+06
17	1097102	1581874	0	0	0	50470.31	630157.8	699542.4	2114231	1828860	2318644	839986
18	0	0	0	0	0	0	0	232792.1	773731.4	1740764	978146.8	2E+06
19	0	0	0	0	0	0	0	0	252749.5	127017.7	557323.6	0
20	0	0	0	0	0	0	0	0	632102.4	252569.1	2106203	333146

Optimistic market -scenario hydrothermal - inflow 2 (911in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	1249897	2033775	2886144	2233498
3	1058480	0	0	0	0	1042282	2017837	2726919	3238992	4087885	4238964	4025245
4	0	614179.4	0	0	0	971495.9	1714655	2374408	3137232	3959005	2872728	0
5	0	0	0	0	0	0	381612.4	1182188	2437613	2257317	2781127	0
6	0	0	0	0	0	0	0	0	200340	1082367	1830954	1676267
7	0	0	0	0	0	0	736323.9	1835423	2599201	3576112	2500998	1677171
8	0	776852.4	250701.8	494931.8	610373.5	1367570	1852909	2279974	3798070	2176011	3699868	2250610
9	2109347	1273673	299273.6	683877.3	913707.2	1181566	1595473	2107040	2284772	3399924	2359369	2162515
10	1257666	0	0	0	0	0	0	0	1001406	1448562	2281405	0
11	0	0	0	0	0	0	0	0	838279.7	1495356	2217152	299519.6
12	0	0	0	0	0	0	0	624515.4	1574034	1674844	1717451	1224238
13	0	0	0	0	0	0	0	0	1183596	1716178	1903311	1631576
14	1668875	0	0	0	0	0	370572.3	1175646	1930699	1647444	3102181	0
15	0	0	0	0	0	0	0	826318.1	1859885	2692797	1761681	2767394
16	1492686	1914375	0	0	0	0	56631.19	832942.1	1749500	1292696	2960552	1329259
17	0	0	0	0	0	0	0	370575.9	1288399	1204601	1620052	2591205
18	0	1684056	0	0	0	278445.3	423424.6	1006062	1474640	1116506	2818924	1191105
19	396012.2	598440.3	0	398867.3	0	0	0	482412.8	1403827	1028411	1478424	0
20	0	0	0	0	0	0	0	0	818290.6	891149.3	1282660	685738.4

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 2 (911bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	1077097	1855215	2713344	2054938
3	879920.3	0	0	0	0	869481.9	1839277	2548359	3066192	3909325	4066164	3846685
4	0	452899.4	0	0	0	798695.9	1536095	2195848	2964432	3780445	2699928	0
5	0	0	0	0	0	0	24492.42	825067.7	2092013	1900197	2435527	0
6	0	0	0	0	0	0	0	0	0	725247.4	1485354	1319147
7	0	0	0	0	0	0	379203.9	1478303	2253601	3218992	2155398	1320051
8	0	454292.3	0	149331.8	253253.5	1021970	1495789	1922854	3452470	1818891	3354268	1893490
9	1752227	789833.3	0	165477.3	378027.2	663165.7	1059793	1571360	1766372	2864244	1840969	1626835
10	721986.3	0	0	0	0	0	0	0	483006.1	912882.2	1763005	0
11	0	0	0	0	0	0	0	0	319879.7	959675.8	1698752	0
12	0	0	0	0	0	0	0	88835.34	1055634	1139164	1199051	688558.2
13	0	0	0	0	0	0	0	0	665195.6	1180498	1384911	1095896
14	1133195	0	0	0	0	0	0	639966.4	1412299	1111764	2583781	0
15	0	0	0	0	0	0	0	290638.1	1341485	2157117	1243281	2231714
16	957006.3	1430535	0	0	0	0	0	297262.2	1231100	757015.6	2442152	793578.4
17	0	0	0	0	0	0	0	0	769998.5	668921.4	1101652	2055525
18	0	1200216	0	0	0	0	0	470382.4	956240.1	580825.7	2300524	655424.8
19	0	114600.3	0	0	0	0	0	0	885427	492731.4	960024.4	0
20	0	0	0	0	0	0	0	0	299890.6	355469.3	764260.3	150058.4

Optimistic market -scenario hydrothermal with wind addition - inflow 2 (912in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	785412.4	1643872	2564070	1964909
3	950629.3	0	0	0	0	870442.8	1805686	2472989	2952675	3801099	3971477	3788602
4	0	523043.7	0	0	0	799029.9	1502137	2111174	2850915	3672219	2605241	0
5	0	0	0	0	0	0	0	632144.6	1839464	1668686	2267055	0
6	0	0	0	0	0	0	0	0	0	479484	1309301	1218114
7	0	0	0	0	0	0	313476.5	1312176	2015601	2995830	1991310	1225726
8	0	572933.8	34160.06	303033.2	351788.5	1070909	1431224	1757372	3214470	1595729	3190180	1799493
9	1701529	1008471	19925.25	442541.9	627776.1	680177.1	983607.6	1351564	1467214	2588101	1669396	1531628
10	849848.2	0	0	0	0	0	0	0	183848.2	636739	1591432	0
11	0	0	0	0	0	0	0	0	20722.15	683532.6	1527179	0
12	0	0	0	0	0	0	0	0	756475.3	863021.1	1027478	593351.6
13	0	0	0	0	0	0	0	0	173348.4	693860.6	1019905	843107.5
14	1126547	0	0	0	0	0	0	232825.5	920452.5	625127.1	2218775	0
15	0	0	0	0	0	0	0	0	849638.7	1670480	878274.9	1978925
16	950358.3	1534908	0	0	0	0	0	0	739253.7	270378.6	2077146	540789.9
17	0	0	0	0	0	0	0	0	69089.06	0	530559.9	1616313
18	0	1239362	0	0	0	0	0	0	255331.4	0	1729431	216213.4
19	0	153746.9	0	22523.91	0	0	0	0	184518.3	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	193168.1	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	785412.4	1643872	2564070	1964909
3	950629.3	0	0	0	0	870442.8	1805686	2472989	2952675	3801099	3971477	3788602
4	0	523043.7	0	0	0	799029.9	1502137	2111174	2850915	3672219	2605241	0
5	0	0	0	0	0	0	0	632144.6	1839464	1668686	2267055	0
6	0	0	0	0	0	0	0	0	0	479484	1253463	1187861
7	0	0	0	0	0	0	508182.5	1489855	2015601	2995830	1991310	1256960
8	0	652236.1	118418.1	331375.4	414182	1189810	1593632	1757372	3214470	2907736	1920495	1799493
9	1701529	769722.9	0	372964.2	733051.8	714434.8	1139473	1436403	1467214	2588101	1669396	1531628
10	762798.4	0	0	0	0	0	0	0	875253.5	1146853	1598581	0
11	0	0	0	0	0	0	0	0	734865.5	1099905	1527767	0
12	0	0	0	0	0	0	96577.59	428949.4	1151223	1011810	1176868	592124.4
13	0	0	0	0	0	0	0	0	821632.5	713222.1	2289589	843107.5
14	1126547	0	0	0	0	0	133203.6	630026.3	920452.5	1937134	949090.8	0
15	0	0	0	0	0	0	68530.1	541931.4	2119323	358472.9	2147959	1978925
16	950358.3	1323775	0	0	0	0	0	257612.9	778822.8	270378.6	2077146	578824.8
17	0	0	0	0	0	0	0	0	326146.6	0	1800244	304306.2
18	0	1882284	0	0	0	0	0	75768.12	255331.4	1205084	459746.7	216213.4
19	0	0	0	103083.8	0	0	0	0	184518.3	1116990	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 2 (913bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin2												
1	179850	0	719553	0	0	0	0	359213.2	1939607	2452912	3090960	2886039
2	0	0	0	0	0	0	0	0	785412.4	1822432	2736870	2143469
3	1129189	0	0	0	0	1043243	1984246	2651549	3125475	3979659	4144277	3967162
4	0	684323.8	0	0	0	971829.9	1680697	2289734	3023715	3850779	2778041	0
5	0	0	0	0	0	0	267199.9	989264.6	2185064	2025806	2612655	0
6	0	0	0	0	0	0	0	0	0	836604	1599063	1544981
7	0	0	0	0	0	0	865302.5	1846975	2361201	3352950	2336910	1614080
8	0	974796.1	475538.1	676975.4	771302.1	1535410	1950752	2114492	3560070	3264856	2266095	2156613
9	2058649	1092283	197839.3	718564.3	1268732	1232835	1675153	1972083	1985614	3123781	2187796	2067308
10	1298478	0	0	0	0	0	0	436361.8	1393654	1682533	2116982	0
11	0	0	0	0	0	0	0	0	1253266	1635585	2046167	210116.8
12	0	0	0	0	0	352071.6	632257.6	964629.4	1669623	1547490	1695268	1127805
13	0	0	0	0	0	0	0	0	1340033	1248902	2807989	1378788
14	1662227	0	0	0	0	124216.2	668883.6	1165706	1438853	2472814	1467491	0
15	0	0	0	0	0	0	604210.1	1077611	2637723	894152.9	2666359	2514605
16	1486038	1807615	0	0	0	0	193642.7	793292.9	1297223	806058.6	2595546	1114505
17	0	0	0	0	0	0	0	306686.4	844546.6	516852.6	2318644	839986.2
18	0	2366124	0	0	0	338866.2	406654.1	611448.1	773731.4	1740764	978146.8	751893.4
19	246827.8	300221.9	0	621483.8	0	0	0	165961.4	702918.3	1652670	907332.2	0
20	0	0	0	0	0	0	0	0	460777.5	252569.1	836517.6	397143.4

Optimistic market -scenario hydrothermal - inflow 3 (911in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	1266259	2024932	3041170	2424773
3	0	0	0	0	0	0	0	0	0	358656.3	1434911	742708.6
4	0	0	0	0	0	0	0	847020.8	2367678	2434929	2872728	1977622
5	0	0	0	0	0	0	0	0	0	0	1139708	0
6	0	0	0	0	0	1000382	1519340	2239110	2670015	2352200	3841496	0
7	0	0	0	0	0	0	0	0	1392504	1944455	2500998	0
8	0	0	0	0	0	35826.33	893273.8	1858015	2528386	2176011	3699868	2250610
9	0	757485.8	0	0	64171.45	1279189	1910271	2191879	3554456	3399924	3629053	3474522
10	0	0	0	0	0	0	0	981781.4	1954254	1999822	3558239	1895860
11	0	0	0	0	0	0	0	539839.6	1810839	1911728	2217740	1805060
12	116840	0	0	0	0	0	0	0	732763.1	1142445	1383079	0
13	0	0	0	0	0	0	0	0	0	0	739778.9	0
14	0	0	0	0	0	0	0	0	0	0	431827.8	0
15	0	0	0	0	0	0	0	0	1019301	1280914	1761681	1455387
16	0	0	0	0	0	0	0	250774.5	1244299	1273445	1645359	933517.3
17	0	0	0	0	0	0	136372.9	984689.8	1545456	2516608	1620052	0
18	0	0	0	0	0	0	0	0	1158.047	629036.8	1405186	0
19	0	0	0	0	0	0	0	0	793153.1	893946.5	1478424	924449.1
20	0	327880.2	0	0	0	0	0	0	1133793	940317.2	1407610	492063

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 3 (911bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	1093459	1846372	2868370	2246213
3	0	0	0	0	0	0	0	0	0	180096.3	1262111	564148.6
4	0	0	0	0	0	0	0	668460.8	2194878	2256369	2699928	1799062
5	0	0	0	0	0	0	0	0	0	0	794107.6	0
6	0	0	0	0	0	654781.6	1162220	1881989	2324415	1995080	3495896	0
7	0	0	0	0	0	0	0	0	1046904	1587335	2155398	0
8	0	0	0	0	0	0	536153.8	1500895	2182786	1818891	3354268	1893490
9	0	273645.8	0	0	0	760789.3	1374591	1656199	3036056	2864244	3110653	2938842
10	0	0	0	0	0	0	0	446101.4	1435854	1464142	3039839	1360180
11	0	0	0	0	0	0	0	4159.57	1292439	1376048	1699340	1269380
12	0	0	0	0	0	0	0	0	214363.1	606764.7	864679.3	0
13	0	0	0	0	0	0	0	0	0	0	221378.9	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	500900.6	745234.4	1243281	919706.8
16	0	0	0	0	0	0	0	0	725899.3	737764.6	1126959	397837.3
17	0	0	0	0	0	0	0	449009.8	1027056	1980928	1101652	0
18	0	0	0	0	0	0	0	0	0	93356.74	886786.2	0
19	0	0	0	0	0	0	0	0	274753.1	358266.5	960024.4	388769.1
20	0	0	0	0	0	0	0	0	615392.6	404637.2	889209.9	0

Optimistic market -scenario hydrothermal with wind addition - inflow 3 (912in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	802089.9	1635212	2719193	2156240
3	0	0	0	0	0	0	0	0	0	0	992628.3	403269.8
4	0	0	0	0	0	0	0	512359.9	2034610	2121085	2605241	1726524
5	0	0	0	0	0	0	0	0	0	0	388122.9	0
6	0	0	0	0	0	658520.9	1071215	1701950	2086415	1771919	3331808	0
7	0	0	0	0	0	0	0	0	808904.5	1364173	1991310	0
8	0	0	0	0	0	0	471599.4	1335413	1944786	1595729	3190180	1799493
9	0	492288.6	0	0	0	777800.8	1298406	1436403	2736898	2588101	2939080	2843635
10	0	0	0	0	0	0	0	226305.3	1136696	1187999	2868266	1264974
11	0	0	0	0	0	0	0	0	993280.8	1099905	1527767	1174174
12	0	0	0	0	0	0	0	0	0	330621.5	693106.2	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	9053.438	258597.4	878274.9	666917.5
16	0	0	0	0	0	0	0	0	234052.7	251127.6	761952.6	145048.8
17	0	0	0	0	0	0	0	0	326146.6	1293180	530559.9	0
18	0	0	0	0	0	0	0	0	0	0	315694	0
19	0	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 3 (913in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	802089.9	1635212	2719193	2156240
3	0	0	0	0	0	0	0	0	0	0	992628.3	403269.8
4	0	0	0	0	0	0	0	512359.9	2034610	2121085	2605241	1726524
5	0	0	0	0	0	0	0	0	0	0	388122.9	0
6	0	0	0	0	0	658520.9	1071215	1701950	2086415	1771919	3331808	0
7	0	0	0	0	0	0	0	0	1016112	1544246	1991310	0
8	0	0	0	0	0	128110.1	833267.6	1645409	1944786	2907736	3190180	1799493
9	0	76458.05	0	0	0	1021728	1542715	2748410	2736898	2588101	2939080	2843635
10	0	0	0	0	0	0	251944.3	1071996	1396399	2500006	1598581	1264974
11	0	0	0	0	0	0	0	549000.8	1325585	2411912	1527767	921316.1
12	0	0	0	0	0	0	0	0	421858.1	758601	880020.7	0
13	0	0	0	0	0	0	0	0	0	0	420168.5	0
14	0	0	0	0	0	0	0	0	0	0	174103.6	0
15	0	0	0	0	0	0	0	0	671573.7	358472.9	2147959	666917.5
16	0	0	0	0	0	0	0	0	557596.4	270378.6	807461.8	274762
17	0	0	0	0	0	0	4288.172	163862.4	1595831	0	1800244	0
18	0	0	0	0	0	0	0	0	0	0	459746.7	0
19	0	0	0	0	0	0	0	0	97651.41	0	388932.2	1261565
20	0	0	0	0	0	0	0	0	113702.3	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 3 (913bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin3												
1	179850	0	0	0	0	0	0	0	0	0	733571.4	0
2	0	0	0	0	0	0	0	0	802089.9	1813772	2891993	2334800
3	0	0	0	0	0	0	0	0	0	0	1165428	581829.8
4	0	0	0	0	0	0	0	690919.9	2207410	2299645	2778041	1905084
5	0	0	0	0	0	0	0	0	0	0	733722.9	0
6	0	0	0	0	0	1004121	1428335	2059070	2432015	2129039	3677408	0
7	0	0	0	0	0	0	0	0	1361712	1901366	2336910	0
8	0	0	0	0	0	473710.1	1190388	2002529	2290386	3264856	3535780	2156613
9	0	399018.1	0	0	437503.3	1540128	2078395	3284090	3255298	3123781	3457480	3379315
10	0	0	0	0	0	0	787624.3	1607676	1914799	3035686	2116982	1800654
11	0	0	0	0	0	0	0	1084681	1843985	2947592	2046167	1456996
12	0	0	0	0	0	0	0	0	940258.1	1294281	1398421	0
13	0	0	0	0	0	0	0	0	0	8013.984	938568.5	0
14	0	0	0	0	0	0	0	0	0	0	692503.6	0
15	0	0	0	0	0	0	0	308523.9	1189974	894152.9	2666359	1202598
16	0	0	0	0	0	0	0	245466.2	1075996	806058.6	1325862	810441.9
17	0	0	0	0	0	0	539968.2	699542.4	2114231	516852.6	2318644	0
18	0	0	0	0	0	0	0	0	52764.61	428756.9	978146.8	0
19	0	0	0	0	0	0	0	0	616051.4	340663.4	907332.2	1797245
20	0	0	0	0	0	0	0	0	632102.4	252569.1	836517.6	268120.4

Optimistic market -scenario hydrothermal - inflow 4 (911in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	1099506	2329544	1499637
3	0	0	0	0	0	0	236143	971815.9	2134231	2002939	2671013	0
4	0	0	0	0	0	0	0	587179.5	2451232	2646998	2872728	2591558
5	1417060	0	0	62649.84	522761.7	1307237	1765766	2161378	2907312	3694765	2821560	0
6	0	0	0	0	0	0	0	0	40914.84	942310.1	1881943	1872982
7	0	0	0	0	0	0	0	0	1063067	1292671	1807477	0
8	0	0	0	0	0	0	0	764907.6	1661029	1765957	2186789	1485428
9	433257.9	0	0	0	0	394508	1129788	1901273	2284772	3399924	3629053	2162515
10	1207387	0	0	0	0	0	0	0	0	0	723810.3	154664.8
11	0	0	0	0	0	0	0	461488.5	1613634	1911728	2217740	1807765
12	0	0	0	0	0	0	508985.4	1210608	2072328	1823633	1974125	1413824
13	0	0	0	0	0	83318.2	798479.8	1660941	2001514	3047546	3172995	2943583
14	0	1321593	0	0	0	0	0	0	849953.7	1186506	1754968	1492575
15	0	0	0	0	0	0	0	691218.9	1627569	1380790	1761681	1455387
16	0	0	0	0	0	0	0	0	0	0	576471.1	0
17	0	0	0	0	0	0	0	0	0	0	717467.4	0
18	0	0	0	0	0	0	0	618243.6	1474640	1116506	2818924	0
19	0	0	0	0	0	0	0	0	1021456	916201.1	1478424	646097.1
20	0	0	0	0	0	0	0	108490.3	1171766	940317.2	2677295	836354.8

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 4 (911bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	920946.3	2156744	1321077
3	0	0	0	0	0	0	57582.98	793255.9	1961431	1824379	2498213	0
4	0	0	0	0	0	0	0	408619.5	2278432	2468438	2699928	2412998
5	1238500	0	0	0	165641.7	961637.4	1408646	1804258	2561712	3337645	2475960	0
6	0	0	0	0	0	0	0	0	0	585190.1	1536343	1515862
7	0	0	0	0	0	0	0	0	717466.6	935551.3	1461877	0
8	0	0	0	0	0	0	0	407787.6	1315429	1408837	1841189	1128308
9	76137.94	0	0	0	0	0	594107.6	1365593	1766372	2864244	3110653	1626835
10	671707	0	0	0	0	0	0	0	0	0	205410.2	0
11	0	0	0	0	0	0	0	0	1095234	1376048	1699340	1272085
12	0	0	0	0	0	0	0	674927.9	1553928	1287953	1455725	878143.8
13	0	0	0	0	0	0	262799.8	1125261	1483114	2511866	2654595	2407903
14	0	837753	0	0	0	0	0	0	331553.7	650825.6	1236568	956894.4
15	0	0	0	0	0	0	0	155538.9	1109169	845109.9	1243281	919706.8
16	0	0	0	0	0	0	0	0	0	0	58071.09	0
17	0	0	0	0	0	0	0	0	0	0	199067.3	0
18	0	0	0	0	0	0	0	82563.66	956240.1	580825.7	2300524	0
19	0	0	0	0	0	0	0	0	503056.4	380521.1	960024.4	110417.2
20	0	0	0	0	0	0	0	0	653365.6	404637.2	2158895	300674.8

Optimistic market -scenario hydrothermal with wind addition - inflow 4 (912in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	709685.9	2007513	1230918
3	0	0	0	0	0	0	20731.73	706989.6	1838191	1710525	2400546	0
4	0	0	0	0	0	0	0	269012.7	2126909	2360212	2605241	2354916
5	1111911	0	0	0	232665.7	993776.8	1334254	1633399	2323712	3114484	2311872	0
6	0	0	0	0	0	0	0	0	0	336171	1358566	1413815
7	0	0	0	0	0	0	0	0	479466.6	712389.1	1297789	0
8	0	0	0	0	0	0	0	242305.7	1077429	1185675	1677101	1034312
9	25439.86	0	0	0	0	0	517922.4	1145797	1467214	2588101	2939080	1531628
10	799568.9	0	0	0	0	0	0	0	0	0	33837.19	0
11	0	0	0	0	0	0	0	0	796076	1099905	1527767	1176879
12	0	0	0	0	0	0	0	455131.8	1254770	1011810	1284152	782937.2
13	0	0	0	0	0	0	32877.68	718119.9	991267	2025229	2289589	2155115
14	0	942126.9	0	0	0	0	0	0	0	164188.6	871561.4	704105.9
15	0	0	0	0	0	0	0	0	617321.9	358472.9	878274.9	666917.5
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	255331.4	0	1729431	0
19	0	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	1587803	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 4 (913in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	709685.9	2007513	1230918
3	0	0	0	0	0	0	20731.73	706989.6	1838191	1710525	2400546	0
4	0	0	0	0	0	0	0	269012.7	2126909	2360212	2605241	2354916
5	1111911	0	0	0	232665.7	993776.8	1334254	1633399	2323712	3114484	2311872	0
6	0	0	0	0	0	0	0	0	0	336171	1306382	1396379
7	0	0	0	0	0	0	0	0	624026.3	834578.4	1333015	0
8	0	0	0	0	0	0	0	432061.3	1205987	1351369	1780577	969764.8
9	0	0	0	0	0	142271.7	853365.1	1436403	1467214	2588101	2939080	1531628
10	767740.4	0	0	0	0	0	0	0	0	0	699503.9	0
11	0	0	0	0	0	0	0	449875.9	1325585	1099905	2797451	1176879
12	0	0	0	0	0	0	389826.9	906128.1	1254770	1011810	2553837	301350.5
13	0	0	0	0	0	356215.8	804266.2	718119.9	2260951	2025229	2289589	2155115
14	0	1157149	0	0	0	0	0	0	203106.1	514767.3	949090.8	755013.3
15	0	0	0	0	0	0	0	484660.1	849638.7	358472.9	2147959	548184.1
16	0	0	0	0	0	0	0	0	0	0	59250.23	0
17	0	0	0	0	0	0	0	0	0	0	248333.2	0
18	0	0	0	0	0	0	0	75768.12	255331.4	1205084	1729431	0
19	0	0	0	0	0	0	0	0	166594.9	0	388932.2	0
20	0	0	0	0	0	0	0	0	113702.3	1028896	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 4 (913bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin4												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	888245.9	2180313	1409478
3	0	0	0	0	0	0	199291.7	885549.6	2010991	1889085	2573346	0
4	0	0	0	0	0	0	0	447572.7	2299709	2538772	2778041	2533476
5	1290471	0	0	162584.7	589785.6	1339377	1691374	1990519	2669312	3471604	2657472	0
6	0	0	0	0	0	0	0	0	0	693291	1651982	1753499
7	0	0	0	0	0	0	0	0	969626.3	1191698	1678615	0
8	0	56294.44	0	0	0	0	109375.3	789181.3	1551587	1708489	2126177	1326885
9	148317.9	0	0	0	0	660671.8	1389045	1972083	1985614	3123781	3457480	2067308
10	1303420	0	0	0	0	0	0	0	0	230536.8	1217904	322703.5
11	0	0	0	0	0	0	238723	985555.9	1843985	1635585	3315851	1712559
12	0	0	0	0	0	133511.8	925506.9	1441808	1773170	1547490	3072237	837030.5
13	0	0	0	0	0	874615.8	1339946	1253800	2779351	2560909	2807989	2690795
14	0	1640989	0	0	0	0	0	0	721506.1	1050447	1467491	1290693
15	0	0	0	0	0	0	486323.2	1020340	1368039	894152.9	2666359	1083864
16	0	0	0	0	0	0	0	0	0	132678.3	577650.3	0
17	0	0	0	0	0	0	0	0	0	0	766733.2	0
18	0	0	0	0	0	0	345485.6	611448.1	773731.4	1740764	2247831	0
19	0	0	0	0	0	0	0	0	684994.9	340663.4	907332.2	327841
20	0	0	0	0	0	0	0	0	632102.4	1564576	836517.6	397143.4

Optimistic market -scenario hydrothermal - inflow 5 (911in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	1352680	1763375
3	0	0	0	0	0	0	0	0	1259454	1817971	2647975	2307610
4	0	0	0	0	0	0	0	0	568679.8	1431146	2646269	2591558
5	0	0	0	526933.8	2029769	2360538	2387942	3616286	4176996	3694765	4091244	0
6	0	516775.9	0	256726.4	165233	631603.1	980594.2	1720604	2423451	2352200	2522681	214802.4
7	0	0	0	0	0	0	0	1157076	2237982	2264105	3770682	2338703
8	0	0	0	468150.1	0	773516.9	1373071	2041320	2528386	3488018	3699868	2250610
9	2055371	0	0	0	0	0	0	0	1142341	1758677	2245159	0
10	0	0	0	0	0	0	0	0	1148239	1619567	2288555	1895860
11	0	0	0	0	0	563198.2	1056264	1565920	2143143	3223735	2217740	1807765
12	155174.1	0	0	0	0	184052.8	919366.8	1573487	2072328	3135640	3243810	1198034
13	0	0	0	0	0	0	0	0	214920	797825.2	1235271	354938.9
14	0	0	0	0	0	0	0	0	0	223522.6	1191678	696864.3
15	0	0	0	0	0	0	0	0	0	0	691105.8	85480.08
16	0	0	0	0	0	258473	736369.6	1334552	1789069	1292696	1690868	0
17	0	0	0	0	0	0	0	522692	1292631	1204601	1620052	0
18	0	0	0	0	0	0	0	780085.4	1474640	2428513	1549239	1191105
19	0	818744.8	0	0	0	0	167012.8	651020.4	1403827	1028411	2748109	924449.1
20	0	0	0	0	0	0	0	0	456671.9	407508.6	929356.9	0

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 5 (911bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	1179880	1584815
3	0	0	0	0	0	0	0	0	1086654	1639411	2475175	2129050
4	0	0	0	0	0	0	0	0	395879.8	1252586	2473469	2412998
5	0	0	0	181333.8	1672649	2014938	2030822	3259166	3831396	3337645	3745644	0
6	0	194215.9	0	0	0	286003.1	623474.2	1363484	2077851	1995080	2177081	0
7	0	0	0	0	0	0	0	799955.5	1892382	1906985	3425082	1981583
8	0	0	0	122550.1	0	427916.9	1015951	1684200	2182786	3130898	3354268	1893490
9	1698251	0	0	0	0	0	0	0	623941.2	1222997	1726759	0
10	0	0	0	0	0	0	0	0	629839	1083887	1770155	1360180
11	0	0	0	0	0	44798.2	520584.2	1030240	1624743	2688055	1699340	1272085
12	0	0	0	0	0	0	383686.8	1037807	1553928	2599960	2725410	662354
13	0	0	0	0	0	0	0	0	0	262145.2	716871.1	0
14	0	0	0	0	0	0	0	0	0	0	673278.1	161184.3
15	0	0	0	0	0	0	0	0	0	0	172705.8	0
16	0	0	0	0	0	0	200689.6	798872.2	1270669	757015.6	1172468	0
17	0	0	0	0	0	0	0	0	774230.6	668921.4	1101652	0
18	0	0	0	0	0	0	0	244405.5	956240.1	1892833	1030839	655424.8
19	0	334904.7	0	0	0	0	0	115340.3	885427	492731.4	2229709	388769.1
20	0	0	0	0	0	0	0	0	0	0	410956.9	0

Optimistic market -scenario hydrothermal with wind addition - inflow 5 (912in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	923960.4	1431913
3	0	0	0	0	0	0	0	0	667379.5	1354223	2286811	2016143
4	0	0	0	0	0	0	0	0	10641.09	987096.9	2295533	2354916
5	0	0	0	279998.8	1738929	2046796	1966268	3093684	3593396	3114484	3581556	0
6	0	31899.66	0	0	0	303520.1	540529.1	1187880	1834484	1771919	2010087	0
7	0	0	0	0	0	0	0	634192.8	1654233	1683823	3260994	1887586
8	0	0	0	276233.6	0	476850.9	951382.4	1518710	1944786	2907736	3190180	1799493
9	1647550	0	0	0	0	0	0	0	324783.6	946854.4	1555186	0
10	0	0	0	0	0	0	0	0	330681.1	807744.3	1598581	1264974
11	0	0	0	0	0	61809.61	444399.1	810444.1	1325585	2411912	1527767	1176879
12	0	0	0	0	0	0	307501.6	818011.3	1254770	2323817	2553837	567147.4
13	0	0	0	0	0	0	0	0	0	0	351864.8	0
14	0	0	0	0	0	0	0	0	0	0	308271.8	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	391731.3	778822.8	270378.6	807461.8	0
17	0	0	0	0	0	0	0	0	73321.17	0	530559.9	0
18	0	0	0	0	0	0	0	0	255331.4	1205084	459746.7	216213.4
19	0	374051.3	0	0	0	0	0	0	184518.3	0	1658616	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 5 (913in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	923960.4	1431913
3	0	0	0	0	0	0	0	0	667379.5	1354223	2286811	2016143
4	0	0	0	0	0	0	0	0	10641.09	987096.9	2295533	2354916
5	0	0	0	279998.8	1738929	2046796	1966268	3093684	3593396	3114484	3581556	0
6	0	31899.66	0	0	0	303520.1	540529.1	1187880	1834484	1771919	2006228	0
7	0	0	0	0	0	0	0	921866.5	1856260	1683823	3260994	3199593
8	0	0	0	472676.8	0	616933.1	1143297	1703063	1944786	2907736	3190180	3111500
9	1063332	0	0	0	0	0	0	0	853259.1	1276094	1669396	0
10	0	0	0	0	0	0	0	204195.3	1108922	1187999	1598581	1264974
11	0	0	0	0	0	492602.3	862813.3	1081654	1325585	2411912	2797451	849964.8
12	0	0	0	0	0	0	751469.1	993558.9	2524454	2323817	1284152	775987.6
13	0	0	0	0	0	0	0	0	313789.2	532115.5	720919	0
14	0	0	0	0	0	0	0	0	0	250095.9	941423.9	140015.9
15	0	0	0	0	0	0	0	0	0	0	201794.1	0
16	0	0	0	0	0	141996.8	455180.5	453837.1	778822.8	1582386	807461.8	0
17	0	0	0	0	0	0	0	0	325122.2	0	530559.9	0
18	0	0	0	0	0	0	0	0	255331.4	1205084	1729431	0
19	0	93256.41	0	0	0	0	0	0	184518.3	0	1658616	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 5 (913bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin5												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	1096760	1610473
3	0	0	0	0	0	0	0	0	840179.5	1532783	2459611	2194703
4	0	0	0	0	0	0	0	0	183441.1	1165657	2468333	2533476
5	0	0	0	625598.8	2096049	2392396	2323388	3450804	3938996	3471604	3927156	0
6	0	354459.7	0	309862.3	204830	649120.1	897649.1	1545000	2180085	2129039	2351828	0
7	0	0	0	0	0	0	217624.7	1278987	2201860	2040943	3606594	3556713
8	0	0	0	818276.8	0	962533.1	1500417	2060183	2290386	3264856	3535780	3468620
9	1420452	0	0	0	0	0	0	67292.77	1371659	1811774	2187796	0
10	0	0	0	0	0	0	0	739875.3	1627322	1723679	2116982	1800654
11	0	0	127229.5	0	0	1011002	1398493	1617334	1843985	2947592	3315851	1385645
12	0	0	0	0	0	515719.7	1287149	1529239	3042854	2859497	1802552	1311668
13	0	0	0	0	0	0	0	0	832189.3	1067796	1239319	93806.48
14	0	0	0	0	0	0	0	0	246555	785775.9	1459824	675695.9
15	0	0	0	0	0	0	0	0	0	5049.609	720194.1	0
16	0	0	0	0	0	660396.8	990860.5	989517.1	1297223	2118066	1325862	0
17	0	0	0	0	0	0	0	177367	843522.2	516852.6	1048960	0
18	0	0	0	0	0	0	0	532714.2	773731.4	1740764	2247831	386945.4
19	0	577096.4	0	0	0	0	241893	344791.7	702918.3	340663.4	2177016	485237.7
20	0	140168.4	0	0	0	0	0	0	18977.34	0	454601.3	0

Optimistic market -scenario hydrothermal - inflow 6 (911in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	649641.3	0	274654.4	0	0	0	535664.8	1527903	2812961	2757878	3099312	2415555
3	0	0	278284.3	1128474	1369265	1720130	2260168	2656683	3238992	4087885	2969280	0
4	0	0	0	0	0	0	0	0	1650871	1868091	2369815	1010424
5	634442.4	0	0	0	0	0	0	0	1555912	1807639	2788199	1895390
6	1016459	912061.5	0	0	0	0	0	568309.9	1734508	1854646	2335034	0
7	0	0	0	0	0	0	0	6124.195	1233099	1543480	2106392	0
8	0	0	0	0	0	0	0	0	374214.4	683175.4	1325545	0
9	0	0	0	0	0	0	0	74272.13	1483659	2053006	2359369	1564344
10	0	0	0	0	0	1100800	1626566	2103784	3483641	3311829	2288555	1895860
11	0	0	0	0	0	0	0	0	1484732	1911728	2217740	0
12	0	0	0	0	0	0	230074.7	1130010	2072328	3135640	1974125	0
13	0	0	0	0	0	0	0	80224.85	1212301	1545393	1899574	1443152
14	0	0	0	0	0	0	0	938279.9	1871492	1647444	1832497	839048.9
15	0	0	0	0	0	0	0	0	468862.8	537950.5	1172840	640016.6
16	0	0	0	0	0	0	0	0	0	0	560134.7	0
17	0	0	0	0	0	0	0	0	868425.5	1188328	1620052	276635
18	0	0	0	0	0	0	379198.1	1092431	1474640	2428513	1549239	1191105
19	0	0	0	0	0	0	378336.3	942624.8	1403827	2340419	2748109	924449.1
20	0	0	0	0	0	0	0	0	62071.88	448475.1	1174386	88086.98

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 6 (911bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	649641.3	0	274654.4	0	0	0	535664.8	1349343	2640161	2579318	2926512	2236995
3	0	0	99724.34	955673.4	1190705	1547330	2081608	2478123	3066192	3909325	2796480	0
4	0	0	0	0	0	0	0	0	1478071	1689531	2197015	831863.9
5	455882.4	0	0	0	0	0	0	0	1210312	1450519	2442599	1538270
6	659339.1	589501.5	0	0	0	0	0	211189.9	1388908	1497526	1989434	0
7	0	0	0	0	0	0	0	0	887498.4	1186360	1760792	0
8	0	0	0	0	0	0	0	0	28614.38	326055.5	979944.9	0
9	0	0	0	0	0	0	0	0	965258.4	1517326	1840969	1028664
10	0	0	0	0	0	582399.9	1090886	1568104	2965241	2776149	1770155	1360180
11	0	0	0	0	0	0	0	0	966332.1	1376048	1699340	0
12	0	0	0	0	0	0	0	594329.6	1553928	2599960	1455725	0
13	0	0	0	0	0	0	0	0	693901.4	1009713	1381174	907472.2
14	0	0	0	0	0	0	0	402599.9	1353092	1111764	1314097	303368.9
15	0	0	0	0	0	0	0	0	0	2270.508	654439.9	104336.6
16	0	0	0	0	0	0	0	0	0	0	41734.69	0
17	0	0	0	0	0	0	0	0	350025.5	652647.9	1101652	0
18	0	0	0	0	0	0	0	556751.1	956240.1	1892833	1030839	655424.8
19	0	0	0	0	0	0	0	406944.8	885427	1804739	2229709	388769.1
20	0	0	0	0	0	0	0	0	0	0	655986.1	0

Optimistic market -scenario hydrothermal with wind addition - inflow 6 (912in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	649641.3	0	274654.4	0	0	0	353574.8	1281416	2526645	2471092	2831825	2178912
3	0	0	167921.7	1045241	1250237	1595746	2075775	2408938	2952675	3801099	2701793	0
4	0	0	0	0	0	0	0	0	1270659	1526962	2073560	756944.8
5	340761.1	0	0	0	0	0	0	0	842705.9	1152345	2239133	1421228
6	719374.3	701901.7	0	0	0	0	0	34075.05	1144741	1270795	1823472	0
7	0	0	0	0	0	0	0	0	647788.4	962208.1	1596179	0
8	0	0	0	0	0	0	0	0	0	102841.3	815828.9	0
9	0	0	0	0	0	0	0	0	666100.9	1241182	1669396	933457.7
10	0	0	0	0	0	599410.9	1014700	1348308	2666083	2500006	1598581	1264974
11	0	0	0	0	0	0	0	0	667174.3	1099905	1527767	0
12	0	0	0	0	0	0	0	374532.8	1254770	2323817	1284152	0
13	0	0	0	0	0	0	0	0	202054.2	523075.6	1016168	654683.7
14	0	0	0	0	0	0	0	0	861245.1	625127.1	949090.8	50580.38
15	0	0	0	0	0	0	0	0	0	0	289433.7	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	530559.9	0
18	0	0	0	0	0	0	0	0	255331.4	1205084	459746.7	216213.4
19	0	0	0	0	0	0	0	0	184518.3	1116990	1658616	0
20	0	0	0	0	0	0	0	0	0	0	84893.91	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	649641.3	0	274654.4	0	0	0	353574.8	1281416	2526645	2471092	2831825	2178912
3	0	0	167921.7	1045241	1250237	1595746	2075775	2408938	2952675	3801099	2701793	0
4	0	0	0	0	0	0	0	0	1270659	1526962	2073560	756944.8
5	340761.1	0	0	0	0	0	0	0	842705.9	1152345	2239133	1421228
6	719374.3	701901.7	0	0	0	0	0	34075.05	1144741	1270795	1805771	0
7	0	0	0	0	0	0	0	0	909540.7	1154370	1693279	0
8	0	0	0	0	0	0	0	0	228266.7	466600.3	1043581	0
9	0	0	0	0	0	0	0	14634.79	1307000	1276094	1669396	1241444
10	0	0	0	0	0	1078715	1454621	1348308	2666083	2500006	2868266	896549.8
11	0	0	0	0	0	0	0	119751.3	1325585	1099905	2797451	0
12	0	0	0	0	0	0	250255.7	941756.5	1254770	2323817	2553837	0
13	0	0	0	617094.9	0	0	0	0	612012.6	713222.1	1019905	843107.5
14	0	0	0	0	0	0	0	576008.6	920452.5	1937134	949090.8	0
15	0	0	0	0	0	0	0	0	433511	119968.5	593855.9	0
16	0	0	0	0	0	0	0	0	0	0	417803.9	0
17	0	0	0	0	0	0	0	0	326146.6	0	1800244	0
18	0	0	0	0	0	0	55249.27	75768.12	1525016	1205084	459746.7	0
19	0	0	0	0	0	0	0	0	1454202	1116990	1658616	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 6 (913bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin6												
1	0	0	0	0	0	0	0	0	1367441	2249215	3090960	2271252
2	649641.3	0	274654.4	0	0	0	353574.8	1281416	2526645	2649652	3004625	2357472
3	0	0	346481.7	1218041	1428797	1768546	2254335	2587498	3125475	3979659	2874593	0
4	0	0	0	0	0	0	0	0	1443459	1705522	2246360	935504.8
5	519321.1	0	0	0	0	0	0	0	1188306	1509465	2584733	1778348
6	1076494	1024462	0	0	0	0	0	391195.1	1490341	1627915	2151371	0
7	0	0	0	0	0	0	0	231625.9	1255141	1511490	2038879	0
8	0	0	0	0	0	0	0	0	573866.8	823720.3	1389181	0
9	0	0	0	0	0	0	0	550314.8	1825400	1811774	2187796	1777124
10	0	0	0	0	385177.7	1597115	1990301	1883988	3184483	3035686	3386666	1432230
11	0	0	0	0	0	0	0	655431.3	1843985	1635585	3315851	0
12	0	0	0	140413	0	39108.52	785935.8	1477437	1773170	2859497	3072237	0
13	0	0	0	1135495	0	0	0	163640.8	1130413	1248902	1538305	1378788
14	0	0	0	0	0	42443.44	422061.6	1111689	1438853	2472814	1467491	18023.84
15	0	0	0	0	0	0	0	0	951911	655648.6	1112256	462212.2
16	0	0	0	0	0	0	0	0	0	0	936203.9	0
17	0	0	0	0	0	0	0	0	844546.6	516852.6	2318644	0
18	0	0	0	0	0	277789.9	590929.3	611448.1	2043416	1740764	978146.8	410056.6
19	0	0	0	0	0	22966.88	488231.1	344791.7	1972602	1652670	2177016	182872.9
20	0	0	0	0	0	0	0	0	280245.9	252569.1	836517.6	0

Optimistic market -scenario hydrothermal - inflow 7 (911in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	2126623	2736453	3099312	2867318
3	0	0	0	0	0	0	0	0	903317.7	1721903	2509924	0
4	0	0	0	0	0	0	0	0	0	429564.5	1532211	988710.6
5	239387.8	0	0	0	0	0	0	0	664428.5	1279509	1915339	1178552
6	0	0	0	0	0	0	0	1243130	2369713	2352200	3841496	2152274
7	1205170	0	0	0	0	1123339	1845922	2368069	3868885	2264105	3770682	2338703
8	2376002	1428814	486065.6	234523.1	0	995681.9	1555779	2184419	2528386	3488018	3699868	2250610
9	0	0	0	0	0	0	280748.1	1260762	2108936	2087917	3629053	2162515
10	21400.54	0	0	0	0	604994.8	1189466	1882224	2213957	3311829	3558239	1895860
11	1213252	0	0	0	0	0	0	833704.3	1984610	1911728	3487424	1807765
12	0	0	0	0	0	0	0	0	0	188649.8	583190.9	0
13	0	0	0	0	0	0	0	0	753691.6	1307419	1903311	1631576
14	0	0	0	0	0	0	0	0	0	632960.9	1241319	508277
15	0	0	0	0	0	0	0	0	259697.8	536555.5	1231042	836006.1
16	181363.1	205536.2	0	0	0	0	450444.1	1284746	1789069	2604703	2960552	2679300
17	0	455350.9	0	477859.2	0	55305	265651.6	924190.4	1545456	1204601	1620052	953001.5
18	0	0	0	0	0	0	0	0	0	0	1014785	0
19	0	0	0	0	0	0	0	0	946029.4	1028411	1478424	924449.1
20	0	0	0	0	0	0	0	0	589900.8	905312.1	1407610	836354.8

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 7 (911bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	1953823	2557893	2926512	2688758
3	0	0	0	0	0	0	0	0	730517.7	1543343	2337124	0
4	0	0	0	0	0	0	0	0	0	251004.5	1359411	810150.6
5	60827.81	0	0	0	0	0	0	0	318828.5	922388.5	1569739	821431.9
6	0	0	0	0	0	0	0	886009.9	2024113	1995080	3495896	1795154
7	848050.3	0	0	0	0	777738.5	1488802	2010949	3523285	1906985	3425082	1981583
8	2018882	1106254	128945.6	0	0	650081.9	1198659	1827299	2182786	3130898	3354268	1893490
9	0	0	0	0	0	0	0	725082.1	1590536	1552237	3110653	1626835
10	0	0	0	0	0	86594.77	653786.4	1346544	1695556	2776149	3039839	1360180
11	677571.9	0	0	0	0	0	0	298024.3	1466210	1376048	2969024	1272085
12	0	0	0	0	0	0	0	0	0	0	64790.86	0
13	0	0	0	0	0	0	0	0	235291.6	771738.7	1384911	1095896
14	0	0	0	0	0	0	0	0	0	97280.91	722919.4	0
15	0	0	0	0	0	0	0	0	0	875.5078	712641.8	300326.1
16	0	0	0	0	0	0	0	749065.6	1270669	2069023	2442152	2143620
17	0	0	0	0	0	0	0	388510.4	1027056	668921.4	1101652	417321.5
18	0	0	0	0	0	0	0	0	0	0	496385.2	0
19	0	0	0	0	0	0	0	0	427629.4	492731.4	960024.4	388769.1
20	0	0	0	0	0	0	0	0	71500.78	369632.1	889209.9	300674.8

Optimistic market -scenario hydrothermal with wind addition - inflow 7 (912in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	1798557	2425505	2831825	2630675
3	0	0	0	0	0	0	0	0	345280.1	1277856	2159188	0
4	0	0	0	0	0	0	0	0	0	11271.16	1195108	711127.4
5	0	0	0	0	0	0	0	0	0	471969.9	1285349	656686.4
6	0	0	0	0	0	0	0	650115.4	1748780	1771919	3331808	1680588
7	909458.6	0	0	0	0	825636.1	1423628	1845467	3285286	1683823	3260994	1887586
8	2091696	1224785	269450.1	42585.12	0	699009.6	1134087	1661807	1944786	2907736	3190180	1799493
9	0	0	0	0	0	0	0	505286.1	1291378	1276094	2939080	1531628
10	0	0	0	0	0	103606.2	577601.2	1126747	1396399	2500006	2868266	1264974
11	805433.8	0	0	0	0	0	0	78228.26	1167053	1099905	2797451	1176879
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	285101.7	1019905	843107.5
14	0	0	0	0	0	0	0	0	0	0	357913.1	0
15	0	0	0	0	0	0	0	0	0	0	347635.6	47536.8
16	0	0	0	0	0	0	0	341924.7	778822.8	1582386	2077146	1890832
17	0	10657.5	0	101515.8	0	0	0	0	326146.6	0	530559.9	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	1798557	2425505	2831825	2630675
3	0	0	0	0	0	0	0	0	345280.1	1277856	2159188	0
4	0	0	0	0	0	0	0	0	0	11271.16	1195108	711127.4
5	0	0	0	0	0	0	0	0	0	471969.9	1285349	656686.4
6	0	0	0	0	0	0	0	650115.4	1748780	1771919	3331808	1658700
7	825402.6	0	0	0	0	938869.1	1553229	1845467	3285286	2995830	3260994	1751972
8	1958877	656500	0	0	0	767499.9	1282292	1757372	1944786	2907736	3190180	1799493
9	0	0	0	0	0	0	130967.3	886284.6	1467214	2588101	1669396	1531628
10	0	0	0	0	0	452850.5	980917.5	1348308	1396399	2500006	2868266	2576981
11	125272.1	0	0	0	0	0	178873.2	724827.5	1325585	2411912	1527767	1176879
12	0	0	0	0	0	0	0	0	0	81626.39	225918.3	0
13	0	0	0	0	0	0	0	0	404426.3	713222.1	1019905	2155115
14	0	0	0	0	0	0	0	0	0	303733.6	746241.3	0
15	0	0	0	0	0	0	0	0	3743.438	83615.72	655713.3	164766.9
16	0	0	0	0	0	0	20052.4	453837.1	2048507	1582386	2077146	578824.8
17	0	524495.4	0	393167.8	0	0	0	51603.38	326146.6	0	1800244	0
18	0	0	0	0	0	0	0	0	0	0	377624.5	0
19	0	0	0	0	0	0	0	0	99729.14	0	1658616	0
20	0	0	0	0	0	0	0	0	113702.3	0	1587803	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 7 (913bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin7												
1	0	0	0	0	0	0	0	1091103	2488504	2764517	3090960	2326484
2	0	0	0	0	0	0	0	0	1798557	2604065	3004625	2809235
3	0	0	0	0	0	0	0	0	518080.1	1456416	2331988	0
4	0	0	0	0	0	0	0	0	0	189831.2	1367908	889687.4
5	110842.2	0	0	0	0	0	0	0	33768.98	829089.9	1630949	1013806
6	0	0	0	0	0	0	0	1007235	2094380	2129039	3677408	2015820
7	1182523	0	0	0	92268.35	1284469	1910349	2202587	3630886	3352950	3606594	2109092
8	2315997	979060	252781.3	125164.7	0	1113100	1639412	2114492	2290386	3264856	3535780	2156613
9	0	0	0	0	0	0	666647.3	1421965	1985614	3123781	2187796	2067308
10	0	0	0	0	0	971250.5	1516598	1883988	1914799	3035686	3386666	3112661
11	660952.1	0	0	0	0	0	714553.1	1260508	1843985	2947592	2046167	1712559
12	0	0	0	0	0	0	0	0	229635.7	617306.4	744318.3	0
13	0	0	0	0	0	0	0	0	922826.3	1248902	1538305	2690795
14	0	0	0	0	0	0	0	0	395523.3	839413.6	1264641	304298.2
15	0	0	0	0	0	0	0	0	522143.4	619295.8	1174113	700446.9
16	17000.11	0	0	0	0	0	555732.4	989517.1	2566907	2118066	2595546	1114505
17	0	1008335	0	911567.8	0	0	208955.8	587283.4	844546.6	516852.6	2318644	0
18	0	0	0	0	0	0	0	0	0	17909.77	896024.5	0
19	0	0	0	0	0	0	0	0	618129.1	340663.4	2177016	337404
20	0	0	0	0	0	0	0	0	632102.4	252569.1	2106203	397143.4

Optimistic market -scenario hydrothermal - inflow 8 (911in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	875399.6	1933683	3199944	4069885	3099312	0
3	0	0	0	0	0	0	0	0	0	0	1397823	1024500
4	0	0	0	0	0	0	0	0	7555.078	703359	1577128	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	1305431	2347341	2352200	2571812	2426798
7	1535952	886782.8	601692.6	1175330	167897.7	788008.4	1297838	1932480	2599201	2264105	3770682	0
8	0	0	0	0	0	0	0	0	0	0	559476.2	0
9	0	0	0	0	0	0	0	221645.2	1534891	1999124	2359369	2023282
10	0	0	0	0	0	0	0	421382.3	1530141	1929845	2288555	0
11	0	0	0	0	0	0	0	0	1039908	1549193	2057809	957612.3
12	0	0	0	0	0	713328.8	990099.8	1299299	1993985	1823633	1974125	0
13	0	0	0	0	0	0	0	375342.2	1368603	1488875	1903311	1631576
14	441851.7	0	0	0	0	0	0	0	954902.8	1575036	1832497	1543482
15	0	0	0	0	0	0	0	4341.211	1520772	1380790	3031365	1455387
16	0	0	0	0	0	0	0	704351.5	1786717	1292696	2960552	0
17	0	0	0	0	0	0	0	225139.9	1004695	971388.6	1373092	1067224
18	0	94007.81	0	0	0	0	0	442948.8	1277155	1116506	2818924	1191105
19	0	0	0	0	0	0	0	0	1108201	1028411	2748109	0
20	0	0	0	0	0	0	0	0	36118.13	532872.6	1366900	689610.3

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 8 (911bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	875399.6	1755123	3027144	3891325	2926512	0
3	0	0	0	0	0	0	0	0	0	0	1225023	845940.4
4	0	0	0	0	0	0	0	0	0	524799	1404328	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	948310.8	2001741	1995080	2226212	2069678
7	1178832	564222.8	244572.6	829729.7	0	442408.4	940718.3	1575360	2253601	1906985	3425082	0
8	0	0	0	0	0	0	0	0	0	0	213876.2	0
9	0	0	0	0	0	0	0	0	1016491	1463444	1840969	1487602
10	0	0	0	0	0	0	0	0	1011741	1394165	1770155	0
11	0	0	0	0	0	0	0	0	521507.8	1013513	1539409	421932.3
12	0	0	0	0	0	194928.8	454419.8	763618.6	1475585	1287953	1455725	0
13	0	0	0	0	0	0	0	0	850203.3	953194.8	1384911	1095896
14	0	0	0	0	0	0	0	0	436502.8	1039356	1314097	1007802
15	0	0	0	0	0	0	0	0	1002372	845109.9	2512965	919706.8
16	0	0	0	0	0	0	0	168671.5	1268317	757015.6	2442152	0
17	0	0	0	0	0	0	0	0	486294.6	435708.6	854692	531544.4
18	0	0	0	0	0	0	0	0	758754.9	580825.7	2300524	655424.8
19	0	0	0	0	0	0	0	0	589800.9	492731.4	2229709	0
20	0	0	0	0	0	0	0	0	0	0	848500.3	153930.3

Optimistic market -scenario hydrothermal with wind addition - inflow 8 (912in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	693309.6	1687196	2913627	3783099	2831825	0
3	0	0	0	0	0	0	0	0	0	0	919116.6	663641.4
4	0	0	0	0	0	0	0	0	0	285286.2	1240142	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	771902.2	1757948	1771919	2062124	1975681
7	1248496	681448	384213.5	982924.4	0	491189.8	876061.4	1409822	2015601	1683823	3260994	0
8	0	0	0	0	0	0	0	0	0	0	49787.93	0
9	0	0	0	0	0	0	0	0	717333.1	1187301	1669396	1392395
10	0	0	0	0	0	0	0	0	712582.8	1118021	1598581	0
11	0	0	0	0	0	0	0	0	222349.6	737370.1	1367836	326725.7
12	0	0	0	0	0	211940.2	378233.9	543823.3	1176427	1011810	1284152	0
13	0	0	0	0	0	0	0	0	358356.1	466557.8	1019905	843107.5
14	0	0	0	0	0	0	0	0	0	552719.4	949090.8	755013.3
15	0	0	0	0	0	0	0	0	510525	358472.9	2147959	666917.5
16	0	0	0	0	0	0	0	0	776470.1	270378.6	2077146	0
17	0	0	0	0	0	0	0	0	0	0	283599.8	92333.02
18	0	0	0	0	0	0	0	0	57846.09	0	1729431	216213.4
19	0	0	0	0	0	0	0	0	0	0	1658616	0
20	0	0	0	0	0	0	0	0	0	0	277408.1	0

Optimisticmarket -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	693309.6	1687196	2913627	3783099	2831825	0
3	0	0	0	0	0	0	0	0	0	0	919116.6	663641.4
4	0	0	0	0	0	0	0	0	0	285286.2	1240142	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	771902.2	1757948	1771919	2062124	1975681
7	1179420	561947.9	340933.3	981409.6	0	493819.4	929135.8	1480324	2015601	1683823	3260994	0
8	0	0	0	0	0	0	0	0	0	0	390820.8	0
9	0	0	0	0	0	0	0	72381.97	1295557	1276094	1669396	1531628
10	0	0	0	0	0	0	148747	952308.4	1396399	1187999	2868266	0
11	0	0	0	0	0	0	0	0	940297.5	1099905	1527767	410757.8
12	0	0	0	0	0	609279.6	721187.4	816453.6	1254770	1011810	2553837	0
13	0	0	0	0	0	0	0	28182.63	773550	713222.1	1019905	843107.5
14	0	0	0	0	0	0	0	0	674398.8	625127.1	2218775	755013.3
15	0	0	0	0	0	0	0	0	849638.7	1670480	2147959	666917.5
16	0	0	0	0	0	0	0	351987.6	778822.8	1582386	807461.8	0
17	0	0	0	0	0	0	0	0	123930.7	0	378397.3	147325.1
18	0	0	0	0	0	0	0	0	255331.4	0	1729431	216213.4
19	0	0	0	0	0	0	0	0	184518.3	1116990	1658616	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 8 (913bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin8												
1	0	0	0	0	0	0	0	0	0	311311.7	1766347	477.7148
2	0	0	0	0	0	0	693309.6	1687196	2913627	3961659	3004625	0
3	0	0	0	0	0	0	0	0	0	0	1091917	842201.4
4	0	0	0	0	0	0	0	0	0	463846.2	1412942	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	1129022	2103548	2129039	2407724	2332801
7	1536540	884507.9	698053.3	1327010	203709.6	839419.4	1286256	1837444	2361201	2040943	3606594	0
8	0	0	0	0	0	0	0	0	0	0	736420.8	0
9	0	0	0	0	0	0	0	608062	1813957	1811774	2187796	2067308
10	0	0	0	0	0	0	684426.9	1487988	1914799	1723679	3386666	0
11	0	0	0	0	0	0	0	25546.66	1458698	1635585	2046167	946437.8
12	0	0	0	0	471049.4	1127680	1256867	1352134	1773170	1547490	3072237	0
13	0	0	0	0	0	0	166458.4	563862.6	1291950	1248902	1538305	1378788
14	291069.7	0	0	0	0	0	0	0	1192799	1160807	2737175	1290693
15	0	0	0	0	0	0	0	516325.1	1368039	2206160	2666359	1202598
16	0	0	0	0	0	0	59409.56	887667.6	1297223	2118066	1325862	0
17	0	0	0	0	0	50219.3	17013.91	96734.53	642330.7	516852.6	896797.3	683005.1
18	0	300525.1	0	0	0	0	0	150253.1	773731.4	428756.9	2247831	751893.4
19	0	0	0	0	0	0	0	150404.3	702918.3	1652670	2177016	0
20	0	0	0	0	0	0	0	0	354930.5	252569.1	836517.6	397143.4

Optimistic market -scenario hydrothermal - inflow 9 (911in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	2061574	1371603	1469758	891432.4	1291223	1511486	1976390	2372229	3199944	2757878	3099312	0
3	0	70166.91	0	0	0	0	0	647075.1	2241605	2469370	2943458	0
4	0	0	0	0	0	13111.88	993799.8	1870139	3137232	3959005	2872728	2591558
5	1927944	1344618	2571372	1952681	2078091	2370328	2387942	3616286	4176996	3694765	2821560	2347031
6	1948057	1460010	0	106101.2	0	941064.9	1430233	2088051	2670015	3664207	2571812	2426798
7	337163.5	0	0	0	0	313027	1109694	1809567	2433786	2264105	2500998	0
8	0	879286.4	0	0	0	342356.5	1120499	1888161	2528386	2176011	2430184	2250610
9	0	0	0	0	0	580874.8	1186117	1885157	2284772	3399924	3629053	2162515
10	1397191	683598.6	0	0	0	319122.4	1138621	1837209	2213957	1999822	3558239	1895860
11	788326.9	123698.5	0	0	358122.7	1459050	1856480	1837130	3412827	3223735	3487424	3119772
12	1845064	2705784	1150943	1210909	480395.9	139121	605161.9	1006180	1797978	1823633	1974125	1719671
13	0	144829.1	0	0	0	843988.4	1177637	1660941	3271198	1735539	3172995	1590413
14	0	0	0	0	0	0	0	0	813386.3	1314621	1832497	1385359
15	0	0	0	0	0	0	0	0	0	63298.13	911334.4	0
16	0	0	0	0	0	0	0	785005	1789069	1292696	2960552	1367293
17	0	1534059	0	0	0	0	0	345699.9	1370130	1204601	2889736	1279198
18	0	0	0	0	0	0	0	406875	1474640	1116506	2818924	1128427
19	901261.6	0	0	0	0	0	0	0	689160.3	872930.7	1478424	277605
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 9 (911bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	2061574	1371603	1469758	891432.4	1291223	1511486	1976390	2193669	3027144	2579318	2926512	0
3	0	0	0	0	0	0	0	468515.1	2068805	2290810	2770658	0
4	0	0	0	0	0	0	815239.8	1691579	2964432	3780445	2699928	2412998
5	1749384	1022058	2214252	1607081	1720971	2024728	2030822	3259166	3831396	3337645	2475960	1989911
6	1590937	1137450	0	0	0	595464.9	1073113	1730931	2324415	3307087	2226212	2069678
7	0	0	0	0	0	0	752573.4	1452447	2088186	1906985	2155398	0
8	0	556726.4	0	0	0	0	763378.5	1531041	2182786	1818891	2084584	1893490
9	0	0	0	0	0	62474.77	650436.9	1349477	1766372	2864244	3110653	1626835
10	861510.6	199758.6	0	0	0	0	602940.8	1301529	1695556	1464142	3039839	1360180
11	252646.8	0	0	0	0	940649.8	1320800	1301450	2894427	2688055	2969024	2584092
12	1309384	2221944	615263.3	692509.3	0	0	69481.9	470500.1	1279578	1287953	1455725	1183991
13	0	0	0	0	0	325588.4	641957.2	1125261	2752798	1199859	2654595	1054733
14	0	0	0	0	0	0	0	0	294986.3	778941.1	1314097	849678.5
15	0	0	0	0	0	0	0	0	0	0	392934.4	0
16	0	0	0	0	0	0	0	249325	1270669	757015.6	2442152	831613.3
17	0	1050219	0	0	0	0	0	0	851729.8	668921.4	2371336	743517.6
18	0	0	0	0	0	0	0	0	956240.1	580825.7	2300524	592747.1
19	365581.6	0	0	0	0	0	0	0	170760.2	337250.7	960024.4	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal with wind addition - inflow 9 (912in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	2061574	1371603	1469758	891432.4	1291223	1511486	1794300	2125742	2913627	2471092	2831825	0
3	0	0	0	0	0	0	0	198326.1	1848046	2120517	2643389	0
4	0	0	0	0	0	0	742315.4	1585459	2850915	2360212	3874925	2354916
5	1634225	1136145	2351814	1759158	1818559	2073167	1966268	3093684	3593396	3114484	2311872	1895644
6	1663602	1256179	0	0	0	629632.6	999906.9	1560688	2086415	3083926	2062124	1975681
7	50469.21	0	0	0	0	16251.68	687940.6	1286922	1850163	1683823	1991310	0
8	0	675518.8	0	0	0	45713.67	698823.4	1365559	1944786	1595729	1920495	1799493
9	0	0	0	0	0	79486.17	574251.8	1129681	1467214	2588101	2939080	1531628
10	989372.5	418401.4	0	0	0	0	526755.3	1081733	1396399	1187999	2868266	1264974
11	380508.8	0	0	0	72192.7	957661.2	1244615	1081654	2595269	2411912	2797451	2488886
12	1437246	2440587	871598.2	969575.6	194465.9	0	0	250704	980419.3	1011810	1284152	1088784
13	0	0	0	0	0	199702.3	412035.1	718119.9	2260951	713222.1	2289589	801944.1
14	0	0	0	0	0	0	0	0	0	292304.1	949090.8	596890
15	0	0	0	0	0	0	0	0	0	0	27928.13	0
16	0	0	0	0	0	0	0	0	778822.8	270378.6	2077146	578824.8
17	0	1089365	0	0	0	0	0	0	150820.3	0	1800244	304306.2
18	0	0	0	0	0	0	0	0	255331.4	0	1729431	153535.7
19	236651.6	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	2061574	1371603	1469758	891432.4	1291223	1511486	1794300	2125742	2913627	2471092	2831825	0
3	0	0	0	0	0	0	0	198326.1	1848046	2120517	2643389	0
4	0	0	0	0	0	0	742315.4	1585459	2850915	2360212	3874925	2354916
5	1634225	1136145	2351814	1759158	1818559	2073167	1966268	3093684	3593396	3114484	2311872	1895644
6	1663602	1256179	0	0	0	629632.6	999906.9	1560688	2086415	3083926	2062124	1975681
7	0	0	0	0	0	71937.07	792234.3	1388569	1927329	1683823	1991310	0
8	0	911879.4	0	0	0	150773.6	900100.5	1568912	1944786	1595729	3190180	1458101
9	0	0	0	0	0	546381.6	986453.2	1436403	1467214	2588101	2939080	1531628
10	1027358	0	0	0	0	354150.7	1086746	1348308	1396399	2500006	1598581	2576981
11	0	0	0	0	440796.8	1323792	1366526	2393661	2595269	2411912	2797451	2488886
12	1437246	2099170	445147.4	759183.8	0	0	71780.02	438165.9	1182912	1011810	2553837	615247.3
13	0	0	0	0	0	568944.9	816096.8	718119.9	2260951	2025229	1019905	843107.5
14	0	0	0	0	0	0	0	0	235361.3	625127.1	949090.8	755013.3
15	0	0	0	0	0	0	0	0	0	0	459347.3	0
16	0	0	0	0	0	0	0	383144	778822.8	1582386	2077146	578824.8
17	0	1290890	0	0	0	0	0	0	326146.6	1293180	530559.9	304306.2
18	0	0	0	0	0	0	0	36390.61	255331.4	1205084	459746.7	216213.4
19	385233.6	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 9 (913bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin9												
1	0	0	0	0	0	0	0	0	1581963	2129916	2697714	2166116
2	2061574	1371603	1469758	891432.4	1291223	1511486	1794300	2125742	2913627	2649652	3004625	0
3	0	59812.59	0	0	0	0	0	376886.1	2020846	2299077	2816189	0
4	0	0	0	0	0	0	920875.4	1764019	3023715	2538772	4047725	2533476
5	1812785	1297425	2530374	2104758	2175680	2418767	2323388	3450804	3938996	3471604	2657472	2252765
6	2020722	1578739	0	212526.2	24958.15	975232.6	1357027	1917808	2432015	3441046	2407724	2332801
7	249653.4	0	0	0	0	417537.1	1149354	1745689	2272929	2040943	2336910	0
8	0	1234439	0	0	0	496373.6	1257221	1926032	2290386	1952849	3535780	1815221
9	0	0	0	0	0	1064782	1522133	1972083	1985614	3123781	3457480	2067308
10	1563038	459917.1	0	0	0	872550.7	1622426	1883988	1914799	3035686	2116982	3112661
11	145553.7	0	0	0	976476.8	1842192	1902206	2929341	3113669	2947592	3315851	3024566
12	1972926	2583010	980827.4	1277584	493830	0	607460	973845.9	1701312	1547490	3072237	1150927
13	0	9430.969	0	0	0	1087345	1351777	1253800	2779351	2560909	1538305	1378788
14	0	0	0	0	0	0	0	0	753761.3	1160807	1467491	1290693
15	0	0	0	0	0	0	0	0	0	353170.4	977747.4	0
16	0	0	0	0	0	0	262805.7	918824	1297223	2118066	2595546	1114505
17	0	1774730	0	0	0	0	0	303886.2	844546.6	1828860	1048960	839986.2
18	0	0	0	0	0	0	0	572070.6	773731.4	1740764	978146.8	751893.4
19	920913.6	0	0	0	0	0	0	0	420402.7	340663.4	907332.2	0
20	0	0	0	0	0	0	0	0	0	0	0	0

Optimistic market -scenario hydrothermal - inflow 10 (911in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	285774.5	2219736	2605423	3089112	1775738
3	0	0	0	0	0	0	0	0	1234331	1753418	2739003	0
4	0	0	0	0	0	0	0	0	397179.5	1238956	2235782	2182457
5	0	0	0	0	0	0	0	0	1148875	1543387	2498743	2172381
6	0	0	0	0	0	0	0	0	1153355	1743620	2253092	1247655
7	0	0	0	0	0	0	0	0	767006.8	1441057	2468688	0
8	0	0	0	0	0	0	0	0	664975.6	1081208	1895270	0
9	0	0	0	0	0	586561.6	953375.7	1573853	2207237	2087917	2359369	568584.6
10	0	0	0	0	0	0	0	0	1260833	1936420	2288555	1701873
11	1123189	2042351	0	0	0	0	0	664727.7	1612961	1719096	1865961	0
12	0	0	0	0	0	0	644104.9	1258636	2048016	1823633	3243810	1719671
13	0	0	0	0	0	0	446966.7	1319167	2001514	3047546	3172995	1631576
14	234206	476618.6	0	0	0	853680.9	1208611	1572847	3200383	2959451	3102181	0
15	0	0	0	0	0	0	0	514606.8	1692264	1380790	3031365	1455387
16	0	0	0	0	0	0	0	0	495952	801671.6	1690868	0
17	0	0	0	0	0	0	0	350969.7	1480919	1204601	2889736	0
18	0	0	0	0	0	0	0	0	715194.9	1102827	1549239	180064
19	0	0	0	0	0	0	0	0	822077.6	1010100	1478424	580917.9
20	411090.5	0	0	0	0	0	0	21377.65	1211519	940317.2	2677295	0

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 10 (911bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	107214.5	2046936	2426863	2916312	1597178
3	0	0	0	0	0	0	0	0	1061531	1574858	2566203	0
4	0	0	0	0	0	0	0	0	224379.5	1060396	2062982	2003897
5	0	0	0	0	0	0	0	0	803275.3	1186267	2153143	1815261
6	0	0	0	0	0	0	0	0	807754.9	1386500	1907492	890534.6
7	0	0	0	0	0	0	0	0	421406.7	1083937	2123088	0
8	0	0	0	0	0	0	0	0	319375.6	724087.8	1549670	0
9	0	0	0	0	0	68161.64	417695.7	1038173	1688837	1552237	1840969	32904.56
10	0	0	0	0	0	0	0	0	742433.2	1400740	1770155	1166193
11	587509.3	1558511	0	0	0	0	0	129047.7	1094561	1183416	1347561	0
12	0	0	0	0	0	0	108424.9	722955.9	1529616	1287953	2725410	1183991
13	0	0	0	0	0	0	0	783486.5	1483114	2511866	2654595	1095896
14	0	0	0	0	0	335280.9	672931.3	1037167	2681983	2423771	2583781	0
15	0	0	0	0	0	0	0	0	1173864	845109.9	2512965	919706.8
16	0	0	0	0	0	0	0	0	0	265991.6	1172468	0
17	0	0	0	0	0	0	0	0	962519.1	668921.4	2371336	0
18	0	0	0	0	0	0	0	0	196794.8	567147.4	1030839	0
19	0	0	0	0	0	0	0	0	303677.6	474419.9	960024.4	45237.96
20	0	0	0	0	0	0	0	0	693118.8	404637.2	2158895	0

Optimistic market -scenario hydrothermal with wind addition - inflow 10 (912in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	1891670	2294474	2808941	1531672
3	0	0	0	0	0	0	0	0	676388	1309426	2388296	0
4	0	0	0	0	0	0	0	0	0	820818	1898762	1904951
5	0	0	0	0	0	0	0	0	344019.4	835049.6	1921266	1681592
6	0	0	0	0	0	0	0	0	487313.4	1115625	1718356	781878.6
7	0	0	0	0	0	0	0	0	183406.6	860774.2	1958999	0
8	0	0	0	0	0	0	0	0	81376.17	500925.6	1385582	0
9	0	0	0	0	0	85173.05	341510.5	818377.1	1389680	1276094	1669396	0
10	0	0	0	0	0	0	0	0	443275.3	1124597	1598581	1070987
11	715371.3	1777154	0	0	0	0	0	0	795403.1	907273.1	1175988	0
12	0	0	0	0	0	0	32239.76	503159.1	1230458	1011810	2553837	1088784
13	0	0	0	0	0	0	0	376345.6	991267	2025229	2289589	843107.5
14	0	97152.56	0	0	0	209394.8	443009.1	630026.3	2190137	1937134	2218775	0
15	0	0	0	0	0	0	0	0	682017.2	358472.9	2147959	666917.5
16	0	0	0	0	0	0	0	0	0	0	807461.8	0
17	0	0	0	0	0	0	0	0	261609.6	0	1800244	0
18	0	0	0	0	0	0	0	0	0	0	459746.7	0
19	0	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	1587803	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	1891670	2294474	2808941	1531672
3	0	0	0	0	0	0	0	0	676388	1309426	2388296	0
4	0	0	0	0	0	0	0	0	0	820818	1898762	1904951
5	0	0	0	0	0	0	0	0	344019.4	835049.6	1921266	1681592
6	0	0	0	0	0	0	0	0	487313.4	1115625	1692858	705176.5
7	0	0	0	0	0	0	0	0	395858.7	1053291	1991310	0
8	0	0	0	0	0	0	0	0	570107.4	912426.6	1676386	0
9	0	0	0	0	0	325203.4	589762.4	1033235	1467214	1276094	1669396	0
10	0	0	0	0	0	0	0	431155.6	1320693	1187999	2868266	916885.6
11	466182.8	1687853	0	0	0	0	0	404669.2	1168456	1099905	1273231	0
12	0	0	0	0	0	0	649597.8	980710.4	1254770	1011810	2553837	1088784
13	0	0	0	0	0	0	350578	718119.9	991267	2025229	2289589	843107.5
14	0	0	0	0	0	510215.6	769946.3	1942033	2190137	1937134	949090.8	0
15	0	0	0	0	0	0	0	389899.6	849638.7	1670480	878274.9	1978925
16	0	0	0	0	0	0	0	0	110637.4	270378.6	807461.8	0
17	0	0	0	0	0	0	0	163862.4	326146.6	1293180	1800244	0
18	0	0	0	0	0	0	0	0	181728.3	0	1729431	0
19	0	0	0	0	0	0	0	0	155583.3	0	388932.2	0
20	0	0	0	0	0	0	0	0	113702.3	1028896	318117.7	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 10 (913bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin10												
1	0	0	0	0	0	0	0	0	0	1068494	2461324	2119156
2	0	0	0	0	0	0	0	0	1891670	2473034	2981741	1710232
3	0	0	0	0	0	0	0	0	849188	1487986	2561096	0
4	0	0	0	0	0	0	0	0	56710.55	999378	2071562	2083511
5	0	0	0	0	0	0	0	0	689619.4	1192170	2266866	2038712
6	0	0	0	0	0	0	0	0	832913.4	1472745	2038458	1062297
7	0	0	0	0	0	0	0	0	741458.7	1410411	2336910	0
8	0	0	0	0	0	0	0	0	915707.4	1269547	2021986	0
9	0	0	0	0	92225.48	843603.4	1125442	1568915	1985614	1811774	2187796	209460.7
10	0	0	0	0	0	0	0	966835.6	1839093	1723679	3386666	1452566
11	1001863	2171693	0	0	0	0	340404.3	940349.1	1686856	1635585	1791631	0
12	0	0	0	0	0	483349.6	1185278	1516390	1773170	1547490	3072237	1624464
13	0	0	0	0	0	408851	886258	1253800	1509667	2560909	2807989	1378788
14	190103.6	306236.4	0	0	0	1028616	1305626	2477713	2708537	2472814	1467491	0
15	0	0	0	0	0	0	232675.8	925579.6	1368039	2206160	1396675	2514605
16	0	0	0	0	0	0	0	0	629037.4	806058.6	1325862	0
17	0	0	0	0	0	0	199452.3	699542.4	844546.6	1828860	2318644	0
18	0	0	0	0	0	0	0	0	700128.3	428756.9	2247831	0
19	0	0	0	0	0	0	0	0	673983.3	340663.4	907332.2	432907
20	343504.2	0	0	0	0	0	0	0	632102.4	1564576	836517.6	0

Optimistic market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	1175306	0	0	387986.2	1418473	2180187	2721158	3199944	4069885	4368996	0
3	0	324770.9	1233179	945515.4	0	794128.7	1562645	2184020	3238992	2775878	4238964	2530386
4	0	0	0	0	0	0	0	0	1564218	1993396	2853073	0
5	0	0	0	0	0	0	0	0	915730.3	1278573	2357891	1752947
6	0	0	0	0	0	0	17497.8	855422	1711597	1777098	2347750	0
7	0	0	0	0	0	0	0	248986.1	1837952	2264105	2500998	3650710
8	0	0	0	0	0	0	0	232352.1	1825540	2176011	2430184	2215609
9	921487.3	0	0	0	0	0	0	445896.1	1579714	2022972	2359369	1410449
10	910296	0	0	0	0	971938.1	1572472	2103784	2213957	3311829	2288555	1892797
11	360428.8	0	0	0	0	406721.3	755162.9	1245834	2057007	1911728	3487424	1807765
12	3157071	0	0	0	0	0	138953.6	1079204	2072328	1823633	3243810	1524670
13	1314499	1795659	371460.9	112483.8	984830.8	1910772	1623642	2972948	3271198	3047546	3172995	2943583
14	0	0	0	0	0	0	0	0	1193355	1378703	1635746	1201434
15	0	550571.4	0	0	0	0	501179.9	1369504	1859885	2692797	3031365	1455387
16	0	0	0	0	0	0	0	0	0	0	657855	430751.3
17	0	0	0	0	0	0	0	0	834346.4	1140147	1620052	2591205
18	2449945	1292813	19070.81	92943.98	0	0	0	688453.6	1397197	1116506	1549239	2503112
19	0	0	0	0	0	0	0	0	274547.8	637036.2	1440260	0
20	0	0	0	0	0	0	0	0	997517.8	940317.2	2677295	682461.6

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	1175306	0	0	387986.2	1418473	2180187	2542598	3027144	3891325	4196196	0
3	0	163490.9	1054619	772715.4	0	621328.7	1384085	2005460	3066192	2597318	4066164	2351826
4	0	0	0	0	0	0	0	0	1391418	1814836	2680273	0
5	0	0	0	0	0	0	0	0	570130.3	921452.8	2012291	1395827
6	0	0	0	0	0	0	0	498302	1365997	1419978	2002150	0
7	0	0	0	0	0	0	0	0	1492352	1906985	2155398	3293590
8	0	0	0	0	0	0	0	0	1479940	1818891	2084584	1858489
9	564367.3	0	0	0	0	0	0	0	1061314	1487292	1840969	874768.9
10	374616	0	0	0	0	453538.1	1036792	1568104	1695556	2776149	1770155	1357117
11	0	0	0	0	0	0	219482.9	710153.8	1538607	1376048	2969024	1272085
12	2621391	0	0	0	0	0	0	543524	1553928	1287953	2725410	988989.6
13	778819.1	1311819	0	0	449150.8	1392372	1087962	2437268	2752798	2511866	2654595	2407903
14	0	0	0	0	0	0	0	0	674955	843023.2	1117346	665753.6
15	0	66731.44	0	0	0	0	0	833824.2	1341485	2157117	2512965	919706.8
16	0	0	0	0	0	0	0	0	0	0	139455	0
17	0	0	0	0	0	0	0	0	315946.4	604466.6	1101652	2055525
18	1914265	808972.5	0	0	0	0	0	152773.6	878796.6	580825.7	1030839	1967432
19	0	0	0	0	0	0	0	0	0	101356.2	921860.1	0
20	0	0	0	0	0	0	0	0	479117.8	404637.2	2158895	146781.6

Optimistic market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	1175306	0	0	387986.2	1418473	1998097	2474672	2913627	3783099	4101509	0
3	0	153135.9	1062419	829624.3	0	659540.4	1372283	1932981	2952675	2489092	3971477	2291423
4	0	0	0	0	0	0	0	0	1184090	1652316	2556911	0
5	0	0	0	0	0	0	0	0	112864.9	571388.8	1781025	1262515
6	0	0	0	0	0	0	0	320399.2	1121413	1193006	1836061	0
7	0	0	0	0	0	0	0	0	1254367	1683823	1991310	3199593
8	0	0	0	0	0	0	0	0	1241941	1595729	1920495	1764492
9	513669.2	0	0	0	0	0	0	0	762155.5	1211149	1669396	779562.3
10	502477.9	0	0	0	0	470549.5	960606.4	1348308	1396399	2500006	1598581	1261911
11	0	0	0	0	0	0	143298.1	490357	1239449	1099905	2797451	1176879
12	2749253	0	0	0	0	0	0	323727.2	1254770	1011810	2553837	893783.1
13	772171	1416193	10747.31	0	575003.8	1266486	858039.8	2030127	2260951	2025229	2289589	2155115
14	0	0	0	0	0	0	0	0	183109.2	356386.2	752339.5	412965.1
15	0	171105.4	0	0	0	0	0	426683.3	849638.7	1670480	2147959	666917.5
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	530559.9	1616313
18	1785335	848119.1	0	0	0	0	0	0	177887.8	0	459746.7	1528220
19	0	0	0	0	0	0	0	0	0	0	350768	0
20	0	0	0	0	0	0	0	0	0	0	1587803	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	1175306	0	0	387986.2	1418473	1998097	2474672	2913627	3783099	4101509	0
3	0	153135.9	1062419	829624.3	0	659540.4	1372283	1932981	2952675	2489092	3971477	2291423
4	0	0	0	0	0	0	0	0	1184090	1652316	2556911	0
5	0	0	0	0	0	0	0	0	112864.9	571388.8	1781025	1262515
6	0	0	0	0	0	0	0	320399.2	1121413	1193006	1819294	0
7	0	0	0	0	0	0	0	0	1467532	1683823	3260994	1887586
8	0	0	0	0	0	0	0	210182.5	1641725	1595729	3190180	1420514
9	99386.13	0	0	0	0	0	0	269446.4	1279520	1276094	1669396	944338
10	463583.6	0	0	0	0	789471.9	1352950	1348308	2666083	2500006	1598581	857199.9
11	0	0	0	0	0	146175.8	432870.3	793832.8	1325585	1099905	2797451	2488886
12	1437246	0	0	0	0	0	158776.4	902297.6	1254770	2323817	2553837	517197
13	537478.3	1183846	0	0	791525.9	1418131	858039.8	2030127	2260951	2025229	2289589	2155115
14	0	0	0	0	0	0	0	0	629981	625127.1	944200.6	458559.8
15	0	0	0	0	0	0	94785.89	541931.4	2119323	1670480	2147959	666917.5
16	0	0	0	0	0	0	0	0	0	0	355462.8	0
17	0	0	0	0	0	0	0	0	326146.6	0	1800244	1616313
18	1785335	400208.8	0	0	0	0	0	0	255331.4	0	1729431	216213.4
19	0	0	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	113702.3	1028896	318117.7	0

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin11												
1	0	0	0	0	0	0	0	0	1782587	2713355	3090960	2882495
2	0	1175306	0	0	387986.2	1418473	1998097	2474672	2913627	3961659	4274309	0
3	0	314415.9	1240979	1002424	0	832340.4	1550843	2111541	3125475	2667652	4144277	2469983
4	0	0	0	0	0	0	0	0	1356890	1830876	2729711	0
5	0	0	0	0	0	0	0	0	458464.9	928508.8	2126625	1619635
6	0	0	0	0	0	0	0	677519.2	1467013	1550126	2164894	0
7	0	0	0	0	0	0	0	324965.3	1813132	2040943	3606594	2244706
8	0	0	0	0	0	0	0	567302.6	1987325	1952849	3535780	1777634
9	456506.1	0	0	0	0	0	0	805126.4	1797920	1811774	2187796	1480018
10	999263.6	0	402006.3	0	261393.2	1307872	1888630	1883988	3184483	3035686	2116982	1392880
11	0	0	0	0	346273.2	664575.8	968550.3	1329513	1843985	1635585	3315851	3024566
12	1972926	0	0	0	0	0	694456.4	1437978	1773170	2859497	3072237	1052877
13	1073158	1667686	325952.7	22150.55	1327206	1936531	1393720	2565807	2779351	2560909	2807989	2690795
14	0	0	0	0	0	0	0	137400.2	1148381	1160807	1462601	994239.8
15	0	393372	0	0	0	12042.42	630465.9	1077611	2637723	2206160	2666359	1202598
16	0	0	0	0	0	0	0	0	0	0	873862.8	478919.5
17	0	0	0	0	0	0	0	61334.95	844546.6	516852.6	2318644	2151993
18	2321015	884048.8	0	10310.63	0	0	0	406319.9	773731.4	428756.9	2247831	751893.4
19	0	0	0	0	0	0	0	0	509016.8	340663.4	907332.2	0
20	0	0	0	0	0	0	0	0	632102.4	1564576	836517.6	397143.4

Optimistic market -scenario hydrothermal - inflow 12 (911in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583782.8
2	1878840	1112297	1596839	1136965	753460.6	1111961	1413261	1955008	3067602	2757878	3099312	4179324.8
3	2194465	0	0	0	0	0	0	1062484	2550677	2729528	2969280	0
4	0	0	0	0	0	0	0	924036.4	2697012	2646998	4142412	0
5	0	0	401156.2	379954.7	528353.4	1592250	2159556	2304279	4176996	2382758	4091244	2514518
6	0	0	0	0	0	0	773056.7	1918845	2670015	3664207	3841496	0
7	0	0	0	0	0	0	523239.4	1537743	2421138	2264105	2500998	0
8	0	0	0	0	0	1051526	1698696	2279974	2528386	3488018	3699868	2250609.5
9	0	0	0	0	0	0	0	617288.3	1448875	1675134	2359369	1998689.1
10	0	297831.5	105988.8	186769	1109901	1740458	2000043	2103784	3483641	3311829	3558239	3207867.3
11	562819.6	0	0	0	0	491480.2	1041068	1523482	2143143	3223735	3487424	623060.06
12	0	0	0	0	123741.6	1097480	1430448	1749035	2072328	3135640	3243810	0
13	520124.3	0	0	0	0	0	0	0	20542.5	849385	1571583	925258.44
14	0	1591852	0	0	0	0	18500.46	830253.9	1767276	1647444	1832497	1543481.8
15	0	0	0	0	0	0	0	583101.3	1782714	1380790	3031365	1455386.8
16	0	0	0	0	0	0	0	0	0	267773.2	1086639	821694.25
17	0	609210	0	0	280752.5	1270491	1271264	2620571	2815140	2516608	2889736	1279197.5
18	1137938	0	0	0	0	0	0	665480.4	1473801	1116506	2818924	1191104.8
19	0	857788.3	0	0	0	0	0	0	728590.8	955698.5	1455623	0
20	0	0	0	0	0	0	0	0	181141.9	470837.2	1356392	433969.25

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 - inflow 12 (911bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 911b in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583782.8
2	1878840	1112297	1596839	1136965	753460.6	1111961	1413261	1776448	2894802	2579318	2926512	4000764.8
3	2015905	0	0	0	0	0	0	883923.6	2377877	2550968	2796480	0
4	0	0	0	0	0	0	0	745476.4	2524212	2468438	3969612	0
5	0	0	44036.23	34354.69	171233.3	1246650	1802436	1947159	3831396	2025638	3745644	2157398
6	0	0	0	0	0	0	415936.7	1561725	2324415	3307087	3495896	0
7	0	0	0	0	0	0	166119.4	1180623	2075538	1906985	2155398	0
8	0	0	0	0	0	705925.6	1341576	1922854	2182786	3130898	3354268	1893489.5
9	0	0	0	0	0	0	0	81608.23	930474.9	1139454	1840969	1463009.1
10	0	0	0	0	574220.5	1222058	1464363	1568104	2965241	2776149	3039839	2672187.3
11	27139.65	0	0	0	0	0	505388.2	987802.4	1624743	2688055	2969024	87380.039
12	0	0	0	0	0	579079.7	894767.5	1213355	1553928	2599960	2725410	0
13	0	0	0	0	0	0	0	0	0	313705	1053183	389578.44
14	0	1108012	0	0	0	0	0	294573.9	1248876	1111764	1314097	1007801.8
15	0	0	0	0	0	0	0	47421.28	1264314	845109.9	2512965	919706.81
16	0	0	0	0	0	0	0	0	0	0	568238.9	286014.25
17	0	125370	0	0	0	752091.3	735583.5	2084891	2296740	1980928	2371336	743517.56
18	602257.8	0	0	0	0	0	0	129800.4	955400.6	580825.7	2300524	655424.75
19	0	373948.3	0	0	0	0	0	0	210190.8	420018.5	937222.8	0
20	0	0	0	0	0	0	0	0	0	0	837992.1	0

Optimistic market -scenario hydrothermal with wind addition - inflow 12 (912in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 912in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583782.8
2	1878840	1112297	1596839	1136965	753460.6	1111961	1231171	1708522	2781285	2471092	2831825	3942682
3	2104330	0	0	0	0	0	0	714567.7	2210581	2411617	2701793	0
4	0	0	0	0	0	0	0	622666.3	2381595	2360212	3874925	0
5	0	0	0	12389.77	166816.6	1240700	1705763	1781677	3593396	1802477	3581556	2063401.1
6	0	0	0	0	0	0	338875.3	1389359	2086415	3083926	3331808	0
7	0	0	0	0	0	0	98981.06	1013719	1836784	1683823	1991310	0
8	0	0	0	0	0	754815.3	1276982	1757372	1944786	2907736	3190180	1799492.6
9	0	0	0	0	0	0	0	0	631313.4	863309.6	1669396	1367800.8
10	0	32634	0	0	823970.6	1239069	1388178	1348308	2666083	2500006	2868266	2576980.5
11	155001.2	0	0	0	0	0	429203.3	768006.4	1325585	2411912	2797451	0
12	0	0	0	0	0	596091.1	818583.1	993558.9	1254770	2323817	2553837	0
13	0	0	0	0	0	0	0	0	0	0	688176.6	136789.92
14	0	1212386	0	0	0	0	0	0	757029.4	625127.1	949090.8	755013.25
15	0	0	0	0	0	0	0	0	772467.9	358472.9	2147959	666917.5
16	0	0	0	0	0	0	0	0	0	0	203232.7	33225.703
17	0	164516.6	0	0	0	578647.3	457979.2	1475869	1595831	1293180	1800244	304306.19
18	473327.9	0	0	0	0	0	0	0	254491.9	0	1729431	216213.38
19	0	413094.9	0	0	0	0	0	0	0	0	366130.6	0
20	0	0	0	0	0	0	0	0	0	0	266899.9	0

Optimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913in12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583782.8
2	1878840	1112297	1596839	1136965	753460.6	1111961	1231171	1708522	2781285	2471092	2831825	3942682
3	2104330	0	0	0	0	0	0	714567.7	2210581	2411617	2701793	0
4	0	0	0	0	0	0	0	622666.3	2381595	2360212	3874925	0
5	0	0	0	12389.77	166816.6	1240700	1705763	1781677	3593396	1802477	3581556	2063401.1
6	0	0	0	0	0	0	338875.3	1389359	2086415	3083926	3331808	0
7	0	0	0	0	0	0	298912.5	1187605	1968590	1683823	3260994	0
8	0	0	0	0	0	958700.4	1508474	1757372	3214470	2907736	1920495	1799492.6
9	0	0	0	0	0	0	0	376101.1	1035336	1171615	1669396	1531627.9
10	0	143749.6	100950.8	0	1237550	1497265	1454621	2660315	2666083	2500006	2868266	1264973.6
11	11148.38	0	0	0	0	413722.6	861485.9	1081654	1325585	2411912	2797451	0
12	0	0	0	0	254782.9	937042.8	1149968	993558.9	2524454	2323817	2553837	0
13	12860.88	0	0	0	0	0	0	0	216254.5	701392.2	1019905	351531.28
14	0	1922777	0	0	0	0	0	299845.8	920452.5	625127.1	2218775	644487.13
15	0	0	0	0	0	0	0	400560.4	849638.7	1670480	2147959	666917.5
16	0	0	0	0	0	0	0	0	147259.7	87234	650264.1	258059.02
17	0	625639.9	0	0	191453.6	886460.6	457979.2	1475869	1595831	1293180	1800244	1616313.1
18	71117.39	0	0	0	0	0	0	0	255331.4	1205084	1729431	216213.38
19	0	377853.7	0	0	0	0	0	0	0	0	388932.2	0
20	0	0	0	0	0	0	0	0	0	0	318117.7	0

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EENS 913bin12												
1	0	0	0	0	352664.7	1300756	1875358	2244655	3019563	2785238	3090960	2583782.8
2	1878840	1112297	1596839	1136965	753460.6	1111961	1231171	1708522	2781285	2649652	3004625	4121242
3	2282890	0	0	0	0	0	0	893127.7	2383381	2590177	2874593	0
4	0	0	0	0	0	0	0	801226.3	2554395	2538772	4047725	0
5	0	0	38307.28	357989.8	523936.6	1586300	2062883	2138797	3938996	2159597	3927156	2420521.3
6	0	0	0	0	0	0	695995.3	1746479	2432015	3441046	3677408	0
7	0	0	0	0	0	0	656032.6	1544725	2314191	2040943	3606594	0
8	0	0	0	0	0	1304300	1865594	2114492	3560070	3264856	2266095	2156612.5
9	0	0	0	0	0	0	307622.9	911781.1	1553737	1707295	2187796	2067307.9
10	0	627589.6	636630.8	495748.8	1773230	2015665	1990301	3195995	3184483	3035686	3386666	1800653.6
11	546828.4	0	0	0	0	932122.6	1397166	1617334	1843985	2947592	3315851	428080.44
12	0	0	0	0	790462.9	1455443	1685648	1529239	3042854	2859497	3072237	0
13	548540.9	0	0	0	0	0	0	0	734654.5	1237072	1538305	887211.25
14	0	2406617	0	0	0	50809.22	239613.8	835525.8	1438853	1160807	2737175	1180167.1
15	0	0	0	0	0	0	8585.789	936240.4	1368039	2206160	2666359	1202597.5
16	0	0	0	0	0	0	0	0	665659.7	622914	1168664	793739
17	0	1109480	0	0	727133.6	1404861	993659.3	2011549	2114231	1828860	2318644	2151993
18	606797.4	0	0	0	0	0	75274.78	473789.2	773731.4	1740764	2247831	751893.38
19	0	861693.6	0	0	0	0	0	0	341194.2	340663.4	907332.2	0
20	0	0	0	0	0	0	0	0	0	204965.5	836517.6	152461.88

APPENDIX 7

ENERGY EXPECTED FORPESSIMISTIC MARKET, REFERENCE MARKET ANDOPTIMISTIC MARKET (MWH)

Energy Expected (EE) Pessimistic market												
1	4719265	4314463	4839023	4626825	4743951	4532614	4732254	4808307	4776814	5070992	4981785	5156603
2	4954652	4529660	5080384	4857601	4980569	4758691	4968289	5048135	5015072	5323923	5230266	5413804
3	5205682	4759157	5337784	5103715	5232912	4999793	5220010	5303902	5269163	5593663	5495260	5688097
4	5559107	5082266	5700177	5450216	5588186	5339239	5574407	5663995	5626898	5973428	5868345	6074274
5	5862860	5359965	6011639	5748020	5893528	5630979	5878997	5973480	5934355	6299820	6188995	6406177
6	6143758	5616769	6299665	6023416	6175896	5900767	6160668	6259678	6218679	6601654	6485519	6713106
7	6445752	5892859	6609323	6319494	6479469	6190817	6463493	6567370	6524355	6926155	6804312	7043086
8	6785375	6203350	6957564	6652465	6820869	6517008	6804051	6913401	6868120	7291091	7162827	7414182
9	7052922	6447948	7231901	6914771	7089815	6773973	7072334	7185996	7138929	7578578	7445257	7706523
10	7347410	6717176	7533862	7203491	7385844	7056814	7367633	7486040	7437009	7895014	7756127	8028301
11	7740377	7014265	7791210	7564478	7842044	7613671	7892877	7918294	7687462	7969127	7736655	8019960
12	8045377	7289749	8096210	7859639	8147044	7908833	8197877	8223294	7982623	8274127	8031817	8324961
13	8350377	7565233	8401211	8154801	8452044	8203994	8502877	8528294	8277784	8579127	8326978	8629961
14	8655377	7840717	8706211	8449962	8757044	8499155	8807877	8833294	8572946	8884127	8622139	8934961
15	8960377	8116201	9011211	8745123	9062044	8794317	9112877	9138294	8868107	9189127	8917301	9239961
16	9265377	8391685	9316211	9040285	9367044	9089478	9417877	9443294	9163269	9494127	9212462	9544961
17	9570377	8667169	9621211	9335446	9672044	9384640	9722878	9748294	9458430	9799128	9507623	9849961
18	9875378	8942653	9926211	9630607	9977044	9679801	10027878	10053294	9753591	10104128	9802785	10154961
19	10180378	9218137	10231211	9925769	10282044	9974962	10332878	10358294	10048753	10409128	10097946	10459961
20	10494118	9501616	10545176	10229714	10596233	10279125	10647291	10672820	10353241	10723878	10402651	10774935

Energy Expected (EE) Reference market												
1	4719265	4314463	4839023	4626825	4743951	4532614	4732254	4808307	4776814	5070992	4981785	5156603
2	4954652	4529660	5080384	4857601	4980569	4758691	4968289	5048135	5015072	5323923	5230266	5413804
3	5205682	4759157	5337784	5103715	5232912	4999793	5220010	5303902	5269163	5593663	5495260	5688097
4	5559107	5082266	5700177	5450216	5588186	5339239	5574407	5663995	5626898	5973428	5868345	6074274
5	5862860	5359965	6011639	5748020	5893528	5630979	5878997	5973480	5934355	6299820	6188995	6406177
6	6143758	5616769	6299665	6023416	6175896	5900767	6160668	6259678	6218679	6601654	6485519	6713106
7	6445752	5892859	6609323	6319494	6479469	6190817	6463493	6567370	6524355	6926155	6804312	7043086
8	6785375	6203350	6957564	6652465	6820869	6517008	6804051	6913401	6868120	7291091	7162827	7414182
9	7052922	6447948	7231901	6914771	7089815	6773973	7072334	7185996	7138929	7578578	7445257	7706523
10	7347410	6717176	7533862	7203491	7385844	7056814	7367633	7486040	7437009	7895014	7756127	8028301
11	7740377	7014265	7791210	7564478	7842044	7613671	7892877	7918294	7687462	7969127	7736655	8019960
12	8045377	7289749	8096210	7859639	8147044	7908833	8197877	8223294	7982623	8274127	8031817	8324961
13	8350377	7565233	8401211	8154801	8452044	8203994	8502877	8528294	8277784	8579127	8326978	8629961
14	8655377	7840717	8706211	8449962	8757044	8499155	8807877	8833294	8572946	8884127	8622139	8934961
15	8960377	8116201	9011211	8745123	9062044	8794317	9112877	9138294	8868107	9189127	8917301	9239961
16	9265377	8391685	9316211	9040285	9367044	9089478	9417877	9443294	9163269	9494127	9212462	9544961
17	9570377	8667169	9621211	9335446	9672044	9384640	9722878	9748294	9458430	9799128	9507623	9849961
18	9875378	8942653	9926211	9630607	9977044	9679801	10027878	10053294	9753591	10104128	9802785	10154961
19	10180378	9218137	10231211	9925769	10282044	9974962	10332878	10358294	10048753	10409128	10097946	10459961
20	10494118	9501616	10545176	10229714	10596233	10279125	10647291	10672820	10353241	10723878	10402651	10774935

Energy Expected (EE) Optmisitc market												
1	4719265	4314463	4839023	4626825	4743951	4532614	4732254	4808307	4776814	5070992	4981785	5156603
2	4954652	4529660	5080384	4857601	4980569	4758691	4968289	5048135	5015072	5323923	5230266	5413804
3	5205682	4759157	5337784	5103715	5232912	4999793	5220010	5303902	5269163	5593663	5495260	5688097
4	5559107	5082266	5700177	5450216	5588186	5339239	5574407	5663995	5626898	5973428	5868345	6074274
5	5862860	5359965	6011639	5748020	5893528	5630979	5878997	5973480	5934355	6299820	6188995	6406177
6	6143758	5616769	6299665	6023416	6175896	5900767	6160668	6259678	6218679	6601654	6485519	6713106
7	6445752	5892859	6609323	6319494	6479469	6190817	6463493	6567370	6524355	6926155	6804312	7043086
8	6785375	6203350	6957564	6652465	6820869	6517008	6804051	6913401	6868120	7291091	7162827	7414182
9	7052922	6447948	7231901	6914771	7089815	6773973	7072334	7185996	7138929	7578578	7445257	7706523
10	7347410	6717176	7533862	7203491	7385844	7056814	7367633	7486040	7437009	7895014	7756127	8028301
11	7740377	7014265	7791210	7564478	7842044	7613671	7892877	7918294	7687462	7969127	7736655	8019960
12	8045377	7289749	8096210	7859639	8147044	7908833	8197877	8223294	7982623	8274127	8031817	8324961
13	8350377	7565233	8401211	8154801	8452044	8203994	8502877	8528294	8277784	8579127	8326978	8629961
14	8655377	7840717	8706211	8449962	8757044	8499155	8807877	8833294	8572946	8884127	8622139	8934961
15	8960377	8116201	9011211	8745123	9062044	8794317	9112877	9138294	8868107	9189127	8917301	9239961
16	9265377	8391685	9316211	9040285	9367044	9089478	9417877	9443294	9163269	9494127	9212462	9544961
17	9570377	8667169	9621211	9335446	9672044	9384640	9722878	9748294	9458430	9799128	9507623	9849961
18	9875378	8942653	9926211	9630607	9977044	9679801	10027878	10053294	9753591	10104128	9802785	10154961
19	10180378	9218137	10231211	9925769	10282044	9974962	10332878	10358294	10048753	10409128	10097946	10459961
20	10494118	9501616	10545176	10229714	10596233	10279125	10647291	10672820	10353241	10723878	10402651	10774935

APPENDIX 8

LOSS OF LOAD PROBABILITY

LOLP

PESSIMISTIC MARKET, REFERENCE MARKET, AND

OPTMISITC MARKET

Pessimistic market -scenario hydrothermal - (911)

Year	LOLP - Scenario 911											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	1.59%	2.16%	0.00%	0.00%	5.10%	5.08%	4.61%	14.24%	2.45%	12.33%	16.73%
3	0.00%	12.07%	0.00%	0.00%	0.00%	10.80%	0.00%	0.00%	0.00%	0.00%	10.65%	1.65%
4	0.00%	3.86%	0.00%	2.43%	0.17%	0.00%	0.00%	0.00%	1.83%	0.00%	0.00%	2.07%
5	0.65%	0.00%	0.00%	3.89%	8.26%	0.00%	0.00%	0.00%	9.64%	0.00%	0.00%	4.76%
6	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	1.83%	0.00%	0.00%	0.08%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.19%	1.12%	0.00%	0.00%	0.00%	0.00%
8	0.00%	1.04%	0.00%	0.00%	1.08%	0.00%	1.00%	0.00%	0.00%	0.00%	0.00%	0.53%
9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 (911b)

Year	LOLP - Scenario 911b											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	1.01%	1.57%	0.00%	0.00%	4.22%	4.20%	4.03%	13.07%	1.57%	11.16%	15.27%
3	0.00%	10.96%	0.00%	0.00%	0.00%	9.41%	0.00%	0.00%	0.00%	0.00%	9.25%	1.10%
4	0.00%	3.09%	0.00%	1.81%	0.00%	0.00%	0.00%	0.00%	1.31%	0.00%	0.00%	1.55%
5	0.16%	0.00%	0.00%	2.42%	6.02%	0.00%	0.00%	0.00%	6.08%	0.00%	0.00%	2.65%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.32%	0.00%	0.00%	0.00%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.30%	0.68%	0.00%	0.00%	0.00%	0.00%
8	0.00%	0.20%	0.00%	0.00%	0.22%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.11%
9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Pessimistic market -scenario hydrothermal with wind addition (912)

Year	LOLP - Scenario 912											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	0.05%	0.36%	0.00%	0.00%	3.12%	3.17%	3.41%	12.13%	0.94%	10.52%	14.24%
3	0.00%	10.09%	0.00%	0.00%	0.00%	8.44%	0.00%	0.00%	0.00%	0.00%	8.05%	0.94%
4	0.00%	2.32%	0.00%	1.14%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	1.02%
5	0.00%	0.00%	0.00%	1.79%	5.11%	0.00%	0.00%	0.00%	5.13%	0.00%	0.00%	1.88%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	0.47%	0.00%	0.00%	0.00%	0.00%
8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion (913)												
Year	LOLP - Scenario 913											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	0.05%	0.36%	0.00%	0.00%	3.12%	3.17%	3.41%	12.13%	0.94%	10.52%	12.78%
3	0.00%	10.09%	0.00%	0.00%	0.00%	8.44%	0.00%	0.00%	0.00%	0.00%	8.05%	0.66%
4	0.00%	2.32%	0.00%	1.14%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.71%
5	0.00%	0.00%	0.00%	1.79%	5.11%	0.00%	0.00%	0.00%	5.13%	0.00%	0.00%	1.30%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.47%	0.00%	0.00%	0.00%	0.00%
8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction (913b)												
Year	LOLP - Scenario 913a											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	0.34%	0.82%	0.00%	0.00%	4.01%	3.75%	3.99%	12.71%	1.39%	11.11%	15.13%
3	0.00%	11.20%	0.00%	0.00%	0.00%	9.84%	0.00%	0.00%	0.00%	0.00%	9.45%	1.23%
4	0.00%	3.09%	0.00%	1.66%	0.00%	0.00%	0.00%	0.00%	1.11%	0.00%	0.00%	1.54%
5	0.00%	0.00%	0.00%	2.95%	6.88%	0.00%	0.00%	0.00%	8.28%	0.00%	0.00%	3.55%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.70%	0.91%	0.00%	0.00%	0.00%	0.00%
8	0.00%	0.41%	0.00%	0.00%	0.33%	0.00%	0.53%	0.00%	0.00%	0.00%	0.00%	0.00%
9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Reference market -scenario hydrothermal (911)												
Year	LOLP - Scenario 911											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	2.41%	2.99%	0.00%	0.00%	6.15%	6.37%	5.25%	15.51%	3.74%	13.26%	18.08%
3	0.66%	15.34%	0.00%	0.37%	1.50%	13.44%	0.33%	0.00%	0.34%	0.61%	13.70%	3.29%
4	0.92%	9.43%	1.25%	5.71%	2.04%	0.63%	0.00%	0.00%	5.62%	0.93%	1.20%	4.55%
5	2.78%	2.05%	0.00%	8.29%	15.71%	0.69%	0.00%	0.00%	18.62%	1.25%	0.18%	12.66%
6	4.00%	0.00%	3.58%	0.17%	3.41%	0.75%	3.50%	3.91%	8.08%	0.25%	0.68%	5.04%
7	0.27%	2.76%	0.85%	0.00%	4.43%	0.08%	8.00%	4.67%	2.68%	0.55%	2.59%	1.99%
8	0.00%	6.50%	4.40%	0.68%	6.11%	0.00%	7.16%	0.00%	2.97%	0.00%	1.95%	6.54%
9	0.86%	3.25%	7.67%	4.54%	0.31%	0.64%	2.87%	0.95%	4.52%	0.90%	0.55%	0.70%
10	3.14%	0.19%	1.84%	0.00%	0.30%	3.19%	3.31%	0.24%	1.84%	0.24%	1.88%	6.08%
11	3.98%	0.00%	0.00%	0.00%	1.02%	0.00%	1.02%	0.00%	3.90%	0.00%	1.02%	2.04%
12	0.00%	0.00%	0.00%	0.00%	1.32%	0.75%	0.00%	0.00%	0.00%	0.57%	1.45%	1.32%
13	0.00%	0.00%	0.00%	1.18%	0.00%	0.00%	0.00%	0.00%	0.78%	0.82%	2.07%	0.00%
14	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Reference market -scenario hydrothermal plus thermal equivalent to wind in 912 (911b)												
Year	LOLP - Scenario 911b											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	1.83%	2.41%	0.00%	0.00%	5.27%	5.49%	4.66%	14.34%	2.86%	12.09%	16.62%
3	0.38%	13.94%	0.00%	0.10%	0.94%	12.05%	0.06%	0.00%	0.07%	0.33%	12.21%	2.47%
4	0.40%	8.39%	0.73%	4.93%	1.52%	0.38%	0.00%	0.00%	4.83%	0.65%	0.95%	3.78%
5	1.79%	1.07%	0.00%	6.05%	12.75%	0.00%	0.00%	0.00%	13.45%	0.32%	0.00%	9.68%
6	2.58%	0.00%	2.18%	0.00%	2.01%	0.27%	2.08%	2.49%	5.24%	0.00%	0.22%	3.64%
7	0.00%	1.09%	0.41%	0.00%	3.07%	0.00%	5.75%	3.18%	1.34%	0.11%	1.24%	1.09%
8	0.00%	4.36%	2.69%	0.08%	4.40%	0.00%	4.69%	0.00%	1.27%	0.00%	0.66%	4.40%
9	0.00%	1.28%	5.09%	2.65%	0.00%	0.00%	1.37%	0.00%	2.65%	0.00%	0.00%	0.00%
10	1.80%	0.00%	1.08%	0.00%	0.00%	1.71%	2.06%	0.00%	1.08%	0.00%	0.98%	3.72%
11	1.71%	0.00%	0.00%	0.00%	0.45%	0.00%	0.46%	0.00%	1.62%	0.00%	0.46%	0.91%
12	0.00%	0.00%	0.00%	0.00%	0.22%	0.19%	0.00%	0.00%	0.00%	0.03%	0.36%	0.22%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Reference market -scenario hydrothermal with wind addition (912)												
Year	LOLP - Scenario 912											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	0.79%	1.35%	0.00%	0.00%	4.52%	4.12%	4.15%	13.40%	1.57%	11.43%	15.58%
3	0.00%	12.53%	0.00%	0.00%	0.28%	11.32%	0.00%	0.00%	0.00%	0.00%	11.27%	2.06%
4	0.00%	5.64%	0.21%	4.18%	1.03%	0.00%	0.00%	0.00%	3.70%	0.33%	0.49%	3.12%
5	1.02%	0.41%	0.00%	4.87%	9.60%	0.00%	0.00%	0.00%	12.69%	0.00%	0.00%	8.06%
6	1.73%	0.00%	0.96%	0.00%	1.16%	0.00%	1.13%	1.62%	4.36%	0.00%	0.00%	2.88%
7	0.00%	0.49%	0.00%	0.00%	2.59%	0.00%	4.60%	2.38%	0.59%	0.00%	0.91%	0.39%
8	0.00%	3.49%	2.01%	0.00%	3.59%	0.00%	3.97%	0.00%	0.47%	0.00%	0.18%	3.59%
9	0.00%	0.96%	4.11%	2.13%	0.00%	0.00%	0.00%	0.00%	2.13%	0.00%	0.00%	0.00%
10	1.28%	0.00%	0.89%	0.00%	0.00%	1.06%	1.56%	0.00%	0.89%	0.00%	0.67%	2.78%
11	0.66%	0.00%	0.00%	0.00%	0.15%	0.00%	0.27%	0.00%	0.72%	0.00%	0.27%	0.42%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Reference market -scenario hydrothermal with wind addition and hydro expansion (913)												
Year	LOLP - Scenario 913											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	0.79%	1.35%	0.00%	0.00%	4.52%	4.12%	4.15%	13.40%	1.57%	11.43%	15.58%
3	0.00%	12.53%	0.00%	0.00%	0.28%	11.32%	0.00%	0.00%	0.00%	0.00%	11.27%	2.06%
4	0.00%	5.64%	0.21%	4.18%	1.03%	0.00%	0.00%	0.00%	3.70%	0.33%	0.49%	3.12%
5	1.02%	0.41%	0.00%	4.87%	9.60%	0.00%	0.00%	0.00%	12.69%	0.00%	0.00%	8.06%
6	1.73%	0.00%	0.96%	0.00%	1.16%	0.00%	1.11%	1.62%	4.36%	0.00%	0.00%	2.88%
7	0.00%	0.59%	0.01%	0.00%	2.59%	0.00%	4.62%	2.38%	0.64%	0.00%	0.91%	0.39%
8	0.00%	3.53%	2.01%	0.00%	3.59%	0.00%	3.97%	0.00%	1.72%	0.00%	0.29%	3.59%
9	0.00%	0.96%	4.88%	2.13%	0.00%	0.00%	1.17%	0.00%	2.13%	0.00%	0.00%	0.00%
10	1.06%	0.00%	0.89%	0.00%	0.00%	1.95%	2.39%	0.00%	1.50%	0.00%	1.06%	2.43%
11	0.66%	0.00%	0.00%	0.27%	0.42%	0.27%	0.27%	0.00%	0.87%	0.00%	0.48%	0.42%
12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction (913b)												
Year	Scenario 913b											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	0.00%	1.37%	1.94%	0.00%	0.00%	5.40%	5.01%	4.74%	13.98%	2.38%	12.01%	16.46%
3	0.00%	13.89%	0.00%	0.00%	0.56%	12.72%	0.00%	0.00%	0.00%	0.00%	12.67%	2.62%
4	0.25%	6.68%	0.58%	4.97%	1.29%	0.18%	0.00%	0.00%	4.48%	0.60%	0.75%	3.64%
5	1.62%	1.02%	0.00%	6.90%	12.56%	0.00%	0.00%	0.00%	17.39%	0.32%	0.00%	10.91%
6	3.15%	0.00%	1.90%	0.00%	2.56%	0.19%	2.38%	3.04%	6.97%	0.00%	0.00%	3.82%
7	0.00%	1.49%	0.45%	0.00%	3.70%	0.00%	6.87%	3.75%	1.98%	0.09%	1.81%	1.16%
8	0.00%	5.48%	3.43%	0.38%	5.23%	0.00%	6.30%	0.00%	3.21%	0.00%	1.49%	5.48%
9	0.34%	2.40%	7.97%	3.77%	0.25%	0.29%	2.24%	0.55%	3.77%	0.34%	0.29%	0.52%
10	2.29%	0.05%	1.47%	0.00%	0.05%	3.71%	4.17%	0.05%	2.75%	0.05%	2.29%	4.79%
11	2.94%	0.00%	0.00%	0.83%	1.56%	0.83%	0.83%	0.00%	3.72%	0.00%	1.62%	1.56%
12	0.00%	0.00%	0.00%	0.39%	0.85%	0.85%	0.00%	0.39%	0.39%	0.39%	0.46%	1.24%
13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.14%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Optimistic market -scenario hydrothermal (911)												
Year	LOLP - Scenario 911											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	7.47%	13.97%	14.56%	8.19%	5.18%	23.39%	18.00%	21.90%	36.57%	16.58%	32.45%	40.00%
3	9.4 i%	35.50%	4.01%	12.68%	12.71%	31.18%	8.12%	3.83%	13.24%	9.06%	31.37%	18.20%
4	11.01%	23.18%	15.56%	16.52%	10.72%	10.22%	4.37%	3.39%	22.87%	8.97%	9.50%	15.42%
5	16.87%	12.70%	1.60%	23.40%	32.15%	12.20%	7.41%	0.00%	43.95%	10.34%	8.86%	28.84%
6	17.11%	6.42%	18.26%	6.35%	15.80%	11.29%	16.03%	14.75%	25.88%	8.58%	8.99%	17.25%
7	8.91%	16.51%	7.46%	5.32%	15.04%	6.25%	24.00%	21.75%	13.76%	5.98%	13.42%	11.82%
8	2.23%	23.74%	16.32%	9.54%	20.18%	2.89%	25.77%	0.68%	16.53%	4.42%	10.78%	20.63%
9	9.83%	23.79%	23.66%	17.91%	8.41%	8.80%	13.46%	9.50%	17.67%	12.07%	10.21%	9.46%
10	20.94%	6.71%	11.65%	2.34%	7.79%	17.72%	16.45%	6.92%	16.86%	8.06%	17.11%	23.66%
11	25.39%	5.23%	8.93%	8.63%	13.56%	6.05%	12.11%	6.04%	21.19%	9.73%	12.97%	14.11%
12	3.15%	7.07%	3.50%	9.34%	12.95%	8.86%	0.80%	9.12%	17.08%	11.14%	13.53%	13.34%
13	0.00%	6.44%	0.74%	13.71%	2.60%	6.18%	5.60%	6.77%	13.60%	11.62%	23.53%	3.89%
14	4.46%	9.55%	0.42%	6.38%	2.04%	6.88%	2.30%	6.13%	5.16%	13.14%	5.22%	8.91%
15	4.03%	9.25%	5.15%	6.45%	0.72%	2.63%	2.67%	6.90%	0.91%	7.54%	10.70%	7.68%
16	10.05%	10.50%	4.83%	0.52%	6.41%	0.51%	10.98%	6.09%	7.40%	2.70%	0.98%	1.96%
17	11.31%	6.19%	5.95%	0.63%	4.06%	3.46%	6.56%	4.06%	7.54%	5.18%	5.41%	13.60%
18	5.88%	8.47%	1.73%	5.11%	6.29%	6.88%	0.86%	5.89%	5.89%	3.01%	9.42%	7.13%
19	1.76%	4.76%	3.37%	3.34%	6.37%	7.19%	3.60%	4.02%	3.47%	3.20%	1.94%	3.29%
20	3.15%	2.94%	3.44%	4.58%	1.43%	1.42%	2.99%	2.10%	0.00%	4.20%	4.23%	1.95%

Optimistic market -scenario hydrothermal plus thermal equivalent to wind in 912 (911b)												
Year	LOLP - Scenario 911b											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	6.60%	12.80%	13.39%	7.31%	4.60%	21.93%	16.83%	20.74%	35.41%	15.12%	31.28%	38.53%
3	8.58%	33.26%	3.17%	11.29%	11.60%	28.67%	7.29%	3.28%	12.02%	8.23%	28.61%	16.81%
4	9.97%	21.38%	14.25%	15.21%	9.68%	9.18%	3.59%	2.86%	21.28%	7.93%	8.72%	14.38%
5	14.51%	10.22%	1.12%	19.60%	28.20%	9.97%	5.19%	0.00%	38.30%	8.37%	6.88%	23.89%
6	14.45%	4.73%	15.43%	4.88%	11.69%	8.49%	13.67%	12.39%	21.52%	6.69%	7.09%	14.89%
7	7.04%	13.81%	6.12%	3.98%	12.78%	4.90%	20.40%	17.07%	10.68%	4.64%	11.31%	9.56%
8	1.35%	19.20%	13.70%	7.41%	16.76%	1.62%	21.23%	0.26%	13.15%	3.15%	8.79%	17.64%
9	6.77%	16.91%	18.70%	13.32%	6.16%	6.25%	10.05%	6.78%	13.35%	7.75%	6.81%	6.37%
10	14.77%	4.35%	8.68%	0.98%	5.43%	13.58%	12.28%	4.68%	11.80%	5.69%	12.37%	18.25%
11	19.42%	3.21%	6.08%	5.87%	9.57%	4.36%	8.69%	3.77%	16.11%	6.36%	8.71%	9.58%
12	1.42%	4.33%	1.75%	6.07%	9.30%	6.44%	0.07%	5.84%	10.98%	7.84%	10.09%	9.93%
13	0.00%	4.33%	0.22%	10.45%	0.98%	3.99%	3.49%	4.29%	9.76%	8.53%	17.79%	1.76%
14	2.94%	6.64%	0.00%	3.88%	0.81%	4.33%	0.79%	3.67%	3.13%	9.40%	3.19%	5.88%
15	2.53%	6.78%	3.18%	3.99%	0.16%	0.71%	0.95%	4.93%	0.37%	5.09%	7.31%	5.22%
16	7.66%	7.14%	2.70%	0.05%	3.79%	0.04%	7.83%	4.19%	5.01%	1.30%	0.13%	0.77%
17	7.67%	4.02%	3.99%	0.17%	2.23%	1.84%	3.15%	2.02%	4.97%	3.50%	3.57%	9.70%
18	3.75%	5.23%	0.83%	3.32%	4.05%	4.32%	0.42%	3.64%	3.76%	1.52%	6.22%	4.43%
19	0.47%	2.02%	1.63%	1.61%	3.66%	4.70%	1.87%	2.73%	1.51%	1.47%	0.84%	1.60%
20	1.46%	1.25%	1.52%	2.81%	0.33%	0.52%	1.30%	0.80%	0.00%	2.60%	2.55%	0.67%

Optimistic market -scenario hydrothermal with wind addition (912)												
Year	LOLP - Scenario 912											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	5.52%	11.57%	12.16%	6.56%	3.92%	20.89%	16.10%	19.80%	34.46%	14.17%	30.34%	37.49%
3	7.27%	32.61%	2.21%	10.56%	10.01%	28.48%	5.98%	2.50%	10.77%	6.92%	28.03%	16.05%
4	9.05%	20.84%	13.33%	14.39%	8.37%	8.34%	2.84%	2.26%	20.40%	6.85%	7.99%	13.69%
5	12.99%	9.00%	0.55%	18.34%	27.27%	8.42%	3.39%	0.00%	37.57%	6.72%	5.24%	22.40%
6	12.97%	4.03%	14.24%	4.17%	10.30%	7.63%	12.31%	11.18%	20.53%	5.50%	5.99%	13.71%
7	6.11%	12.59%	5.32%	3.18%	11.65%	4.10%	19.32%	16.65%	9.67%	3.84%	10.39%	8.46%
8	1.24%	18.60%	12.55%	6.33%	15.86%	1.12%	20.59%	0.06%	12.19%	2.39%	7.92%	16.54%
9	5.79%	16.43%	17.65%	11.93%	5.22%	5.27%	8.81%	5.80%	12.04%	6.52%	5.76%	5.29%
10	14.20%	3.66%	7.49%	0.93%	4.49%	12.32%	11.03%	3.84%	10.91%	4.75%	11.25%	17.31%
11	18.91%	2.40%	5.17%	4.96%	8.36%	3.55%	7.68%	2.86%	15.12%	5.79%	7.49%	8.50%
12	0.85%	3.36%	1.06%	4.97%	8.12%	5.43%	0.00%	4.78%	10.92%	6.66%	9.12%	8.86%
13	0.00%	2.73%	0.00%	8.21%	0.35%	2.40%	2.15%	2.69%	7.40%	6.53%	15.66%	0.83%
14	1.64%	4.95%	0.00%	2.59%	0.30%	2.40%	0.35%	2.18%	1.78%	7.46%	1.65%	4.15%
15	1.28%	5.02%	1.69%	2.35%	0.00%	0.27%	0.37%	3.44%	0.03%	3.60%	5.54%	3.68%
16	5.86%	5.52%	1.26%	0.00%	2.03%	0.00%	6.02%	2.82%	3.35%	0.73%	0.00%	0.21%
17	4.96%	1.94%	1.88%	0.00%	0.53%	0.46%	0.85%	0.33%	2.93%	1.80%	1.88%	6.71%
18	1.80%	2.92%	0.27%	1.68%	1.81%	1.81%	0.00%	1.70%	1.81%	0.39%	4.07%	2.27%
19	0.00%	0.62%	0.32%	0.32%	1.82%	2.44%	0.32%	1.36%	0.51%	0.32%	0.29%	0.64%
20	0.25%	0.15%	0.25%	1.27%	0.00%	0.07%	0.25%	0.22%	0.00%	1.27%	1.27%	0.21%

Optimistic market -scenario hydrothermal with wind addition and hydro expansion (913)												
Year	LOLP - Scenario 913											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	5.52%	11.57%	12.16%	6.56%	3.92%	20.89%	16.10%	19.80%	34.46%	14.17%	30.34%	37.49%
3	7.27%	32.61%	2.21%	10.56%	10.01%	28.48%	5.98%	2.50%	10.77%	6.92%	28.03%	16.05%
4	9.05%	20.84%	13.33%	14.39%	8.37%	8.34%	2.84%	2.26%	20.40%	6.85%	7.99%	13.69%
5	12.99%	9.00%	0.55%	18.34%	27.27%	8.42%	3.39%	0.00%	37.57%	6.72%	5.24%	22.40%
6	12.96%	3.92%	14.24%	4.07%	10.29%	7.61%	12.28%	11.18%	20.53%	5.36%	5.97%	13.71%
7	6.78%	13.11%	5.82%	3.57%	13.96%	4.80%	21.03%	16.52%	10.04%	4.40%	10.60%	10.73%
8	1.39%	19.30%	15.11%	6.97%	18.32%	2.11%	19.74%	0.47%	14.23%	3.83%	9.78%	17.07%
9	7.91%	16.49%	19.26%	12.80%	5.68%	6.43%	9.66%	6.83%	13.42%	7.43%	6.47%	6.75%
10	14.35%	4.91%	9.06%	1.64%	6.01%	14.36%	13.59%	7.35%	13.33%	7.54%	12.98%	18.38%
11	19.18%	3.62%	7.26%	7.38%	10.59%	5.76%	8.05%	4.29%	17.05%	6.57%	9.79%	9.59%
12	2.31%	4.62%	2.14%	6.66%	8.98%	7.60%	0.32%	7.23%	11.01%	7.82%	9.49%	11.14%
13	0.00%	4.67%	0.42%	10.61%	1.57%	3.81%	4.29%	3.38%	8.25%	7.22%	15.55%	2.30%
14	3.60%	5.50%	0.17%	3.46%	1.29%	4.23%	1.01%	4.13%	2.48%	8.01%	2.57%	6.40%
15	1.73%	6.73%	3.59%	4.10%	0.19%	1.07%	0.85%	4.98%	0.43%	5.38%	6.76%	5.35%
16	7.81%	5.63%	1.72%	0.05%	3.81%	0.38%	6.10%	3.18%	4.88%	1.07%	0.32%	1.03%
17	6.04%	2.13%	3.12%	0.22%	0.75%	1.86%	2.71%	0.57%	3.28%	3.13%	3.27%	8.70%
18	2.92%	3.47%	0.39%	2.77%	2.70%	2.82%	0.32%	1.87%	1.84%	1.62%	3.72%	2.95%
19	0.03%	1.48%	1.44%	0.46%	1.59%	3.48%	1.45%	2.44%	0.64%	0.45%	0.32%	0.63%
20	1.36%	0.25%	0.34%	1.17%	0.00%	0.25%	1.36%	0.25%	0.00%	1.17%	1.17%	0.25%

Optimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction (913b)												
Year	LOLP - Scenario 913											
	Inflows											
	1	2	3	4	5	6	7	8	9	10	11	12
1	7.96%	20.29%	1.59%	0.00%	0.00%	15.67%	20.53%	3.63%	14.97%	9.86%	18.27%	30.11%
2	6.10%	12.45%	13.04%	7.44%	4.50%	21.77%	16.98%	20.38%	35.05%	15.05%	30.92%	38.38%
3	8.10%	34.84%	2.76%	11.96%	11.12%	30.98%	6.81%	3.06%	11.98%	7.75%	30.79%	17.44%
4	10.09%	22.64%	14.64%	15.70%	9.41%	9.38%	3.63%	2.78%	21.97%	7.72%	8.77%	14.73%
5	15.21%	11.35%	1.03%	22.28%	31.22%	10.65%	5.08%	0.00%	42.75%	8.69%	7.21%	26.91%
6	15.33%	5.34%	17.06%	5.49%	14.24%	10.40%	14.64%	13.54%	25.07%	7.25%	7.85%	16.08%
7	8.82%	15.81%	7.16%	4.91%	16.49%	6.44%	24.75%	21.24%	13.05%	5.74%	12.82%	12.98%
8	2.42%	23.97%	18.10%	9.31%	21.73%	3.38%	24.02%	0.89%	17.61%	5.11%	11.92%	20.07%
9	11.00%	22.86%	24.47%	17.29%	8.01%	9.52%	13.37%	9.91%	17.74%	11.47%	9.97%	10.20%
10	20.30%	7.77%	12.63%	3.45%	8.98%	18.94%	17.73%	10.31%	18.59%	10.50%	18.46%	24.82%
11	25.40%	5.54%	10.11%	10.49%	14.71%	8.03%	12.06%	6.59%	21.77%	10.31%	14.15%	14.04%
12	4.50%	8.29%	3.77%	10.10%	12.81%	10.53%	1.65%	11.00%	16.98%	11.62%	13.35%	14.98%
13	0.00%	6.78%	0.95%	14.31%	3.23%	6.60%	6.40%	6.19%	11.96%	10.81%	21.16%	4.95%
14	5.53%	8.69%	0.67%	5.96%	3.06%	6.73%	2.71%	6.44%	4.51%	11.55%	4.73%	9.70%
15	3.35%	9.70%	5.84%	7.02%	0.68%	2.97%	2.81%	7.43%	1.24%	8.07%	10.10%	7.83%
16	11.12%	9.11%	3.85%	0.64%	6.67%	0.85%	8.99%	5.14%	7.50%	2.49%	1.22%	2.94%
17	9.76%	4.22%	5.41%	0.67%	2.26%	3.22%	5.59%	2.54%	5.81%	5.15%	5.15%	12.82%
18	4.91%	6.76%	1.24%	4.85%	4.82%	5.64%	0.77%	3.95%	4.08%	2.86%	6.63%	5.66%
19	0.77%	3.78%	3.01%	1.86%	4.01%	5.63%	2.86%	3.85%	2.13%	1.94%	1.45%	2.02%
20	2.65%	1.55%	1.59%	2.74%	0.49%	1.09%	2.71%	1.47%	0.00%	2.70%	2.74%	0.95%

APPENDIX 9

OPERATION COSTS PESSIMISTIC, REFERENCE AND OPTMISITC

MARKETS

($/MWH)

pessimistic market -scenario hydrothermal - inflow 1 (911in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.68	0.72	0.73	0.71	0.67
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	1.15	0.90	0.86
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.02	1.44	1.43	1.09
5	1.49	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.88	95.82	1.25	9.21
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.64	2.42	3.12	2.87	1.78
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.64	1.61	2.10	2.42	1.72
8	2.02	1.89	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	1.82	1.76	1.82
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.51	3.41	4.05	3.28	2.44
10	2.80	2.45	2.43	2.53	3.05	3.82	4.44	4.64	9.86	4.78	9.86	4.92	4.63
11	4.67	3.10	2.57	3.03	4.22	4.96	5.06	10.38	10.72	10.38	10.72	5.34	6.26
12	2.26	2.49	2.24	2.37	2.29	2.36	2.27	2.32	2.39	3.09	4.09	3.70	2.66
13	2.35	2.59	2.39	2.46	2.37	2.45	2.42	2.41	2.48	2.39	2.52	2.44	2.44
14	2.43	2.68	2.47	2.54	2.46	2.53	2.50	3.18	4.50	5.70	6.82	2.51	3.36
15	2.51	2.82	2.54	2.62	2.53	2.66	3.21	4.09	5.37	6.57	7.23	2.58	3.73
16	2.58	2.90	2.61	2.69	2.60	3.15	4.45	6.23	7.54	14.83	15.32	14.83	6.64
17	7.58	6.34	4.20	3.45	3.55	4.80	5.96	7.72	16.18	15.67	8.12	7.86	7.62
18	2.76	3.04	2.74	3.54	3.25	4.24	5.04	6.20	8.31	8.27	17.04	8.28	6.06
19	2.89	3.20	4.16	3.03	3.69	3.78	4.42	5.41	6.78	7.34	7.61	5.47	4.81
20	3.03	3.36	3.03	3.18	3.08	3.20	4.22	5.72	7.68	9.11	9.42	9.25	5.36
													10.98

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 1 (911bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	0.79	0.80	0.78	0.70
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.24	0.97	0.94
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.08	1.53	1.52	1.16
5	1.58	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	2.08	13.71	1.38	2.50
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.79	2.63	3.39	3.13	1.95
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.77	1.74	2.27	2.61	1.86
8	2.18	2.04	1.82	1.91	1.87	2.03	1.96	1.93	1.95	1.91	1.95	1.89	1.95
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.75	3.74	4.44	3.59	2.68
10	3.06	2.68	2.66	2.77	3.32	4.16	4.84	5.06	10.72	5.20	10.72	5.34	5.04
11	5.07	3.37	2.78	3.28	4.57	5.37	5.48	11.21	11.58	11.21	11.58	5.76	6.77
12	2.43	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	3.32	4.39	3.97	2.86
13	2.52	2.78	2.56	2.64	2.54	2.62	2.58	2.58	2.65	2.56	2.70	2.60	2.61
14	2.59	2.86	2.63	2.71	2.62	2.70	2.66	3.39	4.79	6.07	7.25	2.67	3.58
15	2.67	3.00	2.70	2.78	2.69	2.82	3.40	4.33	5.70	6.96	7.66	2.74	3.95
16	2.73	3.07	2.77	2.85	2.75	3.33	4.71	6.58	7.97	15.66	16.18	15.66	7.02
17	7.99	6.69	4.43	3.64	3.74	5.06	6.28	8.13	17.04	16.50	8.55	8.27	8.03
18	2.90	3.20	2.89	3.73	3.42	4.46	5.30	6.52	8.73	8.69	17.90	8.69	6.37
19	3.03	3.36	4.37	3.18	3.87	3.96	4.64	5.67	7.11	7.69	7.98	5.73	5.05
20	3.18	3.52	3.18	3.33	3.22	3.35	4.42	5.98	8.03	9.53	9.85	9.67	5.60
													10.85

Pessimistic market -scenario hydrothermal with wind addition - inflow 1 (912in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.85	0.82	0.73
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.09	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.34	1.39	1.16
5	1.58	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.55	2.27	1.43	1.55
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.97	2.62	2.61	1.81
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	1.82	2.06	1.82
8	1.94	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	1.94	1.98	1.92	1.97
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.56	3.24	2.93	2.43
10	2.76	2.55	2.54	2.66	3.15	3.65	4.02	3.99	6.64	4.04	7.08	4.38	3.95
11	4.47	3.21	2.67	3.15	4.24	4.58	4.50	7.21	7.14	7.02	7.61	4.69	5.04
12	2.45	2.71	2.44	2.57	2.48	2.56	2.47	2.52	2.59	2.50	3.18	3.17	2.64
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	2.72	2.63	2.76	2.67	2.68
14	2.65	2.92	2.69	2.77	2.67	2.75	2.71	2.70	3.48	4.29	5.48	2.72	3.15
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	2.92	3.84	4.69	5.44	2.78	3.28
16	2.76	3.10	2.80	2.88	2.78	2.92	3.89	4.95	5.76	8.91	9.65	9.90	5.02
17	6.51	5.89	4.10	3.48	3.53	4.43	5.16	5.77	8.88	8.72	6.10	6.15	5.73
18	2.94	3.25	2.93	3.22	3.08	3.84	4.40	4.89	5.98	6.01	9.79	6.43	4.73
19	2.99	3.31	3.86	3.12	3.52	3.53	4.00	4.48	5.26	5.58	5.92	4.71	4.19
20	3.10	3.35	3.08	3.21	3.11	3.10	3.88	4.73	5.83	6.58	6.98	7.14	4.51
													10.18

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.85	0.82	0.73
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.09	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.34	1.39	1.16
5	1.58	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.55	2.27	1.43	1.55
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.97	2.62	2.63	1.81
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.80	1.85	1.98	1.83
8	1.90	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	1.99	2.03	1.97	2.00
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.41	3.36	2.94	2.47
10	2.70	2.60	2.48	2.68	3.38	4.05	4.28	4.10	6.81	6.70	4.41	4.49	4.06
11	4.79	3.01	2.57	3.22	4.91	4.90	4.60	7.38	7.31	7.18	7.79	4.80	5.21
12	2.51	2.77	2.50	2.63	2.54	2.61	2.52	2.57	2.65	2.56	2.93	3.09	2.66
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.78	2.68	2.82	2.72	2.73
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	2.75	3.23	4.47	5.58	2.78	3.20
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.81	3.88	5.09	5.87	2.83	3.38
16	2.81	3.16	2.85	2.93	2.83	2.97	3.58	5.22	5.86	9.06	9.82	10.07	5.09
17	6.61	5.90	3.87	3.26	3.48	4.79	5.82	5.87	9.03	8.86	9.52	6.25	6.11
18	2.99	3.30	2.97	3.07	3.01	3.48	4.46	5.23	6.25	9.25	6.47	10.26	5.06
19	3.04	3.36	3.20	3.17	3.20	3.41	4.17	4.83	5.76	6.02	6.16	4.53	4.24
20	3.14	3.13	3.13	3.16	3.16	3.15	3.60	4.94	6.40	6.67	10.88	6.76	4.84
													10.27

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.76	0.77	0.75	0.71
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	1.01	0.94	0.89
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.26	1.32	1.09
5	1.50	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.41	2.06	1.30	1.42
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.81	2.41	2.42	1.66
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.67	1.72	1.84	1.69
8	1.76	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	1.86	1.90	1.84	1.86
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.21	3.08	2.70	2.28
10	2.48	2.39	2.28	2.47	3.11	3.73	3.94	3.78	6.29	6.18	4.07	4.15	3.74
11	4.43	2.78	2.37	2.98	4.55	4.54	4.27	6.85	6.78	6.67	7.23	4.47	4.83
12	2.33	2.57	2.32	2.45	2.36	2.43	2.35	2.40	2.47	2.38	2.73	2.88	2.47
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.61	2.51	2.65	2.56	2.56
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.59	3.04	4.21	5.26	2.62	3.01
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.65	3.66	4.81	5.55	2.67	3.19
16	2.66	2.99	2.69	2.77	2.68	2.81	3.39	4.95	5.55	8.59	9.31	9.54	4.83
17	6.28	5.60	3.67	3.10	3.31	4.55	5.53	5.58	8.59	8.43	9.06	5.94	5.80
18	2.84	3.14	2.83	2.92	2.86	3.32	4.24	4.98	5.95	8.82	6.17	9.78	4.82
19	2.90	3.20	3.05	3.02	3.05	3.26	3.99	4.62	5.51	5.75	5.89	4.33	4.05
20	3.00	3.00	2.99	3.03	3.02	3.01	3.45	4.73	6.13	6.39	10.41	6.48	4.64
													10.09

pessimistic market -scenario hydrothermal - inflow 2 (911in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.68	0.72	63.58	69.79	11.67
3	0.86	0.89	0.80	0.83	0.81	0.85	0.82	0.96	455.60	676.07	2490.02	2485.16	509.47
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	1.25	229.51	446.87	400.68	1.07	90.54
5	1.18	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.65	2.08	1.25	1.35
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.45	1.44	1.64	1.87	1.48
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	2.01	2.83	3.30	2.60	1.97
8	1.66	1.89	1.77	1.93	2.08	2.68	3.23	3.80	178.298.9	4	189.43	3.94	32.89
9	4.08	2.71	2.36	2.48	2.91	2.98	3.47	4.08	4.50	8.71	4.51	4.36	3.93
10	3.48	2.28	2.03	2.12	2.14	2.23	2.14	2.11	2.19	2.39	3.44	2.08	2.39
11	2.16	2.38	2.15	2.27	2.19	2.26	2.18	2.23	2.50	3.44	4.50	3.17	2.62
12	2.26	2.49	2.24	2.37	2.29	2.36	2.27	2.92	3.96	4.65	5.03	4.66	3.13
13	2.35	2.59	2.39	2.46	2.37	2.45	2.42	2.77	4.07	5.37	6.38	6.18	3.48
14	6.18	2.68	2.47	2.54	2.46	3.04	4.03	5.21	6.67	6.46	13.60	2.51	4.82
15	2.51	2.82	2.54	2.62	2.53	2.66	3.08	4.44	6.30	7.02	14.46	14.00	5.42
16	6.90	6.13	4.19	3.29	2.96	4.04	4.86	5.99	7.41	7.44	15.32	7.32	6.32
17	4.92	4.19	2.68	2.76	2.74	3.68	4.46	5.63	7.33	7.86	8.12	15.67	5.84
18	2.76	6.91	4.66	3.98	4.74	5.62	6.31	7.52	8.55	8.27	17.04	8.28	7.05
19	6.74	5.44	5.53	6.36	4.33	5.03	5.95	7.37	8.98	8.69	8.98	3.03	6.37
20	3.03	3.36	4.62	3.86	3.38	4.27	5.16	6.30	7.83	8.94	8.98	8.75	5.71

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 2 (911bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.33	1035.95	1519.47	1373.04	401.69
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	0.79	39.66	45.58	7.68
3	0.94	0.97	0.87	0.91	0.89	0.93	0.89	1.05	336.14	591.65	2321.22	2316.36	464.40
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.34	80.54	372.33	326.16	1.14	65.76
5	1.25	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.82	2.30	1.38	1.50
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.59	1.57	1.79	2.04	1.62
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	2.18	3.05	3.56	2.81	2.13
8	1.79	2.04	1.90	2.07	2.24	2.87	3.46	4.08	21.40	4.22	26.73	4.22	6.42
9	4.36	2.99	2.60	2.73	3.20	3.28	3.82	4.49	4.93	9.54	4.94	4.78	4.30
10	3.81	2.49	2.22	2.32	2.33	2.44	2.33	2.30	2.38	2.59	3.74	2.26	2.60
11	2.35	2.59	2.33	2.46	2.38	2.45	2.36	2.41	2.71	3.72	4.87	3.42	2.84
12	2.43	2.69	2.42	2.55	2.46	2.54	2.45	3.14	4.25	5.00	5.39	5.00	3.36
13	2.52	2.78	2.56	2.64	2.54	2.62	2.58	2.96	4.36	5.74	6.81	6.60	3.73
14	6.60	2.86	2.63	2.71	2.62	3.24	4.29	5.55	7.10	6.88	14.46	2.67	5.13
15	2.67	3.00	2.70	2.78	2.69	2.82	3.27	4.71	6.68	7.43	15.32	14.83	5.74
16	7.31	6.49	4.43	3.48	3.13	4.27	5.14	6.34	7.84	7.85	16.18	7.74	6.68
17	5.19	4.42	2.83	2.92	2.89	3.88	4.70	5.94	7.72	8.27	8.55	16.50	6.15
18	2.90	7.27	4.90	4.19	4.98	5.91	6.63	7.91	8.98	8.69	17.90	8.69	7.41
19	7.07	5.71	5.80	6.67	4.54	5.27	6.24	7.73	9.41	9.11	9.41	3.18	6.68
20	3.18	3.52	4.84	4.04	3.54	4.46	5.40	6.59	8.19	9.35	9.39	9.14	5.97
													50.59

Pessimistic market -scenario hydrothermal with wind addition - inflow 2 (912in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.97	2.61	0.89
3	0.93	1.01	0.90	0.95	0.93	0.97	0.93	0.96	196.38	486.87	1840.79	1915.83	370.62
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.20	10.88	294.98	258.19	1.17	47.86
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.64	1.43	1.47
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.65	1.60	1.62
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	2.38	2.88	2.47	1.99
8	1.83	2.08	1.86	1.95	2.09	2.65	3.05	3.46	3.49	5.95	6.33	3.67	3.20
9	3.99	2.84	2.50	2.64	3.04	2.95	3.28	3.59	3.82	6.04	3.97	3.94	3.55
10	3.46	2.54	2.26	2.37	2.37	2.48	2.38	2.34	2.42	2.28	2.56	2.30	2.48
11	2.38	2.62	2.36	2.49	2.41	2.48	2.39	2.44	2.51	2.56	3.49	2.84	2.58
12	2.45	2.71	2.44	2.57	2.48	2.56	2.47	2.52	2.90	3.51	4.09	4.03	2.89
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	3.06	3.93	4.97	5.09	3.20
14	5.56	2.92	2.69	2.77	2.67	2.75	3.33	4.09	5.00	5.05	8.71	2.72	4.02
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	3.12	4.30	5.31	5.78	9.41	3.97
16	6.22	6.15	4.25	3.36	2.99	3.81	4.35	4.95	5.69	5.71	9.65	6.03	5.26
17	4.55	4.12	2.89	2.97	2.92	3.25	3.85	4.44	5.37	5.75	6.10	9.67	4.66
18	2.94	5.92	4.34	3.89	4.53	5.03	5.40	5.70	6.15	6.01	9.79	6.43	5.51
19	5.95	5.21	5.29	6.11	4.23	4.63	5.21	5.71	6.44	6.30	6.68	3.05	5.40
20	3.10	3.35	4.20	3.73	3.31	3.97	4.60	5.10	5.91	6.49	6.74	6.85	4.78
													43.87

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 2 (913in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.97	2.61	0.89
3	0.93	1.01	0.90	0.95	0.93	0.97	0.93	0.96	196.38	486.87	1840.79	1915.83	370.62
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.20	10.88	294.98	258.19	1.17	47.86
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.64	1.43	1.47
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.67	1.62	1.62
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	2.35	2.90	2.45	2.00
8	1.86	2.11	1.89	1.98	2.03	2.70	3.21	3.52	6.02	6.09	3.78	3.75	3.25
9	4.08	2.75	2.47	2.67	3.20	3.05	3.49	3.79	3.93	6.21	4.08	4.05	3.65
10	3.47	2.60	2.32	2.43	2.43	2.55	2.44	2.40	2.48	2.34	2.38	2.36	2.52
11	2.44	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	2.48	3.46	2.72	2.61
12	2.51	2.77	2.50	2.63	2.54	2.61	2.52	2.57	2.84	3.77	4.37	4.20	2.99
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.81	4.13	5.29	5.30	3.28
14	5.69	2.98	2.74	2.82	2.72	2.81	3.11	4.30	5.28	5.14	8.87	2.78	4.10
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.84	4.54	5.52	9.35	9.58	4.32
16	6.02	5.54	3.85	3.08	2.85	4.03	4.80	5.52	5.86	5.80	9.82	6.20	5.28
17	4.46	3.90	2.93	3.02	2.97	3.07	4.03	4.89	5.98	5.84	9.52	6.25	4.74
18	2.99	5.97	4.15	3.71	4.70	5.36	5.83	6.13	6.25	9.25	6.47	6.52	5.61
19	6.00	4.92	5.32	6.33	3.99	4.67	5.56	6.23	6.54	9.69	6.77	3.09	5.76
20	3.14	3.13	3.67	3.42	3.16	4.11	5.03	5.61	6.51	6.67	7.08	7.23	4.90
													43.95

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 2 (913bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.33	1035.95	1519.47	1373.04	401.69
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.76	0.88	12.55	1.71
3	0.86	0.93	0.83	0.87	0.85	0.90	0.86	0.89	252.64	563.56	1981.68	2060.35	405.44
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.12	47.51	362.18	325.62	1.10	62.08
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.49	1.30	1.35
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.49	1.53	1.49	1.48
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	2.19	2.70	2.28	1.85
8	1.73	1.97	1.76	1.85	1.89	2.52	3.00	3.29	28.6426	.53	3.54	3.51	6.69
9	3.84	2.59	2.32	2.51	2.92	2.78	3.19	3.47	3.60	5.69	3.74	3.72	3.36
10	3.19	2.39	2.13	2.23	2.24	2.34	2.25	2.21	2.29	2.16	2.19	2.18	2.32
11	2.25	2.48	2.24	2.37	2.28	2.35	2.27	2.32	2.39	2.31	3.22	2.53	2.42
12	2.33	2.57	2.32	2.45	2.36	2.43	2.35	2.40	2.65	3.51	4.08	3.92	2.78
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.64	3.87	4.97	4.98	3.07
14	5.35	2.80	2.58	2.65	2.56	2.64	2.93	4.04	4.97	4.84	8.36	2.62	3.86
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.68	4.29	5.22	8.84	9.06	4.08
16	5.69	5.24	3.65	2.91	2.69	3.82	4.55	5.23	5.55	5.50	9.31	5.88	5.00
17	4.23	3.70	2.79	2.87	2.82	2.92	3.83	4.65	5.69	5.56	9.06	5.94	4.50
18	2.84	5.68	3.95	3.53	4.48	5.10	5.56	5.84	5.95	8.82	6.17	6.22	5.35
19	5.73	4.69	5.08	6.04	3.81	4.46	5.31	5.95	6.25	9.26	6.47	2.96	5.50
20	3.00	3.00	3.50	3.27	3.02	3.93	4.81	5.37	6.23	6.39	6.78	6.92	4.69
													46.46

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 3 (911bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	0.79	63.22	75.05	12.09
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.00	0.97	0.92
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.09	1.67	1.54	1.17
5	1.25	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.39	1.42	1.38	1.39
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	2.06	2.77	3.45	1.55	1.86
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.77	2.14	3.02	1.72	1.88
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	1.93	2.49	3.43	4.36	4.22	2.49
9	2.05	2.33	2.08	2.18	2.20	2.97	3.86	4.64	9.85	9.54	9.86	9.54	5.09
10	2.28	2.49	2.22	2.32	2.33	2.44	2.33	2.39	3.63	4.85	5.37	5.34	3.16
11	3.02	2.59	2.33	2.46	2.38	2.45	2.36	2.66	3.95	5.08	5.66	5.11	3.34
12	3.33	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.80	3.66	4.41	2.52	2.86
13	2.52	2.78	2.56	2.64	2.54	2.62	2.58	2.58	2.65	2.88	3.99	2.60	2.74
14	2.59	2.86	2.63	2.71	2.62	2.70	2.66	2.65	2.73	2.93	4.11	2.67	2.82
15	2.67	3.00	2.70	2.78	2.69	2.82	2.73	3.46	4.81	6.36	7.68	7.43	4.09
16	2.73	3.07	2.80	2.85	3.08	3.61	4.35	5.31	6.52	7.76	7.95	6.73	4.73
17	2.84	3.14	2.83	2.92	2.95	4.25	5.50	7.08	8.55	16.50	8.55	2.86	5.66
18	2.90	3.20	2.89	2.98	2.94	3.03	2.94	3.97	5.69	7.33	8.50	2.98	4.11
19	3.03	3.36	3.03	3.18	3.16	3.77	4.63	5.87	7.59	8.67	9.41	9.25	5.41
20	5.53	5.65	5.19	3.33	4.06	4.63	5.47	7.04	9.13	9.53	9.85	8.55	6.50
													4.37

Pessimistic market -scenario hydrothermal with wind addition - inflow 3 (912in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	1.00	13.85	1.83
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.45	1.41	1.17
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	2.17	2.77	1.60	1.75
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	2.35	1.76	1.84
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	2.66	3.62	3.56	2.29
9	2.18	2.39	2.14	2.24	2.26	2.37	2.94	3.66	6.14	6.04	6.55	6.61	3.79
10	2.32	2.54	2.26	2.37	2.37	2.48	2.38	2.34	2.54	3.35	4.22	4.38	2.79
11	2.68	2.62	2.36	2.49	2.41	2.48	2.39	2.44	2.87	3.65	4.27	4.13	2.90
12	3.04	2.71	2.44	2.57	2.48	2.56	2.47	2.52	2.59	2.50	3.17	2.54	2.63
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	2.72	2.63	2.76	2.67	2.68
14	2.65	2.92	2.69	2.77	2.67	2.75	2.71	2.70	2.78	2.69	2.82	2.72	2.74
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	2.76	3.54	4.52	5.78	5.80	3.51
16	2.76	3.10	2.80	2.88	2.78	2.97	3.54	4.13	4.84	5.57	5.93	5.38	3.89
17	2.90	3.20	2.89	2.97	2.92	3.29	4.17	4.89	5.89	8.72	6.10	2.91	4.24
18	2.94	3.25	2.93	3.02	2.96	3.05	2.94	3.01	4.10	5.06	5.94	2.95	3.51
19	2.99	3.31	2.98	3.12	3.01	3.10	3.74	4.42	5.37	5.96	6.68	6.83	4.29
20	4.82	5.17	4.79	3.21	3.82	4.15	4.69	5.39	6.40	6.58	6.98	6.52	5.21
													3.43

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 3 (913in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	1.00	13.85	1.83
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.45	1.41	1.17
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	2.17	2.78	1.62	1.76
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.80	2.29	1.80	1.85
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	2.58	3.78	3.72	2.34
9	2.22	2.44	2.18	2.29	2.31	2.42	2.88	3.79	6.31	6.21	6.73	6.79	3.88
10	2.38	2.60	2.32	2.43	2.43	2.55	2.44	2.40	2.48	3.39	4.41	4.49	2.86
11	2.50	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.66	3.84	4.57	4.24	2.95
12	2.85	2.77	2.50	2.63	2.54	2.61	2.52	2.57	2.65	2.56	3.09	2.60	2.66
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.78	2.68	2.82	2.72	2.73
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	2.75	2.84	2.74	2.88	2.78	2.79
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.81	3.26	4.71	5.88	5.90	3.55
16	2.81	3.16	2.85	2.93	2.83	2.97	3.36	4.30	5.22	5.80	6.18	5.56	4.00
17	2.95	3.25	2.93	3.02	2.97	3.06	4.21	5.34	5.98	8.86	6.19	2.96	4.31
18	2.99	3.30	2.97	3.07	3.01	3.10	2.99	2.98	3.85	5.31	6.32	3.00	3.57
19	3.04	3.36	3.03	3.17	3.06	3.15	3.40	4.52	5.81	6.39	6.77	6.93	4.38
20	4.60	5.01	4.76	3.16	3.68	4.21	5.03	5.96	6.83	6.67	7.08	6.95	5.33
													3.48

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 3 (913bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.76	6.48	51.21	5.39
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.97	0.94	0.88
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.36	1.33	1.10
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.34	1.30	1.33
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	2.00	2.56	1.49	1.61
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.67	2.13	1.67	1.71
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	2.42	3.54	3.48	2.18
9	2.09	2.29	2.05	2.15	2.11	2.21	2.63	3.47	5.79	5.69	6.17	6.22	3.57
10	2.19	2.39	2.13	2.23	2.24	2.34	2.25	2.21	2.29	3.12	4.07	4.15	2.63
11	2.31	2.48	2.24	2.37	2.28	2.35	2.27	2.32	2.47	3.56	4.24	3.94	2.74
12	2.65	2.57	2.32	2.45	2.36	2.43	2.35	2.40	2.47	2.38	2.89	2.43	2.48
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.61	2.51	2.65	2.56	2.56
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.59	2.67	2.58	2.71	2.62	2.63
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.65	3.08	4.46	5.56	5.58	3.35
16	2.66	2.99	2.69	2.77	2.68	2.81	3.18	4.07	4.94	5.50	5.86	5.27	3.79
17	2.80	3.09	2.79	2.87	2.82	2.91	4.00	5.07	5.69	8.43	5.89	2.82	4.10
18	2.84	3.14	2.83	2.92	2.86	2.95	2.85	2.84	3.67	5.06	6.03	2.86	3.40
19	2.90	3.20	2.89	3.02	2.92	3.01	3.25	4.32	5.55	6.10	6.47	6.63	4.19
20	4.40	4.79	4.55	3.03	3.52	4.03	4.81	5.71	6.54	6.39	6.78	6.66	5.10
													3.49

pessimistic market -scenario hydrothermal - inflow 4 (911in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.68	0.72	0.76	0.76	0.68
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	1.02	0.90	0.85
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.02	5.79	366.18	275.09	54.69
5	1.46	1.29	1.16	1.28	1.26	1.46	1.79	2.20	103.58	1684.73	108.32	1.25	159.15
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.45	1.44	1.60	1.90	1.48
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.64	1.65	2.15	1.60	1.66
8	1.66	1.89	1.70	1.78	1.74	1.90	1.82	1.80	1.82	2.18	2.81	2.64	1.98
9	2.33	2.11	1.89	1.98	2.00	2.10	2.33	3.15	4.40	4.36	9.00	4.36	3.33
10	3.73	2.28	2.03	2.12	2.14	2.23	2.14	2.11	2.19	2.06	2.12	2.38	2.29
11	2.16	2.38	2.15	2.27	2.19	2.26	2.18	2.23	3.02	4.00	5.25	5.24	2.95
12	2.26	2.49	2.24	2.37	2.29	2.36	2.63	3.72	4.98	5.62	5.95	4.78	3.47
13	2.35	2.59	2.39	2.46	2.37	2.45	3.39	4.82	6.24	12.05	12.74	6.18	5.00
14	2.43	4.19	2.90	2.54	2.46	2.59	3.03	3.61	4.57	5.40	6.55	6.43	3.89
15	2.51	2.82	2.54	2.62	2.53	2.66	3.35	4.57	5.91	6.95	7.25	7.02	4.23
16	2.58	2.90	2.61	2.69	2.60	2.73	2.64	2.63	3.56	4.60	5.19	2.65	3.12
17	2.69	2.97	2.68	2.76	2.72	2.80	2.70	2.69	3.78	4.75	5.93	2.72	3.27
18	2.76	3.04	2.74	2.83	2.79	3.79	5.00	6.58	8.55	8.27	17.04	2.84	5.52
19	2.89	3.20	4.00	3.67	3.37	4.15	4.86	6.17	7.81	8.34	8.98	7.99	5.45
20	3.03	3.36	3.80	4.13	3.92	4.94	5.74	7.07	8.86	9.11	18.76	9.25	6.83
													13.52

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 4 (911bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
sts 911b in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	0.79	0.83	0.83	0.71
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.09	0.97	0.92
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.09	1.64	293.38	100.07	33.74
5	1.55	1.44	1.29	1.43	1.40	1.62	1.98	2.44	16.60	1346.16	18.88	1.38	116.35
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.59	1.57	1.74	2.08	1.62
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.77	1.78	2.32	1.72	1.80
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	1.93	1.95	2.33	3.00	2.83	2.12
9	2.49	2.33	2.08	2.18	2.20	2.31	2.56	3.46	4.83	4.78	9.86	4.78	3.65
10	4.07	2.49	2.22	2.32	2.33	2.44	2.33	2.30	2.38	2.24	2.31	2.58	2.50
11	2.35	2.59	2.33	2.46	2.38	2.45	2.36	2.41	3.27	4.33	5.67	5.65	3.19
12	2.43	2.69	2.42	2.55	2.46	2.54	2.83	4.00	5.35	6.04	6.38	5.12	3.73
13	2.52	2.78	2.56	2.64	2.54	2.62	3.62	5.15	6.67	12.88	13.60	6.60	5.35
14	2.59	4.48	3.09	2.71	2.62	2.76	3.23	3.84	4.86	5.75	6.96	6.84	4.14
15	2.67	3.00	2.70	2.78	2.69	2.82	3.55	4.84	6.27	7.37	7.68	7.43	4.48
16	2.73	3.07	2.77	2.85	2.75	2.89	2.79	2.78	3.77	4.86	5.48	2.80	3.30
17	2.84	3.14	2.83	2.92	2.86	2.95	2.85	2.84	3.98	5.00	6.25	2.86	3.44
18	2.90	3.20	2.89	2.98	2.94	3.98	5.26	6.92	8.98	8.69	17.90	2.98	5.80
19	3.03	3.36	4.20	3.85	3.54	4.36	5.10	6.47	8.18	8.74	9.41	8.36	5.72
20	3.18	3.52	3.98	4.32	4.10	5.17	6.01	7.40	9.26	9.53	19.62	9.67	7.15
													10.51

Pessimistic market -scenario hydrothermal with wind addition - inflow 4 (912in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.85	0.82	0.73
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.43	71.38	61.43	12.03
5	1.58	1.51	1.35	1.49	1.46	1.53	1.72	2.07	2.47	2.52	893.45	1.43	76.05
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.65	1.60	1.62
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	1.82	1.76	1.79
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	1.94	2.14	2.26	2.00
9	2.26	2.39	2.14	2.24	2.26	2.37	2.28	2.46	3.35	3.73	6.55	3.94	3.00
10	3.46	2.54	2.26	2.37	2.37	2.48	2.38	2.34	2.42	2.28	2.32	2.30	2.46
11	2.38	2.62	2.36	2.49	2.41	2.48	2.39	2.44	2.51	3.07	4.12	4.37	2.80
12	2.45	2.71	2.44	2.57	2.48	2.56	2.47	2.88	3.79	4.38	5.05	4.14	3.16
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	3.53	4.61	4.77	8.24	8.44	4.03
14	2.65	3.75	2.82	2.77	2.67	2.75	2.71	3.00	3.69	4.27	5.20	5.32	3.47
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	3.44	4.35	5.07	5.78	5.63	3.66
16	2.76	3.10	2.80	2.88	2.78	2.92	2.82	2.81	2.89	3.40	4.08	2.83	3.00
17	2.90	3.20	2.89	2.97	2.92	3.01	2.90	2.90	3.03	3.45	4.41	2.91	3.13
18	2.94	3.25	2.93	3.02	2.96	3.06	3.96	4.79	5.99	6.01	9.79	2.95	4.30
19	2.99	3.31	3.48	3.45	3.24	3.83	4.33	4.96	5.82	6.10	6.68	6.33	4.54
20	3.10	3.35	3.66	4.05	3.83	4.55	5.06	5.59	6.45	6.58	10.73	7.14	5.34
													6.93

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 4 (913in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.85	0.82	0.73
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.43	71.38	61.43	12.03
5	1.58	1.51	1.35	1.49	1.46	1.53	1.72	2.07	2.47	2.52	893.45	1.43	76.05
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.67	1.62	1.62
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.80	1.85	1.80	1.81
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	1.99	2.03	2.22	2.02
9	2.23	2.44	2.18	2.29	2.31	2.42	2.33	2.49	3.73	3.84	6.73	4.05	3.09
10	3.58	2.60	2.32	2.43	2.43	2.55	2.44	2.40	2.48	2.34	2.38	2.36	2.53
11	2.44	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	2.89	4.35	4.60	2.87
12	2.51	2.77	2.50	2.63	2.54	2.61	2.52	2.69	4.00	4.75	5.16	4.21	3.24
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	3.44	4.99	7.59	8.40	5.30	4.07
14	2.70	3.52	2.74	2.82	2.72	2.81	2.76	2.96	3.93	4.71	5.58	5.60	3.57
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	3.23	4.55	5.52	5.88	5.90	3.76
16	2.81	3.16	2.85	2.93	2.83	2.97	2.86	2.86	2.94	3.08	4.07	2.88	3.02
17	2.95	3.25	2.93	3.02	2.97	3.06	2.95	2.94	3.08	3.14	4.49	2.96	3.15
18	2.99	3.30	2.97	3.07	3.01	3.10	3.60	4.96	6.25	6.10	9.94	3.00	4.36
19	3.04	3.36	3.14	3.26	3.16	4.02	4.73	5.53	6.48	6.39	6.77	6.63	4.71
20	3.14	3.13	3.41	3.99	3.82	4.83	5.53	6.15	6.83	10.12	7.08	7.24	5.44
													6.97

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 4 (913bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.76	0.77	0.75	0.71
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.97	0.94	0.88
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.34	208.75	90.54	25.84
5	1.50	1.44	1.28	1.35	1.32	1.38	1.56	1.87	21.76	20.23	1135.71	1.30	99.22
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.49	1.53	1.49	1.48
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.67	1.72	1.67	1.68
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	1.86	1.90	2.08	1.88
9	2.10	2.29	2.05	2.15	2.11	2.21	2.13	2.28	3.42	3.52	6.17	3.72	2.85
10	3.29	2.39	2.13	2.23	2.24	2.34	2.25	2.21	2.29	2.16	2.19	2.18	2.33
11	2.25	2.48	2.24	2.37	2.28	2.35	2.27	2.32	2.39	2.68	4.03	4.27	2.66
12	2.33	2.57	2.32	2.45	2.36	2.43	2.35	2.50	3.73	4.43	4.82	3.93	3.02
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	3.23	4.68	7.12	7.89	4.98	3.82
14	2.54	3.30	2.58	2.65	2.56	2.64	2.60	2.78	3.70	4.43	5.26	5.28	3.36
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	3.05	4.30	5.22	5.56	5.58	3.55
16	2.66	2.99	2.69	2.77	2.68	2.81	2.71	2.71	2.79	2.92	3.86	2.73	2.86
17	2.80	3.09	2.79	2.87	2.82	2.91	2.80	2.80	2.93	2.98	4.27	2.82	2.99
18	2.84	3.14	2.83	2.92	2.86	2.95	3.43	4.73	5.95	5.82	9.48	2.86	4.15
19	2.90	3.20	2.99	3.12	3.02	3.84	4.51	5.28	6.19	6.10	6.47	6.34	4.50
20	3.00	3.00	3.26	3.81	3.65	4.62	5.29	5.89	6.54	9.69	6.78	6.93	5.20
													8.67

pessimistic market -scenario hydrothermal - inflow 5 (911in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.68	0.72	0.73	0.71	0.67
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	1.10	1.23	0.88
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.02	1.32	9.92	1.78
5	1.18	1.29	1.16	1.28	1.44	1.92	19.55	78.32	1727.97	1684.73	1749.73	1.25	439.15
6	1.37	1.50	1.34	1.41	1.38	1.45	1.52	1.98	2.52	3.10	2.96	1.65	1.85
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.72	2.53	3.49	3.52	2.01
8	1.66	1.89	1.70	1.78	1.74	1.90	1.90	2.61	3.56	3.94	189.43	185.78	33.16
9	3.49	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.08	2.67	3.41	1.92	2.31
10	2.08	2.28	2.03	2.12	2.14	2.23	2.14	2.11	2.19	2.70	3.76	4.33	2.51
11	2.16	2.38	2.15	2.27	2.19	2.42	3.08	4.12	5.35	5.20	10.72	5.13	3.93
12	3.14	2.59	2.39	2.69	2.34	3.19	3.99	5.26	5.80	11.21	11.87	4.80	4.94
13	2.35	2.59	2.39	2.46	2.37	2.45	2.42	2.41	2.93	3.78	4.58	3.96	2.89
14	2.43	2.68	2.47	2.54	2.46	2.53	2.50	2.49	2.59	3.52	4.83	4.67	2.97
15	2.51	2.82	2.54	2.62	2.53	2.66	2.57	2.56	3.09	4.04	4.83	4.48	3.11
16	2.58	2.90	3.02	2.88	3.39	4.74	5.81	7.06	7.54	7.44	7.68	2.65	4.81
17	2.69	3.30	3.32	3.18	4.12	4.70	5.11	5.93	7.37	7.86	8.12	2.72	4.87
18	2.76	3.65	3.37	3.79	4.06	4.94	5.54	6.97	8.55	16.50	8.55	8.28	6.41
19	5.16	5.75	4.56	4.29	4.07	5.25	6.32	7.80	8.98	8.69	17.90	8.83	7.30
20	3.03	4.87	4.15	4.10	4.25	4.41	4.98	5.86	7.00	7.58	7.93	6.97	5.43
													26.57

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 5 (911bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	0.79	0.80	0.78	0.70
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.18	1.32	0.96
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.08	1.41	1.83	1.17
5	1.25	1.44	1.29	1.43	1.60	2.13	2.70	4.84	1389.34	1346.16	1411.15	1.38	347.06
6	1.51	1.65	1.48	1.55	1.51	1.59	1.67	2.16	2.75	3.38	3.23	1.80	2.02
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.87	2.74	3.77	3.80	2.18
8	1.79	2.04	1.82	1.91	1.87	2.03	2.04	2.80	3.82	4.22	26.73	24.88	6.33
9	3.73	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.28	2.92	3.73	2.11	2.52
10	2.28	2.49	2.22	2.32	2.33	2.44	2.33	2.30	2.38	2.93	4.09	4.70	2.73
11	2.35	2.59	2.33	2.46	2.38	2.62	3.34	4.45	5.78	5.62	11.58	5.54	4.25
12	3.38	2.80	2.58	2.90	2.51	3.44	4.30	5.65	6.24	12.05	12.73	5.15	5.31
13	2.52	2.78	2.56	2.64	2.54	2.62	2.58	2.58	3.13	4.04	4.89	4.23	3.09
14	2.59	2.86	2.63	2.71	2.62	2.70	2.66	2.65	2.76	3.75	5.13	4.96	3.17
15	2.67	3.00	2.70	2.78	2.69	2.82	2.73	2.72	3.28	4.28	5.12	4.75	3.29
16	2.73	3.07	3.20	3.05	3.59	5.01	6.15	7.47	7.97	7.85	8.11	2.80	5.08
17	2.84	3.48	3.50	3.35	4.34	4.95	5.38	6.25	7.76	8.27	8.55	2.86	5.13
18	2.90	3.84	3.54	3.99	4.27	5.19	5.83	7.32	8.98	17.33	8.98	8.69	6.74
19	5.42	6.03	4.79	4.50	4.27	5.50	6.63	8.17	9.41	9.11	18.76	9.25	7.65
20	3.18	5.10	4.35	4.29	4.45	4.62	5.22	6.12	7.32	7.92	8.29	7.29	5.68
													20.78

Pessimistic market -scenario hydrothermal with wind addition - inflow 5 (912in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912 in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.85	0.82	0.73
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.21	0.97
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.24	1.64	1.17
5	1.38	1.51	1.35	1.49	1.46	1.88	2.30	2.45	793.19	787.76	893.45	1.43	207.47
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	2.10	2.62	2.67	1.67	1.83
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	2.04	2.87	3.32	2.03
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	2.08	2.82	3.52	6.33	3.67	2.68
9	3.82	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.20	2.60	2.16	2.42
10	2.32	2.54	2.26	2.37	2.37	2.48	2.38	2.34	2.42	2.28	2.86	3.48	2.51
11	2.38	2.62	2.36	2.49	2.41	2.48	2.49	3.26	4.10	4.34	7.61	4.36	3.41
12	3.07	2.71	2.45	2.78	2.48	3.06	3.66	4.45	4.75	7.51	8.32	4.30	4.13
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	2.72	2.77	3.56	3.40	2.82
14	2.65	2.92	2.69	2.77	2.67	2.75	2.71	2.70	2.78	2.69	3.49	3.73	2.88
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	2.76	2.84	3.01	3.79	3.80	2.99
16	2.76	3.10	2.81	2.88	3.23	4.24	4.94	5.52	5.76	5.71	6.08	2.83	4.15
17	2.90	3.20	3.06	3.09	3.92	4.27	4.50	4.74	5.49	5.75	6.10	2.91	4.16
18	2.94	3.27	3.15	3.65	3.89	4.47	4.83	5.38	6.15	9.12	6.37	6.43	4.97
19	4.74	5.47	4.44	4.26	3.99	4.80	5.47	5.95	6.44	6.30	10.26	6.83	5.75
20	3.10	4.60	4.01	4.05	4.14	4.13	4.50	4.84	5.46	5.78	6.17	5.76	4.71
													13.11

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 5 (913in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.83	0.85	0.82	0.73
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.21	0.97
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.24	1.64	1.17
5	1.38	1.51	1.35	1.49	1.46	1.88	2.30	2.45	793.19	787.76	893.45	1.43	207.47
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	2.10	2.62	2.68	1.63	1.83
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	2.01	2.91	3.38	2.05
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.02	2.91	3.60	6.48	3.75	2.72
9	4.08	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.26	2.43	2.22	2.47
10	2.38	2.60	2.32	2.43	2.43	2.55	2.44	2.40	2.48	2.34	2.67	3.58	2.55
11	2.44	2.69	2.42	2.55	2.46	2.54	2.45	3.35	4.53	4.44	7.79	4.61	3.52
12	2.88	2.77	2.50	2.63	2.54	3.13	4.03	4.82	7.81	4.75	8.50	4.60	4.25
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.78	2.68	3.45	3.35	2.84
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	2.75	2.84	2.74	3.21	3.69	2.90
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.81	2.89	2.84	3.68	3.79	3.00
16	2.81	3.16	2.85	2.93	3.06	4.52	5.52	5.83	5.86	9.06	6.18	2.88	4.55
17	2.95	3.25	2.93	3.02	3.49	4.19	4.64	5.02	5.91	5.84	6.19	2.96	4.20
18	2.99	3.30	2.97	3.44	3.91	4.73	5.21	5.95	6.25	9.25	9.94	5.90	5.32
19	4.20	5.22	4.25	4.10	3.93	5.10	6.04	6.52	6.54	6.39	10.41	6.93	5.80
20	3.14	4.22	3.83	3.94	4.20	4.18	4.75	5.18	5.87	6.17	6.40	5.76	4.80
													13.18

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 5 (913bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.76	0.77	0.75	0.71
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.97	1.13	0.90
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.17	1.54	1.10
5	1.31	1.44	1.28	1.35	1.32	1.70	2.08	18.72	1025.78	1023.12	1135.71	1.30	267.93
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.92	2.41	2.47	1.50	1.67
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.87	2.70	3.14	1.90
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.89	2.72	3.37	43.73	3.51	5.68
9	3.84	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.07	2.22	2.03	2.28
10	2.19	2.39	2.13	2.23	2.24	2.34	2.25	2.21	2.29	2.16	2.46	3.31	2.35
11	2.25	2.48	2.24	2.37	2.28	2.35	2.27	3.11	4.20	4.12	7.23	4.29	3.27
12	2.68	2.57	2.32	2.45	2.36	2.91	3.76	4.50	7.28	4.43	7.94	4.30	3.96
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.61	2.51	3.24	3.15	2.66
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.59	2.67	2.58	3.03	3.48	2.73
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.65	2.73	2.69	3.48	3.58	2.84
16	2.66	2.99	2.69	2.77	2.90	4.28	5.23	5.52	5.55	8.59	5.86	2.73	4.31
17	2.80	3.09	2.79	2.87	3.32	3.99	4.41	4.77	5.62	5.56	5.89	2.82	3.99
18	2.84	3.14	2.83	3.27	3.72	4.51	4.97	5.67	5.95	8.82	9.48	5.63	5.07
19	4.00	4.98	4.05	3.91	3.75	4.87	5.76	6.23	6.25	6.10	9.95	6.63	5.54
20	3.00	4.04	3.67	3.77	4.02	4.00	4.55	4.95	5.62	5.91	6.13	5.52	4.60
													16.20

pessimistic market -scenario hydrothermal - inflow 6 (911in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
							Costs 911in6						
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.71	260.66	678.39	231.37	98.03
3	0.81	0.89	0.80	0.83	0.81	0.94	52.09	455.91	700.49	2597.19	622.68	0.90	369.53
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.06	1.47	1.24	1.08
5	1.27	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.26	1.69	1.69	1.33
6	1.64	1.59	1.34	1.41	1.38	1.45	1.46	1.44	1.45	1.63	2.16	1.42	1.53
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.64	1.63	2.22	1.60	1.66
8	1.66	1.89	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	1.82	1.76	1.79
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.08	2.77	3.62	3.06	2.30
10	2.08	2.28	2.03	2.12	2.14	2.34	3.10	4.14	4.94	9.54	9.86	4.44	4.08
11	2.16	2.38	2.15	2.27	2.19	2.26	2.18	2.29	3.44	4.55	5.37	2.26	2.79
12	2.26	2.49	2.24	2.37	2.29	2.36	2.27	3.04	4.51	5.62	5.95	2.35	3.15
13	2.35	2.59	2.39	2.46	2.37	2.45	2.42	3.06	4.12	5.09	6.00	5.58	3.41
14	2.43	2.68	2.47	2.54	2.46	2.53	3.21	4.42	5.84	6.46	6.82	4.95	3.90
15	3.34	2.82	2.54	2.62	2.53	2.66	2.57	2.89	4.14	4.96	5.65	5.24	3.50
16	3.80	3.36	2.61	2.69	2.60	2.73	2.64	2.63	2.77	3.75	5.12	4.66	3.28
17	2.69	2.97	2.68	2.76	2.72	2.80	3.21	4.45	6.27	7.69	8.12	5.65	4.34
18	4.01	3.71	3.05	3.01	3.66	5.14	6.23	7.76	8.55	16.50	8.55	8.28	6.54
19	2.89	4.06	4.30	4.53	4.18	5.48	6.72	8.66	8.98	17.33	17.90	8.83	7.82
20	3.03	3.36	3.03	3.18	3.08	3.18	3.26	4.53	6.28	7.68	8.63	7.20	4.70
													41.63

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 6 (911bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
							Costs 911b in6						
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.79	204.47	599.88	177.15	82.30
3	0.88	0.97	0.87	0.91	0.89	1.02	12.66	334.41	615.75	2427.44	537.97	0.97	327.89
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.13	1.57	1.32	1.15
5	1.35	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.39	1.87	1.86	1.47
6	1.81	1.75	1.48	1.55	1.51	1.59	1.60	1.58	1.59	1.78	2.36	1.55	1.68
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.77	1.76	2.40	1.72	1.80
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	1.93	1.95	1.91	1.95	1.89	1.92
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.28	3.03	3.97	3.35	2.52
10	2.28	2.49	2.22	2.32	2.33	2.55	3.38	4.51	5.37	10.38	10.72	4.82	4.45
11	2.35	2.59	2.33	2.46	2.38	2.45	2.36	2.48	3.72	4.92	5.80	2.44	3.02
12	2.43	2.69	2.42	2.55	2.46	2.54	2.45	3.27	4.85	6.04	6.38	2.52	3.38
13	2.52	2.78	2.56	2.64	2.54	2.62	2.58	3.27	4.41	5.44	6.41	5.96	3.64
14	2.59	2.86	2.63	2.71	2.62	2.70	3.42	4.71	6.21	6.88	7.25	5.27	4.15
15	3.56	3.00	2.70	2.78	2.69	2.82	2.73	3.07	4.39	5.25	5.99	5.55	3.71
16	4.02	3.56	2.77	2.85	2.75	2.89	2.79	2.78	2.93	3.96	5.40	4.92	3.47
17	2.84	3.14	2.83	2.92	2.86	2.95	3.38	4.69	6.61	8.10	8.55	5.95	4.57
18	4.22	3.90	3.21	3.17	3.85	5.41	6.55	8.15	8.98	17.33	8.98	8.69	6.87
19	3.03	4.26	4.51	4.75	4.39	5.75	7.05	9.07	9.41	18.16	18.76	9.25	8.20
20	3.18	3.52	3.18	3.33	3.22	3.33	3.41	4.74	6.57	8.03	9.02	7.53	4.92
													38.95

Pessimistic market -scenario hydrothermal with wind addition - inflow 6 (912in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
							Costs 912in6						
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	43.24	442.98	61.98	46.21
3	0.92	1.01	0.90	0.95	0.93	0.99	4.16	257.31	503.43	486.87	1840.79	1.01	258.27
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.38	1.23	1.15
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.53	1.46
6	1.63	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.70	1.60	1.63
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	1.82	1.76	1.79
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	1.94	1.98	1.92	1.96
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.20	2.82	2.68	2.34
10	2.32	2.54	2.26	2.37	2.37	2.48	2.46	3.21	4.13	4.04	7.08	4.38	3.30
11	2.38	2.62	2.36	2.49	2.41	2.48	2.39	2.44	2.66	3.48	4.43	2.47	2.72
12	2.45	2.71	2.44	2.57	2.48	2.56	2.47	2.52	3.12	4.05	5.05	2.54	2.91
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	2.72	3.33	4.27	4.41	3.01
14	2.65	2.92	2.69	2.77	2.67	2.75	2.71	3.21	4.17	4.91	5.48	4.15	3.42
15	3.19	3.04	2.74	2.83	2.73	2.86	2.76	2.76	3.15	3.81	4.51	4.45	3.24
16	3.60	3.34	2.80	2.88	2.78	2.92	2.82	2.81	2.89	2.84	3.76	3.81	3.10
17	2.90	3.20	2.89	2.97	2.92	3.01	2.90	3.52	4.65	5.46	6.10	4.71	3.77
18	3.77	3.66	3.05	3.04	3.62	4.70	5.37	5.84	6.15	9.12	6.37	6.43	5.09
19	2.99	3.87	4.11	4.42	4.07	4.96	5.73	6.40	6.44	9.55	10.26	6.83	5.80
20	3.10	3.35	3.08	3.21	3.11	3.10	3.10	3.91	5.01	5.82	6.55	5.90	4.10
													33.15

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	43.24	442.98	61.98	46.21
3	0.92	1.01	0.90	0.95	0.93	0.99	4.16	257.31	503.43	486.87	1840.79	1.01	258.27
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.38	1.23	1.15
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.53	1.46
6	1.63	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.67	1.62	1.62
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.80	1.85	1.80	1.81
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	1.99	2.03	1.97	1.99
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.26	2.67	2.62	2.37
10	2.38	2.60	2.32	2.43	2.43	2.55	2.44	3.44	4.24	6.70	7.26	3.98	3.56
11	2.44	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	3.50	4.73	2.53	2.78
12	2.51	2.77	2.50	2.63	2.54	2.61	2.52	2.57	2.89	4.29	5.16	2.60	2.97
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.78	3.22	4.47	4.60	3.07
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	3.04	4.42	5.14	5.58	4.17	3.49
15	3.00	3.10	2.79	2.88	2.78	2.92	2.81	2.81	2.89	3.81	4.71	4.56	3.26
16	3.44	3.16	2.85	2.93	2.83	2.97	2.86	2.86	2.94	2.89	3.44	3.70	3.07
17	2.95	3.25	2.93	3.02	2.97	3.06	2.95	3.21	4.81	5.84	6.19	4.67	3.82
18	3.52	3.44	2.97	3.07	3.71	5.25	6.10	6.13	9.43	9.25	6.47	5.94	5.44
19	3.04	3.36	3.93	4.37	4.04	5.33	6.40	6.52	9.87	9.69	10.41	6.38	6.11
20	3.14	3.13	3.13	3.16	3.16	3.15	3.14	3.57	5.17	6.30	6.96	5.89	4.16
													33.22

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 6 (913bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	407.13	888.77	1519.47	875.65	307.91
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	66.68	512.15	178.33	63.62
3	0.85	0.93	0.83	0.87	0.85	0.91	15.32	318.01	579.89	563.56	1981.68	0.94	288.72
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.30	1.16	1.08
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.34	1.39	1.34
6	1.49	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.49	1.53	1.49	1.49
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.67	1.72	1.67	1.68
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	1.86	1.90	1.84	1.86
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.07	2.44	2.41	2.19
10	2.19	2.39	2.13	2.23	2.24	2.34	2.25	3.17	3.91	6.18	6.70	3.68	3.28
11	2.25	2.48	2.24	2.37	2.28	2.35	2.27	2.32	2.39	3.25	4.39	2.35	2.58
12	2.33	2.57	2.32	2.45	2.36	2.43	2.35	2.40	2.69	4.00	4.82	2.43	2.76
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.61	3.02	4.20	4.32	2.88
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.86	4.16	4.84	5.26	3.93	3.29
15	2.82	2.93	2.64	2.72	2.62	2.75	2.66	2.65	2.73	3.60	4.45	4.32	3.07
16	3.25	2.99	2.69	2.77	2.68	2.81	2.71	2.71	2.79	2.74	3.26	3.51	2.91
17	2.80	3.09	2.79	2.87	2.82	2.91	2.80	3.05	4.58	5.56	5.89	4.44	3.63
18	3.35	3.28	2.83	2.92	3.53	5.01	5.81	5.84	8.99	8.82	6.17	5.66	5.18
19	2.90	3.20	3.75	4.18	3.85	5.09	6.11	6.23	9.43	9.26	9.95	6.10	5.84
20	3.00	3.00	2.99	3.03	3.02	3.01	3.00	3.41	4.95	6.03	6.67	5.65	3.98
													35.46

pessimistic market -scenario hydrothermal - inflow 7 (911in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911bin7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.68	53.59	558.42	564.00	98.49
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	1.11	0.90	0.86
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.02	1.11	1.07	1.03
5	1.18	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.26	1.46	1.48	1.29
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.57	2.30	2.99	2.67	1.74
7	2.05	1.70	1.52	1.60	1.56	1.71	2.12	2.86	3.49	706.34	764.03	3.49	124.37
8	3.43	2.35	2.08	1.95	1.83	2.49	2.99	3.65	3.93	161.54	189.43	3.94	31.63
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.39	3.29	4.22	4.29	2.52
10	2.48	2.28	2.03	2.12	2.14	2.44	3.08	3.94	4.94	9.54	4.94	9.82	4.15
11	3.69	2.38	2.15	2.27	2.19	2.26	2.18	2.37	3.57	4.64	5.37	5.34	3.20
12	2.26	2.49	2.24	2.37	2.29	2.36	2.27	2.32	2.39	2.78	3.37	3.23	2.53
13	2.35	2.59	2.39	2.46	2.37	2.45	2.42	2.41	3.52	4.58	6.20	6.18	3.33
14	2.43	2.68	2.47	2.54	2.46	2.53	2.50	2.49	3.33	4.26	5.23	4.60	3.13
15	3.94	2.82	2.54	2.62	2.53	2.66	2.57	2.62	3.68	4.71	5.57	5.45	3.48
16	4.59	4.08	3.42	3.81	3.65	4.48	5.42	7.00	7.54	14.83	15.32	14.83	7.41
17	2.69	4.53	4.46	5.23	4.12	4.94	5.57	6.72	8.12	7.86	8.12	6.98	5.78
18	2.76	3.04	2.74	2.83	2.79	2.88	2.79	3.39	4.71	5.78	7.07	4.40	3.77
19	2.89	3.69	3.07	3.41	3.23	4.10	4.84	5.95	7.61	8.69	8.98	8.83	5.44
20	3.03	3.36	3.03	3.18	3.08	3.18	3.63	5.24	7.29	8.99	9.42	9.25	5.22
													36.47

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 7 (911bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	14.34	484.81	490.08	82.94
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.19	0.97	0.93
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.08	1.17	1.14	1.10
5	1.25	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.39	1.61	1.63	1.43
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.72	2.51	3.26	2.91	1.90
7	2.23	1.85	1.66	1.74	1.70	1.85	2.30	3.10	3.78	199.67	227.42	3.77	37.59
8	3.70	2.52	2.24	2.09	1.97	2.68	3.21	3.92	4.21	13.64	26.73	4.22	5.93
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.62	3.60	4.62	4.70	2.76
10	2.71	2.49	2.22	2.32	2.33	2.66	3.36	4.29	5.37	10.38	5.37	10.66	4.51
11	4.01	2.59	2.33	2.46	2.38	2.45	2.36	2.56	3.86	5.01	5.80	5.76	3.46
12	2.43	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	2.99	3.62	3.47	2.72
13	2.52	2.78	2.56	2.64	2.54	2.62	2.58	2.58	3.77	4.89	6.62	6.60	3.56
14	2.59	2.86	2.63	2.71	2.62	2.70	2.66	2.65	3.55	4.53	5.56	4.89	3.33
15	4.19	3.00	2.70	2.78	2.69	2.82	2.73	2.78	3.91	4.99	5.91	5.77	3.69
16	4.86	4.32	3.63	4.03	3.86	4.73	5.73	7.40	7.97	15.66	16.18	15.66	7.84
17	2.84	4.78	4.71	5.52	4.34	5.20	5.87	7.09	8.55	8.27	8.55	7.36	6.09
18	2.90	3.20	2.89	2.98	2.94	3.03	2.94	3.56	4.95	6.07	7.42	4.63	3.96
19	3.03	3.87	3.23	3.57	3.39	4.30	5.08	6.24	7.98	9.11	9.41	9.25	5.71
20	3.18	3.52	3.18	3.33	3.22	3.33	3.80	5.48	7.62	9.40	9.85	9.67	5.46
													30.25

Pessimistic market -scenario hydrothermal with wind addition - inflow 7 (912in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.96	288.86	338.96	52.92
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.06	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.21	1.17	1.13
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.89	2.54	2.46	1.78
7	2.08	1.90	1.70	1.78	1.74	1.90	1.91	2.51	3.15	38.57	3.35	3.32	5.33
8	3.50	2.64	2.28	2.10	1.94	2.56	2.92	3.36	3.49	5.95	6.33	3.67	3.40
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.36	3.20	3.51	2.46
10	2.45	2.54	2.26	2.37	2.37	2.48	2.63	3.24	3.99	4.04	7.08	7.33	3.56
11	3.54	2.62	2.36	2.49	2.41	2.48	2.39	2.44	2.61	3.41	4.38	4.56	2.98
12	2.45	2.71	2.44	2.57	2.48	2.56	2.47	2.52	2.59	2.50	2.66	2.78	2.56
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	2.72	3.30	4.54	5.20	3.09
14	2.65	2.92	2.69	2.77	2.67	2.75	2.71	2.70	2.78	3.19	4.08	3.92	2.99
15	3.68	3.04	2.74	2.83	2.73	2.86	2.76	2.76	2.84	3.39	4.24	4.44	3.19
16	4.18	3.96	3.40	3.80	3.60	4.14	4.75	5.55	5.76	8.91	9.65	9.90	5.63
17	2.90	4.20	4.22	5.01	4.01	4.51	4.87	5.22	5.89	5.75	6.10	5.63	4.86
18	2.94	3.25	2.93	3.02	2.96	3.05	2.94	2.94	3.60	4.34	5.32	3.85	3.43
19	2.99	3.52	3.02	3.38	3.20	3.85	4.37	4.86	5.74	6.30	6.68	6.83	4.56
20	3.10	3.35	3.08	3.21	3.11	3.10	3.30	4.33	5.53	6.45	6.98	7.14	4.39
													26.53

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.96	288.86	338.96	52.92
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.06	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.21	1.17	1.13
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.89	2.53	2.47	1.78
7	2.07	1.92	1.71	1.80	1.76	1.92	1.89	2.56	3.18	38.61	114.42	3.25	14.59
8	3.41	2.34	2.14	2.03	1.94	2.61	3.07	3.52	3.57	6.09	6.48	3.75	3.41
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.26	3.28	3.72	2.51
10	2.38	2.60	2.32	2.43	2.43	2.55	2.57	3.51	4.24	6.70	7.26	4.49	3.62
11	3.60	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	3.53	4.73	4.80	3.07
12	2.51	2.77	2.50	2.63	2.54	2.61	2.52	2.57	2.65	2.56	2.69	2.60	2.60
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.78	3.09	4.77	5.30	3.15
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	2.75	2.84	2.93	4.15	3.94	3.01
15	3.62	3.10	2.79	2.88	2.78	2.92	2.81	2.81	2.89	3.15	4.33	4.61	3.22
16	4.15	3.79	3.30	3.86	3.64	4.38	5.24	5.83	9.11	9.06	9.82	6.20	5.70
17	2.95	4.00	4.25	5.28	3.92	4.68	5.21	5.68	5.98	5.84	9.52	4.97	5.19
18	2.99	3.30	2.97	3.07	3.01	3.10	2.99	2.98	3.26	4.41	5.67	3.66	3.45
19	3.04	3.36	3.03	3.23	3.14	4.08	4.79	5.36	6.38	6.39	10.41	6.65	4.99
20	3.14	3.13	3.13	3.16	3.16	3.15	3.14	4.25	5.95	6.67	7.08	11.38	4.78
													27.08

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 7 (913bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1010.22	1304.97	1519.47	912.48	420.16
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.88	392.31	451.63	70.92
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.98	0.94	0.88
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.14	1.10	1.06
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.34	1.30	1.33
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.74	2.33	2.27	1.64
7	1.90	1.77	1.58	1.66	1.62	1.77	1.75	2.37	2.94	361.38	445.14	3.02	68.91
8	3.17	2.18	1.99	1.89	1.81	2.44	2.87	3.29	3.34	26.53	43.73	3.51	8.06
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.07	3.00	3.41	2.32
10	2.19	2.39	2.13	2.23	2.24	2.34	2.37	3.23	3.91	6.18	6.70	4.15	3.34
11	3.33	2.48	2.24	2.37	2.28	2.35	2.27	2.32	2.39	3.28	4.39	4.47	2.85
12	2.33	2.57	2.32	2.45	2.36	2.43	2.35	2.40	2.47	2.38	2.51	2.43	2.42
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.61	2.90	4.48	4.98	2.95
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.59	2.67	2.76	3.91	3.72	2.83
15	3.41	2.93	2.64	2.72	2.62	2.75	2.66	2.65	2.73	2.97	4.10	4.35	3.04
16	3.93	3.59	3.13	3.65	3.45	4.15	4.97	5.52	8.63	8.59	9.31	5.88	5.40
17	2.80	3.80	4.04	5.01	3.72	4.45	4.95	5.40	5.69	5.56	9.06	4.72	4.93
18	2.84	3.14	2.83	2.92	2.86	2.95	2.85	2.84	3.10	4.21	5.41	3.49	3.29
19	2.90	3.20	2.89	3.09	3.00	3.90	4.57	5.12	6.10	6.10	9.95	6.36	4.76
20	3.00	3.00	2.99	3.03	3.02	3.01	3.00	4.06	5.70	6.39	6.78	10.90	4.57
													30.78

pessimistic market -scenario hydrothermal - inflow 8 (911in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.74	421.34	831.36	0.71	104.95
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	0.93	0.90	0.84
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.02	1.11	1.07	1.03
5	1.18	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.26	1.28	1.25	1.26
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.68	2.40	2.95	2.90	1.77
7	2.02	1.84	1.87	2.11	1.72	2.08	2.41	2.89	3.49	3.52	764.03	1.60	65.80
8	1.66	1.89	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	1.82	1.76	1.79
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.28	3.08	3.76	3.72	2.40
10	2.08	2.28	2.03	2.12	2.14	2.23	2.14	2.11	2.75	3.62	4.63	2.08	2.52
11	2.16	2.38	2.15	2.27	2.19	2.26	2.18	2.23	2.80	3.69	4.44	3.79	2.71
12	2.26	2.49	2.24	2.37	2.32	3.04	3.62	4.44	5.36	5.62	5.95	2.35	3.50
13	2.35	2.59	2.39	2.46	2.37	2.45	2.43	3.24	4.29	4.99	6.06	6.18	3.48
14	4.10	2.68	2.47	2.54	2.46	2.53	2.50	2.91	4.26	5.72	6.82	6.60	3.80
15	2.51	2.82	2.54	2.62	2.53	2.66	2.68	3.96	5.79	7.02	14.46	7.02	4.72
16	2.58	2.90	2.61	2.69	2.60	3.02	3.91	5.31	7.10	7.44	15.32	2.65	4.85
17	2.69	2.97	2.68	2.76	2.78	3.81	4.49	5.32	6.58	7.14	7.35	7.25	4.65
18	2.76	4.54	3.63	3.79	4.20	4.64	5.12	6.28	7.93	8.27	17.04	8.28	6.37
19	2.89	3.20	2.89	3.03	2.94	3.27	4.44	6.02	8.05	8.69	17.90	3.03	5.53
20	3.03	3.36	3.03	3.18	3.08	3.18	3.18	4.40	6.24	7.89	9.27	8.76	4.88
													13.88

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 8 (911bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.82	310.36	746.59	0.78	88.65
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.00	0.97	0.92
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.08	1.17	1.14	1.10
5	1.25	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.39	1.42	1.38	1.39
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.83	2.62	3.22	3.16	1.94
7	2.20	2.00	2.03	2.29	1.87	2.25	2.61	3.13	3.78	3.80	227.42	1.72	21.26
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	1.93	1.95	1.91	1.95	1.89	1.92
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.50	3.38	4.12	4.07	2.64
10	2.28	2.49	2.22	2.32	2.33	2.44	2.33	2.30	2.99	3.94	5.03	2.26	2.74
11	2.35	2.59	2.33	2.46	2.38	2.45	2.36	2.41	3.02	3.99	4.79	4.09	2.93
12	2.43	2.69	2.42	2.55	2.50	3.27	3.89	4.77	5.76	6.04	6.38	2.52	3.77
13	2.52	2.78	2.56	2.64	2.54	2.62	2.60	3.46	4.59	5.34	6.47	6.59	3.72
14	4.38	2.86	2.63	2.71	2.62	2.70	2.66	3.09	4.53	6.09	7.25	7.01	4.04
15	2.67	3.00	2.70	2.78	2.69	2.82	2.84	4.20	6.14	7.43	15.32	7.43	5.00
16	2.73	3.07	2.77	2.85	2.75	3.20	4.13	5.62	7.51	7.85	16.18	2.80	5.12
17	2.84	3.14	2.83	2.92	2.94	4.02	4.73	5.60	6.93	7.52	7.75	7.63	4.90
18	2.90	4.78	3.81	3.98	4.41	4.88	5.39	6.60	8.33	8.69	17.90	8.69	6.70
19	3.03	3.36	3.03	3.18	3.08	3.43	4.65	6.31	8.43	9.11	18.76	3.18	5.80
20	3.18	3.52	3.18	3.33	3.22	3.33	3.33	4.60	6.52	8.25	9.69	9.16	5.11
													11.02

Pessimistic market -scenario hydrothermal with wind addition - inflow 8 (912in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	196.75	617.30	0.82	68.43
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.21	1.17	1.13
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.99	2.54	2.65	1.81
7	2.06	1.94	1.98	2.23	1.82	2.15	2.40	2.74	3.15	3.19	114.32	1.76	11.64
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	1.94	1.98	1.92	1.96
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.30	2.99	3.18	2.41
10	2.32	2.54	2.26	2.37	2.37	2.48	2.38	2.34	2.42	2.76	3.66	2.30	2.52
11	2.38	2.62	2.36	2.49	2.41	2.48	2.39	2.44	2.51	2.81	3.56	3.34	2.65
12	2.45	2.71	2.44	2.57	2.48	2.63	3.12	3.71	4.33	4.64	5.05	2.54	3.22
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	2.64	3.31	3.85	4.76	5.06	3.20
14	3.88	2.92	2.69	2.77	2.67	2.75	2.71	2.70	3.22	4.17	5.48	5.50	3.46
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	3.15	4.33	5.40	5.78	5.80	3.68
16	2.76	3.10	2.80	2.88	2.78	2.92	3.32	4.24	5.31	5.71	9.65	2.83	4.02
17	2.90	3.20	2.89	2.97	2.92	3.01	3.56	4.04	4.83	5.21	5.59	5.73	3.90
18	2.94	4.19	3.49	3.72	4.06	4.28	4.55	4.99	5.84	6.01	9.79	6.43	5.02
19	2.99	3.31	2.98	3.12	3.01	3.10	3.77	4.67	5.78	6.30	10.26	3.05	4.36
20	3.10	3.35	3.08	3.21	3.11	3.10	3.10	3.66	4.84	5.82	6.81	6.80	4.17
													9.03

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	196.75	617.30	0.82	68.43
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.04	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.21	1.17	1.13
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.99	2.54	2.67	1.81
7	2.04	1.92	1.98	2.26	1.81	2.17	2.46	2.82	3.18	3.21	114.42	1.80	11.67
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	1.99	2.03	1.97	1.99
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.26	2.96	3.28	2.45
10	2.38	2.60	2.32	2.43	2.43	2.55	2.44	2.40	2.48	2.59	3.84	2.36	2.57
11	2.44	2.69	2.42	2.55	2.46	2.54	2.45	2.50	2.57	2.60	3.66	3.35	2.69
12	2.51	2.77	2.50	2.63	2.54	2.61	3.13	3.97	4.73	4.75	5.16	2.60	3.32
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	2.70	3.08	3.95	5.08	5.30	3.27
14	3.71	2.98	2.74	2.82	2.72	2.81	2.76	2.75	2.95	4.39	5.58	5.60	3.49
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.85	4.56	5.52	9.35	5.90	4.02
16	2.81	3.16	2.85	2.93	2.83	2.97	2.86	4.21	5.72	5.80	9.82	2.88	4.07
17	2.95	3.25	2.93	3.02	2.97	3.06	3.29	4.13	5.16	5.60	5.83	5.93	4.01
18	2.99	3.79	3.27	3.67	4.21	4.46	4.85	5.45	6.25	6.10	9.94	6.52	5.12
19	3.04	3.36	3.03	3.17	3.06	3.15	3.47	4.88	6.38	6.39	10.41	3.09	4.45
20	3.14	3.13	3.13	3.16	3.16	3.15	3.14	3.41	5.11	6.46	7.08	7.24	4.28
													9.09

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 8 (913bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.97	0.50	50.70
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	250.30	693.67	0.75	79.25
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.97	0.94	0.88
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.14	1.10	1.06
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.34	1.30	1.33
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.83	2.33	2.46	1.66
7	1.88	1.77	1.83	2.08	1.68	2.01	2.27	2.61	2.94	2.99	445.14	1.67	39.07
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	1.86	1.90	1.84	1.86
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.07	2.71	3.01	2.26
10	2.19	2.39	2.13	2.23	2.24	2.34	2.25	2.21	2.29	2.39	3.54	2.18	2.37
11	2.25	2.48	2.24	2.37	2.28	2.35	2.27	2.32	2.39	2.41	3.40	3.11	2.49
12	2.33	2.57	2.32	2.45	2.36	2.43	2.91	3.70	4.42	4.43	4.82	2.43	3.10
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.89	3.71	4.77	4.98	3.07
14	3.49	2.80	2.58	2.65	2.56	2.64	2.60	2.59	2.77	4.13	5.26	5.28	3.28
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.69	4.31	5.22	8.84	5.58	3.80
16	2.66	2.99	2.69	2.77	2.68	2.81	2.71	3.99	5.42	5.50	9.31	2.73	3.86
17	2.80	3.09	2.79	2.87	2.82	2.91	3.12	3.93	4.91	5.33	5.54	5.64	3.81
18	2.84	3.60	3.12	3.49	4.01	4.25	4.62	5.19	5.95	5.82	9.48	6.22	4.88
19	2.90	3.20	2.89	3.02	2.92	3.01	3.31	4.66	6.09	6.10	9.95	2.96	4.25
20	3.00	3.00	2.99	3.03	3.02	3.01	3.00	3.26	4.89	6.18	6.78	6.93	4.09
													10.85

pessimistic market -scenario hydrothermal - inflow 9 (911in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911in9							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	242.36	48.061	3.35	0.74	0.79	8.84	235.94	532.75	825.70	800.37	831.36	0.71	295.08
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	1.09	0.90	0.86
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.45	226.99	244.36	40.16
5	1.71	1.78	65.20	2.10	2.15	13.776	4.44	1608.53	1727.97	1684.73	108.32	66.89	445.63
6	2.42	1.93	1.34	1.41	1.38	1.46	1.92	2.41	6.50	3.10	1307.69	2.99	111.21
7	1.69	1.70	1.52	1.60	1.56	1.71	1.96	2.49	3.06	3.52	3.64	1.60	2.17
8	1.66	1.89	1.70	1.78	1.74	1.90	2.04	2.74	3.56	3.94	4.07	3.85	2.57
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.23	3.36	4.36	9.00	4.21	3.10
10	3.54	2.61	2.24	2.12	2.14	2.26	2.99	3.83	4.94	4.78	9.86	4.92	3.85
11	3.30	2.55	2.15	2.39	3.11	3.98	4.79	5.20	10.72	10 .38	10.72	10.66	5.83
12	5.34	5.91	4.11	4.23	3.63	3.17	3.68	4.38	5.24	5.62	5.95	5.76	4.75
13	2.35	2.81	2.44	2.57	3.16	4.06	5.11	6.04	6.24	12.05	12.74	5.98	5.46
14	2.43	2.68	2.52	2.93	2.51	2.53	2.77	3.48	4.55	5.66	6.82	6.18	3.75
15	2.51	2.82	2.54	2.62	2.53	2.66	2.57	2.56	3.08	4.20	5.08	3.92	3.09
16	2.58	2.98	2.61	2.69	2.60	3.36	4.42	5.74	7.54	7.44	15.32	7.44	5.39
17	2.69	5.93	2.68	2.76	2.72	3.42	4.30	5.55	7.50	7.86	16.18	7.86	5.79
18	4.48	3.04	2.74	2.83	2.79	3.48	4.58	6.20	8.55	8.27	17.04	8.07	6.01
19	7.96	3.20	2.89	3.03	3.23	3.75	4.32	5.63	7.01	8.21	8.98	7.09	5.44
20	3.03	3.36	3.03	3.18	3.08	3.18	3.08	3.13	3.57	4.57	5.90	6.12	3.77
													61.31

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 9 (911bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911b in9							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	242.36	48.061	3.35	0.74	0.79	8.84	235.94	457.95	740.92	715.60	746.59	0.78	267.66
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.18	0.97	0.93
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.55	78.25	86.07	14.64
5	1.81	1.98	2.40	2.33	2.39	2.76	2.82	1269.92	1389.34	1346.16	18.88	2.78	336.96
6	2.66	2.12	1.48	1.55	1.51	1.60	2.10	2.63	3.35	3.38	854.49	3.26	73.34
7	1.84	1.85	1.66	1.74	1.70	1.85	2.12	2.70	3.31	3.80	3.93	1.72	2.35
8	1.79	2.04	1.82	1.91	1.87	2.03	2.19	2.94	3.82	4.22	4.36	4.12	2.76
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.45	3.68	4.78	9.86	4.61	3.40
10	3.87	2.86	2.45	2.32	2.33	2.46	3.26	4.18	5.37	5.20	10.72	5.34	4.20
11	3.58	2.76	2.33	2.58	3.37	4.31	5.18	5.62	11.581	1 .21	11.58	11.49	6.30
12	5.76	6.37	4.43	4.56	3.90	3.41	3.96	4.70	5.63	6.04	6.38	6.18	5.11
13	2.52	3.01	2.61	2.75	3.39	4.35	5.46	6.46	6.67	12.88	13.60	6.38	5.84
14	2.59	2.86	2.69	3.12	2.68	2.70	2.95	3.70	4.85	6.02	7.25	6.57	4.00
15	2.67	3.00	2.70	2.78	2.69	2.82	2.73	2.72	3.27	4.45	5.38	4.15	3.28
16	2.73	3.15	2.77	2.85	2.75	3.56	4.68	6.07	7.97	7.85	16.18	7.85	5.70
17	2.84	6.26	2.83	2.92	2.86	3.61	4.53	5.85	7.90	8.27	17.04	8.27	6.10
18	4.71	3.20	2.89	2.98	2.94	3.66	4.82	6.52	8.98	8.69	17.90	8.48	6.31
19	8.36	3.36	3.03	3.18	3.39	3.93	4.53	5.90	7.35	8.60	9.41	7.42	5.71
20	3.18	3.52	3.18	3.33	3.22	3.33	3.22	3.27	3.73	4.78	6.17	6.40	3.94
													51.54

Pessimistic market -scenario hydrothermal with wind addition - inflow 9 (912in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 912in9							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	242.36	48.061	3.35	0.74	0.79	8.84	169.03	396.69	615.92	598.90	633.55	0.82	227.42
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.05	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.35	9.97	47.70	5.76
5	1.82	1.94	11.03	2.28	2.29	2.59	2.53	796.98	793.19	787.76	2.74	2.49	200.64
6	2.52	2.08	1.53	1.60	1.57	1.64	1.80	2.21	2.72	2.86	509.65	2.83	44.42
7	1.77	1.90	1.70	1.78	1.74	1.90	1.82	2.24	2.69	3.10	3.29	1.76	2.14
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	2.22	2.88	3.43	3.70	3.39	2.44
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.37	3.15	3.97	3.94	2.63
10	3.62	2.78	2.38	2.37	2.37	2.48	2.66	3.25	4.05	4.04	4.30	7.33	3.47
11	3.20	2.63	2.36	2.49	3.10	3.72	4.24	4.41	7.14	7.02	7.61	7.86	4.65
12	5.02	5.73	4.12	4.28	3.66	3.09	3.44	3.87	4.39	4.64	5.05	5.01	4.36
13	2.59	2.85	2.63	2.71	3.02	3.68	4.38	4.87	4.89	7.44	8.24	5.00	4.36
14	2.65	2.92	2.69	2.78	2.67	2.75	2.71	2.82	3.60	4.34	5.37	5.11	3.37
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	2.76	2.84	3.08	3.92	3.41	2.97
16	2.76	3.10	2.80	2.88	2.78	2.92	3.56	4.41	5.49	5.71	9.65	6.10	4.35
17	2.90	5.15	2.89	2.97	2.92	3.01	3.62	4.29	5.38	5.75	9.37	6.15	4.53
18	4.12	3.25	2.93	3.02	2.96	3.05	3.83	4.70	5.96	6.01	6.37	6.43	4.39
19	7.15	3.31	2.98	3.12	3.27	3.60	3.99	4.68	5.43	6.06	6.68	5.80	4.67
20	3.10	3.35	3.08	3.21	3.11	3.10	3.10	3.13	3.13	3.68	4.72	5.07	3.48
													40.16

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	242.36	48.061	3.35	0.74	0.79	8.84	169.03	396.69	615.92	598.90	633.55	0.82	227.42
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.05	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.35	9.97	47.70	5.76
5	1.82	1.94	11.03	2.28	2.29	2.59	2.53	796.98	793.19	787.76	2.74	2.49	200.64
6	2.52	2.08	1.53	1.60	1.57	1.64	1.80	2.21	2.72	2.86	509.70	2.84	44.42
7	1.73	1.92	1.71	1.80	1.76	1.92	1.84	2.25	2.74	3.18	3.38	1.80	2.17
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.15	2.95	3.60	3.78	3.52	2.49
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	3.18	4.08	4.05	2.68
10	3.70	2.60	2.32	2.43	2.43	2.55	2.73	3.61	4.24	4.14	7.26	4.49	3.54
11	3.22	2.69	2.42	2.55	3.08	3.99	4.60	7.38	7.31	7.18	7.79	4.80	4.75
12	5.14	5.91	4.21	4.34	3.62	3.00	3.60	4.15	4.76	4.75	8.50	4.47	4.70
13	2.64	2.91	2.68	2.76	2.67	3.60	4.68	4.97	7.77	7.59	5.29	5.30	4.41
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	2.75	3.56	4.67	5.58	5.41	3.46
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.81	2.89	2.84	3.90	3.31	2.98
16	2.81	3.16	2.85	2.93	2.83	2.97	3.53	4.80	5.86	9.06	6.18	6.20	4.43
17	2.95	5.08	2.93	3.02	2.97	3.06	3.44	4.53	5.95	5.84	9.52	6.25	4.63
18	3.91	3.30	2.97	3.07	3.01	3.10	3.70	5.07	6.25	9.25	6.47	6.52	4.72
19	7.22	3.36	3.03	3.17	3.06	3.17	3.92	4.98	5.88	6.39	6.77	5.95	4.74
20	3.14	3.13	3.13	3.16	3.16	3.15	3.14	3.18	3.17	3.30	4.76	5.21	3.47
													40.23

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 9 (913bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.27	811.06	1148.47	808.90	272.38
2	242.36	48.061	3.35	0.74	0.79	8.84	169.03	396.92	616.23	675.65	710.58	0.75	240.28
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.98	0.94	0.88
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.27	46.25	76.13	11.09
5	1.73	1.85	50.51	2.07	2.08	16.182	1.86	1039.75	1025.78	1023.12	62.10	20.78	272.32
6	2.30	1.90	1.39	1.46	1.43	1.50	1.65	2.03	2.49	2.63	820.09	2.62	70.12
7	1.59	1.77	1.58	1.66	1.62	1.77	1.71	2.08	2.54	2.95	3.14	1.67	2.01
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	2.01	2.76	3.37	3.54	3.30	2.33
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.91	3.74	3.72	2.48
10	3.40	2.39	2.13	2.23	2.24	2.34	2.52	3.33	3.91	3.82	6.70	4.15	3.26
11	2.97	2.48	2.24	2.37	2.85	3.70	4.27	6.85	6.78	6.67	7.23	4.47	4.41
12	4.78	5.49	3.92	4.04	3.37	2.79	3.35	3.87	4.44	4.43	7.94	4.18	4.38
13	2.47	2.73	2.51	2.59	2.50	3.37	4.39	4.66	7.29	7.12	4.97	4.98	4.13
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.59	3.35	4.40	5.26	5.10	3.26
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.65	2.73	2.69	3.69	3.13	2.82
16	2.66	2.99	2.69	2.77	2.68	2.81	3.34	4.55	5.55	8.59	5.86	5.88	4.20
17	2.80	4.82	2.79	2.87	2.82	2.91	3.26	4.31	5.66	5.56	9.06	5.94	4.40
18	3.72	3.14	2.83	2.92	2.86	2.95	3.53	4.83	5.95	8.82	6.17	6.22	4.49
19	6.89	3.20	2.89	3.02	2.92	3.03	3.74	4.76	5.62	6.10	6.47	5.69	4.53
20	3.00	3.00	2.99	3.03	3.02	3.01	3.00	3.04	3.03	3.16	4.56	4.99	3.32
													45.85

pessimistic market -scenario hydrothermal - inflow 10 (911in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.68	0.68	14.72	338.92	15.68	31.27
3	0.81	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.84	1.12	0.90	0.86
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.02	1.26	1.51	1.08
5	1.18	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.26	1.69	1.89	1.34
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.45	1.44	1.92	1.76	1.49
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.64	1.67	2.52	1.60	1.69
8	1.66	1.89	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	2.06	1.76	1.81
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.47	3.49	4.22	4.47	2.52	2.60
10	2.08	2.28	2.03	2.12	2.14	2.23	2.14	2.11	2.27	3.25	4.30	3.93	2.57
11	3.49	4.03	2.15	2.27	2.19	2.26	2.18	2.76	3.71	4.30	4.43	2.26	3.00
12	2.26	2.49	2.24	2.37	2.29	2.36	2.27	3.27	4.47	5.33	5.95	5.76	3.42
13	2.35	2.59	2.39	2.46	2.37	2.51	3.44	4.65	6.22	12.05	12.74	5.91	4.97
14	3.84	3.51	3.56	3.21	3.40	4.50	5.73	6.46	13.3112	.88	13.60	2.51	6.38
15	2.51	2.82	2.54	2.62	2.53	2.66	2.88	4.09	5.74	7.02	7.25	14.00	4.72
16	2.58	2.90	2.61	2.69	2.60	2.73	2.64	3.26	4.44	5.76	7.68	2.65	3.55
17	2.69	2.97	2.68	2.76	2.72	2.95	3.94	5.51	7.77	7.86	16.18	2.72	5.06
18	2.76	3.04	2.74	2.83	2.79	2.88	3.20	4.61	6.58	8.23	8.55	5.98	4.52
19	2.89	3.20	2.89	3.03	2.94	3.45	4.18	5.55	7.31	8.63	8.98	7.81	5.07
20	7.30	3.36	3.03	3.52	3.66	4.55	5.50	6.90	8.99	9.11	18.76	3.18	6.49
													13.03

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 10 (911bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.70	0.68	0.71	0.69	0.75	0.76	4.14	280.38	5.21	24.65
3	0.88	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.91	1.21	0.97	0.93
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.08	1.34	1.61	1.15
5	1.25	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.39	1.86	2.08	1.48
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.59	1.57	2.09	1.92	1.64
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.77	1.81	2.72	1.72	1.83
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	1.93	1.95	1.91	2.21	1.89	1.94
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.71	3.83	4.62	4.90	2.76	2.85
10	2.28	2.49	2.22	2.32	2.33	2.44	2.33	2.30	2.46	3.53	4.67	4.26	2.80
11	3.79	4.37	2.33	2.46	2.38	2.45	2.36	2.98	4.00	4.65	4.79	2.44	3.25
12	2.43	2.69	2.42	2.55	2.46	2.54	2.45	3.51	4.80	5.73	6.38	6.18	3.68
13	2.52	2.78	2.56	2.64	2.54	2.68	3.68	4.97	6.65	12.88	13.60	6.31	5.32
14	4.10	3.75	3.79	3.42	3.63	4.79	6.10	6.88	14.17	13 .72	14.46	2.67	6.79
15	2.67	3.00	2.70	2.78	2.69	2.82	3.06	4.33	6.09	7.43	7.68	14.83	5.01
16	2.73	3.07	2.77	2.85	2.75	2.89	2.79	3.44	4.70	6.08	8.11	2.80	3.75
17	2.84	3.14	2.83	2.92	2.86	3.11	4.15	5.81	8.18	8.27	17.04	2.86	5.33
18	2.90	3.20	2.89	2.98	2.94	3.03	3.36	4.85	6.92	8.65	8.98	6.28	4.75
19	3.03	3.36	3.03	3.18	3.08	3.62	4.39	5.82	7.66	9.05	9.41	8.18	5.32
20	7.65	3.52	3.18	3.68	3.83	4.76	5.76	7.21	9.40	9.53	19.62	3.32	6.79
													12.90

Pessimistic market -scenario hydrothermal with wind addition - inflow 10 (912in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.92	171.08	0.97	14.94
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.06	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.21	1.45	1.16
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.67	1.47
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.65	1.60	1.62
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.78	2.02	1.76	1.81
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	1.94	1.98	1.92	1.96
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.67	3.26	2.30	2.39
10	2.32	2.54	2.26	2.37	2.37	2.48	2.38	2.34	2.42	2.37	3.28	3.33	2.54
11	3.30	3.98	2.36	2.49	2.41	2.48	2.39	2.44	2.88	3.41	3.76	2.47	2.86
12	2.45	2.71	2.44	2.57	2.48	2.56	2.47	2.55	3.43	4.11	5.05	5.01	3.15
13	2.59	2.85	2.63	2.71	2.61	2.69	2.65	3.46	4.44	4.77	8.24	5.20	3.74
14	3.96	3.65	3.67	3.32	3.43	4.18	4.96	5.16	8.06	7.88	8.71	2.72	4.97
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	3.17	4.26	5.19	5.78	5.80	3.66
16	2.76	3.10	2.80	2.88	2.78	2.92	2.82	2.81	3.33	4.26	5.70	2.83	3.25
17	2.90	3.20	2.89	2.97	2.92	3.01	3.37	4.28	5.51	5.75	9.37	2.91	4.09
18	2.94	3.25	2.93	3.02	2.96	3.05	2.94	3.72	4.92	5.83	6.37	4.96	3.91
19	2.99	3.31	2.98	3.12	3.01	3.10	3.67	4.46	5.46	6.18	6.68	6.19	4.26
20	6.38	3.35	3.08	3.50	3.61	4.24	4.89	5.48	6.52	6.58	10.73	3.15	5.13
													11.83

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.92	171.08	0.97	14.94
3	0.92	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.06	1.01	0.96
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.21	1.45	1.16
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.67	1.47
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.67	1.62	1.62
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.80	1.94	1.80	1.82
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	1.99	2.03	1.97	1.99
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.52	3.37	2.22	2.42
10	2.38	2.60	2.32	2.43	2.43	2.55	2.44	2.40	2.48	2.34	3.24	3.35	2.58
11	3.29	4.09	2.42	2.55	2.46	2.54	2.45	2.50	2.81	3.62	3.95	2.53	2.93
12	2.51	2.77	2.50	2.63	2.54	2.61	2.52	2.57	3.27	4.31	5.16	5.12	3.21
13	2.64	2.91	2.68	2.76	2.67	2.75	2.71	3.35	4.76	4.86	8.40	5.30	3.82
14	3.86	3.47	3.67	3.24	3.50	4.57	5.53	8.31	8.22	8.03	5.58	2.78	5.06
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.87	4.45	5.52	5.88	9.58	4.03
16	2.81	3.16	2.85	2.93	2.83	2.97	2.86	2.86	2.94	4.29	6.18	2.88	3.30
17	2.95	3.25	2.93	3.02	2.97	3.06	3.01	4.44	5.98	8.86	6.19	2.96	4.14
18	2.99	3.30	2.97	3.07	3.01	3.10	2.99	3.39	5.10	6.10	6.47	4.96	3.95
19	3.04	3.36	3.03	3.17	3.06	3.15	3.38	4.63	5.97	6.39	6.77	6.58	4.38
20	6.50	3.13	3.13	3.21	3.55	4.46	5.38	6.09	6.83	10.12	7.08	3.19	5.22
													11.89

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 10 (913bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.76	780.42	168.78
2	0.53	0.66	0.59	0.70	0.68	0.71	0.81	0.79	0.80	0.84	222.77	6.20	19.67
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	0.99	0.94	0.88
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.14	1.37	1.08
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.34	1.52	1.35
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.49	1.53	1.49	1.48
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.67	1.80	1.67	1.68
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	1.86	1.90	1.84	1.86
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.31	3.09	2.03	2.23
10	2.19	2.39	2.13	2.23	2.24	2.34	2.25	2.21	2.29	2.16	2.99	3.10	2.38
11	3.04	3.79	2.24	2.37	2.28	2.35	2.27	2.32	2.61	3.36	3.66	2.35	2.72
12	2.33	2.57	2.32	2.45	2.36	2.43	2.35	2.40	3.05	4.02	4.82	4.79	2.99
13	2.47	2.73	2.51	2.59	2.50	2.57	2.54	3.14	4.47	4.56	7.89	4.98	3.58
14	3.63	3.26	3.45	3.04	3.30	4.30	5.21	7.83	7.74	7.56	5.26	2.62	4.77
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.71	4.20	5.22	5.56	9.06	3.81
16	2.66	2.99	2.69	2.77	2.68	2.81	2.71	2.71	2.79	4.06	5.86	2.73	3.12
17	2.80	3.09	2.79	2.87	2.82	2.91	2.86	4.22	5.69	8.43	5.89	2.82	3.93
18	2.84	3.14	2.83	2.92	2.86	2.95	2.85	3.23	4.86	5.82	6.17	4.73	3.77
19	2.90	3.20	2.89	3.02	2.92	3.01	3.23	4.43	5.71	6.10	6.47	6.29	4.18
20	6.22	3.00	2.99	3.07	3.40	4.26	5.15	5.83	6.54	9.69	6.78	3.06	5.00
													11.96

pessimistic market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911 in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.70	0.68	0.71	0.77	413.31	825.70	2846.48	831.36	0.71	410.18
3	0.81	0.89	0.80	0.83	0.81	0.85	0.92	73.47	599.03	676.07	2490.02	381.70	352.18
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.00	1.04	1.63	1.07	1.07
5	1.18	1.29	1.16	1.28	1.26	1.32	1.27	1.25	1.26	1.26	1.51	1.62	1.31
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.45	1.44	1.92	1.42	1.46
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.64	2.21	3.13	3.52	1.95
8	1.66	1.89	1.70	1.78	1.74	1.90	1.82	1.80	1.95	2.84	3.96	3.20	2.19
9	2.59	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.08	2.67	3.42	2.95	2.32
10	2.94	2.28	2.03	2.12	2.29	2.96	3.72	4.64	4.94	9.54	4.94	4.78	3.93
11	3.04	2.38	2.15	2.27	2.30	2.74	3.20	4.04	5.03	5.20	10.72	5.34	4.03
12	10.66	2.49	2.24	2.37	2.29	2.36	2.29	3.40	4.81	5.62	5.95	5.76	4.19
13	5.18	4.76	4.01	3.52	4.62	5.77	6.04	12.05	12.45	12 .05	12.74	12.33	7.96
14	2.43	2.68	2.47	2.54	2.46	2.53	2.74	3.55	4.74	5.53	6.12	5.73	3.63
15	4.00	4.14	3.53	3.58	3.19	4.14	5.05	6.59	7.11	14.00	14.46	7.02	6.40
16	2.58	2.90	2.61	2.69	2.60	2.73	2.64	2.63	3.12	4.18	5.25	5.36	3.27
17	2.69	2.97	2.68	2.76	2.72	2.80	3.20	4.41	6.21	7.55	8.12	15.67	5.15
18	15.94	6.13	5.48	5.13	3.78	4.53	5.50	6.76	8.30	8.27	8.55	16.50	7.91
19	2.89	3.20	2.89	3.03	2.94	3.03	3.28	4.55	6.22	7.57	8.85	3.03	4.29
20	3.03	3.36	3.03	3.18	3.08	3.45	4.60	6.19	8.32	9.11	18.76	8.74	6.24
													61.22

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911bin11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.70	0.68	0.71	0.77	302.63	740.92	2676.60	746.59	0.78	372.68
3	0.88	0.97	0.87	0.91	0.89	0.93	1.00	46.74	518.71	591.33	2320.32	314.61	316.51
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.07	1.11	1.73	1.14	1.15
5	1.25	1.44	1.29	1.43	1.40	1.46	1.41	1.39	1.40	1.39	1.67	1.79	1.44
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.59	1.57	2.09	1.55	1.60
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.77	2.39	3.38	3.80	2.11
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	1.93	2.09	3.04	4.24	3.42	2.35
9	2.77	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.28	2.92	3.74	3.23	2.54
10	3.21	2.49	2.22	2.32	2.50	3.23	4.06	5.06	5.37	10.38	5.37	5.18	4.28
11	3.30	2.59	2.33	2.46	2.49	2.97	3.47	4.36	5.43	5.62	11.58	5.76	4.36
12	11.49	2.69	2.42	2.55	2.46	2.54	2.47	3.66	5.17	6.04	6.38	6.18	4.50
13	5.55	5.11	4.30	3.77	4.95	6.18	6.46	12.88	13.31	12 .88	13.60	13.16	8.51
14	2.59	2.86	2.63	2.71	2.62	2.70	2.91	3.78	5.04	5.88	6.51	6.10	3.86
15	4.25	4.39	3.75	3.80	3.38	4.40	5.36	6.99	7.54	14.83	15.32	7.43	6.79
16	2.73	3.07	2.77	2.85	2.75	2.89	2.79	2.78	3.30	4.41	5.55	5.66	3.46
17	2.84	3.14	2.83	2.92	2.86	2.95	3.37	4.65	6.54	7.96	8.55	16.50	5.42
18	16.77	6.45	5.77	5.40	3.97	4.76	5.78	7.11	8.71	8.69	8.98	17.33	8.31
19	3.03	3.36	3.03	3.18	3.08	3.18	3.44	4.77	6.52	7.93	9.27	3.18	4.50
20	3.18	3.52	3.18	3.33	3.22	3.61	4.81	6.47	8.70	9.53	19.62	9.13	6.53
													57.78

Pessimistic market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.70	0.68	0.71	0.87	259.27	615.92	2112.98	633.55	0.82	302.27
3	0.92	1.01	0.90	0.95	0.93	0.97	0.94	5.01	326.83	486.87	1840.79	249.29	242.95
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.49	1.17	1.16
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.65	1.60	1.62
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.81	2.60	3.10	1.97
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	1.99	2.28	3.22	2.88	2.17
9	2.59	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.20	2.61	2.55	2.35
10	2.79	2.54	2.26	2.37	2.37	2.68	3.27	3.86	4.13	6.53	4.30	4.17	3.44
11	3.02	2.62	2.36	2.49	2.41	2.55	2.93	3.51	4.15	4.34	7.61	4.69	3.56
12	8.84	2.71	2.44	2.57	2.48	2.56	2.47	2.65	3.65	4.42	5.05	4.78	3.72
13	4.64	4.61	3.99	3.59	4.51	5.10	5.13	7.70	7.62	7.44	8.24	8.44	5.92
14	2.65	2.92	2.69	2.77	2.67	2.75	2.71	2.70	3.50	4.11	4.80	4.78	3.25
15	3.78	4.07	3.53	3.61	3.19	3.88	4.48	5.27	5.47	8.47	9.18	5.80	5.06
16	2.76	3.10	2.80	2.88	2.78	2.92	2.82	2.81	2.89	3.09	4.04	4.38	3.11
17	2.90	3.20	2.89	2.97	2.92	3.01	2.90	3.49	4.61	5.39	6.10	9.67	4.17
18	11.32	5.69	5.18	4.99	3.72	4.20	4.84	5.29	6.02	6.01	6.37	10.10	6.14
19	2.99	3.31	2.98	3.12	3.01	3.10	3.01	3.84	4.88	5.66	6.57	3.05	3.79
20	3.10	3.35	3.08	3.21	3.11	3.31	4.19	5.04	6.18	6.58	10.73	6.84	4.89
													49.88

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.70	0.68	0.71	0.87	259.27	615.92	2112.98	633.55	0.82	302.27
3	0.92	1.01	0.90	0.95	0.93	0.97	0.94	5.01	326.83	486.87	1840.79	249.29	242.95
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.11	1.12	1.49	1.17	1.16
5	1.38	1.51	1.35	1.49	1.46	1.53	1.47	1.45	1.46	1.45	1.48	1.43	1.45
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.62	1.67	1.62	1.62
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.80	2.59	3.20	1.99
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.03	2.17	3.39	2.93	2.20
9	2.54	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.26	2.43	2.50	2.37
10	2.81	2.60	2.32	2.43	2.43	2.66	3.58	4.10	6.81	4.14	7.26	3.79	3.74
11	2.73	2.69	2.42	2.55	2.46	2.54	2.88	3.73	4.55	4.44	7.79	4.80	3.63
12	9.05	2.77	2.50	2.63	2.54	2.61	2.52	2.57	3.74	4.75	5.16	5.12	3.83
13	4.72	4.52	3.91	3.47	4.89	5.45	5.23	7.86	7.77	7.59	8.40	8.61	6.04
14	2.70	2.98	2.74	2.82	2.72	2.81	2.76	2.75	3.36	4.30	5.06	4.94	3.33
15	3.60	3.94	3.46	3.60	3.15	4.12	4.97	5.54	8.67	8.62	9.35	5.90	5.41
16	2.81	3.16	2.85	2.93	2.83	2.97	2.86	2.86	2.94	2.89	3.97	4.49	3.13
17	2.95	3.25	2.93	3.02	2.97	3.06	2.95	3.17	4.77	5.84	6.19	9.82	4.24
18	11.50	5.55	5.15	4.91	3.49	4.27	5.23	5.82	6.25	6.10	9.94	6.52	6.23
19	3.04	3.36	3.03	3.17	3.06	3.15	3.04	3.50	5.02	6.11	6.77	3.09	3.86
20	3.14	3.13	3.13	3.16	3.16	3.15	4.01	5.34	6.83	6.67	10.88	7.24	4.99
													49.96

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.78	1256.53	1519.47	1369.51	394.85
2	0.53	0.68	0.59	0.70	0.68	0.71	0.87	259.27	616.23	2253.05	710.58	0.75	320.39
3	0.85	0.93	0.83	0.87	0.85	0.90	0.86	16.03	441.60	563.56	1981.68	310.36	276.61
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.04	1.05	1.41	1.10	1.08
5	1.31	1.44	1.28	1.35	1.32	1.38	1.33	1.31	1.32	1.32	1.34	1.30	1.33
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.49	1.53	1.49	1.48
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.67	2.41	2.98	1.84
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	1.90	2.03	3.17	2.74	2.06
9	2.39	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.07	2.23	2.29	2.19
10	2.58	2.39	2.13	2.23	2.24	2.45	3.29	3.78	6.29	3.82	6.70	3.50	3.45
11	2.52	2.48	2.24	2.37	2.28	2.35	2.67	3.47	4.22	4.12	7.23	4.47	3.37
12	8.41	2.57	2.32	2.45	2.36	2.43	2.35	2.40	3.49	4.43	4.82	4.78	3.57
13	4.42	4.23	3.67	3.25	4.58	5.11	4.91	7.37	7.29	7.12	7.89	8.09	5.66
14	2.54	2.80	2.58	2.65	2.56	2.64	2.60	2.59	3.16	4.05	4.77	4.66	3.13
15	3.39	3.72	3.27	3.40	2.97	3.89	4.70	5.24	8.19	8.15	8.84	5.58	5.11
16	2.66	2.99	2.69	2.77	2.68	2.81	2.71	2.71	2.79	2.74	3.76	4.25	2.96
17	2.80	3.09	2.79	2.87	2.82	2.91	2.80	3.02	4.54	5.56	5.89	9.35	4.04
18	10.94	5.28	4.90	4.67	3.33	4.07	4.99	5.54	5.95	5.82	9.48	6.22	5.93
19	2.90	3.20	2.89	3.02	2.92	3.01	2.90	3.34	4.79	5.84	6.47	2.96	3.69
20	3.00	3.00	2.99	3.03	3.02	3.01	3.84	5.11	6.54	6.39	10.41	6.93	4.77
													52.38

pessimistic market -scenario hydrothermal - inflow 12 (911in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	180.31	5.26	44.88	0.78	0.70	0.78	11.36	276.39	723.05	800.37	831.36	2904.02	481.61
3	230.29	0.89	0.80	0.83	0.81	0.85	0.82	0.81	0.82	0.91	55.89	0.90	24.55
4	0.99	1.09	0.98	1.02	1.00	1.05	1.01	0.99	1.15	79.46	400.68	1.07	40.87
5	1.18	1.29	1.16	1.28	1.26	1.33	1.77	10.35	103.58	1684.73	108.32	106.95	168.60
6	1.37	1.50	1.34	1.41	1.38	1.45	1.46	1.44	1.78	2.58	8.90	1.42	2.17
7	1.49	1.70	1.52	1.60	1.56	1.71	1.64	1.62	1.69	2.47	3.15	1.60	1.81
8	1.66	1.89	1.70	1.78	1.74	1.90	1.82	2.29	3.29	3.94	189.43	3.94	17.95
9	1.92	2.11	1.89	1.98	2.00	2.10	2.02	2.00	2.08	2.47	3.43	3.46	2.29
10	2.08	2.28	2.10	2.24	3.19	3.75	4.36	4.64	9.86	9.54	9.86	9.82	5.31
11	3.19	2.38	2.15	2.27	2.19	2.52	3.20	4.18	5.37	10.38	5.37	4.09	3.94
12	2.26	2.49	2.24	2.51	3.12	3.86	4.53	5.62	5.80	11.21	11.87	2.35	4.82
13	3.40	2.59	2.39	2.46	2.37	2.45	2.42	2.41	2.73	3.73	4.97	4.56	3.04
14	2.43	4.15	3.01	2.54	2.59	3.24	3.93	4.89	6.15	6.46	6.82	6.60	4.40
15	2.51	2.82	2.54	2.62	2.53	2.66	3.04	4.33	6.11	7.02	14.46	7.02	4.80
16	2.58	2.90	2.61	2.69	2.60	2.73	2.64	2.79	4.06	5.13	6.05	6.07	3.57
17	2.69	4.67	4.20	4.33	5.68	7.01	7.72	15.39	16.18	15 .67	16.18	7.86	8.96
18	8.00	3.04	2.74	3.37	3.37	4.48	5.43	6.71	8.54	8.27	17.04	8.28	6.61
19	2.89	5.81	4.59	4.06	3.56	4.04	4.67	5.81	7.10	8.46	8.90	5.15	5.42
20	4.31	4.31	4.69	3.18	3.22	3.50	3.89	4.91	6.48	7.73	9.23	8.02	5.29
													71.10

Pessimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 12 (911bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	180.31	5.26	44.88	0.78	0.70	0.78	11.36	218.67	642.48	715.60	746.59	2734.13	441.80
3	170.77	0.97	0.87	0.91	0.89	0.93	0.89	0.88	0.89	0.98	14.56	0.97	16.21
4	1.06	1.17	1.04	1.09	1.07	1.12	1.08	1.07	1.23	50.38	326.16	1.14	32.30
5	1.25	1.44	1.29	1.43	1.40	1.47	1.96	2.55	16.60	1346.16	18.88	18.19	117.72
6	1.51	1.65	1.48	1.55	1.51	1.59	1.60	1.58	1.95	2.81	3.50	1.55	1.86
7	1.62	1.85	1.66	1.74	1.70	1.85	1.78	1.76	1.83	2.66	3.40	1.72	1.96
8	1.79	2.04	1.82	1.91	1.87	2.03	1.96	2.46	3.53	4.22	26.73	4.22	4.55
9	2.05	2.33	2.08	2.18	2.20	2.31	2.22	2.19	2.28	2.70	3.76	3.80	2.51
10	2.28	2.49	2.30	2.45	3.47	4.09	4.76	5.06	10.72	10 .38	10.72	10.66	5.78
11	3.46	2.59	2.33	2.46	2.38	2.73	3.46	4.52	5.80	11.21	5.80	4.41	4.26
12	2.43	2.69	2.42	2.70	3.36	4.15	4.88	6.04	6.24	12.05	12.73	2.52	5.18
13	3.65	2.78	2.56	2.64	2.54	2.62	2.58	2.58	2.92	3.99	5.31	4.86	3.25
14	2.59	4.43	3.21	2.71	2.76	3.45	4.18	5.21	6.55	6.88	7.25	7.01	4.69
15	2.67	3.00	2.70	2.78	2.69	2.82	3.22	4.60	6.48	7.43	15.32	7.43	5.10
16	2.73	3.07	2.77	2.85	2.75	2.89	2.79	2.94	4.29	5.42	6.39	6.41	3.78
17	2.84	4.93	4.43	4.57	5.99	7.39	8.13	16.22	17.04	16 .50	17.04	8.27	9.45
18	8.41	3.20	2.89	3.55	3.54	4.71	5.71	7.06	8.97	8.69	17.90	8.69	6.94
19	3.03	6.09	4.81	4.25	3.73	4.24	4.90	6.09	7.44	8.87	9.33	5.39	5.68
20	4.52	4.52	4.91	3.33	3.37	3.67	4.07	5.13	6.78	8.09	9.65	8.39	5.54
													65.22

Pessimistic market -scenario hydrothermal with wind addition - inflow 12 (912in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	180.31	5.26	44.88	0.78	0.70	0.78	0.94	183.42	532.58	598.90	633.55	2270.46	371.05
3	195.02	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.33	1.01	17.15
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.13	3.79	258.19	1.17	22.77
5	1.38	1.51	1.35	1.49	1.46	1.53	1.55	2.00	2.47	2.52	893.45	8.19	76.58
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.95	2.78	1.60	1.74
7	1.66	1.90	1.70	1.78	1.74	1.90	1.82	1.80	1.82	1.97	2.62	1.76	1.87
8	1.83	2.08	1.86	1.95	1.91	2.07	1.99	1.97	2.43	3.30	3.70	3.67	2.40
9	2.18	2.39	2.14	2.24	2.26	2.37	2.28	2.25	2.33	2.20	2.54	2.83	2.33
10	2.32	2.54	2.26	2.37	2.86	3.31	3.76	3.99	6.64	6.53	7.08	7.33	4.25
11	3.12	2.62	2.36	2.49	2.41	2.48	2.79	3.49	4.41	7.02	4.62	3.66	3.46
12	2.45	2.71	2.44	2.57	2.93	3.50	3.98	4.69	4.75	7.51	8.32	2.54	4.03
13	3.13	2.85	2.63	2.71	2.61	2.69	2.65	2.64	2.72	2.70	3.72	3.77	2.90
14	2.65	3.77	2.94	2.77	2.67	2.97	3.50	4.09	4.82	5.05	5.48	5.50	3.85
15	2.71	3.04	2.74	2.83	2.73	2.86	2.76	3.18	4.32	5.31	5.78	5.80	3.67
16	2.76	3.10	2.80	2.88	2.78	2.92	2.82	2.81	3.05	3.86	4.72	4.98	3.29
17	2.90	4.24	3.95	4.20	5.32	6.01	6.33	8.85	8.88	8.72	9.37	6.15	6.24
18	6.81	3.25	2.93	3.20	3.24	4.08	4.72	5.21	6.12	6.01	9.79	6.43	5.15
19	2.99	5.29	4.36	3.99	3.51	3.81	4.23	4.77	5.46	6.18	6.63	4.49	4.64
20	4.07	4.23	4.56	3.21	3.22	3.37	3.63	4.21	5.16	5.87	6.88	6.42	4.57
													58.39

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 12 (913in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	180.31	5.26	44.88	0.78	0.70	0.78	0.94	183.42	532.58	598.90	633.55	2270.46	371.05
3	195.02	1.01	0.90	0.95	0.93	0.97	0.93	0.92	0.93	0.95	1.33	1.01	17.15
4	1.10	1.20	1.08	1.13	1.11	1.16	1.11	1.10	1.13	3.79	258.19	1.17	22.77
5	1.38	1.51	1.35	1.49	1.46	1.53	1.55	2.00	2.47	2.52	893.45	8.19	76.58
6	1.56	1.71	1.53	1.60	1.57	1.64	1.65	1.63	1.64	1.95	2.79	1.62	1.74
7	1.68	1.92	1.71	1.80	1.76	1.92	1.84	1.82	1.83	1.93	2.63	1.80	1.89
8	1.86	2.11	1.89	1.98	1.94	2.11	2.02	2.00	2.38	3.54	3.78	3.75	2.45
9	2.22	2.44	2.18	2.29	2.31	2.42	2.33	2.31	2.39	2.26	2.35	2.86	2.36
10	2.38	2.60	2.32	2.43	2.81	3.51	4.16	4.10	6.81	6.70	7.26	7.51	4.38
11	3.02	2.69	2.42	2.55	2.46	2.54	2.71	3.75	4.55	7.18	7.79	3.22	3.74
12	2.51	2.77	2.50	2.63	2.64	3.54	4.30	4.82	7.81	7.67	5.16	2.60	4.08
13	2.99	2.91	2.68	2.76	2.67	2.75	2.71	2.70	2.78	2.68	3.57	3.75	2.91
14	2.70	3.63	2.79	2.82	2.72	2.95	3.74	4.53	5.28	5.14	5.58	5.60	3.96
15	2.76	3.10	2.79	2.88	2.78	2.92	2.81	2.98	4.63	5.52	9.35	5.90	4.04
16	2.81	3.16	2.85	2.93	2.83	2.97	2.86	2.86	2.94	3.71	4.88	5.19	3.33
17	2.95	3.98	3.88	4.22	5.87	6.67	6.43	9.00	9.03	8.86	9.52	9.82	6.69
18	6.13	3.30	2.97	3.07	3.01	3.89	4.94	5.67	6.25	9.25	6.47	10.26	5.43
19	3.04	4.45	3.95	3.72	3.35	3.85	4.50	5.21	5.96	6.39	6.77	4.33	4.63
20	3.88	4.07	4.73	3.16	3.16	3.29	3.74	4.56	5.75	6.57	7.08	6.77	4.73
													58.49

Pessimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 12 (913bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin12													
1	0.59	0.51	0.46	0.47	37.41	412.48	688.73	944.57	1481.38	1325.12	1519.47	1102.39	626.13
2	180.31	5.26	44.88	0.78	0.70	0.78	0.94	183.42	532.87	675.65	710.58	2415.09	395.94
3	252.96	0.93	0.83	0.87	0.85	0.90	0.86	0.85	0.86	0.88	1.24	0.94	21.91
4	1.03	1.13	1.01	1.06	1.03	1.08	1.04	1.03	1.06	15.58	325.62	1.10	29.31
5	1.31	1.44	1.28	1.35	1.32	1.38	1.40	1.81	21.76	20 .23	1135.71	75.35	105.36
6	1.42	1.56	1.39	1.46	1.43	1.50	1.51	1.49	1.50	1.80	2.57	1.49	1.59
7	1.55	1.77	1.58	1.66	1.62	1.77	1.71	1.68	1.70	1.79	2.44	1.67	1.75
8	1.73	1.97	1.76	1.85	1.81	1.97	1.89	1.87	2.22	3.32	3.54	3.51	2.29
9	2.09	2.29	2.05	2.15	2.11	2.21	2.13	2.11	2.19	2.07	2.16	2.62	2.18
10	2.19	2.39	2.13	2.23	2.59	3.23	3.83	3.78	6.29	6.18	6.70	6.95	4.04
11	2.80	2.48	2.24	2.37	2.28	2.35	2.51	3.48	4.22	6.67	7.23	2.99	3.47
12	2.33	2.57	2.32	2.45	2.45	3.30	4.00	4.50	7.28	7.16	4.82	2.43	3.80
13	2.80	2.73	2.51	2.59	2.50	2.57	2.54	2.53	2.61	2.51	3.35	3.52	2.73
14	2.54	3.41	2.62	2.65	2.56	2.77	3.52	4.27	4.97	4.84	5.26	5.28	3.73
15	2.60	2.93	2.64	2.72	2.62	2.75	2.66	2.82	4.37	5.22	8.84	5.58	3.81
16	2.66	2.99	2.69	2.77	2.68	2.81	2.71	2.71	2.79	3.52	4.63	4.92	3.16
17	2.80	3.78	3.68	4.01	5.58	6.34	6.12	8.55	8.59	8.43	9.06	9.35	6.36
18	5.83	3.14	2.83	2.92	2.86	3.71	4.71	5.40	5.95	8.82	6.17	9.78	5.18
19	2.90	4.24	3.76	3.56	3.20	3.68	4.30	4.97	5.69	6.10	6.47	4.14	4.42
20	3.71	3.89	4.52	3.03	3.02	3.14	3.58	4.36	5.51	6.29	6.78	6.48	4.53
													61.58

Reference market -scenario hydrothermal - inflow 1 (911in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	0.70	0.71	0.69	0.66
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.84	60.28	0.85	5.76
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	1.12	52.51	18.55	6.72
5	1.56	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.62	266.69	559.32	1.10	69.85
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.50	2.22	376.96	441.85	446.53	106.47
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.35	1.58	2.11	2.69	18.70	2.99
8	2.17	1.55	1.38	1.44	1.41	1.53	1.47	1.44	1.45	1.93	2.37	1.40	1.63
9	1.52	1.66	1.48	1.55	1.56	1.63	1.66	2.42	3.58	33.99	91.34	3.62	12.17
10	2.94	2.50	2.47	2.56	3.07	3.84	4.47	4.65	1010.69	14.11	1285.15	10.05	195.54
11	4.69	3.12	2.58	3.04	4.24	4.98	5.07	759.34	780.68	801.63	822.96	5.35	266.47
12	1.84	2.03	2.42	1.95	1.88	1.95	1.88	2.40	3.26	4.14	4.94	4.08	2.73
13	1.98	2.19	2.03	2.10	2.03	2.10	2.08	2.08	2.15	2.08	2.61	2.12	2.13
14	2.12	2.35	2.17	2.24	2.17	2.25	2.99	3.87	5.19	6.33	6.83	2.27	3.40
15	2.27	2.56	2.32	2.82	2.66	3.06	3.61	4.44	5.69	6.84	7.27	2.41	3.83
16	2.41	2.72	2.46	2.54	2.46	3.43	4.78	6.57	7.56	14.85	15.34	14.85	6.66
17	7.59	6.50	4.25	3.48	3.57	4.82	5.98	7.73	16.20	15 .68	8.13	7.87	7.65
18	2.75	3.04	2.75	3.57	3.27	4.26	5.06	6.22	8.33	8.29	17.06	8.29	6.07
19	2.90	3.21	4.17	3.04	3.70	3.79	4.43	5.42	6.80	7.36	7.63	5.49	4.83
20	3.04	3.37	3.04	3.19	3.09	3.21	4.23	5.73	7.70	9.13	9.43	9.27	5.37
													42.86

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 1 (911bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.74	0.77	0.78	0.76	0.69
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.91	17.39	0.91	2.25
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	1.20	13.72	7.36	2.61
5	1.65	1.31	1.17	1.29	1.25	1.31	1.26	1.24	1.80	67.96	388.33	1.21	39.15
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	1.64	2.43	111.94	292.89	297.56	59.66
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.46	1.71	2.28	2.90	3.06	1.81
8	2.34	1.66	1.49	1.55	1.52	1.64	1.57	1.55	1.56	2.07	2.54	1.49	1.75
9	1.62	1.83	1.63	1.71	1.72	1.80	1.83	2.66	3.92	4.79	4.95	3.96	2.70
10	3.21	2.74	2.70	2.79	3.35	4.19	4.87	5.07	276.16	5.2 1	839.70	5.35	96.28
11	5.09	3.38	2.79	3.29	4.58	5.39	5.49	78.46	83.50	176.50	186.95	5.77	46.77
12	1.98	2.19	2.61	2.09	2.03	2.09	2.03	2.58	3.50	4.44	5.30	4.38	2.94
13	2.12	2.35	2.17	2.24	2.17	2.24	2.22	2.22	2.29	2.22	2.79	2.27	2.28
14	2.27	2.51	2.32	2.39	2.32	2.39	3.18	4.12	5.53	6.74	7.26	2.41	3.62
15	2.41	2.72	2.46	2.99	2.82	3.25	3.83	4.71	6.03	7.24	7.70	2.56	4.06
16	2.56	2.88	2.61	2.69	2.61	3.62	5.05	6.94	7.99	15.68	16.20	15.68	7.04
17	8.01	6.85	4.48	3.67	3.76	5.08	6.30	8.15	17.06	16 .51	8.56	8.29	8.06
18	2.90	3.20	2.90	3.75	3.44	4.47	5.32	6.54	8.75	8.71	17.92	8.71	6.38
19	3.04	3.36	4.38	3.19	3.88	3.97	4.65	5.68	7.12	7.71	7.99	5.74	5.06
20	3.18	3.53	3.18	3.34	3.23	3.36	4.43	5.99	8.05	9.55	9.86	9.68	5.62
													22.25

Reference market -scenario hydrothermal with wind addition - inflow 1 (912in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	0.82	0.80	0.72
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.24	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.09	1.59	1.55	1.13
5	1.67	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.41	1.98	264.63	1.26	23.35
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.42	2.02	15.36	90.16	107.11	18.82
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.50	1.51	1.86	2.42	2.64	1.70
8	2.20	1.70	1.51	1.58	1.54	1.67	1.60	1.58	1.59	1.68	2.13	1.52	1.69
9	1.72	1.88	1.67	1.75	1.76	1.84	1.76	2.17	3.03	3.66	3.99	3.30	2.38
10	2.93	2.63	2.59	2.70	3.18	3.68	4.05	4.01	46.91	4.05	449.73	4.39	44.24
11	4.49	3.22	2.68	3.16	4.25	4.59	4.51	24.21	16.25	22 .94	39.18	4.71	11.18
12	1.89	2.12	2.51	2.04	1.97	1.98	1.90	2.30	2.98	3.64	4.35	3.77	2.62
13	2.04	2.29	2.13	2.21	2.12	2.12	2.07	2.04	2.10	2.03	2.46	2.11	2.14
14	2.16	2.43	2.26	2.34	2.24	2.25	2.86	3.46	4.31	4.97	5.50	2.23	3.08
15	2.29	2.62	2.39	2.89	2.70	2.97	3.37	3.88	4.64	5.33	5.79	2.35	3.43
16	2.41	2.76	2.51	2.60	2.50	3.28	4.28	5.30	5.77	8.92	9.67	9.91	4.99
17	6.52	6.11	4.17	3.51	3.55	4.45	5.18	5.79	8.90	8.74	6.11	6.16	5.77
18	2.70	3.05	2.77	3.58	3.26	3.99	4.52	4.98	6.05	6.02	9.81	6.44	4.76
19	2.83	3.20	4.09	3.08	3.66	3.60	4.06	4.52	5.30	5.61	5.94	4.73	4.22
20	2.97	3.36	3.05	3.22	3.09	3.11	3.92	4.76	5.86	6.60	6.99	7.15	4.51
													14.40

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	0.82	0.80	0.72
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.24	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.09	1.59	1.55	1.13
5	1.67	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.41	1.98	264.63	1.26	23.35
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.42	2.02	15.36	90.19	107.14	18.83
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	1.52	1.82	2.41	2.70	1.72
8	2.17	1.73	1.54	1.61	1.57	1.70	1.63	1.60	1.63	1.58	2.10	1.56	1.70
9	1.75	1.92	1.71	1.79	1.80	1.88	1.80	1.98	3.20	3.85	4.10	3.46	2.44
10	2.87	2.50	2.61	2.75	3.43	4.08	4.29	4.11	47.08	154.85	4.42	4.50	19.79
11	4.81	3.02	2.58	3.23	4.93	4.91	4.62	24.38	16.42	23 .11	39.36	4.82	11.35
12	1.94	2.14	2.31	2.03	1.96	2.02	1.95	2.29	3.24	4.16	4.83	3.82	2.72
13	2.04	2.25	2.07	2.13	2.06	2.12	2.09	2.08	2.14	2.07	2.18	2.10	2.11
14	2.08	2.30	2.11	2.18	2.10	2.20	3.14	3.94	4.98	5.16	8.89	2.14	3.43
15	2.13	2.39	2.16	3.07	2.77	3.10	3.68	4.31	5.22	5.54	5.90	2.18	3.54
16	2.17	2.43	2.19	2.26	2.98	4.58	5.95	5.84	9.13	9.07	9.84	10.08	5.54
17	6.63	5.90	3.87	3.27	3.49	4.80	5.83	5.88	9.04	8.88	9.54	6.26	6.12
18	2.33	2.62	2.38	4.32	3.46	4.43	5.10	5.59	6.26	9.27	6.48	10.28	5.21
19	2.44	2.75	4.45	2.63	4.17	3.81	4.44	4.98	5.85	6.07	6.19	4.54	4.36
20	2.55	2.88	2.61	2.75	3.15	3.98	5.03	5.90	6.85	6.69	10.89	7.13	5.03
													13.32

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 1 (913bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.74	0.75	0.73	0.70
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	1.16	0.88	0.86
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	1.02	5.61	7.30	1.89
5	1.59	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.28	6.50	388.76	1.15	33.98
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.30	1.85	84.98	309.25	347.77	62.84
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.41	1.69	2.24	2.51	1.59
8	2.02	1.61	1.44	1.50	1.46	1.59	1.52	1.50	1.52	1.48	1.97	1.46	1.59
9	1.65	1.80	1.61	1.68	1.64	1.72	1.65	1.81	2.94	6.62	22.51	3.17	4.07
10	2.64	2.29	2.40	2.53	3.16	3.76	3.96	3.79	459.72	591.98	7.21	4.16	90.63
11	4.45	2.79	2.38	2.99	4.57	4.55	4.28	179.19	156.48	173.09	213.86	4.48	62.76
12	1.80	1.99	2.15	1.89	1.82	1.88	1.81	2.14	3.03	3.88	4.52	3.57	2.54
13	1.91	2.10	1.94	2.00	1.93	1.98	1.96	1.95	2.01	1.94	2.05	1.97	1.98
14	1.96	2.16	1.99	2.05	1.98	2.07	2.95	3.71	4.69	4.85	8.38	2.02	3.23
15	2.00	2.26	2.03	2.89	2.61	2.93	3.47	4.07	4.93	5.24	5.58	2.06	3.34
16	2.05	2.30	2.08	2.14	2.82	4.33	5.63	5.54	8.65	8.61	9.33	9.56	5.25
17	6.30	5.60	3.68	3.11	3.32	4.57	5.54	5.59	8.60	8.45	9.08	5.96	5.82
18	2.21	2.49	2.26	4.12	3.30	4.22	4.86	5.32	5.97	8.84	6.18	9.80	4.96
19	2.33	2.62	4.25	2.51	3.99	3.64	4.24	4.76	5.59	5.80	5.92	4.34	4.16
20	2.44	2.75	2.49	2.63	3.02	3.81	4.82	5.65	6.56	6.40	10.43	6.83	4.82
													22.17

Reference market -scenario hydrothermal - inflow 2 (911in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.33	1035.95	1519.47	1373.04	401.69
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	0.74	215.05	214.84	36.37
3	0.87	0.86	0.77	0.80	0.78	0.82	0.78	159.37	777.91	822.61	2800.96	2810.15	614.72
4	0.93	1.10	0.91	0.95	0.93	0.97	1.11	199.62	700.98	748.74	2657.75	0.98	359.58
5	1.07	1.17	1.05	1.16	1.13	1.18	1.13	1.22	1.71	88.40	357.64	1.10	38.16
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.24	1.25	1.64	2.12	2.20	1.42
7	1.26	1.44	1.29	1.34	1.31	1.43	1.39	2.05	25.30	312.08	356.02	28.48	61.12
8	1.36	2.04	2.00	2.07	2.18	2.76	3.30	77.52	1773.68	117.45	1892.91	142.04	334.94
9	18.10	2.74	2.38	2.49	2.93	3.00	3.49	5.96	15.46	1553.23	91.34	93.82	149.58
10	3.50	1.76	1.57	1.64	1.65	1.72	1.72	2.32	3.24	3.87	20.41	1.69	3.76
11	1.69	1.87	1.69	1.80	1.74	1.80	1.76	2.51	3.56	4.50	5.39	3.40	2.64
12	1.84	2.51	1.84	1.95	1.93	2.67	3.15	3.94	4.87	5.33	5.42	4.86	3.36
13	1.98	2.19	2.03	2.10	2.03	2.10	2.37	3.37	4.73	6.01	6.40	6.19	3.46
14	6.19	2.35	2.17	2.51	2.66	3.51	4.49	5.62	6.69	6.47	33.11	2.27	6.50
15	2.27	2.56	2.32	2.39	2.32	3.11	4.09	5.51	7.12	14.02	7.27	14.02	5.58
16	7.03	6.59	4.33	3.34	2.99	4.07	4.89	6.02	7.44	7.45	15.34	7.35	6.40
17	4.93	4.20	2.61	2.69	2.83	3.76	4.53	5.70	7.39	7.87	8.13	15.68	5.86
18	2.75	6.98	4.68	4.00	4.76	5.64	6.33	7.54	8.57	8.29	17.06	8.29	7.07
19	6.75	5.45	5.54	6.37	4.34	5.04	5.97	7.39	9.00	8.71	9.00	3.04	6.38
20	3.04	3.37	4.64	3.87	3.39	4.28	5.17	6.31	7.85	8.96	8.99	8.77	5.72
													102.72

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 2 (911bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.74	0.81	163.32	163.22	27.78
3	0.94	0.93	0.83	0.87	0.85	0.89	0.85	51.63	695.17	737.46	2630.25	2639.43	563.34
4	1.00	1.18	0.98	1.02	0.99	1.04	1.19	69.19	618.31	663.63	2487.11	1.04	320.56
5	1.14	1.31	1.17	1.29	1.25	1.31	1.26	1.36	1.90	15.79	109.11	1.21	11.51
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	1.36	1.37	1.78	2.31	2.40	1.56
7	1.38	1.56	1.40	1.46	1.42	1.55	1.51	2.22	3.24	80.07	101.17	3.18	16.68
8	1.47	2.20	2.15	2.22	2.35	2.96	3.54	5.18	1434.71	23.76	1553.90	35.16	255.80
9	4.37	3.02	2.62	2.75	3.22	3.29	3.83	4.50	4.95	922.04	4.95	4.79	80.36
10	3.82	1.92	1.71	1.79	1.80	1.88	1.88	2.53	3.52	4.21	5.29	1.84	2.68
11	1.83	2.03	1.83	1.94	1.88	1.94	1.91	2.71	3.84	4.86	5.82	3.67	2.86
12	1.98	2.71	1.98	2.09	2.08	2.87	3.39	4.24	5.23	5.73	5.81	5.21	3.61
13	2.12	2.35	2.17	2.24	2.17	2.24	2.53	3.61	5.06	6.42	6.83	6.61	3.70
14	6.61	2.51	2.32	2.67	2.84	3.74	4.77	5.99	7.12	6.89	14.48	2.41	5.20
15	2.41	2.72	2.46	2.54	2.46	3.29	4.33	5.85	7.55	14.85	7.70	14.85	5.92
16	7.45	6.98	4.59	3.54	3.16	4.30	5.17	6.37	7.87	7.87	16.20	7.76	6.77
17	5.20	4.43	2.75	2.84	2.98	3.96	4.78	6.01	7.78	8.29	8.56	16.51	6.18
18	2.90	7.34	4.93	4.21	5.00	5.93	6.65	7.92	9.00	8.71	17.92	8.71	7.43
19	7.09	5.72	5.82	6.68	4.55	5.28	6.26	7.74	9.43	9.13	9.43	3.18	6.69
20	3.18	3.53	4.85	4.05	3.55	4.47	5.41	6.60	8.21	9.37	9.40	9.16	5.98
													86.81

Reference market -scenario hydrothermal with wind addition - inflow 2 (912in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	9.48	41.74	4.85
3	0.95	0.98	0.87	0.91	0.89	0.93	0.89	1.09	479.90	618.62	2096.90	2190.40	449.44
4	1.03	1.18	1.01	1.05	1.03	1.07	1.13	17.06	411.94	552.08	458.87	1.07	120.71
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.58	1.99	22.92	1.26	3.18
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.41	1.44	1.92	2.08	1.51
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.72	2.46	8.50	27.83	2.68	4.48
8	1.50	2.05	2.04	2.14	2.24	2.77	3.15	3.47	727.093.5	3	877.76	22.65	137.53
9	4.00	2.89	2.53	2.67	3.06	2.97	3.29	3.61	3.83	428.73	3.99	3.96	38.79
10	3.47	1.96	1.75	1.83	1.83	1.91	1.83	1.99	2.71	3.23	4.09	1.78	2.36
11	1.83	2.02	1.82	1.92	1.86	1.91	1.84	2.30	3.11	3.80	4.57	3.20	2.52
12	1.89	2.60	1.92	2.04	2.01	2.64	3.01	3.55	4.15	4.46	4.69	4.36	3.11
13	2.04	2.29	2.13	2.21	2.12	2.12	2.33	3.08	3.99	4.75	5.20	5.21	3.12
14	5.59	2.43	2.26	2.60	2.71	3.36	4.05	4.65	5.20	5.06	8.73	2.23	4.07
15	2.29	2.62	2.39	2.47	2.37	3.01	3.75	4.61	5.48	8.49	5.79	9.43	4.39
16	6.24	6.22	4.28	3.38	3.00	3.82	4.37	4.96	5.71	5.72	9.67	6.04	5.28
17	4.56	4.14	2.65	2.76	2.85	3.58	4.12	4.63	5.52	5.76	6.11	9.69	4.70
18	2.70	6.49	4.54	3.98	4.60	5.08	5.44	5.73	6.17	6.02	9.81	6.44	5.58
19	5.97	5.22	5.30	6.12	4.24	4.64	5.22	5.73	6.46	6.31	6.69	2.86	5.40
20	2.97	3.36	4.51	3.86	3.37	4.03	4.65	5.14	5.94	6.51	6.76	6.87	4.83
													60.37

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 2 (913in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	9.48	41.74	4.85
3	0.95	0.98	0.87	0.91	0.89	0.93	0.89	1.09	479.90	618.62	2096.90	2190.40	449.44
4	1.03	1.18	1.01	1.05	1.03	1.07	1.13	17.06	411.94	552.08	458.87	1.07	120.71
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.58	1.99	22.92	1.26	3.18
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.41	1.44	1.89	2.08	1.50
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.70	2.51	15.25	27.88	2.69	5.06
8	1.52	1.97	2.03	2.16	2.29	2.90	3.36	3.53	727.23	758.06	15.51	22.74	128.61
9	4.09	2.80	2.49	2.69	3.21	3.06	3.51	3.80	3.94	428.90	4.10	4.07	38.89
10	3.49	2.01	1.79	1.87	1.88	1.96	1.88	1.85	2.79	3.54	4.42	1.82	2.44
11	1.88	2.07	1.87	1.97	1.90	1.96	1.89	2.06	3.23	4.23	4.74	3.14	2.58
12	1.94	2.40	1.93	2.03	1.96	2.82	3.33	3.98	4.64	4.76	4.97	4.44	3.27
13	2.04	2.25	2.07	2.13	2.06	2.12	2.12	3.26	4.51	4.88	8.42	5.32	3.43
14	5.71	2.30	2.11	2.37	2.68	3.61	4.58	5.27	5.29	8.05	5.60	2.14	4.14
15	2.13	2.39	2.16	2.22	2.75	3.57	4.59	5.56	5.58	8.64	9.36	9.60	4.88
16	6.35	5.71	3.90	3.10	2.86	4.04	4.82	5.54	5.87	5.82	9.84	6.22	5.34
17	4.47	3.91	2.27	2.36	3.25	4.18	4.79	5.33	5.99	5.86	9.54	6.26	4.85
18	2.33	8.10	4.86	3.93	4.86	5.45	5.89	6.15	6.26	9.27	6.48	6.54	5.84
19	6.03	4.93	5.34	6.34	4.00	4.69	5.58	6.24	6.55	9.70	6.79	2.47	5.72
20	2.55	2.88	5.89	4.00	3.35	4.28	5.15	5.68	6.55	6.69	7.09	7.25	5.11
													60.07

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 2 (913bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.33	1035.95	1519.47	1373.04	401.69
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.74	40.65	63.97	9.30
3	0.87	0.90	0.80	0.84	0.82	0.86	0.82	9.93	550.42	695.37	2237.88	2335.02	486.21
4	0.97	1.10	0.94	0.98	0.96	1.00	1.05	59.51	540.33	628.79	597.79	1.01	152.87
5	1.19	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.43	7.06	203.83	1.15	18.59
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.28	1.29	1.33	1.74	1.92	1.38
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.58	2.33	87.42	115.44	2.50	18.26
8	1.42	1.84	1.89	2.01	2.13	2.71	3.14	19.02	1057.47	1095.28	88.29	105.38	198.38
9	11.91	2.63	2.35	2.53	2.94	2.80	3.21	3.48	3.61	704.74	22.51	30.06	66.06
10	3.20	1.85	1.65	1.72	1.73	1.81	1.73	1.71	2.57	3.27	7.21	1.68	2.51
11	1.74	1.92	1.73	1.83	1.76	1.81	1.75	1.92	3.00	3.93	4.40	2.92	2.39
12	1.80	2.23	1.79	1.89	1.82	2.63	3.10	3.72	4.33	4.44	4.64	4.15	3.05
13	1.91	2.10	1.94	2.00	1.93	1.98	1.99	3.06	4.23	4.57	7.91	5.00	3.22
14	5.36	2.16	1.99	2.23	2.52	3.40	4.31	4.96	4.99	7.58	5.28	2.02	3.90
15	2.00	2.26	2.03	2.10	2.59	3.37	4.33	5.25	5.27	8.17	8.86	9.08	4.61
16	6.01	5.40	3.69	2.93	2.70	3.83	4.56	5.25	5.56	5.52	9.33	5.89	5.06
17	4.24	3.71	2.16	2.24	3.09	3.97	4.55	5.06	5.70	5.57	9.08	5.96	4.61
18	2.21	7.71	4.63	3.74	4.63	5.19	5.61	5.86	5.97	8.84	6.18	6.23	5.57
19	5.76	4.71	5.09	6.06	3.82	4.47	5.32	5.96	6.26	9.27	6.49	2.36	5.46
20	2.44	2.75	5.63	3.83	3.20	4.09	4.92	5.44	6.27	6.40	6.79	6.95	4.89
													69.90

Reference market -scenario hydrothermal - inflow 3 (911in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	0.73	273.11	284.75	47.04
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.80	0.88	0.85	0.80
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	1.19	196.27	17.15	18.59
5	1.07	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.12	1.12	1.23	1.10	1.13
6	1.20	1.32	1.17	1.23	1.20	1.25	1.57	2.15	284.15	399.97	441.85	1.21	94.86
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.35	1.89	2.65	132.86	1.31	12.46
8	1.36	1.55	1.38	1.44	1.41	1.59	2.10	2.88	91.23	117.45	1891.93	142.04	188.03
9	1.52	2.23	1.84	1.90	2.35	3.04	3.84	14.03	1199.98	1552.37	1661.06	1673.41	509.80
10	1.61	1.76	1.57	1.64	1.65	1.78	2.39	3.21	4.44	14.11	1285.15	10.05	110.78
11	2.73	1.87	1.69	1.80	1.74	1.83	2.45	3.49	4.76	5.21	5.39	5.35	3.19
12	3.23	2.03	1.97	1.95	1.88	2.05	2.35	2.94	3.81	4.47	4.84	1.98	2.79
13	1.98	2.19	2.03	2.10	2.03	2.10	2.08	2.08	2.64	3.39	4.39	2.12	2.43
14	2.12	2.35	2.17	2.24	2.17	2.25	2.22	2.22	2.61	3.32	4.41	2.27	2.53
15	2.27	2.56	2.32	2.39	2.32	2.44	3.13	4.11	5.35	6.78	7.27	7.03	4.00
16	2.41	2.72	2.89	2.79	3.03	3.50	4.19	5.09	6.22	7.40	7.57	6.40	4.52
17	2.61	2.88	2.61	2.69	2.98	4.22	5.40	6.89	8.13	15.68	8.13	2.70	5.41
18	2.75	3.04	2.75	2.84	2.80	2.89	2.80	3.79	5.43	7.00	8.11	2.85	3.92
19	2.90	3.21	2.90	3.04	3.03	3.61	4.42	5.61	7.26	8.29	9.00	8.85	5.18
20	5.29	5.41	4.97	3.19	3.89	4.44	5.24	6.75	8.75	9.13	9.43	8.20	6.22
													51.94

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 3 (911bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.74	0.81	219.09	230.38	38.02
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.86	0.94	0.91	0.87
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	1.27	68.08	6.01	7.04
5	1.14	1.31	1.17	1.29	1.25	1.31	1.26	1.24	1.25	1.23	1.36	1.21	1.25
6	1.32	1.45	1.29	1.35	1.32	1.38	1.72	2.35	71.88	121.88	292.89	1.32	41.68
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.46	2.04	2.86	32.49	1.42	4.21
8	1.47	1.66	1.49	1.55	1.52	1.71	2.26	3.09	12.7223	.76	1553.90	35.16	136.69
9	1.62	2.45	2.02	2.09	2.58	3.34	4.22	4.65	754.33	922.04	1017.79	1028.55	312.14
10	1.76	1.92	1.71	1.79	1.80	1.94	2.61	3.50	4.83	5.21	839.70	5.35	72.68
11	2.96	2.03	1.83	1.94	1.88	1.98	2.65	3.77	5.15	5.63	5.82	5.77	3.45
12	3.48	2.19	2.13	2.09	2.03	2.20	2.53	3.16	4.09	4.81	5.19	2.12	3.00
13	2.12	2.35	2.17	2.24	2.17	2.24	2.22	2.22	2.83	3.63	4.69	2.27	2.60
14	2.27	2.51	2.32	2.39	2.32	2.39	2.36	2.36	2.77	3.53	4.68	2.41	2.69
15	2.41	2.72	2.46	2.54	2.46	2.59	3.32	4.36	5.68	7.18	7.70	7.45	4.24
16	2.56	2.88	3.06	2.95	3.20	3.70	4.43	5.38	6.58	7.81	7.99	6.76	4.78
17	2.75	3.04	2.75	2.84	3.14	4.45	5.69	7.26	8.56	16.51	8.56	2.85	5.70
18	2.90	3.20	2.90	2.99	2.94	3.04	2.94	3.98	5.70	7.35	8.52	2.99	4.12
19	3.04	3.36	3.04	3.19	3.17	3.78	4.64	5.88	7.61	8.68	9.43	9.27	5.43
20	5.54	5.67	5.21	3.34	4.07	4.64	5.49	7.05	9.15	9.55	9.86	8.57	6.51
													33.61

Reference market -scenario hydrothermal with wind addition - inflow 3 (912in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	39.48	68.51	9.58
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	0.98	0.95	0.91
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.15	10.62	1.54	1.89
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.28	1.31	1.26	1.30
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.63	2.20	17.60	90.16	1.36	10.23
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.50	1.67	2.31	3.02	1.45	1.71
8	1.50	1.70	1.51	1.58	1.54	1.67	1.83	2.47	3.17	3.53	877.76	22.65	76.74
9	1.72	2.26	1.92	2.03	2.47	2.99	3.55	3.70	148.32	428.73	565.27	642.53	150.46
10	1.79	1.96	1.75	1.83	1.83	1.91	2.24	2.85	3.71	4.05	449.73	4.39	39.84
11	2.73	2.02	1.82	1.92	1.86	1.91	2.36	3.15	4.01	4.35	4.63	4.67	2.95
12	3.20	2.12	2.06	2.04	1.97	2.07	2.31	2.76	3.40	3.88	4.28	1.97	2.67
13	2.04	2.29	2.13	2.21	2.12	2.12	2.07	2.04	2.47	3.05	3.87	2.11	2.37
14	2.16	2.43	2.26	2.34	2.24	2.25	2.19	2.15	2.45	3.00	3.90	2.23	2.47
15	2.29	2.62	2.39	2.47	2.37	2.42	2.97	3.64	4.43	5.29	5.79	5.81	3.54
16	2.41	2.76	2.92	2.84	3.03	3.34	3.83	4.35	5.00	5.69	6.01	5.42	3.97
17	2.58	2.92	2.65	2.76	3.00	3.96	4.77	5.33	5.90	8.74	6.11	2.57	4.27
18	2.70	3.05	2.77	2.89	2.82	2.82	2.70	3.36	4.43	5.35	6.14	2.69	3.48
19	2.83	3.20	2.91	3.08	3.03	3.45	4.05	4.65	5.56	6.10	6.69	6.85	4.37
20	4.88	5.20	4.81	3.22	3.84	4.16	4.71	5.40	6.41	6.60	6.99	6.53	5.23
													17.16

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 3 (913in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	39.48	68.51	9.58
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	0.98	0.95	0.91
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.15	10.62	1.54	1.89
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.28	1.31	1.26	1.30
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.63	2.20	17.60	90.19	1.38	10.23
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	1.62	2.33	3.85	1.48	1.78
8	1.52	1.73	1.54	1.61	1.57	1.70	1.75	2.54	3.40	3.61	877.91	22.74	76.80
9	1.75	2.12	1.86	2.02	2.61	3.27	3.94	174.04	148.49	428.90	565.45	642.71	164.76
10	1.84	2.01	1.79	1.87	1.88	1.96	2.01	2.96	4.13	4.15	449.91	4.50	39.92
11	2.59	2.07	1.87	1.97	1.90	1.96	2.12	3.28	4.48	4.46	4.74	4.82	3.02
12	3.08	2.14	1.93	2.03	1.96	2.03	2.43	3.03	3.84	4.39	4.58	2.00	2.79
13	2.04	2.25	2.07	2.13	2.06	2.12	2.09	2.08	2.24	3.12	4.17	2.10	2.37
14	2.08	2.30	2.11	2.18	2.10	2.16	2.13	2.12	2.31	3.16	4.30	2.14	2.42
15	2.13	2.39	2.24	2.22	2.22	2.95	3.79	4.51	5.28	5.54	9.36	5.92	4.04
16	2.17	2.43	2.90	2.81	3.14	3.51	4.21	4.83	5.52	5.82	6.20	5.71	4.10
17	2.27	2.51	2.67	2.74	3.27	4.63	5.69	5.88	9.04	5.86	9.54	2.28	4.70
18	2.33	2.62	2.38	2.47	2.41	2.43	2.67	3.89	5.25	6.12	6.48	2.33	3.45
19	2.44	2.75	2.49	2.63	4.88	4.44	5.00	5.49	6.40	6.40	6.79	10.92	5.05
20	4.17	4.81	4.67	2.75	4.07	4.41	5.16	6.05	6.85	6.69	7.09	7.00	5.31
													17.98

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 3 (913bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.74	61.67	190.76	21.61
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	0.91	0.88	0.84
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	1.08	44.52	5.96	5.03
5	1.19	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.18	1.17	1.19	1.15	1.19
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.50	2.02	90.27	309.25	1.27	34.44
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.50	2.16	58.69	1.37	6.25
8	1.42	1.61	1.44	1.50	1.46	1.59	1.64	2.37	12.2329	.55	1237.60	105.38	116.48
9	1.65	2.00	1.75	1.90	2.38	2.99	3.61	640.27	574.96	704.74	969.91	1071.58	331.48
10	1.69	1.85	1.65	1.72	1.73	1.81	1.86	2.73	3.81	3.83	739.04	4.16	63.82
11	2.40	1.92	1.73	1.83	1.76	1.81	1.96	3.05	4.16	4.14	4.40	4.48	2.80
12	2.87	1.99	1.79	1.89	1.82	1.89	2.27	2.82	3.58	4.10	4.28	1.87	2.60
13	1.91	2.10	1.94	2.00	1.93	1.98	1.96	1.95	2.10	2.93	3.92	1.97	2.22
14	1.96	2.16	1.99	2.05	1.98	2.04	2.01	2.00	2.18	2.97	4.05	2.02	2.28
15	2.00	2.26	2.11	2.10	2.09	2.78	3.58	4.26	4.99	5.24	8.86	5.60	3.82
16	2.05	2.30	2.75	2.66	2.97	3.32	3.99	4.57	5.23	5.52	5.88	5.41	3.89
17	2.16	2.38	2.53	2.60	3.11	4.40	5.41	5.59	8.60	5.57	9.08	2.17	4.47
18	2.21	2.49	2.26	2.35	2.30	2.31	2.54	3.70	5.01	5.83	6.18	2.22	3.28
19	2.33	2.62	2.38	2.51	4.66	4.24	4.78	5.25	6.12	6.12	6.49	10.44	4.83
20	3.99	4.60	4.46	2.63	3.89	4.22	4.94	5.79	6.56	6.40	6.79	6.71	5.08
													31.58

Reference market -scenario hydrothermal - inflow 4 (911in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	0.70	0.79	0.78	0.68
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.83	15.91	0.85	2.06
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	1.19	332.28	706.67	677.72	143.78
5	1.50	1.17	1.05	1.17	1.32	1.69	15.66	320.00	501.91	2371.75	559.32	1.10	314.80
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.24	1.25	1.55	2.10	10.70	2.12
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.35	1.83	2.29	2.67	1.31	1.57
8	1.36	1.57	1.42	1.47	1.41	1.76	2.03	2.40	2.92	15.32	80.58	3.06	9.61
9	2.49	1.66	1.70	1.73	1.96	2.45	3.03	3.80	15.46	1552.37	1661.06	93.82	278.46
10	3.44	1.76	1.57	1.64	1.65	1.72	1.65	1.63	1.86	2.36	3.00	2.93	2.10
11	1.69	1.94	1.75	1.80	1.74	1.99	2.55	3.42	4.46	5.21	5.39	5.35	3.11
12	1.84	2.03	2.06	2.27	2.23	2.91	3.60	4.68	5.82	5.63	5.97	5.17	3.68
13	1.98	2.19	2.03	2.10	2.39	3.43	4.61	6.05	6.26	206.80	74.76	79.05	32.64
14	2.12	4.41	2.97	2.24	2.38	2.84	3.22	3.75	4.69	5.51	6.63	6.49	3.94
15	2.27	2.56	2.32	2.39	2.32	3.17	4.10	5.30	6.53	7.03	7.27	7.03	4.36
16	2.41	2.72	2.46	2.54	2.46	2.59	2.51	2.76	3.83	4.85	5.36	2.56	3.09
17	2.61	2.88	2.61	2.69	2.66	2.74	2.66	2.71	3.87	4.84	6.01	2.70	3.25
18	2.75	3.04	2.75	2.84	2.80	3.84	5.06	6.63	8.57	8.29	17.06	2.85	5.54
19	2.90	3.21	4.02	3.68	3.38	4.17	4.88	6.19	7.83	8.36	9.00	8.00	5.47
20	3.04	3.37	3.81	4.14	3.93	4.95	5.75	7.09	8.87	9.13	18.78	9.27	6.84
													41.38

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 4 (911bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.74	0.77	0.87	0.85	0.71
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.90	5.18	0.91	1.23
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	1.27	271.61	621.97	594.48	124.79
5	1.59	1.31	1.17	1.29	1.47	1.88	2.20	88.56	352.88	2032.89	388.33	1.21	239.57
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	1.36	1.37	1.69	2.29	2.50	1.56
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.46	1.98	2.47	2.88	1.42	1.71
8	1.47	1.69	1.53	1.58	1.52	1.89	2.18	2.57	3.14	3.65	9.47	3.28	2.83
9	2.66	1.83	1.87	1.91	2.15	2.69	3.33	4.17	4.95	922.04	1017.79	4.79	164.18
10	3.76	1.92	1.71	1.79	1.80	1.88	1.80	1.77	2.02	2.56	3.26	3.18	2.29
11	1.83	2.10	1.90	1.94	1.88	2.16	2.76	3.69	4.81	5.63	5.82	5.77	3.36
12	1.98	2.19	2.22	2.44	2.40	3.14	3.87	5.02	6.25	6.05	6.40	5.55	3.96
13	2.12	2.35	2.17	2.24	2.55	3.68	4.92	6.47	6.69	12.90	13.61	13.18	6.07
14	2.27	4.71	3.17	2.39	2.53	3.03	3.43	4.00	5.00	5.86	7.05	6.90	4.19
15	2.41	2.72	2.46	2.54	2.46	3.36	4.34	5.62	6.92	7.45	7.70	7.45	4.62
16	2.56	2.88	2.61	2.69	2.61	2.74	2.65	2.92	4.04	5.12	5.66	2.70	3.27
17	2.75	3.04	2.75	2.84	2.80	2.89	2.80	2.86	4.07	5.09	6.32	2.85	3.42
18	2.90	3.20	2.90	2.99	2.94	4.04	5.31	6.97	9.00	8.71	17.92	2.99	5.82
19	3.04	3.36	4.21	3.86	3.55	4.37	5.12	6.49	8.20	8.75	9.43	8.38	5.73
20	3.18	3.53	3.99	4.33	4.11	5.18	6.02	7.41	9.28	9.55	19.63	9.68	7.16
													29.35

Reference market -scenario hydrothermal with wind addition - inflow 4 (912in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	0.82	0.80	0.72
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.12	0.95	0.92
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.16	77.21	458.87	415.50	80.09
5	1.62	1.37	1.22	1.34	1.39	1.76	1.99	20.33	98.70	1264.42	264.63	1.26	138.34
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.41	1.38	1.90	2.15	1.50
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.50	1.62	2.05	2.45	1.45	1.63
8	1.50	1.70	1.51	1.58	1.54	1.67	1.91	2.23	2.66	3.07	3.40	2.93	2.14
9	2.57	1.88	1.81	1.87	2.09	2.47	2.91	3.39	3.83	428.73	565.27	3.96	85.06
10	3.42	1.96	1.75	1.83	1.83	1.91	1.83	1.80	1.87	1.99	2.61	2.69	2.12
11	1.83	2.02	1.82	1.92	1.86	1.97	2.44	3.09	3.81	4.35	4.63	4.71	2.87
12	1.89	2.12	2.14	2.37	2.31	2.87	3.38	4.08	4.76	4.66	5.07	4.60	3.35
13	2.04	2.29	2.13	2.21	2.47	3.30	4.13	4.88	4.91	7.46	8.25	8.46	4.38
14	2.16	4.36	3.03	2.34	2.44	2.78	3.05	3.37	3.98	4.49	5.37	5.43	3.57
15	2.29	2.62	2.39	2.47	2.37	3.06	3.75	4.46	5.15	5.44	5.79	5.81	3.80
16	2.41	2.76	2.51	2.60	2.50	2.55	2.43	2.60	3.40	4.12	4.60	2.47	2.91
17	2.58	2.92	2.65	2.76	2.69	2.69	2.58	2.52	3.38	4.03	4.89	2.57	3.02
18	2.70	3.05	2.77	2.89	2.82	3.64	4.52	5.22	6.17	6.02	9.81	2.69	4.36
19	2.83	3.20	3.95	3.68	3.36	3.92	4.41	5.02	5.86	6.13	6.69	6.36	4.62
20	2.97	3.36	3.76	4.11	3.87	4.58	5.09	5.61	6.48	6.60	10.74	7.15	5.36
													17.56

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 4 (913in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	0.82	0.80	0.72
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.12	0.95	0.92
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.16	77.21	458.87	415.50	80.09
5	1.62	1.37	1.22	1.34	1.39	1.76	1.99	20.33	98.70	1264.42	264.63	1.26	138.34
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.41	1.38	1.87	2.16	1.50
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	1.58	2.06	2.47	1.48	1.64
8	1.52	1.73	1.54	1.61	1.57	1.70	1.86	2.27	2.75	3.26	3.58	2.95	2.20
9	2.50	1.92	1.71	1.82	2.13	2.64	3.21	3.80	3.94	428.90	565.45	4.07	85.17
10	3.47	2.01	1.79	1.87	1.88	1.96	1.88	1.85	1.91	1.80	2.61	2.73	2.15
11	1.88	2.07	1.87	1.97	1.90	1.96	2.44	3.38	4.29	4.46	39.36	4.82	5.87
12	1.94	2.14	1.93	2.13	2.23	3.05	3.80	4.67	4.87	4.76	8.52	4.12	3.68
13	2.04	2.25	2.07	2.13	2.33	3.57	4.76	4.98	7.79	7.61	8.42	5.32	4.44
14	2.08	4.75	2.94	2.18	2.44	2.92	3.27	3.66	4.39	5.00	5.60	5.62	3.74
15	2.13	2.39	2.16	2.22	2.56	3.65	4.57	5.34	5.58	5.54	9.36	5.66	4.26
16	2.17	2.43	2.19	2.26	2.18	2.29	2.21	2.85	3.92	4.81	5.04	2.22	2.88
17	2.27	2.51	2.27	2.36	2.31	2.45	2.88	3.57	4.48	5.05	5.75	2.28	3.18
18	2.33	2.62	2.45	2.96	3.68	4.70	5.79	6.15	6.26	9.27	9.96	2.33	4.87
19	2.44	2.75	5.16	3.93	3.43	4.19	4.84	5.59	6.52	6.40	6.79	6.66	4.89
20	2.55	2.88	4.25	4.41	3.99	4.95	5.60	6.19	6.85	10.14	7.09	7.25	5.51
													17.83

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 4 (913bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.74	0.75	0.74	0.70
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	1.04	0.88	0.85
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	1.09	212.86	597.79	546.21	113.81
5	1.54	1.30	1.16	1.21	1.25	1.59	4.36	198.48	324.76	1500.09	388.76	1.15	202.14
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.28	1.29	1.27	1.72	1.99	1.38
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.47	1.91	2.29	1.37	1.52
8	1.42	1.61	1.44	1.50	1.46	1.59	1.74	2.12	2.57	3.14	26.66	2.76	4.00
9	2.35	1.80	1.61	1.71	1.95	2.41	2.94	3.48	3.61	704.74	970.45	30.06	143.93
10	3.19	1.85	1.65	1.72	1.73	1.81	1.73	1.71	1.77	1.66	2.41	2.53	1.98
11	1.74	1.92	1.73	1.83	1.76	1.81	2.26	3.14	3.99	4.14	213.86	4.48	20.22
12	1.80	1.99	1.79	1.98	2.08	2.84	3.54	4.36	4.54	4.44	54.66	3.85	7.32
13	1.91	2.10	1.94	2.00	2.18	3.34	4.47	4.68	7.31	7.45	7.91	5.00	4.19
14	1.96	4.46	2.76	2.05	2.29	2.75	3.08	3.45	4.14	4.71	5.28	5.30	3.52
15	2.00	2.26	2.03	2.10	2.41	3.44	4.32	5.04	5.27	5.24	8.86	5.35	4.03
16	2.05	2.30	2.08	2.14	2.07	2.17	2.09	2.70	3.72	4.56	4.78	2.10	2.73
17	2.16	2.38	2.16	2.24	2.20	2.33	2.73	3.40	4.26	4.81	5.47	2.17	3.03
18	2.21	2.49	2.33	2.82	3.51	4.48	5.52	5.86	5.97	8.84	9.50	2.22	4.64
19	2.33	2.62	4.92	3.75	3.27	4.00	4.62	5.35	6.23	6.12	6.49	6.36	4.67
20	2.44	2.75	4.07	4.22	3.82	4.74	5.36	5.93	6.56	9.71	6.79	6.95	5.28
													26.52

Reference market -scenario hydrothermal - inflow 5 (911in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	0.70	0.71	0.71	0.66
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.82	39.98	203.64	20.96
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	0.99	18.94	408.53	36.41
5	1.07	1.17	1.05	1.24	1.86	85.94	396.03	2231.75	2382.25	2371.75	2462.26	1.10	828.12
6	1.20	1.32	1.17	1.34	1.39	1.54	1.87	2.28	254.07	399.97	403.24	1.68	89.26
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.60	2.33	90.76	356.02	2059.98	210.01
8	1.36	1.55	1.38	1.63	1.59	2.17	2.68	3.34	114.34	1787.33	1891.93	142.04	329.28
9	6.64	1.66	1.48	1.55	1.56	1.63	1.57	2.04	2.93	3.72	25.31	1.50	4.30
10	1.61	1.76	1.57	1.64	1.65	1.72	1.70	2.33	3.32	4.05	25.34	10.05	4.73
11	1.69	1.87	2.21	2.22	2.49	3.18	3.75	4.72	5.39	801.63	5.39	5.35	69.99
12	3.26	2.64	2.42	2.72	2.35	3.21	4.01	5.28	5.82	297.87	237.50	4.82	47.66
13	1.98	2.19	2.03	2.10	2.03	2.10	2.08	2.65	3.67	4.46	5.07	4.17	2.88
14	2.12	2.35	2.17	2.24	2.17	2.25	2.22	2.28	3.26	4.20	5.46	5.00	2.98
15	2.27	2.56	2.32	2.39	2.32	2.44	2.37	2.45	3.49	4.41	5.11	4.62	3.06
16	2.41	2.72	3.28	3.00	3.50	4.85	5.91	7.15	7.56	7.45	7.70	2.56	4.84
17	2.61	3.44	3.42	3.23	4.17	4.74	5.14	5.95	7.40	7.87	8.13	2.70	4.90
18	2.75	3.68	3.39	3.81	4.08	4.96	5.56	6.98	8.57	16.51	8.57	8.29	6.43
19	5.17	5.76	4.58	4.31	4.08	5.26	6.34	7.81	9.00	8.71	17.92	8.85	7.32
20	3.04	4.88	4.16	4.11	4.26	4.42	5.00	5.87	7.02	7.59	7.94	6.99	5.44
													83.99

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 5 (911bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.74	0.77	0.78	0.78	0.69
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.89	8.34	72.22	7.44
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	1.05	7.71	343.43	30.11
5	1.14	1.31	1.17	1.38	2.06	12.57	119.68	1892.88	2043.33	2032.89	2123.38	1.21	686.08
6	1.32	1.45	1.29	1.48	1.53	1.69	2.04	2.49	28.92	121.88	125.25	1.83	24.27
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.73	2.52	13.92	101.17	1721.63	154.27
8	1.47	1.66	1.49	1.75	1.71	2.33	2.87	3.58	22.32	1449.30	1553.90	35.16	256.46
9	4.18	1.83	1.63	1.71	1.72	1.80	1.72	2.24	3.21	4.08	4.62	1.64	2.53
10	1.76	1.92	1.71	1.79	1.80	1.88	1.85	2.54	3.61	4.40	5.39	5.35	2.83
11	1.83	2.03	2.39	2.41	2.70	3.44	4.06	5.10	5.82	176.50	5.82	5.77	18.16
12	3.51	2.85	2.61	2.92	2.53	3.46	4.32	5.67	6.25	46.11	18.56	5.17	8.66
13	2.12	2.35	2.17	2.24	2.17	2.24	2.22	2.84	3.93	4.77	5.41	4.45	3.08
14	2.27	2.51	2.32	2.39	2.32	2.39	2.36	2.43	3.47	4.47	5.80	5.32	3.17
15	2.41	2.72	2.46	2.54	2.46	2.59	2.51	2.60	3.70	4.67	5.42	4.90	3.25
16	2.56	2.88	3.47	3.18	3.70	5.13	6.25	7.55	7.99	7.87	8.13	2.70	5.12
17	2.75	3.63	3.60	3.41	4.39	4.99	5.42	6.28	7.79	8.29	8.56	2.85	5.16
18	2.90	3.87	3.57	4.01	4.29	5.21	5.84	7.34	9.00	17.34	9.00	8.71	6.76
19	5.43	6.05	4.80	4.52	4.28	5.52	6.65	8.19	9.43	9.13	18.77	9.27	7.67
20	3.18	5.11	4.36	4.31	4.46	4.63	5.23	6.14	7.34	7.94	8.31	7.30	5.69
													61.59

Reference market -scenario hydrothermal with wind addition - inflow 5 (912in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	0.82	0.80	0.72
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.19	11.75	1.83
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.51	224.53	19.70
5	1.25	1.37	1.22	1.34	1.85	2.46	92.12	1242.93	1241.74	1264.42	264.63	1.26	343.05
6	1.37	1.50	1.34	1.46	1.50	1.64	1.91	2.23	6.82	63.40	76.98	1.73	13.49
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.51	2.13	2.85	27.83	1216.61	105.12
8	1.50	1.70	1.51	1.63	1.62	2.18	2.59	3.08	3.50	757.92	877.76	22.65	139.80
9	3.83	1.88	1.67	1.75	1.76	1.84	1.76	1.84	2.55	3.15	3.67	1.67	2.28
10	1.79	1.96	1.75	1.83	1.83	1.91	1.83	1.88	2.65	3.24	4.08	4.39	2.43
11	1.83	2.02	2.20	2.28	2.55	3.07	3.48	4.07	4.45	22.94	4.63	4.71	4.85
12	3.23	2.73	2.51	2.82	2.43	3.13	3.72	4.50	4.76	7.53	8.34	4.33	4.17
13	2.04	2.29	2.13	2.21	2.12	2.12	2.07	2.51	3.26	3.80	4.35	3.79	2.72
14	2.16	2.43	2.26	2.34	2.24	2.25	2.19	2.20	2.96	3.64	4.63	4.42	2.81
15	2.29	2.62	2.39	2.47	2.37	2.42	2.31	2.34	3.14	3.81	4.41	4.15	2.89
16	2.41	2.76	3.29	3.05	3.47	4.45	5.11	5.65	5.77	5.72	6.09	2.47	4.19
17	2.58	3.43	3.41	3.28	4.10	4.38	4.58	4.79	5.53	5.76	6.11	2.57	4.21
18	2.70	3.64	3.37	3.81	4.00	4.55	4.89	5.42	6.17	9.13	6.39	6.44	5.04
19	4.76	5.49	4.45	4.27	4.00	4.81	5.48	5.96	6.46	6.31	10.28	6.85	5.76
20	2.97	4.74	4.09	4.09	4.18	4.15	4.52	4.85	5.48	5.79	6.18	5.78	4.73
													33.51

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 5 (913in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.81	0.82	0.80	0.72
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.19	11.75	1.83
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.51	224.53	19.70
5	1.25	1.37	1.22	1.34	1.85	2.46	92.12	1242.93	1241.74	1264.42	264.63	1.26	343.05
6	1.37	1.50	1.34	1.46	1.50	1.64	1.91	2.23	6.82	63.40	76.05	1.69	13.41
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	2.12	2.91	27.88	1216.71	105.15
8	1.52	1.73	1.54	1.61	1.57	2.20	2.72	3.29	3.59	758.06	877.91	22.74	139.87
9	4.05	1.92	1.71	1.79	1.80	1.88	1.80	1.78	2.48	3.39	3.96	1.71	2.36
10	1.84	2.01	1.79	1.87	1.88	1.96	1.88	1.85	2.55	3.45	4.42	4.50	2.50
11	1.88	2.07	1.99	2.19	2.64	3.37	3.91	4.53	4.56	23.11	39.36	4.34	7.83
12	2.84	2.47	2.42	2.85	2.40	3.42	4.25	4.84	7.83	7.69	5.18	4.69	4.24
13	2.04	2.25	2.07	2.13	2.06	2.12	2.09	2.39	3.47	4.20	4.67	3.80	2.77
14	2.08	2.30	2.11	2.18	2.10	2.16	2.13	2.57	3.59	4.43	5.45	4.71	2.98
15	2.13	2.39	2.16	2.22	2.14	2.25	2.17	2.23	3.38	4.27	4.83	4.28	2.87
16	2.17	2.43	3.80	3.14	3.76	5.08	5.89	5.84	5.87	9.07	6.20	2.22	4.62
17	2.27	3.39	3.51	3.26	4.47	4.71	4.92	5.16	5.99	5.86	6.21	2.28	4.34
18	2.33	4.06	3.59	4.05	4.24	4.93	5.33	6.02	6.26	9.27	9.96	5.94	5.50
19	4.21	5.23	4.26	4.11	3.94	5.11	6.05	6.54	6.55	6.40	10.43	6.95	5.82
20	2.55	5.04	4.16	4.09	4.28	4.22	4.78	5.20	5.89	6.19	6.42	5.77	4.88
													33.75

Reference market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 5 (913bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.74	0.75	0.73	0.70
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	1.11	46.64	4.67
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	0.96	1.43	281.67	24.40
5	1.19	1.30	1.16	1.21	1.68	55.97	318.16	1485.99	1474.61	1500.09	388.76	1.15	435.94
6	1.25	1.37	1.22	1.34	1.37	1.50	1.75	2.04	64.84	251.38	276.93	1.56	50.55
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.96	14.37	115.44	1469.38	134.36
8	1.42	1.61	1.44	1.50	1.46	2.06	2.54	3.07	26.45	1095.28	1238.26	105.38	206.71
9	9.58	1.80	1.61	1.68	1.64	1.72	1.65	1.63	2.27	3.11	13.86	1.57	3.51
10	1.69	1.85	1.65	1.72	1.73	1.81	1.73	1.71	2.36	3.19	7.21	4.16	2.57
11	1.74	1.92	1.84	2.03	2.45	3.13	3.62	4.21	4.23	173.09	213.86	4.04	34.68
12	2.64	2.30	2.25	2.65	2.24	3.18	3.96	4.51	50.70	116.67	4.84	4.38	16.69
13	1.91	2.10	1.94	2.00	1.93	1.98	1.96	2.24	3.25	3.94	4.39	3.57	2.60
14	1.96	2.16	1.99	2.05	1.98	2.04	2.01	2.42	3.38	4.17	5.13	4.44	2.81
15	2.00	2.26	2.03	2.10	2.02	2.12	2.05	2.11	3.19	4.03	4.57	4.05	2.71
16	2.05	2.30	3.60	2.98	3.56	4.81	5.58	5.54	5.56	8.61	5.88	2.10	4.38
17	2.16	3.22	3.33	3.10	4.25	4.47	4.68	4.91	5.70	5.57	5.91	2.17	4.12
18	2.21	3.86	3.42	3.86	4.04	4.70	5.08	5.73	5.97	8.84	9.50	5.66	5.24
19	4.02	4.99	4.06	3.92	3.76	4.88	5.78	6.25	6.26	6.12	9.96	6.64	5.55
20	2.44	4.82	3.98	3.91	4.09	4.04	4.57	4.97	5.64	5.93	6.14	5.53	4.67
													47.37

Reference market -scenario hydrothermal - inflow 6 (911in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.74	345.52	784.42	293.13	119.08
3	0.78	0.86	0.77	0.80	0.83	1.00	245.63	627.30	836.29	2889.35	777.76	0.85	448.52
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	1.28	65.12	1.32	6.35
5	1.32	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.12	1.45	52.85	12.27	6.41
6	1.74	1.64	1.20	1.23	1.20	1.25	1.26	1.31	1.84	3.04	97.99	1.21	9.57
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.35	1.75	2.30	7.35	1.31	1.96
8	1.36	1.55	1.38	1.44	1.41	1.53	1.47	1.44	1.57	2.04	2.50	1.40	1.59
9	1.52	1.66	1.48	1.55	1.56	1.63	1.57	2.11	3.18	15.30	91.34	3.48	10.53
10	1.61	2.06	1.83	1.83	2.46	3.27	3.97	4.65	1010.69	1185.46	25.34	10.05	187.77
11	1.69	1.87	1.69	1.80	1.74	1.80	2.10	3.04	4.28	5.21	5.39	1.84	2.70
12	1.84	2.03	1.84	2.22	2.18	2.72	3.37	4.56	5.82	297.87	5.97	1.98	27.70
13	1.98	2.19	2.03	2.82	2.36	2.48	3.03	3.78	4.77	5.65	6.39	5.78	3.60
14	2.12	2.35	2.17	2.24	2.41	3.19	4.02	5.22	6.54	6.47	6.83	5.22	4.07
15	3.42	2.56	2.32	2.39	2.32	2.44	2.40	3.34	4.60	5.33	5.90	5.37	3.53
16	3.84	3.38	2.46	2.54	2.46	2.59	2.51	2.51	2.98	3.96	5.33	4.77	3.28
17	2.61	2.88	2.61	2.69	2.66	2.74	3.34	4.60	6.43	7.82	8.13	5.70	4.35
18	4.03	3.72	3.06	3.02	3.67	5.16	6.24	7.77	8.57	16.51	8.57	8.29	6.55
19	2.90	4.07	4.31	4.54	4.19	5.50	6.74	8.67	9.00	17.34	17.92	8.85	7.84
20	3.04	3.37	3.04	3.19	3.09	3.19	3.26	4.54	6.29	7.69	8.64	7.22	4.71
													58.40

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 6 (911bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.82	287.61	704.30	238.42	103.03
3	0.86	0.93	0.83	0.87	0.91	1.09	188.08	548.53	751.53	2719.53	693.03	0.91	408.93
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	1.37	19.33	1.40	2.60
5	1.39	1.31	1.17	1.29	1.25	1.31	1.26	1.24	1.25	1.61	2.26	2.08	1.45
6	1.91	1.80	1.32	1.35	1.32	1.38	1.38	1.43	2.01	2.50	19.18	1.32	3.07
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.46	1.89	2.48	3.04	1.42	1.71
8	1.47	1.66	1.49	1.55	1.52	1.64	1.57	1.55	1.69	2.19	2.67	1.49	1.71
9	1.62	1.83	1.63	1.71	1.72	1.80	1.72	2.32	3.48	4.47	4.95	3.81	2.59
10	1.76	2.25	2.00	2.00	2.68	3.56	4.33	5.07	276.16	739.97	5.39	5.35	87.54
11	1.83	2.03	1.83	1.94	1.88	1.94	2.27	3.28	4.62	5.63	5.82	1.98	2.92
12	1.98	2.19	1.98	2.39	2.34	2.93	3.62	4.90	6.25	46.11	6.40	2.12	6.93
13	2.12	2.35	2.17	3.02	2.52	2.65	3.24	4.04	5.10	6.04	6.82	6.17	3.85
14	2.27	2.51	2.32	2.39	2.57	3.40	4.28	5.55	6.96	6.89	7.26	5.55	4.33
15	3.63	2.72	2.46	2.54	2.46	2.59	2.54	3.54	4.88	5.64	6.25	5.69	3.75
16	4.07	3.58	2.61	2.69	2.61	2.74	2.65	2.65	3.15	4.19	5.63	5.04	3.47
17	2.75	3.04	2.75	2.84	2.80	2.89	3.52	4.85	6.77	8.24	8.56	6.00	4.59
18	4.24	3.92	3.22	3.17	3.86	5.42	6.56	8.17	9.00	17.34	9.00	8.71	6.88
19	3.04	4.27	4.52	4.76	4.40	5.77	7.06	9.09	9.43	18.17	18.77	9.27	8.21
20	3.18	3.53	3.18	3.34	3.23	3.34	3.42	4.75	6.58	8.04	9.04	7.54	4.93
													48.51

Reference market -scenario hydrothermal with wind addition - inflow 6 (912in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.79	196.44	567.25	196.17	80.50
3	0.89	0.98	0.87	0.91	0.90	1.09	161.98	463.48	625.47	2148.38	585.11	0.95	332.58
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.21	1.61	1.33	1.13
5	1.43	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.30	1.86	1.82	1.41
6	1.80	1.75	1.34	1.40	1.36	1.42	1.42	1.40	1.61	2.03	2.47	1.36	1.61
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.50	1.57	2.06	2.56	1.45	1.64
8	1.50	1.70	1.51	1.58	1.54	1.67	1.60	1.58	1.59	1.81	2.28	1.52	1.66
9	1.72	1.88	1.67	1.75	1.76	1.84	1.76	1.86	2.68	3.35	3.94	3.19	2.28
10	1.79	2.12	1.91	1.94	2.56	3.18	3.66	4.01	46.91	154.68	4.31	4.39	19.29
11	1.83	2.02	1.82	1.92	1.86	1.91	2.05	2.80	3.68	4.35	4.63	1.91	2.57
12	1.89	2.12	1.92	2.28	2.24	2.68	3.18	3.99	4.76	7.53	5.07	1.97	3.30
13	2.04	2.29	2.13	2.92	2.44	2.47	2.90	3.38	4.01	4.54	5.19	4.94	3.27
14	2.16	2.43	2.26	2.34	2.47	3.09	3.70	4.39	5.11	5.06	5.50	4.57	3.59
15	3.33	2.62	2.39	2.47	2.37	2.42	2.34	3.06	3.94	4.42	4.94	4.69	3.25
16	3.69	3.38	2.51	2.60	2.50	2.55	2.43	2.38	2.75	3.50	4.58	4.26	3.10
17	2.58	2.92	2.65	2.76	2.69	2.69	3.17	3.92	5.00	5.74	6.11	4.82	3.75
18	3.81	3.68	3.06	3.06	3.63	4.71	5.38	5.85	6.17	9.13	6.39	6.44	5.11
19	2.83	4.00	4.21	4.48	4.11	5.00	5.76	6.42	6.46	9.57	10.28	6.85	5.83
20	2.97	3.36	3.05	3.22	3.09	3.09	3.11	3.95	5.05	5.85	6.57	5.92	4.10
													39.39

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.79	196.44	567.25	196.17	80.50
3	0.89	0.98	0.87	0.91	0.90	1.09	161.98	463.48	625.47	2148.38	585.11	0.95	332.58
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.21	1.61	1.33	1.13
5	1.43	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.30	1.86	1.82	1.41
6	1.80	1.75	1.34	1.40	1.36	1.42	1.42	1.40	1.61	2.03	2.46	1.38	1.61
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	1.52	2.07	2.60	1.48	1.65
8	1.52	1.73	1.54	1.61	1.57	1.70	1.63	1.60	1.63	1.68	2.29	1.56	1.67
9	1.75	1.92	1.71	1.79	1.80	1.88	1.80	1.78	2.66	3.67	4.10	3.25	2.34
10	1.84	2.01	1.79	1.90	2.81	3.65	4.26	4.11	47.08	154.85	449.91	4.03	56.52
11	1.88	2.07	1.87	1.97	1.90	1.96	1.89	2.79	4.05	4.46	39.36	1.95	5.51
12	1.94	2.14	1.93	2.03	2.04	2.73	3.48	4.58	4.87	7.69	8.52	2.00	3.66
13	2.04	2.25	2.07	2.65	2.29	2.44	3.08	3.74	4.48	4.88	5.30	5.32	3.38
14	2.08	2.30	2.11	2.18	2.62	3.46	4.25	5.10	5.29	8.05	5.60	4.07	3.93
15	2.98	2.39	2.16	2.22	2.14	2.25	2.89	3.85	4.87	5.13	5.42	4.85	3.43
16	3.51	3.17	2.19	2.26	2.18	2.29	2.21	2.26	3.21	4.21	5.48	4.54	3.13
17	2.27	2.51	2.27	2.36	2.31	2.91	3.90	4.84	5.99	5.86	9.54	4.41	4.10
18	3.46	3.43	2.91	2.98	3.84	5.37	6.18	6.15	9.44	9.27	6.48	5.97	5.46
19	2.44	3.86	4.35	4.58	4.12	5.39	6.44	6.54	9.88	9.70	10.43	6.41	6.18
20	2.55	2.88	2.61	2.75	2.65	3.13	4.11	5.07	6.26	6.69	7.09	6.20	4.33
													41.52

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin6													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	407.13	888.77	1519.47	875.65	307.91
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.79	248.37	639.11	247.05	95.06
3	0.82	0.90	0.80	0.84	0.83	1.00	215.95	535.64	701.99	2288.47	662.11	0.88	367.52
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	1.14	8.95	1.26	1.68
5	1.36	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.18	1.19	1.69	1.66	1.29
6	1.64	1.60	1.22	1.27	1.24	1.30	1.31	1.28	1.48	1.87	11.35	1.27	2.24
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.41	1.92	2.41	1.37	1.53
8	1.42	1.61	1.44	1.50	1.46	1.59	1.52	1.50	1.52	1.57	2.15	1.46	1.56
9	1.65	1.80	1.61	1.68	1.64	1.72	1.65	1.63	2.44	3.37	22.51	2.98	3.72
10	1.69	1.85	1.65	1.74	2.59	3.36	3.92	3.79	459.72	591.98	739.04	3.72	151.25
11	1.74	1.92	1.73	1.83	1.76	1.81	1.75	2.59	3.76	4.14	213.86	1.81	19.89
12	1.80	1.99	1.79	1.89	1.90	2.54	3.25	4.28	4.54	116.67	54.66	1.87	16.43
13	1.91	2.10	1.94	2.48	2.14	2.28	2.89	3.51	4.20	4.57	4.98	5.00	3.17
14	1.96	2.16	1.99	2.05	2.46	3.25	4.01	4.81	4.99	7.58	5.28	3.84	3.70
15	2.81	2.26	2.03	2.10	2.02	2.12	2.73	3.64	4.60	4.85	5.12	4.59	3.24
16	3.32	3.00	2.08	2.14	2.07	2.17	2.09	2.14	3.04	3.99	5.20	4.31	2.96
17	2.16	2.38	2.16	2.24	2.20	2.76	3.71	4.60	5.70	5.57	9.08	4.19	3.90
18	3.30	3.26	2.77	2.83	3.66	5.12	5.88	5.86	9.00	8.84	6.18	5.69	5.20
19	2.33	3.69	4.15	4.38	3.94	5.15	6.15	6.25	9.45	9.27	9.96	6.13	5.90
20	2.44	2.75	2.49	2.63	2.53	3.00	3.94	4.85	5.99	6.40	6.79	5.94	4.15
													50.11

Reference market -scenario hydrothermal - inflow 7 (911in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	209.12	683.44	667.22	130.47
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.83	14.18	0.85	1.92
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	0.93	1.15	1.19	0.98
5	1.16	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.12	1.43	1.73	1.63	1.25
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.37	2.04	263.96	441.85	360.29	89.85
7	2.14	1.44	1.29	1.34	1.52	2.15	2.74	115.03	309.66	1949.22	2048.63	360.92	399.67
8	123.04	2.48	2.16	1.98	1.85	2.52	3.02	27.79	114.34	1787.33	1891.93	142.04	341.71
9	1.52	1.95	1.48	1.55	1.56	1.78	2.29	2.97	4.08	33.99	1661.06	93.82	150.67
10	2.53	1.76	1.93	2.04	2.28	2.89	3.48	4.28	4.95	1185.46	1285.15	10.05	208.90
11	3.87	1.87	1.69	1.80	1.74	2.21	2.86	3.77	5.07	5.21	822.96	5.35	71.53
12	1.84	2.03	1.84	1.95	1.88	1.95	1.88	2.14	2.93	3.47	3.85	3.49	2.44
13	1.98	2.19	2.03	2.10	2.03	2.10	2.13	3.02	4.20	5.21	6.40	6.19	3.30
14	2.12	2.35	2.17	2.24	2.17	2.25	2.22	2.67	3.78	4.67	5.54	4.75	3.08
15	4.00	2.56	2.32	2.39	2.32	2.44	2.55	3.33	4.37	5.32	6.01	5.69	3.61
16	4.69	4.12	3.45	3.83	3.66	4.49	5.44	7.02	7.56	14.85	15.34	14.85	7.44
17	2.61	4.66	4.55	5.29	4.15	4.96	5.59	6.75	8.13	7.87	8.13	7.01	5.81
18	2.75	3.04	2.75	2.84	2.80	2.89	2.80	3.40	4.73	5.79	7.08	4.42	3.78
19	2.90	3.70	3.08	3.41	3.24	4.12	4.86	5.97	7.63	8.71	9.00	8.85	5.45
20	3.04	3.37	3.04	3.19	3.09	3.19	3.64	5.25	7.30	9.01	9.43	9.27	5.24
													92.85

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 7 (911bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	7.57	429.63	474.53	76.49
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.18	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.10	1.18	1.06
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.29	1.62	1.61	1.36
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.84	2.49	90.16	56.01	13.48
7	2.19	1.61	1.43	1.50	1.54	2.14	2.62	4.98	12.95	971.99	1107.62	72.35	181.91
8	29.73	2.56	2.24	2.09	1.93	2.56	2.92	3.37	3.50	757.92	877.76	22.65	142.44
9	1.72	2.05	1.67	1.75	1.76	1.84	2.13	2.64	3.43	3.75	3.99	3.96	2.56
10	2.86	1.96	2.11	2.21	2.43	2.88	3.29	3.76	4.14	154.68	449.73	4.39	52.87
11	3.79	2.02	1.82	1.92	1.86	2.18	2.72	3.37	4.22	4.35	39.18	4.71	6.01
12	1.89	2.12	1.92	2.04	1.97	1.98	1.90	2.08	2.72	3.15	3.54	3.28	2.38
13	2.04	2.29	2.13	2.21	2.12	2.12	2.12	2.81	3.63	4.28	5.20	5.21	3.01
14	2.16	2.43	2.26	2.34	2.24	2.25	2.19	2.52	3.35	3.96	4.69	4.23	2.88
15	3.84	2.62	2.39	2.47	2.37	2.42	2.47	3.05	3.78	4.42	5.02	4.92	3.31
16	4.41	4.07	3.46	3.84	3.63	4.17	4.77	5.57	5.77	8.92	9.67	9.91	5.68
17	2.58	4.54	4.44	5.18	4.08	4.56	4.91	5.25	5.90	5.76	6.11	5.65	4.91
18	2.70	3.05	2.77	2.89	2.82	2.82	2.70	3.06	3.98	4.65	5.57	3.92	3.41
19	2.83	3.66	3.09	3.43	3.23	3.88	4.39	4.88	5.76	6.31	6.69	6.85	4.58
20	2.97	3.36	3.05	3.22	3.09	3.09	3.42	4.45	5.64	6.54	6.99	7.15	4.41
													46.68

Reference market -scenario hydrothermal with wind addition - inflow 7 (912in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	7.57	429.63	474.53	76.49
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.18	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.10	1.18	1.06
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.29	1.62	1.61	1.36
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.84	2.49	90.16	56.01	13.48
7	2.19	1.61	1.43	1.50	1.54	2.14	2.62	4.98	12.95	971.99	1107.62	72.35	181.91
8	29.73	2.56	2.24	2.09	1.93	2.56	2.92	3.37	3.50	757.92	877.76	22.65	142.44
9	1.72	2.05	1.67	1.75	1.76	1.84	2.13	2.64	3.43	3.75	3.99	3.96	2.56
10	2.86	1.96	2.11	2.21	2.43	2.88	3.29	3.76	4.14	154.68	449.73	4.39	52.87
11	3.79	2.02	1.82	1.92	1.86	2.18	2.72	3.37	4.22	4.35	39.18	4.71	6.01
12	1.89	2.12	1.92	2.04	1.97	1.98	1.90	2.08	2.72	3.15	3.54	3.28	2.38
13	2.04	2.29	2.13	2.21	2.12	2.12	2.12	2.81	3.63	4.28	5.20	5.21	3.01
14	2.16	2.43	2.26	2.34	2.24	2.25	2.19	2.52	3.35	3.96	4.69	4.23	2.88
15	3.84	2.62	2.39	2.47	2.37	2.42	2.47	3.05	3.78	4.42	5.02	4.92	3.31
16	4.41	4.07	3.46	3.84	3.63	4.17	4.77	5.57	5.77	8.92	9.67	9.91	5.68
17	2.58	4.54	4.44	5.18	4.08	4.56	4.91	5.25	5.90	5.76	6.11	5.65	4.91
18	2.70	3.05	2.77	2.89	2.82	2.82	2.70	3.06	3.98	4.65	5.57	3.92	3.41
19	2.83	3.66	3.09	3.43	3.23	3.88	4.39	4.88	5.76	6.31	6.69	6.85	4.58
20	2.97	3.36	3.05	3.22	3.09	3.09	3.42	4.45	5.64	6.54	6.99	7.15	4.41
													46.68

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	7.57	429.63	474.53	76.49
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.18	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.10	1.18	1.06
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.29	1.62	1.61	1.36
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.84	2.49	90.19	25.85	10.96
7	2.17	1.62	1.45	1.51	1.51	2.16	2.70	5.94	12.98	972.03	1107.72	72.40	182.02
8	29.79	2.51	2.22	2.07	1.93	2.66	3.11	3.53	3.59	758.06	877.91	22.74	142.51
9	1.75	1.92	1.71	1.79	1.80	1.88	2.10	2.78	3.84	3.85	565.45	4.07	49.41
10	2.44	2.01	1.88	2.13	2.49	3.12	3.71	4.11	4.25	154.85	449.91	205.94	69.74
11	3.28	2.07	1.87	1.97	1.90	1.96	2.69	3.63	4.56	4.46	39.36	4.82	6.05
12	1.94	2.14	1.93	2.03	1.96	2.02	1.95	1.98	2.63	3.30	3.69	3.33	2.41
13	2.04	2.25	2.07	2.13	2.06	2.12	2.09	2.73	3.91	4.78	5.30	8.63	3.34
14	2.08	2.30	2.11	2.18	2.10	2.16	2.13	2.49	3.66	4.47	5.15	4.31	2.93
15	3.75	2.39	2.16	2.22	2.18	2.36	3.01	3.69	4.48	5.13	5.53	5.16	3.51
16	4.34	3.86	3.33	3.88	3.66	4.40	5.26	5.84	9.13	9.07	9.84	6.22	5.74
17	2.27	5.04	4.82	5.63	4.01	4.74	5.25	5.71	5.99	5.86	9.54	4.98	5.32
18	2.33	2.62	2.38	2.47	2.41	2.43	3.05	3.82	4.85	5.53	6.34	3.78	3.50
19	2.44	3.82	3.10	3.51	3.26	4.17	4.85	5.40	6.41	6.40	10.43	6.67	5.04
20	2.55	2.88	2.61	2.75	2.65	3.53	4.74	5.94	6.85	6.69	10.89	7.25	4.94
													49.86

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1010.22	1304.97	1519.47	912.48	420.16
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	36.80	496.00	542.56	90.13
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	1.10	0.88	0.86
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	0.96	1.04	1.11	0.99
5	1.19	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.18	1.17	1.47	1.47	1.24
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.28	1.69	18.72	309.25	223.04	46.91
7	2.00	1.50	1.34	1.40	1.40	2.00	2.50	68.47	82.15	1207.37	1349.95	274.72	249.57
8	124.32	2.34	2.07	1.93	1.80	2.49	2.90	19.02	26.45	1095.28	1238.26	105.38	218.52
9	1.65	1.80	1.61	1.68	1.64	1.72	1.92	2.55	3.52	6.62	970.45	30.06	85.44
10	2.24	1.85	1.73	1.96	2.29	2.88	3.41	3.79	3.92	591.98	739.04	723.46	173.21
11	3.03	1.92	1.73	1.83	1.76	1.81	2.49	3.37	4.23	4.14	213.86	4.48	20.39
12	1.80	1.99	1.79	1.89	1.82	1.88	1.81	1.85	2.45	3.08	3.45	3.11	2.24
13	1.91	2.10	1.94	2.00	1.93	1.98	1.96	2.56	3.67	4.49	4.98	20.71	4.18
14	1.96	2.16	1.99	2.05	1.98	2.04	2.01	2.34	3.45	4.21	4.85	4.07	2.76
15	3.54	2.26	2.03	2.10	2.06	2.23	2.84	3.48	4.23	4.85	5.23	4.88	3.31
16	4.10	3.65	3.16	3.68	3.46	4.17	4.98	5.54	8.65	8.61	9.33	5.89	5.43
17	2.16	4.79	4.58	5.34	3.81	4.51	4.99	5.43	5.70	5.57	9.08	4.74	5.06
18	2.21	2.49	2.26	2.35	2.30	2.31	2.90	3.64	4.63	5.27	6.05	3.61	3.34
19	2.33	3.64	2.95	3.36	3.11	3.98	4.63	5.16	6.12	6.12	9.96	6.38	4.81
20	2.44	2.75	2.49	2.63	2.53	3.37	4.54	5.69	6.56	6.40	10.43	6.95	4.73
													67.16

Reference market -scenario hydrothermal - inflow 8 (911in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in8													
1	0.59	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50
2	0.53	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.77	529.97	901.97	0.69
3	0.81	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.80	0.88	0.85
4	0.99	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	0.93	1.23	1.00
5	1.18	1.07	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.12	1.12	1.14	1.10
6	1.37	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.56	2.23	338.46	441.85	446.53
7	2.02	2.12	1.88	1.90	2.13	1.73	2.09	2.43	12.23	309.66	312.08	2048.63	1.31
8	1.66	1.36	1.55	1.38	1.44	1.41	1.53	1.47	1.44	1.45	1.67	2.14	1.85
9	1.92	1.52	1.66	1.48	1.55	1.56	1.63	1.60	2.28	3.34	16.76	85.35	27.88
10	2.08	1.61	1.76	1.57	1.64	1.65	1.72	1.89	2.65	3.72	4.52	25.34	1.69
11	2.16	1.69	1.87	1.69	1.80	1.74	1.80	1.89	2.69	3.76	4.58	5.07	4.04
12	2.26	1.84	2.17	2.05	2.30	3.03	3.64	4.09	4.81	5.65	5.63	5.97	1.98
13	2.35	1.98	2.19	2.03	2.10	2.04	2.68	3.37	4.06	5.01	5.54	6.40	6.19
14	4.10	4.22	2.35	2.17	2.24	2.17	2.25	2.39	3.43	4.83	6.30	6.83	6.61
15	2.51	2.27	2.56	2.32	2.39	2.32	2.44	3.06	4.41	6.29	7.03	14.48	7.03
16	2.58	2.41	2.72	2.46	2.54	2.58	3.53	4.39	5.79	7.55	7.45	15.34	2.56
17	2.69	2.61	2.88	2.61	2.69	3.04	4.07	4.69	5.48	6.71	7.23	7.42	7.29
18	2.76	2.75	4.57	3.64	3.80	4.21	4.66	5.14	6.29	7.95	8.29	17.06	8.29
19	2.89	2.90	3.21	2.90	3.04	2.94	3.28	4.45	6.03	8.06	8.71	17.92	3.04
20	3.03	3.04	3.37	3.04	3.19	3.09	3.19	3.19	4.41	6.25	7.91	9.29	8.78
													26.96

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 8 (911bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.85	458.63	817.20	0.76	106.89
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.86	0.94	0.91	0.87
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	0.99	1.31	1.06	1.04
5	1.14	1.31	1.17	1.29	1.25	1.31	1.26	1.24	1.25	1.23	1.25	1.21	1.24
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	1.71	2.44	95.31	292.89	297.56	58.28
7	2.31	2.04	2.07	2.31	1.88	2.26	2.62	3.14	78.9080	.07	1710.33	1.42	157.45
8	1.47	1.66	1.49	1.55	1.52	1.64	1.57	1.55	1.56	1.78	2.29	1.98	1.67
9	1.62	1.83	1.63	1.71	1.72	1.80	1.75	2.50	3.66	4.50	4.90	4.50	2.68
10	1.76	1.92	1.71	1.79	1.80	1.88	2.06	2.89	4.04	4.91	5.39	1.84	2.66
11	1.83	2.03	1.83	1.94	1.88	1.94	2.04	2.91	4.06	4.95	5.47	4.36	2.94
12	1.98	2.34	2.21	2.47	3.26	3.92	4.40	5.17	6.07	6.05	6.40	2.12	3.87
13	2.12	2.35	2.17	2.24	2.18	2.87	3.60	4.35	5.35	5.92	6.83	6.61	3.88
14	4.51	2.51	2.32	2.39	2.32	2.39	2.55	3.65	5.15	6.71	7.26	7.03	4.07
15	2.41	2.72	2.46	2.54	2.46	2.59	3.24	4.68	6.67	7.45	15.34	7.45	5.00
16	2.56	2.88	2.61	2.69	2.73	3.74	4.64	6.12	7.98	7.87	16.20	2.70	5.23
17	2.75	3.04	2.75	2.84	3.21	4.29	4.95	5.77	7.06	7.62	7.81	7.67	4.98
18	2.90	4.81	3.83	4.00	4.43	4.90	5.40	6.62	8.35	8.71	17.92	8.71	6.71
19	3.04	3.36	3.04	3.19	3.09	3.44	4.66	6.32	8.45	9.13	18.77	3.18	5.81
20	3.18	3.53	3.18	3.34	3.23	3.34	3.34	4.61	6.54	8.27	9.71	9.17	5.12
													21.55

Reference market -scenario hydrothermal with wind addition - inflow 8 (912in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.81	293.08	697.44	0.80	83.13
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	0.98	0.95	0.91
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.17	1.07	1.05
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.28	1.31	1.26	1.30
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.46	2.02	9.97	90.16	105.02	18.20
7	2.17	1.99	2.01	2.26	1.83	2.16	2.41	2.75	12.95	15 .22	1107.62	1.45	96.23
8	1.50	1.70	1.51	1.58	1.54	1.67	1.60	1.58	1.59	1.55	1.96	1.79	1.63
9	1.72	1.88	1.67	1.75	1.76	1.84	1.76	2.02	2.83	3.41	3.85	3.70	2.35
10	1.79	1.96	1.75	1.83	1.83	1.91	1.83	2.43	3.23	3.80	4.31	1.78	2.37
11	1.83	2.02	1.82	1.92	1.86	1.91	1.86	2.52	3.32	3.91	4.39	3.73	2.59
12	1.89	2.26	2.14	2.40	3.10	3.50	3.78	4.18	4.66	4.66	5.07	1.97	3.30
13	2.04	2.29	2.13	2.21	2.12	2.65	3.18	3.59	4.16	4.48	5.20	5.21	3.27
14	4.03	2.43	2.26	2.34	2.24	2.25	2.34	3.13	4.07	4.96	5.50	5.51	3.42
15	2.29	2.62	2.39	2.47	2.37	2.42	2.91	3.86	5.01	5.44	9.20	5.81	3.90
16	2.41	2.76	2.51	2.60	2.61	3.37	3.99	4.81	5.77	5.72	9.67	2.47	4.06
17	2.58	2.92	2.65	2.76	3.06	3.84	4.25	4.50	5.16	5.43	5.72	5.82	4.06
18	2.70	4.45	3.61	3.80	4.12	4.32	4.58	5.02	5.86	6.02	9.81	6.44	5.06
19	2.83	3.20	2.91	3.08	2.95	3.16	4.07	4.92	5.99	6.31	10.28	2.86	4.38
20	2.97	3.36	3.05	3.22	3.09	3.09	3.04	3.85	5.02	5.97	6.92	6.87	4.20
													14.81

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.81	293.08	697.44	0.80	83.13
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	0.98	0.95	0.91
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.17	1.07	1.05
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.28	1.31	1.26	1.30
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.46	2.02	9.97	90.19	104.90	18.20
7	2.14	1.96	2.01	2.28	1.83	2.19	2.47	2.83	12.98	15 .25	1107.72	1.48	96.26
8	1.52	1.73	1.54	1.61	1.57	1.70	1.63	1.60	1.63	1.58	1.82	1.72	1.64
9	1.75	1.92	1.71	1.79	1.80	1.88	1.80	1.83	2.97	3.80	4.10	3.90	2.44
10	1.84	2.01	1.79	1.87	1.88	1.96	1.88	2.23	3.37	4.15	4.42	1.82	2.44
11	1.88	2.07	1.87	1.97	1.90	1.96	1.89	2.30	3.46	4.31	4.73	3.70	2.67
12	1.94	2.14	1.98	2.37	3.44	3.88	4.19	4.58	4.87	4.76	8.52	2.00	3.72
13	2.04	2.25	2.07	2.13	2.06	2.51	3.32	3.89	4.57	4.87	5.30	5.32	3.36
14	3.94	2.30	2.11	2.18	2.10	2.16	2.20	3.38	4.67	5.16	8.89	5.62	3.73
15	2.13	2.39	2.16	2.22	2.14	2.25	3.24	4.62	5.58	8.64	9.36	5.89	4.22
16	2.17	2.43	2.19	2.64	2.80	3.82	4.63	5.65	5.87	9.07	6.20	2.22	4.14
17	2.27	2.51	2.27	3.22	3.91	4.74	4.99	5.06	5.68	5.86	5.96	6.00	4.37
18	2.33	4.67	3.59	3.83	4.31	4.51	4.88	5.48	6.26	6.12	9.96	6.54	5.21
19	2.44	2.75	2.49	2.72	2.94	4.29	5.48	6.22	6.55	9.70	10.43	2.47	4.87
20	2.55	2.88	2.61	2.75	2.84	3.53	4.24	5.07	6.38	6.69	7.09	7.25	4.49
													14.94

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.97	0.50	50.70
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.81	396.32	774.50	0.73	98.15
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	0.91	0.88	0.84
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	0.96	1.10	1.01	0.99
5	1.19	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.18	1.17	1.19	1.15	1.19
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.34	1.86	72.27	309.25	342.64	61.36
7	1.97	1.81	1.86	2.11	1.69	2.02	2.28	4.22	82.15	87 .42	1349.95	1.37	128.24
8	1.42	1.61	1.44	1.50	1.46	1.59	1.52	1.50	1.52	1.48	1.70	1.62	1.53
9	1.65	1.80	1.61	1.68	1.64	1.72	1.65	1.68	2.73	3.62	22.51	19.10	5.12
10	1.69	1.85	1.65	1.72	1.73	1.81	1.73	2.06	3.11	3.83	7.21	1.68	2.51
11	1.74	1.92	1.73	1.83	1.76	1.81	1.75	2.14	3.22	4.00	4.39	3.44	2.48
12	1.80	1.99	1.84	2.21	3.21	3.61	3.90	4.28	4.54	4.44	54.66	1.87	7.36
13	1.91	2.10	1.94	2.00	1.93	2.35	3.12	3.65	4.28	4.57	4.98	5.00	3.15
14	3.70	2.16	1.99	2.05	1.98	2.04	2.07	3.18	4.40	4.85	8.38	5.30	3.51
15	2.00	2.26	2.03	2.10	2.02	2.12	3.06	4.37	5.27	8.17	8.86	5.57	3.99
16	2.05	2.30	2.08	2.49	2.65	3.62	4.39	5.36	5.56	8.61	5.88	2.10	3.92
17	2.16	2.38	2.16	3.06	3.72	4.51	4.74	4.81	5.40	5.57	5.67	5.71	4.16
18	2.21	4.45	3.42	3.65	4.10	4.30	4.65	5.22	5.97	5.83	9.50	6.23	4.96
19	2.33	2.62	2.38	2.59	2.81	4.09	5.24	5.94	6.26	9.27	9.96	2.36	4.65
20	2.44	2.75	2.49	2.63	2.72	3.38	4.06	4.85	6.11	6.40	6.79	6.95	4.30
													19.65

Reference market -scenario hydrothermal - inflow 9 (911in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	245.97	51.273	2.66	0.74	3.18	13.33	263.69	575.10	881.10	863.60	901.97	0.69	319.44
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.82	14.61	0.85	1.95
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	1.15	333.87	703.41	633.80	139.98
5	12.00	1.81	370.46	60.56	85.38	298.66	396.03	2231.75	2382.25	2371.75	559.32	439.62	767.47
6	74.54	1.93	1.17	1.31	1.34	1.64	2.10	64.84	401.15	2149.62	441.85	438.23	298.31
7	1.71	1.60	1.34	1.43	1.49	1.88	2.31	2.80	108.72	312.08	356.02	1.31	66.06
8	1.36	1.96	1.61	1.71	1.71	2.14	2.64	3.30	114.34	117.45	139.65	142.04	44.16
9	1.52	1.66	1.48	1.55	1.72	2.42	2.96	3.68	15.46	1552.37	1661.06	90.49	278.03
10	3.60	2.64	2.25	1.64	2.02	2.68	3.41	4.20	4.95	14.11	1285.15	10.05	111.39
11	3.43	2.59	2.07	2.46	3.19	4.05	4.85	5.21	780.68	801.63	822.96	695.52	260.72
12	5.35	5.92	4.14	4.26	3.64	3.18	3.69	4.39	5.25	5.63	5.97	5.77	4.77
13	1.98	3.09	2.57	2.65	3.24	4.13	5.18	6.05	197.056.0	5	74.76	6.10	26.07
14	2.12	2.59	2.75	3.10	2.59	2.42	2.88	3.58	4.65	5.75	6.83	6.24	3.79
15	2.27	2.56	2.32	2.39	2.32	2.44	2.37	2.58	3.56	4.69	5.45	4.05	3.08
16	2.41	3.12	2.46	2.68	2.67	3.57	4.63	5.93	7.56	7.45	15.34	7.45	5.44
17	2.61	6.23	2.61	2.69	2.79	3.55	4.42	5.66	7.61	7.87	16.20	7.87	5.84
18	4.51	3.04	2.75	2.84	2.80	3.50	4.61	6.23	8.57	8.29	17.06	8.10	6.02
19	7.98	3.21	2.90	3.04	3.24	3.76	4.33	5.65	7.03	8.23	9.00	7.10	5.45
20	3.04	3.37	3.04	3.19	3.09	3.19	3.09	3.14	3.58	4.58	5.91	6.14	3.78
													131.20

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 9 (911bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	245.97	51.273	2.66	0.74	3.18	13.33	263.69	500.29	796.32	778.83	817.20	0.76	292.02
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.88	3.94	0.91	1.13
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	1.24	273.13	618.86	486.72	115.67
5	1.87	2.02	235.70	2.81	12.86	76.58	119.68	1892.88	2043.33	2032.89	388.33	299.89	592.40
6	7.65	2.12	1.29	1.44	1.47	1.81	2.29	3.18	122.43	1811.04	292.89	290.06	211.47
7	1.86	1.74	1.46	1.55	1.62	2.04	2.50	3.03	21.3680	.07	101.17	1.42	18.32
8	1.47	2.11	1.73	1.84	1.84	2.29	2.84	3.54	22.3223	.76	34.13	35.16	11.08
9	1.62	1.83	1.63	1.71	1.89	2.66	3.25	4.04	4.95	922.04	1017.79	4.77	164.01
10	3.94	2.88	2.46	1.79	2.20	2.93	3.72	4.58	5.38	5.21	839.70	5.35	73.35
11	3.72	2.81	2.24	2.67	3.46	4.39	5.25	5.63	83.50	176.50	186.95	64.55	45.14
12	5.77	6.39	4.47	4.58	3.92	3.42	3.97	4.72	5.64	6.05	6.40	6.19	5.13
13	2.12	3.32	2.75	2.84	3.47	4.42	5.53	6.47	13.33	6.47	13.61	6.51	5.90
14	2.27	2.77	2.93	3.30	2.76	2.58	3.07	3.81	4.95	6.12	7.26	6.63	4.04
15	2.41	2.72	2.46	2.54	2.46	2.59	2.51	2.73	3.77	4.96	5.77	4.29	3.27
16	2.56	3.30	2.61	2.84	2.83	3.77	4.89	6.27	7.99	7.87	16.20	7.87	5.75
17	2.75	6.57	2.75	2.84	2.94	3.74	4.66	5.97	8.01	8.29	17.06	8.29	6.16
18	4.74	3.20	2.90	2.99	2.94	3.68	4.84	6.55	9.00	8.71	17.92	8.51	6.33
19	8.38	3.36	3.04	3.19	3.40	3.94	4.54	5.92	7.36	8.62	9.43	7.44	5.72
20	3.18	3.53	3.18	3.34	3.23	3.34	3.23	3.28	3.74	4.79	6.18	6.41	3.95
													92.16

Reference market -scenario hydrothermal with wind addition - inflow 9 (912in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	245.97	51.273	2.66	0.74	3.18	13.33	195.39	435.79	665.71	655.91	697.44	0.80	249.85
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.17	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.09	58.94	380.14	384.16	69.39
5	1.88	1.98	262.16	13.27	18.74	77.189	2.12	1242.93	1241.74	1264.42	264.63	226.17	392.27
6	12.33	2.08	1.34	1.42	1.44	1.74	2.12	2.46	59.69	1110.69	90.16	103.27	115.73
7	1.80	1.72	1.45	1.54	1.59	1.97	2.31	2.66	3.00	15.22	27.83	1.45	5.21
8	1.50	1.95	1.65	1.78	1.77	2.18	2.59	3.06	3.50	3.53	15.42	22.65	5.13
9	1.72	1.88	1.67	1.75	1.76	2.31	2.74	3.22	3.83	428.73	565.27	3.88	84.90
10	3.54	2.76	2.38	1.83	2.11	2.65	3.20	3.68	4.14	4.05	449.73	4.39	40.37
11	3.39	2.70	2.17	2.58	3.27	3.85	4.34	4.42	16.2522	.94	39.18	31.90	11.42
12	5.04	5.79	4.16	4.31	3.68	3.10	3.46	3.88	4.40	4.66	5.07	5.03	4.38
13	2.04	3.16	2.67	2.76	3.28	3.87	4.54	4.88	7.63	4.78	8.25	5.15	4.42
14	2.16	2.67	2.83	3.17	2.65	2.41	2.77	3.24	3.95	4.64	5.50	5.27	3.44
15	2.29	2.62	2.39	2.47	2.37	2.42	2.31	2.44	3.19	4.00	4.64	3.71	2.90
16	2.41	3.13	2.51	2.74	2.70	3.40	4.17	4.90	5.77	5.72	9.67	6.11	4.44
17	2.58	5.88	2.65	2.76	2.82	3.40	4.04	4.61	5.64	5.76	9.39	6.16	4.64
18	4.21	3.05	2.77	2.89	2.82	3.35	4.18	4.98	6.17	6.02	9.81	6.33	4.71
19	6.85	3.20	2.91	3.08	3.23	3.58	3.98	4.67	5.43	6.07	6.69	5.81	4.62
20	2.97	3.36	3.05	3.22	3.09	3.09	2.96	2.89	3.20	3.93	4.94	5.21	3.49
													64.23

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	245.97	51.273	2.66	0.74	3.18	13.33	195.39	435.79	665.71	655.91	697.44	0.80	249.85
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.17	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.09	58.94	380.14	384.16	69.39
5	1.88	1.98	262.16	13.27	18.74	77.189	2.12	1242.93	1241.74	1264.42	264.63	226.17	392.27
6	12.33	2.08	1.34	1.42	1.44	1.74	2.12	2.46	59.69	1110.69	90.19	103.01	115.71
7	1.76	1.69	1.45	1.53	1.59	2.00	2.39	2.76	5.82	15.25	27.88	1.48	5.47
8	1.52	1.86	1.60	1.78	1.80	2.26	2.76	3.31	3.59	3.61	877.91	3.38	75.45
9	1.75	1.92	1.71	1.79	1.80	2.04	2.70	3.38	3.94	428.90	565.45	4.07	84.95
10	3.56	2.58	2.30	1.87	2.03	2.84	3.65	4.11	4.25	154.85	4.42	205.94	32.70
11	2.90	2.40	2.02	2.61	3.65	4.37	4.62	24.38	16.4223	.11	39.36	32.08	13.16
12	5.15	5.25	3.81	4.16	3.57	2.99	3.60	4.16	4.77	4.76	8.52	4.48	4.60
13	2.04	2.75	2.46	2.69	3.50	4.29	5.16	4.98	7.79	7.61	5.30	5.32	4.49
14	2.08	2.46	2.82	3.28	2.61	2.36	2.91	3.56	4.44	5.16	5.60	5.62	3.57
15	2.13	2.39	2.16	2.22	2.14	2.25	2.17	2.51	3.55	4.63	5.16	3.67	2.91
16	2.17	3.15	2.19	2.98	2.85	3.78	4.88	5.72	5.87	9.07	9.84	6.22	4.89
17	2.27	6.13	2.27	2.36	3.09	3.82	4.66	5.32	5.99	8.88	6.21	6.26	4.77
18	4.09	2.62	2.38	2.48	3.22	4.09	5.20	6.08	6.26	9.27	6.48	6.54	4.89
19	7.27	2.75	2.49	2.63	4.08	4.13	4.51	5.36	6.10	6.40	6.79	6.05	4.88
20	2.55	2.88	2.61	2.75	2.65	2.66	2.55	2.57	3.68	4.62	5.73	5.70	3.41
													67.53

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.27	811.06	1148.47	808.90	272.38
2	245.97	51.273	2.66	0.74	3.18	13.33	195.39	436.04	666.04	732.68	774.50	0.73	262.71
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	1.09	0.88	0.86
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	1.02	83.63	504.46	509.06	92.17
5	1.79	1.88	324.56	79.77	93.45	285.87	318.16	1485.99	1474.61	1500.09	388.76	346.48	525.12
6	79.61	1.90	1.22	1.29	1.32	1.59	1.94	14.98	242.83	1346.19	309.25	338.33	195.04
7	1.62	1.56	1.34	1.41	1.47	1.85	2.21	2.56	65.1987	.42	115.44	1.37	23.62
8	1.42	1.73	1.49	1.66	1.67	2.11	2.58	3.09	26.4529	.55	1238.26	20.42	110.87
9	1.65	1.80	1.61	1.68	1.64	1.87	2.47	3.09	3.61	704.74	970.45	30.06	143.72
10	3.27	2.37	2.11	1.72	1.87	2.61	3.37	3.79	3.92	591.98	7.21	723.46	112.31
11	2.68	2.22	1.87	2.42	3.39	4.05	4.28	179.19	156.48	173.09	213.86	203.66	78.93
12	4.79	4.88	3.54	3.88	3.32	2.78	3.35	3.88	4.45	4.44	54.66	4.19	8.18
13	1.91	2.58	2.31	2.52	3.28	4.02	4.84	4.68	7.31	7.45	4.98	5.00	4.24
14	1.96	2.31	2.66	3.09	2.45	2.22	2.74	3.35	4.18	4.85	5.28	5.30	3.36
15	2.00	2.26	2.03	2.10	2.02	2.12	2.05	2.37	3.35	4.38	4.88	3.47	2.75
16	2.05	2.98	2.08	2.82	2.70	3.58	4.62	5.42	5.56	8.61	9.33	5.89	4.64
17	2.16	5.82	2.16	2.24	2.94	3.63	4.43	5.05	5.70	8.45	5.91	5.96	4.54
18	3.90	2.49	2.26	2.36	3.06	3.90	4.96	5.80	5.97	8.84	6.18	6.23	4.66
19	6.93	2.62	2.38	2.51	3.89	3.94	4.31	5.12	5.82	6.12	6.49	5.78	4.66
20	2.44	2.75	2.49	2.63	2.53	2.55	2.44	2.46	3.53	4.43	5.48	5.46	3.27
													92.90

Reference market -scenario hydrothermal - inflow 10 (911in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.66	0.67	155.02	492.05	61.57	59.54
3	0.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	0.81	55.04	0.85	5.32
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	1.01	2.04	196.26	17.32
5	1.07	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.12	1.52	23.09	94.85	10.80
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.24	1.36	1.94	15.90	1.99	2.59
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.35	1.61	2.25	80.90	1.31	8.07
8	1.36	1.55	1.38	1.44	1.41	1.53	1.47	1.44	1.63	2.20	2.88	1.40	1.64
9	1.82	1.84	1.65	1.72	2.16	2.57	2.89	3.42	7.43	33.99	91.34	2.72	12.80
10	1.61	1.89	1.57	1.64	1.65	1.72	1.70	2.39	3.47	4.55	25.34	4.53	4.34
11	3.75	4.20	1.69	1.80	1.84	2.42	2.81	3.60	4.46	4.86	4.73	1.84	3.17
12	1.84	2.03	1.88	1.96	2.17	2.97	3.73	4.75	5.77	5.63	237.50	5.77	23.00
13	1.98	2.19	2.03	2.38	2.33	3.23	4.18	5.36	6.26	206.80	74.76	6.19	26.47
14	4.01	3.59	3.61	3.24	3.42	4.52	5.76	6.47	56.3560	.62	33.11	2.27	15.58
15	2.27	2.56	2.32	2.39	2.32	2.90	3.81	5.04	6.68	7.03	14.48	7.03	4.90
16	2.41	2.72	2.46	2.54	2.46	2.59	3.07	3.86	5.01	6.28	7.70	2.56	3.64
17	2.61	2.88	2.61	2.69	2.66	3.09	4.08	5.67	7.93	7.87	16.20	2.70	5.08
18	2.75	3.04	2.75	2.84	2.80	2.89	3.21	4.63	6.60	8.25	8.57	5.99	4.53
19	2.90	3.21	2.90	3.04	2.94	3.46	4.19	5.57	7.33	8.65	9.00	7.83	5.08
20	7.32	3.37	3.04	3.53	3.67	4.56	5.51	6.91	9.00	9.13	18.78	3.19	6.50
													19.45

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 10 (911bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.69	0.67	0.70	0.67	0.74	0.74	50.68	423.48	38.55	43.23
3	0.86	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	0.88	15.05	0.91	2.05
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	1.07	1.59	68.10	6.65
5	1.14	1.31	1.17	1.29	1.25	1.31	1.26	1.24	1.25	1.68	2.24	19.20	2.86
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	1.36	1.49	2.12	2.64	2.17	1.60
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.46	1.74	2.43	10.70	1.42	2.33
8	1.47	1.66	1.49	1.55	1.52	1.64	1.57	1.55	1.75	2.35	3.08	1.49	1.76
9	1.95	2.03	1.82	1.89	2.37	2.82	3.18	3.76	4.80	4.79	4.95	2.98	3.11
10	1.76	2.06	1.71	1.79	1.80	1.88	1.85	2.61	3.77	4.95	5.39	4.91	2.87
11	4.06	4.56	1.83	1.94	1.99	2.62	3.05	3.89	4.81	5.25	5.11	1.98	3.42
12	1.98	2.19	2.02	2.11	2.33	3.20	4.01	5.10	6.19	6.05	18.56	6.19	4.99
13	2.12	2.35	2.17	2.55	2.50	3.46	4.47	5.73	6.69	12.90	13.61	6.61	5.43
14	4.28	3.83	3.85	3.45	3.65	4.82	6.13	6.89	14.19	13 .74	14.48	2.41	6.81
15	2.41	2.72	2.46	2.54	2.46	3.08	4.04	5.34	7.09	7.45	15.34	7.45	5.20
16	2.56	2.88	2.61	2.69	2.61	2.74	3.25	4.08	5.30	6.63	8.13	2.70	3.85
17	2.75	3.04	2.75	2.84	2.80	3.25	4.30	5.98	8.35	8.29	17.06	2.85	5.36
18	2.90	3.20	2.90	2.99	2.94	3.04	3.37	4.86	6.93	8.66	9.00	6.29	4.76
19	3.04	3.36	3.04	3.19	3.09	3.63	4.40	5.83	7.68	9.06	9.43	8.20	5.33
20	7.66	3.53	3.18	3.69	3.84	4.77	5.77	7.23	9.42	9.55	19.63	3.33	6.80
													14.36

Reference market -scenario hydrothermal with wind addition - inflow 10 (912in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.96	249.66	8.61	22.12
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.21	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.44	15.81	2.30
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.34	1.83	2.01	1.41
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.41	1.68	2.17	1.93	1.53
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.50	1.51	2.04	2.84	1.45	1.65
8	1.50	1.70	1.51	1.58	1.54	1.67	1.60	1.58	1.59	1.96	2.60	1.52	1.70
9	1.83	1.93	1.76	1.85	2.28	2.58	2.80	3.12	3.74	3.75	3.99	2.65	2.69
10	1.79	1.97	1.75	1.83	1.83	1.91	1.83	2.04	2.87	3.65	4.31	3.95	2.48
11	3.62	4.21	1.82	1.92	1.91	2.40	2.71	3.27	3.84	4.11	4.17	1.91	2.99
12	1.89	2.12	1.94	2.04	2.24	2.91	3.48	4.13	4.72	4.66	8.34	5.03	3.62
13	2.04	2.29	2.13	2.49	2.41	3.13	3.82	4.46	4.91	7.46	8.25	5.21	4.05
14	3.85	3.61	3.64	3.31	3.43	4.18	4.96	5.17	8.08	7.89	8.73	2.23	4.92
15	2.29	2.62	2.39	2.47	2.37	2.83	3.53	4.29	5.24	5.44	9.20	5.81	4.04
16	2.41	2.76	2.51	2.60	2.50	2.55	2.92	3.46	4.23	5.04	6.09	2.47	3.30
17	2.58	2.92	2.65	2.76	2.69	3.00	3.77	4.62	5.80	5.76	9.39	2.57	4.04
18	2.70	3.05	2.77	2.89	2.82	2.82	3.05	3.95	5.13	6.00	6.39	5.03	3.88
19	2.83	3.20	2.91	3.08	2.95	3.32	3.87	4.62	5.59	6.28	6.69	6.25	4.30
20	6.42	3.36	3.05	3.54	3.63	4.26	4.91	5.50	6.54	6.60	10.74	2.99	5.13
													12.29

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	0.96	249.66	8.61	22.12
3	0.89	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	0.90	1.21	0.95	0.93
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.02	1.44	15.81	2.30
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.34	1.83	2.01	1.41
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.41	1.68	2.14	1.91	1.53
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	1.52	2.00	2.87	1.48	1.67
8	1.52	1.73	1.54	1.61	1.57	1.70	1.63	1.60	1.63	1.83	2.66	1.56	1.71
9	1.75	1.92	1.73	1.86	2.44	2.77	3.03	3.39	3.94	3.85	4.10	2.58	2.78
10	1.84	2.01	1.79	1.87	1.88	1.96	1.88	1.89	3.06	4.15	4.42	4.28	2.59
11	3.63	4.29	1.87	1.97	1.90	2.26	2.79	3.57	4.24	4.46	4.34	1.95	3.11
12	1.94	2.14	1.93	2.03	2.07	3.06	3.90	4.68	4.87	4.76	8.52	5.14	3.75
13	2.04	2.25	2.07	2.38	2.39	3.44	4.38	4.98	5.01	7.61	8.42	5.32	4.19
14	3.84	3.47	3.68	3.24	3.51	4.58	5.55	8.33	8.24	8.05	5.60	2.14	5.02
15	2.13	2.39	2.16	2.39	2.32	3.49	4.41	5.26	5.58	8.64	5.90	9.60	4.52
16	2.17	2.43	2.19	2.26	2.37	2.91	3.51	4.08	4.92	5.82	6.20	2.22	3.42
17	2.27	2.51	2.27	2.36	3.03	4.36	5.19	5.88	5.99	8.88	9.54	2.28	4.55
18	2.33	2.62	2.38	2.47	2.41	2.43	3.31	4.65	6.10	6.12	9.96	4.59	4.11
19	2.44	2.75	2.49	2.63	3.56	4.07	4.64	5.48	6.50	6.40	6.79	6.85	4.55
20	6.62	2.88	2.61	3.85	3.88	4.67	5.52	6.17	6.85	10.14	7.09	2.58	5.24
													12.41

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.76	780.42	168.78
2	0.53	0.66	0.59	0.69	0.67	0.70	0.79	0.78	0.78	8.17	302.75	38.72	29.65
3	0.82	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.83	1.13	0.88	0.86
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	0.96	1.36	56.17	5.61
5	1.19	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.18	1.21	1.66	15.71	2.45
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.28	1.29	1.55	1.97	1.76	1.40
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.41	1.86	7.60	1.37	1.95
8	1.42	1.61	1.44	1.50	1.46	1.59	1.52	1.50	1.52	1.71	2.49	1.46	1.60
9	1.65	1.80	1.63	1.75	2.23	2.53	2.77	3.10	3.61	6.62	22.51	2.37	4.38
10	1.69	1.85	1.65	1.72	1.73	1.81	1.73	1.74	2.82	3.83	7.21	3.96	2.65
11	3.36	3.97	1.73	1.83	1.76	2.09	2.59	3.31	3.94	4.14	4.03	1.81	2.88
12	1.80	1.99	1.79	1.89	1.92	2.85	3.63	4.37	4.54	4.44	54.66	4.80	7.39
13	1.91	2.10	1.94	2.23	2.24	3.22	4.11	4.68	4.70	7.45	7.91	5.00	3.96
14	3.61	3.26	3.46	3.05	3.30	4.31	5.22	7.84	7.76	7.58	5.28	2.02	4.72
15	2.00	2.26	2.03	2.26	2.19	3.29	4.16	4.97	5.27	8.17	5.58	9.08	4.27
16	2.05	2.30	2.08	2.14	2.25	2.76	3.33	3.86	4.66	5.52	5.88	2.10	3.24
17	2.16	2.38	2.16	2.24	2.88	4.14	4.94	5.59	5.70	8.45	9.08	2.17	4.32
18	2.21	2.49	2.26	2.35	2.30	2.31	3.15	4.43	5.82	5.83	9.50	4.38	3.92
19	2.33	2.62	2.38	2.51	3.40	3.89	4.43	5.23	6.21	6.12	6.49	6.55	4.35
20	6.33	2.75	2.49	3.68	3.71	4.46	5.29	5.91	6.56	9.71	6.79	2.47	5.01
													13.17

Reference market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.69	0.67	0.70	1.55	481.66	881.10	2972.93	901.97	0.69	436.98
3	0.78	0.86	0.81	0.84	0.78	0.82	4.54	315.65	808.28	822.21	2800.01	616.09	447.64
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	0.92	1.26	283.48	0.98	24.52
5	1.07	1.17	1.05	1.16	1.13	1.18	1.13	1.12	1.12	1.37	4.06	7.80	1.95
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.30	1.76	2.18	90.16	1.21	8.77
7	1.26	1.44	1.29	1.34	1.31	1.43	1.37	1.41	2.16	64.29	356.02	360.92	66.19
8	1.36	1.55	1.38	1.44	1.41	1.53	1.47	1.87	2.78	85.14	139.65	100.79	28.36
9	2.76	1.66	1.48	1.55	1.56	1.63	1.70	2.28	3.27	12.70	72.62	3.34	8.88
10	3.14	1.76	2.35	2.14	2.52	3.16	3.90	4.65	4.95	1185.46	25.34	9.29	104.06
11	3.08	1.87	1.96	2.25	2.77	3.07	3.46	4.26	5.21	5.21	822.96	5.35	71.79
12	716.66	2.03	1.84	1.96	2.01	2.55	3.30	4.49	5.82	5.63	237.50	5.38	82.43
13	4.94	4.67	3.97	3.52	4.61	5.77	6.05	186.59	197.05	206.80	74.76	79.05	64.82
14	2.12	2.73	2.32	2.24	2.17	2.81	3.30	4.05	5.19	5.87	6.34	5.85	3.75
15	4.04	4.16	3.55	3.60	3.20	4.16	5.07	6.60	7.12	14.02	14.48	7.03	6.42
16	2.41	2.72	2.46	2.54	2.46	2.59	2.51	2.51	3.39	4.45	5.48	5.50	3.25
17	2.61	2.88	2.61	2.69	2.66	2.74	3.33	4.55	6.36	7.68	8.13	15.68	5.16
18	15.96	6.18	5.51	5.16	3.79	4.54	5.51	6.78	8.31	8.29	8.57	16.51	7.93
19	2.90	3.21	2.90	3.04	2.94	3.04	3.29	4.56	6.24	7.58	8.87	3.04	4.30
20	3.04	3.37	3.04	3.19	3.09	3.46	4.61	6.20	8.34	9.13	18.78	8.76	6.25
													88.91

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.69	0.67	0.70	1.55	410.70	796.32	2803.02	817.20	0.76	402.78
3	0.86	0.93	0.88	0.92	0.85	0.89	1.09	256.29	724.66	737.46	2630.25	538.31	407.78
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	0.99	1.35	223.65	1.04	19.59
5	1.14	1.31	1.17	1.29	1.25	1.31	1.26	1.24	1.25	1.52	2.08	2.04	1.40
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	1.42	1.92	2.38	15.88	1.32	2.70
7	1.38	1.56	1.40	1.46	1.42	1.55	1.48	1.53	2.34	3.32	101.17	103.44	18.50
8	1.47	1.66	1.49	1.55	1.52	1.64	1.57	2.01	2.98	10.33	34.13	17.94	6.52
9	2.95	1.83	1.63	1.71	1.72	1.80	1.87	2.50	3.58	4.43	4.86	3.66	2.71
10	3.43	1.92	2.56	2.34	2.74	3.45	4.25	5.07	5.38	739.97	5.39	5.34	65.15
11	3.34	2.03	2.13	2.44	2.99	3.32	3.75	4.60	5.63	5.63	186.95	5.77	19.05
12	69.23	2.19	1.98	2.11	2.16	2.75	3.55	4.82	6.25	6.05	18.56	5.76	10.45
13	5.30	5.01	4.26	3.76	4.94	6.17	6.47	12.90	13.33	12 .90	13.61	13.18	8.49
14	2.27	2.91	2.48	2.39	2.32	2.99	3.51	4.31	5.52	6.25	6.74	6.22	3.99
15	4.29	4.42	3.77	3.82	3.40	4.41	5.38	7.00	7.55	14.85	15.34	7.45	6.81
16	2.56	2.88	2.61	2.69	2.61	2.74	2.65	2.65	3.58	4.70	5.78	5.80	3.44
17	2.75	3.04	2.75	2.84	2.80	2.89	3.51	4.80	6.69	8.09	8.56	16.51	5.44
18	16.79	6.50	5.80	5.43	3.99	4.77	5.79	7.13	8.73	8.71	9.00	17.34	8.33
19	3.04	3.36	3.04	3.19	3.09	3.19	3.45	4.78	6.53	7.95	9.29	3.18	4.51
20	3.18	3.53	3.18	3.34	3.23	3.62	4.82	6.48	8.72	9.55	19.63	9.15	6.54
													69.94

Reference market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.69	0.67	0.70	0.89	313.41	665.71	2216.75	697.44	0.80	324.91
3	0.89	0.98	0.88	0.93	0.89	0.93	1.05	187.93	575.29	618.62	2096.90	460.76	328.84
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.20	49.89	1.07	5.13
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.28	1.68	1.76	1.37
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.46	1.87	2.37	1.36	1.52
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.50	1.87	2.61	27.83	72.35	9.72
8	1.50	1.70	1.51	1.58	1.54	1.67	1.60	1.74	2.48	3.26	15.42	3.41	3.12
9	2.80	1.88	1.67	1.75	1.76	1.84	1.76	1.97	2.74	3.33	3.80	3.11	2.37
10	3.13	1.96	2.41	2.25	2.62	3.09	3.61	4.01	4.14	154.68	4.31	4.37	15.88
11	3.08	2.02	2.05	2.36	2.85	3.01	3.27	3.76	4.34	4.35	39.18	4.71	6.25
12	142.94	2.12	1.92	2.06	2.10	2.54	3.13	3.95	4.76	4.66	8.34	4.74	15.27
13	4.63	4.61	4.00	3.60	4.52	5.11	5.14	7.72	7.63	7.46	8.25	8.46	5.93
14	2.16	2.79	2.40	2.34	2.24	2.75	3.11	3.59	4.30	4.71	5.20	5.01	3.38
15	3.87	4.12	3.57	3.64	3.21	3.90	4.49	5.29	5.48	8.49	9.20	5.81	5.09
16	2.41	2.76	2.51	2.60	2.50	2.55	2.43	2.38	3.06	3.85	4.68	4.80	3.04
17	2.58	2.92	2.65	2.76	2.69	2.69	3.16	3.89	4.96	5.67	6.11	9.69	4.15
18	11.33	5.83	5.26	5.04	3.74	4.22	4.86	5.30	6.04	6.02	6.39	10.12	6.18
19	2.83	3.20	2.91	3.08	2.95	2.96	3.12	3.94	4.97	5.73	6.62	2.86	3.76
20	2.97	3.36	3.05	3.22	3.09	3.33	4.21	5.06	6.20	6.60	10.74	6.86	4.89
													57.28

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.53	0.68	0.59	0.69	0.67	0.70	0.89	313.41	665.71	2216.75	697.44	0.80	324.91
3	0.89	0.98	0.88	0.93	0.89	0.93	1.05	187.93	575.29	618.62	2096.90	460.76	328.84
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.02	1.20	49.89	1.07	5.13
5	1.25	1.37	1.22	1.34	1.31	1.37	1.31	1.29	1.30	1.28	1.68	1.76	1.37
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.40	1.46	1.87	2.36	1.38	1.52
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.51	1.83	2.65	27.88	72.40	9.74
8	1.52	1.73	1.54	1.61	1.57	1.70	1.63	1.64	2.52	3.54	15.51	10.54	3.75
9	2.74	1.92	1.71	1.79	1.80	1.88	1.80	1.83	2.91	3.75	4.10	3.13	2.45
10	3.11	2.01	2.28	2.17	2.73	3.38	4.12	4.11	47.08	154.85	4.42	3.98	19.52
11	2.78	2.07	1.87	2.28	3.04	3.19	3.55	4.16	4.56	4.46	39.36	32.08	8.62
12	5.15	2.14	1.93	2.03	1.96	2.59	3.49	4.59	4.87	7.69	5.18	5.14	3.90
13	4.87	4.58	3.94	3.49	4.91	5.47	5.24	7.88	7.79	7.61	8.42	8.63	6.07
14	2.08	2.59	2.29	2.18	2.19	3.11	3.51	4.05	4.87	5.16	5.58	5.16	3.56
15	3.66	3.97	3.48	3.61	3.16	4.13	4.98	5.56	8.68	8.64	9.36	5.92	5.43
16	2.17	2.43	2.19	2.26	2.18	2.29	2.21	2.38	3.53	4.55	5.36	5.19	3.06
17	2.27	2.51	2.27	2.36	2.39	3.36	4.26	5.02	5.99	5.86	9.54	9.84	4.64
18	11.51	5.30	5.04	4.87	3.49	4.28	5.24	5.83	6.26	6.12	9.96	6.54	6.20
19	2.44	2.75	2.49	2.63	2.53	3.46	4.48	5.25	6.23	6.40	6.79	2.47	3.99
20	2.55	2.88	2.61	2.75	3.25	4.62	5.69	6.39	6.85	10.14	7.09	7.25	5.17
													57.13

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.78	1256.53	1519.47	1369.51	394.85
2	0.53	0.68	0.59	0.69	0.67	0.70	0.89	313.41	666.04	2356.85	774.50	0.73	343.02
3	0.82	0.90	0.81	0.85	0.82	0.86	0.97	241.92	649.74	695.37	2237.88	532.33	363.61
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	0.95	1.13	74.71	1.01	7.13
5	1.19	1.30	1.16	1.21	1.18	1.24	1.19	1.17	1.18	1.17	1.53	1.60	1.26
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.28	1.34	1.72	2.17	1.27	1.39
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.40	1.70	2.46	115.44	274.72	33.79
8	1.42	1.61	1.44	1.50	1.46	1.59	1.52	1.53	2.35	24.43	88.29	76.48	16.97
9	2.58	1.80	1.61	1.68	1.64	1.72	1.65	1.67	2.67	3.44	22.51	2.87	3.82
10	2.86	1.85	2.10	1.99	2.51	3.11	3.79	3.79	459.72	591.98	7.21	3.68	90.38
11	2.57	1.92	1.73	2.11	2.82	2.96	3.29	3.86	4.23	4.14	213.86	203.66	37.26
12	4.79	1.99	1.79	1.89	1.82	2.41	3.25	4.28	4.54	116.67	4.84	4.80	12.76
13	4.56	4.28	3.70	3.27	4.60	5.12	4.92	10.80	7.31	7.45	7.91	20.71	7.05
14	1.96	2.43	2.15	2.05	2.06	2.92	3.30	3.82	4.59	4.85	5.26	4.87	3.35
15	3.45	3.75	3.28	3.41	2.98	3.91	4.71	5.25	8.20	8.17	8.86	5.60	5.13
16	2.05	2.30	2.08	2.14	2.07	2.17	2.09	2.25	3.35	4.32	5.09	4.93	2.90
17	2.16	2.38	2.16	2.24	2.27	3.20	4.05	4.77	5.70	5.57	9.08	9.36	4.41
18	10.96	5.05	4.80	4.64	3.33	4.08	4.99	5.55	5.97	5.83	9.50	6.23	5.91
19	2.33	2.62	2.38	2.51	2.42	3.31	4.28	5.02	5.95	6.12	6.49	2.36	3.81
20	2.44	2.75	2.49	2.63	3.11	4.42	5.45	6.12	6.56	9.71	6.79	6.95	4.95
													67.19

Reference market -scenario hydrothermal - inflow 12 (911in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	183.76	6.66	49.69	0.78	0.70	0.78	34.95	309.08	775.71	863.60	901.97	3058.31	515.50
3	286.78	0.86	0.77	0.80	0.78	0.82	0.78	0.77	0.78	10.81	381.38	0.85	57.18
4	0.93	1.02	0.91	0.95	0.93	0.97	0.93	0.92	17.56	614.46	706.67	0.98	112.27
5	1.07	1.17	1.05	1.17	1.28	1.78	93.02	435.52	501.91	2371.75	2462.26	615.01	540.58
6	1.20	1.32	1.17	1.23	1.20	1.25	1.26	1.85	96.81	399.97	2244.42	1.21	229.41
7	1.26	1.44	1.29	1.34	1.31	1.43	1.39	1.97	2.71	312.08	356.02	1.31	56.96
8	1.36	1.55	1.38	1.44	1.65	2.36	2.98	74.42	114.34	1787.33	1891.93	142.04	335.23
9	1.52	1.66	1.48	1.55	1.56	1.63	1.81	2.35	3.14	3.59	82.64	22.33	10.44
10	1.61	2.36	2.51	2.48	3.45	3.95	4.52	4.65	1010.69	1185.46	1285.15	1147.84	387.89
11	3.24	1.87	1.94	1.94	2.51	3.13	3.74	4.66	5.39	801.63	822.96	3.69	138.06
12	1.84	2.32	2.33	2.76	3.34	4.03	4.68	5.63	5.82	297.87	237.50	1.98	47.51
13	3.93	2.19	2.03	2.10	2.03	2.10	2.08	2.49	3.51	4.53	5.66	4.88	3.13
14	2.12	4.76	3.21	2.24	2.85	3.45	4.10	5.05	6.29	6.47	6.83	6.61	4.50
15	2.27	2.56	2.32	2.39	2.32	2.96	3.79	5.13	6.91	7.03	14.48	7.03	4.93
16	2.41	2.72	2.46	2.54	2.46	2.59	2.51	3.02	4.32	5.36	6.22	6.17	3.57
17	2.61	4.83	4.29	4.39	5.74	7.06	7.73	15.40	16.2015	.68	16.20	7.87	9.00
18	8.01	3.04	2.75	3.39	3.38	4.49	5.45	6.73	8.56	8.29	17.06	8.29	6.62
19	2.90	5.82	4.60	4.07	3.57	4.05	4.68	5.82	7.11	8.48	8.92	5.16	5.43
20	4.32	4.33	4.70	3.19	3.23	3.51	3.90	4.92	6.50	7.75	9.25	8.04	5.30
													154.97

Reference market -scenario hydrothermal plus thermal equivalent to wind - inflow 12 (911bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	183.76	6.66	49.69	0.78	0.70	0.78	34.95	251.35	695.13	778.83	817.20	2888.40	475.69
3	227.26	0.93	0.83	0.87	0.85	0.89	0.85	0.84	0.85	1.16	319.53	0.91	46.31
4	1.00	1.09	0.98	1.02	0.99	1.04	1.00	0.98	6.66	535.44	621.97	1.04	97.77
5	1.14	1.31	1.17	1.29	1.42	1.97	15.95	286.50	352.88	2032.89	2123.38	392.80	434.39
6	1.32	1.45	1.29	1.35	1.32	1.38	1.38	2.03	17.91	121.88	1905.83	1.32	171.54
7	1.38	1.56	1.40	1.46	1.42	1.55	1.51	2.13	2.94	80.07	101.17	1.42	16.50
8	1.47	1.66	1.49	1.55	1.77	2.54	3.20	4.07	22.32	1449.30	1553.90	35.16	256.54
9	1.62	1.83	1.63	1.71	1.72	1.80	1.99	2.59	3.45	3.94	4.88	4.40	2.63
10	1.76	2.58	2.75	2.71	3.76	4.30	4.93	5.07	276.16	739.97	839.70	702.45	215.51
11	3.51	2.03	2.11	2.10	2.71	3.39	4.05	5.03	5.82	176.50	186.95	3.98	33.18
12	1.98	2.50	2.51	2.97	3.59	4.34	5.03	6.05	6.25	46.11	18.56	2.12	8.50
13	4.21	2.35	2.17	2.24	2.17	2.24	2.22	2.66	3.76	4.84	6.04	5.21	3.34
14	2.27	5.09	3.42	2.39	3.04	3.68	4.37	5.37	6.69	6.89	7.26	7.03	4.79
15	2.41	2.72	2.46	2.54	2.46	3.14	4.02	5.44	7.33	7.45	15.34	7.45	5.23
16	2.56	2.88	2.61	2.69	2.61	2.74	2.65	3.19	4.56	5.66	6.57	6.52	3.77
17	2.75	5.10	4.53	4.63	6.05	7.44	8.15	16.23	17.0616	.51	17.06	8.29	9.48
18	8.43	3.20	2.90	3.56	3.56	4.72	5.73	7.08	8.99	8.71	17.92	8.71	6.96
19	3.04	6.11	4.83	4.26	3.74	4.25	4.91	6.10	7.45	8.88	9.35	5.40	5.69
20	4.53	4.53	4.92	3.34	3.38	3.68	4.08	5.14	6.79	8.10	9.67	8.40	5.55
													121.46

Reference market -scenario hydrothermal with wind addition - inflow 12 (912in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	183.76	6.66	49.69	0.78	0.70	0.78	5.47	213.89	580.15	655.91	697.44	2401.19	399.70
3	250.00	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	1.02	80.48	0.95	28.31
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.31	318.26	458.87	1.07	65.65
5	1.25	1.37	1.22	1.34	1.31	1.76	2.11	88.10	98.70	1264.42	1402.23	258.53	260.19
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.58	2.22	63.40	1247.07	1.36	110.45
7	1.41	1.61	1.43	1.50	1.46	1.59	1.52	1.59	2.21	2.89	27.83	1.45	3.87
8	1.50	1.70	1.51	1.58	1.54	2.21	2.72	3.32	3.50	757.92	877.76	22.65	139.83
9	1.72	1.88	1.67	1.75	1.76	1.84	1.76	2.01	2.65	3.04	3.80	3.62	2.29
10	1.79	2.41	2.57	2.59	3.51	3.75	4.07	4.01	46.91	154.68	449.73	205.76	73.48
11	3.22	2.02	2.03	2.05	2.60	3.06	3.49	4.04	4.45	22.94	39.18	3.45	7.71
12	1.89	2.41	2.42	2.86	3.40	3.83	4.23	4.73	4.76	7.53	8.34	1.97	4.03
13	3.79	2.29	2.13	2.21	2.12	2.12	2.07	2.38	3.15	3.84	4.74	4.32	2.93
14	2.16	4.67	3.26	2.34	2.90	3.31	3.76	4.28	4.97	5.06	5.50	5.51	3.98
15	2.29	2.62	2.39	2.47	2.37	2.88	3.51	4.36	5.37	5.44	9.20	5.81	4.06
16	2.41	2.76	2.51	2.60	2.50	2.55	2.43	2.80	3.75	4.46	5.18	5.27	3.27
17	2.58	4.69	4.21	4.36	5.46	6.12	6.35	8.87	8.90	8.74	9.39	6.16	6.32
18	6.83	3.05	2.77	3.41	3.36	4.18	4.81	5.28	6.16	6.02	9.81	6.44	5.18
19	2.83	5.54	4.47	4.05	3.54	3.83	4.25	4.79	5.48	6.19	6.65	4.50	4.68
20	4.08	4.24	4.57	3.22	3.22	3.38	3.64	4.22	5.17	5.88	6.90	6.44	4.58
													87.82

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 12 (913in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	183.76	6.66	49.69	0.78	0.70	0.78	5.47	213.89	580.15	655.91	697.44	2401.19	399.70
3	250.00	0.98	0.87	0.91	0.89	0.93	0.89	0.88	0.88	1.02	80.48	0.95	28.31
4	1.03	1.13	1.01	1.05	1.03	1.07	1.03	1.01	1.31	318.26	458.87	1.07	65.65
5	1.25	1.37	1.22	1.34	1.31	1.76	2.11	88.10	98.70	1264.42	1402.23	258.53	260.19
6	1.37	1.50	1.34	1.40	1.36	1.42	1.42	1.58	2.22	63.40	1247.12	1.38	110.46
7	1.43	1.62	1.45	1.51	1.48	1.60	1.54	1.55	2.23	2.98	27.88	1.48	3.90
8	1.52	1.73	1.54	1.61	1.57	2.14	2.79	3.52	3.59	758.06	877.91	22.74	139.89
9	1.75	1.92	1.71	1.79	1.80	1.88	1.80	1.84	2.75	3.31	4.10	3.88	2.38
10	1.84	2.19	2.58	2.60	3.98	4.13	4.29	114.80	47.08	154.85	449.91	4.50	66.06
11	3.19	2.07	1.87	1.97	2.77	3.38	3.95	4.53	4.56	23.11	39.36	3.44	7.85
12	1.94	2.18	2.38	2.96	3.75	4.24	4.73	4.84	7.83	7.69	8.52	2.00	4.42
13	3.29	2.25	2.07	2.13	2.06	2.12	2.09	2.38	3.48	4.43	5.30	4.48	3.01
14	2.08	4.95	3.13	2.18	2.98	3.53	4.13	4.77	5.29	5.16	5.60	5.62	4.12
15	2.13	2.39	2.16	2.22	2.54	3.37	4.21	5.28	5.58	8.64	9.36	5.92	4.48
16	2.17	2.43	2.19	2.26	2.18	2.29	2.79	3.74	4.89	5.49	5.90	5.67	3.50
17	2.27	5.16	4.41	4.47	6.09	6.79	6.45	9.01	9.04	8.88	9.54	9.84	6.83
18	6.18	2.62	2.38	3.55	3.46	4.60	5.43	5.93	6.26	9.27	9.96	6.54	5.52
19	2.44	5.58	4.37	3.88	3.41	3.89	4.53	5.23	5.98	6.40	6.79	4.34	4.74
20	3.89	4.08	4.74	2.75	3.33	3.49	3.86	4.63	5.81	6.61	7.09	6.79	4.76
													87.58

Reference market -scenario hydrothermal with wind addition and hydro expansion -inflow 12 (913bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin12													
1	0.59	0.51	0.46	0.47	37.41	412.48	688.73	944.57	1481.38	1325.12	1519.47	1102.39	626.13
2	183.76	6.66	49.69	0.78	0.70	0.78	5.47	213.89	580.45	732.68	774.50	2545.86	424.60
3	307.95	0.90	0.80	0.84	0.82	0.86	0.82	0.81	0.81	0.94	219.38	0.88	44.65
4	0.97	1.06	0.94	0.98	0.96	1.00	0.96	0.95	1.23	378.33	597.79	1.01	82.18
5	1.19	1.30	1.16	1.21	1.18	1.59	19.44	305.72	324.76	1500.09	1644.81	381.78	348.69
6	1.25	1.37	1.22	1.27	1.24	1.30	1.31	1.45	2.04	251.38	1489.53	1.27	146.22
7	1.31	1.50	1.34	1.40	1.36	1.48	1.42	1.44	2.06	20.72	115.44	1.37	12.57
8	1.42	1.61	1.44	1.50	1.46	2.00	2.61	18.58	26.45	1095.28	1238.26	105.38	208.00
9	1.65	1.80	1.61	1.68	1.64	1.72	1.65	1.68	2.52	3.03	22.51	17.54	4.92
10	1.69	2.01	2.37	2.39	3.66	3.80	3.96	515.78	459.72	591.98	739.04	4.16	194.21
11	2.95	1.92	1.73	1.83	2.56	3.13	3.66	4.21	4.23	173.09	213.86	3.20	34.70
12	1.80	2.03	2.21	2.76	3.49	3.95	4.41	4.51	50.70	116.67	54.66	1.87	20.76
13	3.08	2.10	1.94	2.00	1.93	1.98	1.96	2.24	3.26	4.16	4.98	4.21	2.82
14	1.96	4.65	2.94	2.05	2.80	3.32	3.89	4.49	4.99	4.85	5.28	5.30	3.88
15	2.00	2.26	2.03	2.10	2.40	3.19	3.98	4.99	5.27	8.17	8.86	5.60	4.24
16	2.05	2.30	2.08	2.14	2.07	2.17	2.64	3.55	4.63	5.20	5.59	5.38	3.32
17	2.16	4.90	4.19	4.25	5.79	6.46	6.13	8.57	8.60	8.45	9.08	9.36	6.49
18	5.88	2.49	2.26	3.38	3.30	4.38	5.17	5.65	5.97	8.84	9.50	6.23	5.26
19	2.33	5.33	4.17	3.70	3.26	3.71	4.32	5.00	5.71	6.12	6.49	4.15	4.52
20	3.72	3.90	4.53	2.63	3.19	3.34	3.70	4.44	5.56	6.33	6.79	6.51	4.55
													109.14

Otpimistic market -scenario hydrothermal - inflow 1 (911in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.56	266.57	444.92	667.51	0.59	115.32
3	0.63	0.70	0.62	0.63	0.62	0.64	0.63	0.64	303.24	695.45	1262.27	0.72	188.90
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.81	301.02	648.59	1138.97	676.90	230.97
5	425.46	0.95	0.84	0.91	0.90	1.04	5.93	361.67	1283.75	1134.23	4015.38	0.92	602.67
6	0.97	1.08	0.97	1.00	0.97	1.22	13.06	427.81	1151.09	1119.84	3769.34	1155.25	636.88
7	1.07	1.24	1.12	1.15	1.12	1.20	1.42	4.58	361.06	493.12	914.47	852.09	219.47
8	245.87	1.40	1.26	1.31	1.26	1.35	1.31	1.31	1.71	3.08	247.29	1.36	42.38
9	1.41	1.56	1.41	1.46	1.46	1.51	1.81	64.55	637.74	994.82	1160.95	602.38	289.25
10	89.41	25.73	2.49	17.96	88.68	569.68	896.84	1002.45	3414.58	953.19	3487.49	796.06	945.38
11	717.48	124.852.5	9	19.22	486.26	967.89	830.56	2987.79	3344.36	3058.32	3417.22	759.51	1393.00
12	1.84	2.04	2.43	1.96	1.89	1.96	1.89	2.41	7.51	132.25	522.73	93.29	64.35
13	1.99	2.20	2.04	2.11	2.04	2.11	2.09	2.09	2.16	2.09	2.62	2.13	2.14
14	2.13	2.37	2.18	2.26	2.18	2.26	3.00	3.89	405.82	652.65	796.05	2.28	156.42
15	2.28	2.58	2.33	2.83	2.67	3.08	3.63	6.25	424.86	536.01	765.77	2.42	146.23
16	2.42	2.74	2.47	2.56	2.47	3.44	4.79	203.35	777.71	2470.37	2898.52	2540.69	742.63
17	252.01	600.484.2	6	3.50	3.58	4.84	41.73	552.80	2756.23	2102.29	705.27	262.84	607.49
18	2.76	3.06	2.76	3.58	3.28	4.27	5.08	34.71	594.40	230.77	2759.23	245.64	324.13
19	2.91	3.22	4.19	3.06	3.71	3.80	4.45	5.44	48.5449	.81	185.66	5.50	26.69
20	3.05	3.38	3.05	3.21	3.10	3.22	4.25	5.75	134.99	196.41	299.06	175.83	69.61
													347.51

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 1 (911bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.62	225.59	342.33	608.61	0.64	98.45
3	0.68	0.76	0.67	0.69	0.68	0.69	0.69	0.70	261.45	630.99	1183.13	0.77	173.49
4	0.80	0.89	0.79	0.81	0.80	0.82	0.81	0.87	258.56	584.18	1062.41	610.83	210.21
5	373.86	1.06	0.94	1.02	0.99	1.15	1.51	256.26	1122.91	964.24	3674.50	1.02	533.29
6	1.07	1.18	1.07	1.10	1.07	1.34	1.78	320.94	991.84	949.89	3428.72	985.29	557.11
7	1.16	1.34	1.21	1.25	1.21	1.30	1.54	1.96	263.34	377.36	766.28	617.72	169.64
8	73.21	1.51	1.36	1.40	1.36	1.45	1.41	1.41	1.83	2.33	75.21	1.46	13.66
9	1.50	1.72	1.55	1.60	1.60	1.65	1.98	2.84	452.12	652.58	798.78	413.02	194.25
10	10.66	2.77	2.72	2.81	10.22	391.03	575.23	659.37	2905.72	616.08	2978.57	572.79	727.33
11	505.24	31.46	2.81	3.31	145.92	640.30	607.31	2479.51	2835.82	2549.97	2908.62	536.32	1103.88
12	1.99	2.20	2.62	2.10	2.04	2.10	2.04	2.59	3.52	27.42	164.42	10.67	18.64
13	2.13	2.36	2.18	2.25	2.18	2.25	2.23	2.23	2.30	2.23	2.80	2.28	2.29
14	2.28	2.52	2.33	2.40	2.33	2.40	3.19	4.14	114.25	211.54	573.06	2.42	76.91
15	2.42	2.74	2.47	3.00	2.83	3.26	3.85	4.72	121.26	156.57	542.86	2.57	70.71
16	2.57	2.90	2.62	2.70	2.62	3.64	5.07	53.68	554.83	1731.18	2107.93	1793.03	521.90
17	145.61	208.504.5	0	3.69	3.78	5.10	6.32	162.18	1983.14	1658.08	235.37	156.46	381.06
18	2.91	3.22	2.91	3.77	3.45	4.49	5.33	6.56	185.43	62.36	1986.13	69.25	194.65
19	3.05	3.38	4.39	3.20	3.89	3.99	4.67	5.70	11.49	8.38	48.59	5.76	8.87
20	3.20	3.54	3.20	3.35	3.25	3.37	4.45	6.02	26.7146	.91	192.78	37.45	27.85
													261.52

Otpimistic market -scenario hydrothermal with wind addition - inflow 1 (912in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	142.14	258.63	513.15	0.68	76.58
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	149.75	474.94	977.30	0.80	134.05
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	184.31	472.01	907.24	540.40	175.89
5	315.36	1.11	0.98	1.06	1.04	1.09	1.40	71.39	793.24	703.27	2510.27	1.06	366.77
6	1.10	1.19	1.09	1.11	1.08	1.24	1.61	96.08	687.40	691.56	2335.12	785.45	383.67
7	1.15	1.34	1.21	1.25	1.20	1.28	1.47	1.81	81.77	259.04	521.25	505.23	114.83
8	77.15	1.49	1.35	1.40	1.34	1.42	1.36	1.34	1.70	2.11	23.61	1.40	9.64
9	1.51	1.70	1.53	1.59	1.58	1.59	1.85	2.48	272.35	410.81	570.49	315.36	131.90
10	16.80	11.64	2.62	5.27	23.86	343.01	445.41	441.20	1594.28	382.93	1825.94	430.17	460.26
11	484.73	86.14	2.69	5.79	354.86	545.50	467.13	1445.66	1552.06	1418.12	1780.89	400.75	712.03
12	1.90	2.14	2.52	2.05	1.98	1.98	1.90	2.32	3.00	7.08	110.37	3.82	11.76
13	2.04	2.30	2.14	2.22	2.12	2.13	2.08	2.03	2.08	2.02	2.51	2.12	2.15
14	2.17	2.44	2.27	2.35	2.25	2.26	2.87	3.47	14.9541	.94	150.77	2.24	19.17
15	2.30	2.63	2.39	2.90	2.71	2.98	3.38	3.89	16.7223	.85	140.21	2.36	17.19
16	2.42	2.78	2.52	2.62	2.51	3.29	4.30	15.10	120.71	749.57	1063.29	992.92	246.84
17	47.97	188.194.1	9	3.53	3.56	4.47	5.20	16.36	709.44	375.09	41.62	26.70	118.86
18	2.71	3.07	2.78	3.59	3.27	4.00	4.54	4.99	17.60	6.04	810.32	21.04	73.66
19	2.84	3.22	4.10	3.09	3.67	3.62	4.07	4.54	5.32	5.62	5.96	4.75	4.23
20	2.98	3.37	3.06	3.23	3.10	3.12	3.93	4.78	5.88	6.62	28.28	7.18	6.29
													160.60

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 1 (913in1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.16	1214.54	0.45	146.30
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	142.14	258.63	513.15	0.68	76.58
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	149.75	474.94	977.30	0.80	134.05
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	184.31	472.01	907.24	540.40	175.89
5	315.36	1.11	0.98	1.06	1.04	1.09	1.40	71.39	793.24	703.27	2510.27	1.06	366.77
6	1.10	1.19	1.09	1.11	1.08	1.24	1.61	96.08	687.40	691.56	2335.17	784.18	383.57
7	1.14	1.29	1.17	1.21	1.16	1.30	1.58	1.94	234.42	318.01	640.59	531.08	144.57
8	58.12	1.38	1.25	1.29	1.24	1.32	1.26	1.30	1.78	2.31	83.92	1.29	13.04
9	1.38	1.52	1.37	1.42	1.41	1.44	2.12	27.18	482.95	410.91	1871.20	86.55	240.79
10	2.81	2.49	2.61	2.76	75.99	458.28	496.85	441.31	1594.45	1469.85	546.77	430.27	460.37
11	555.90	17.59	2.59	5.37	544.59	618.22	467.24	1445.83	1552.22	1418.29	1781.07	400.86	734.15
12	1.64	1.84	3.00	1.76	1.70	1.86	2.34	2.96	16.12	121.43	388.85	5.28	45.73
13	1.76	1.98	1.84	1.90	1.83	1.84	1.80	1.77	1.81	2.15	2.98	1.83	1.96
14	1.87	2.10	1.95	2.04	2.15	3.11	3.86	4.38	134.16	95.00	1135.10	1.94	115.64
15	1.98	2.26	2.05	4.03	3.08	3.26	3.78	4.38	91.5829	.42	140.31	2.04	24.02
16	2.08	2.38	2.16	2.29	3.37	4.93	48.69	36.75	990.81	749.72	1063.46	993.09	324.98
17	48.08	164.213.9	1	3.29	3.51	4.82	11.89	16.46	709.58	375.23	843.07	26.80	184.24
18	2.33	2.63	2.39	4.34	3.48	4.45	5.11	5.60	22.77	257.75	37.25	739.88	90.67
19	2.45	2.76	4.47	2.64	4.19	3.83	4.45	5.00	5.87	6.09	8.59	4.56	4.57
20	2.56	2.89	2.62	2.76	3.16	3.99	5.05	5.92	14.21	6.71	745.40	7.15	66.87
													186.74

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 1 (913bin1)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin1													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	8.52	528.43	1215.00	0.45	146.36
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	142.14	303.52	567.29	0.62	84.83
3	0.66	0.73	0.65	0.67	0.65	0.67	0.66	0.67	186.96	532.05	1047.45	0.75	147.71
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.79	223.23	530.40	976.35	601.77	194.84
5	363.22	1.05	0.93	0.96	0.94	0.98	1.26	237.15	922.86	842.46	2753.44	0.97	427.19
6	1.00	1.09	0.99	1.02	0.99	1.14	1.48	289.35	815.81	830.72	2578.20	927.88	454.14
7	1.05	1.19	1.08	1.12	1.07	1.21	1.47	10.86	323.66	421.01	770.00	735.80	189.13
8	99.44	1.29	1.16	1.21	1.16	1.23	1.18	1.22	1.67	9.20	260.35	1.21	31.69
9	1.30	1.43	1.29	1.34	1.29	1.32	1.94	246.10	740.42	581.58	2201.37	319.33	341.56
10	19.99	9.75	4.88	56.04	299.63	631.71	769.97	614.80	1904.25	1784.38	820.44	610.37	627.18
11	850.83	86.84	2.39	66.35	837.83	913.91	648.39	1768.77	1861.91	1732.69	2110.97	580.91	955.15
12	1.52	1.71	2.79	1.64	1.58	1.73	2.18	2.77	92.16	409.98	558.50	71.69	95.69
13	1.65	1.85	1.72	1.79	1.71	1.72	1.69	1.66	1.70	2.02	2.80	1.72	1.84
14	1.76	1.97	1.83	1.91	2.02	2.92	3.64	28.34	432.63	353.53	1587.71	1.83	201.67
15	1.86	2.14	1.94	6.66	2.91	3.08	3.57	9.67	163.23	133.74	452.31	1.93	65.25
16	1.97	2.25	2.05	2.17	3.19	32.98	180.37	150.88	1406.95	1000.28	1505.95	1271.48	463.38
17	181.01	482.043.7	1	3.13	3.34	7.24	45.82	102.84	936.97	796.86	1082.95	128.21	314.51
18	2.22	2.51	2.27	4.13	3.31	4.24	4.87	18.97	113.79	759.07	147.35	995.44	171.52
19	2.34	2.64	4.27	2.52	4.00	3.65	4.25	4.77	20.191	3 .41	39.94	4.36	8.86
20	2.45	2.76	2.50	2.65	3.03	3.82	4.83	5.67	47.382	2 .35	985.03	28.91	92.62
													250.76

Otpimistic market -scenario hydrothermal - inflow 2 (911in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.56	306.37	758.38	1308.54	855.83	269.44
3	263.60	0.70	0.62	0.63	0.66	263.10	739.49	1296.96	1591.58	3884.92	4161.98	3824.97	1335.77
4	0.75	78.42	0.74	0.76	0.91	248.53	599.74	1046.20	1541.59	3761.19	1411.77	0.83	724.28
5	0.85	1.18	0.95	0.91	1.06	1.27	44.72	347.99	1011.44	1025.18	1345.45	0.92	315.16
6	0.97	1.08	0.97	1.00	0.97	1.00	1.02	1.09	11.29	306.98	697.69	621.11	137.10
7	1.07	1.24	1.12	1.15	1.13	1.60	93.73	726.85	1277.70	3394.13	1229.57	562.49	607.65
8	1.21	93.921	5.21	59.10	75.68	420.64	768.66	1085.19	3723.24	1035.91	3626.75	1071.30	998.07
9	1004.34	359.80	18.54	85.97	129.40	352.74	552.79	971.94	1123.78	3225.28	1160.33	1029.64	834.55
10	410.35	1.72	1.55	1.61	1.60	1.66	1.85	2.45	295.87	503.77	1119.10	1.70	195.27
11	1.70	1.88	1.70	1.81	1.75	1.81	1.77	2.52	117.92	543.16	1090.64	21.03	148.97
12	1.84	2.53	1.84	1.96	1.94	2.68	3.16	91.30	572.25	666.54	677.77	434.58	204.87
13	1.99	2.20	2.04	2.11	2.04	2.11	2.38	3.39	390.78	716.41	826.34	686.48	219.86
14	702.03	2.37	2.18	2.52	2.67	3.52	28.26	431.50	838.27	693.25	3036.55	2.28	478.78
15	2.28	2.58	2.33	2.41	2.33	3.12	4.10	137.37	807.98	2552.56	765.77	2622.89	575.48
16	629.07	739.954.3	5	3.36	3.00	4.09	8.41	142.84	749.05	546.01	2896.96	553.26	523.36
17	4.95	4.23	2.62	2.71	2.84	3.78	4.55	30.97	248.43	247.97	705.27	2164.14	285.20
18	2.76	618.164.7	0	4.02	4.77	23.463	6.71	192.96	642.95	230.77	2757.69	245.64	397.05
19	36.08	41.23	5.56	33.81	4.35	5.06	5.99	45.20	612.75	213.59	644.83	3.05	137.63
20	3.05	3.38	4.65	3.89	3.40	4.29	5.19	6.34	147.99	183.20	260.60	68.66	57.89
													442.40

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 2 (911bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.62	264.19	691.94	1230.28	787.54	248.18
3	219.36	0.76	0.67	0.69	0.71	219.71	674.21	1212.14	1506.73	3714.90	3991.94	3655.00	1266.40
4	0.80	58.24	0.79	0.81	0.97	204.61	537.49	967.69	1456.77	3591.30	1326.99	0.88	678.95
5	0.90	1.31	1.06	1.02	1.17	1.40	2.89	243.58	868.44	863.49	1178.63	1.02	263.74
6	1.07	1.18	1.07	1.10	1.07	1.10	1.12	1.19	1.71	100.04	499.21	431.27	86.76
7	1.16	1.34	1.21	1.25	1.23	1.73	24.16	516.43	1108.32	3055.24	1060.23	443.48	517.98
8	1.31	55.99	2.24	10.25	16.51	315.21	547.47	915.90	3384.38	866.65	3287.99	902.03	858.83
9	735.82	108.972.6	4	12.12	27.48	97.22	368.63	639.85	766.61	2717.74	798.78	683.72	579.96
10	115.57	1.88	1.70	1.75	1.74	1.80	2.02	2.67	34.95	155.01	763.24	1.84	90.35
11	1.84	2.04	1.84	1.95	1.89	1.95	1.91	2.72	24.08	170.26	737.74	3.68	79.33
12	1.99	2.73	1.99	2.10	2.08	2.88	3.40	10.01	187.29	455.35	475.11	120.85	105.48
13	2.13	2.36	2.18	2.25	2.18	2.25	2.54	3.62	108.87	494.96	603.28	225.22	120.99
14	478.98	2.52	2.33	2.69	2.85	3.75	4.79	116.91	615.26	228.63	2530.76	2.42	332.66
15	2.42	2.74	2.47	2.55	2.47	3.31	4.35	27.36	585.04	1804.36	542.86	1866.25	403.85
16	198.26	554.864.6	0	3.55	3.18	4.32	5.19	29.01	257.54	158.77	2107.93	163.69	290.91
17	5.22	4.46	2.76	2.85	2.99	3.98	4.79	6.03	151.81	141.59	235.37	1719.90	190.15
18	2.91	215.754.9	4	4.22	5.02	5.95	6.67	48.11	205.81	62.36	1986.13	69.25	218.09
19	7.11	12.59	5.84	6.71	4.56	5.31	6.28	7.76	191.62	54.63	206.97	3.20	42.72
20	3.20	3.54	4.87	4.07	3.56	4.49	5.43	6.62	32.0341	.60	159.29	22.28	24.25
													340.06

Otpimistic market -scenario hydrothermal with wind addition - inflow 2 (912in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	174.84	549.39	1041.07	695.86	205.46
3	231.33	0.79	0.70	0.72	0.72	211.67	623.23	1072.76	1304.24	2965.53	3222.13	3051.13	1057.08
4	0.83	65.67	0.81	0.84	0.97	196.88	496.22	851.53	1259.38	2864.38	1158.78	0.91	574.77
5	1.00	1.27	1.05	1.06	1.15	1.36	1.52	79.06	637.51	625.18	915.43	1.06	188.89
6	1.10	1.19	1.09	1.11	1.08	1.10	1.12	1.13	1.57	58.02	380.13	350.98	66.63
7	1.15	1.34	1.21	1.25	1.22	1.68	18.57	393.71	806.84	1974.85	816.50	362.41	365.06
8	1.29	66.98	3.89	17.75	20.82	305.07	459.90	615.66	2162.89	549.38	2235.39	732.09	597.59
9	619.04	267.698.5	6	26.39	83.88	87.85	287.43	431.23	482.84	1521.28	570.49	519.63	408.44
10	120.93	1.84	1.67	1.73	1.71	1.72	1.88	2.36	12.8487	.26	543.04	1.73	64.89
11	1.77	1.99	1.80	1.92	1.84	1.85	1.79	2.41	4.30	96.94	522.55	3.23	53.53
12	1.90	2.62	1.93	2.05	2.02	2.66	3.02	3.56	107.04	130.68	159.19	87.31	42.00
13	2.04	2.30	2.14	2.22	2.12	2.13	2.34	3.09	13.65	103.97	161.35	134.68	36.00
14	395.10	2.44	2.27	2.61	2.73	3.37	4.06	18.94	141.08	94.91	1134.93	2.24	150.39
15	2.30	2.63	2.39	2.48	2.38	3.02	3.76	4.62	130.89	790.61	140.21	1038.58	176.99
16	163.42	525.474.2	9	3.39	3.01	3.84	4.38	4.98	113.60	23.74	1063.29	44.10	163.13
17	4.57	4.16	2.66	2.77	2.87	3.60	4.13	4.65	9.72	5.78	41.62	781.58	72.34
18	2.71	194.164.5	6	4.00	4.62	5.10	5.45	5.75	22.67	6.04	810.32	21.04	90.54
19	5.99	13.53	5.32	7.54	4.25	4.65	5.24	5.75	18.39	6.33	32.72	2.87	9.38
20	2.98	3.37	4.53	3.88	3.38	4.04	4.67	5.15	5.96	6.53	19.27	6.89	5.89
													236.53

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 2 (913in2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.01	1035.53	1518.95	1372.55	401.54
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	174.84	549.39	1041.07	695.86	205.46
3	231.33	0.79	0.70	0.72	0.72	211.67	623.23	1072.76	1304.24	2965.53	3222.13	3051.13	1057.08
4	0.83	65.67	0.81	0.84	0.97	196.88	496.22	851.53	1259.38	2864.38	1158.78	0.91	574.77
5	1.00	1.27	1.05	1.06	1.15	1.36	1.52	79.06	637.51	625.18	915.43	1.06	188.89
6	1.10	1.19	1.09	1.11	1.08	1.10	1.12	1.13	1.57	58.02	358.78	339.67	63.91
7	1.14	1.29	1.17	1.27	1.24	1.74	62.23	469.32	806.87	1974.89	816.56	374.75	376.04
8	1.21	77.29	8.29	19.35	24.48	349.35	537.13	615.72	2163.03	1916.88	787.83	732.17	602.73
9	619.13	94.30	2.51	22.38	100.07	92.95	346.74	469.66	482.95	1521.45	570.60	519.74	403.54
10	106.55	1.59	1.44	1.49	1.66	1.95	2.29	2.89	122.06	365.54	546.77	1.50	96.31
11	1.53	1.72	1.55	1.65	1.59	1.60	1.92	2.81	101.51	355.17	522.96	3.31	83.11
12	1.64	2.78	1.66	1.76	2.49	3.32	8.95	30.59	369.12	159.12	391.29	87.21	88.33
13	1.76	1.98	1.84	1.90	1.83	1.84	2.53	3.64	120.58	107.40	1328.75	134.79	142.40
14	395.21	2.10	1.95	2.71	2.87	3.76	12.72	97.84	141.18	915.38	150.88	1.94	144.04
15	1.98	2.26	2.05	2.13	3.64	4.10	9.13	42.47	1024.62	29.42	1099.26	1038.75	271.65
16	163.53	426.423.9	7	3.13	2.87	4.07	4.84	22.18	120.80	23.84	1063.46	47.40	157.21
17	4.49	3.93	2.28	2.37	3.27	4.19	4.81	5.34	27.08	5.87	843.07	26.80	77.79
18	2.33	739.114.8	8	3.94	4.88	5.47	5.91	11.05	22.77	257.75	37.25	21.14	93.04
19	6.05	4.96	5.35	12.90	4.01	4.70	5.59	6.26	18.49	239.95	32.81	2.48	28.63
20	2.56	2.89	5.91	4.02	3.36	4.29	5.16	5.70	6.57	6.71	28.38	7.27	6.90
													253.17

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 2 (913bin2)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin2													
1	11.85	0.53	169.82	0.47	0.46	0.47	0.47	39.43	668.33	1035.95	1519.47	1373.04	401.69
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	174.84	609.20	1111.58	759.31	221.61
3	274.52	0.73	0.65	0.67	0.66	253.42	685.02	1150.57	1381.01	3105.87	3363.47	3196.02	1117.72
4	0.78	177.120.7	6	0.79	0.91	239.11	555.27	923.80	1336.15	3004.71	1236.02	0.85	623.02
5	0.95	1.21	1.00	0.96	1.04	1.24	14.12	254.30	757.18	758.76	1055.04	0.97	237.23
6	1.00	1.09	0.99	1.02	0.99	1.00	1.02	1.04	1.44	205.99	456.91	440.93	92.78
7	1.05	1.19	1.08	1.17	1.15	1.61	215.55	659.88	945.09	2210.85	958.11	480.29	456.42
8	1.13	236.23	54.35	77.37	91.05	449.83	745.72	840.47	2396.24	2152.73	929.34	877.12	737.63
9	849.59	273.97	12.05	84.34	353.29	326.95	507.89	730.44	740.42	1836.11	847.61	794.85	613.13
10	369.88	1.46	1.32	1.37	1.52	1.80	2.11	24.65	397.34	534.15	820.44	1.39	179.79
11	1.41	1.59	1.43	1.53	1.47	1.48	1.78	2.61	351.57	525.76	698.60	13.82	133.59
12	1.52	2.58	1.55	1.64	2.32	20.787	8.45	132.13	533.00	497.87	561.22	333.55	180.55
13	1.65	1.85	1.72	1.79	1.71	1.72	2.37	3.41	399.20	379.78	1628.64	447.51	239.28
14	580.20	1.97	1.83	2.55	2.70	9.67	91.50	362.90	448.92	1324.18	474.75	1.83	275.25
15	1.86	2.14	1.94	2.01	3.44	3.87	83.81	163.56	1445.53	133.74	1546.82	1495.66	407.03
16	519.68	579.908.7	6	2.96	2.72	3.85	15.46	115.72	405.64	121.34	1505.95	176.97	287.83
17	4.26	3.73	2.17	2.25	3.10	3.99	4.57	22.98	123.42	38.21	1082.95	128.21	118.32
18	2.22	926.854.6	5	3.75	4.65	24.553	0.71	45.26	113.79	759.07	147.35	115.65	181.54
19	20.90	19.78	5.11	45.50	3.83	4.49	5.34	16.19	104.20	721.34	137.41	2.37	90.54
20	2.45	2.76	5.65	3.84	3.22	4.11	4.94	5.46	34.7522	.35	127.47	33.74	20.90
													330.79

Otpimistic market -scenario hydrothermal - inflow 3 (911in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.56	311.51	753.10	1461.03	986.97	293.07
3	0.63	0.70	0.62	0.63	0.62	0.64	0.63	0.64	0.61	38.26	440.22	178.47	55.22
4	0.75	0.98	0.81	0.76	0.74	0.76	0.94	214.36	893.35	1071.79	1411.77	762.88	363.32
5	0.85	1.05	0.90	0.91	0.90	0.92	0.91	0.92	0.96	1.29	297.88	0.92	25.70
6	0.97	1.26	1.07	1.18	1.34	258.77	475.14	984.26	1312.37	1119.28	3767.94	1.07	660.39
7	1.07	1.24	1.12	1.15	1.12	1.20	1.17	1.64	410.03	825.54	1229.57	1.21	206.34
8	1.21	1.40	1.26	1.35	1.53	3.81	249.03	762.64	1243.05	1035.91	3626.75	1071.30	666.60
9	1.41	92.22	1.93	1.96	5.77	391.95	832.64	1043.53	3483.35	3225.28	3556.28	3295.86	1327.68
10	1.55	1.72	1.55	1.61	1.60	1.84	2.46	290.52	872.97	952.66	3485.91	796.06	534.20
11	2.75	1.88	1.70	1.81	1.75	1.84	2.46	75.69	695.29	802.81	1091.18	757.60	286.40
12	9.77	2.04	1.98	1.96	1.89	2.06	2.36	2.95	102.87	383.04	488.62	1.99	83.46
13	1.99	2.20	2.04	2.11	2.04	2.11	2.09	2.09	2.66	3.41	109.11	2.13	11.16
14	2.13	2.37	2.18	2.26	2.18	2.26	2.23	2.23	2.62	3.33	31.05	2.28	4.76
15	2.28	2.58	2.33	2.41	2.33	2.46	3.14	4.12	163.33	521.07	765.77	613.53	173.78
16	2.42	2.74	2.90	2.80	3.04	3.52	4.21	21.26	226.98	534.09	703.37	166.22	139.46
17	2.62	2.90	2.62	2.71	2.99	4.24	14.23	181.70	673.17	2102.29	705.27	2.72	308.12
18	2.76	3.06	2.76	2.86	2.81	2.91	2.81	3.80	5.52	56.05	580.32	2.86	55.71
19	2.91	3.22	2.91	3.06	3.04	3.62	4.44	5.63	139.00	177.74	644.83	193.00	98.62
20	5.31	23.96	4.99	3.21	3.91	4.45	5.26	6.77	225.16	196.41	299.06	48.39	68.91
													268.90

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 3 (911bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.62	269.17	686.84	1378.08	914.41	271.06
3	0.68	0.76	0.67	0.69	0.68	0.69	0.69	0.70	0.66	9.66	341.27	65.62	35.23
4	0.80	1.05	0.86	0.81	0.80	0.82	1.01	81.78	828.31	993.36	1326.99	694.21	327.57
5	0.90	1.17	1.00	1.02	0.99	1.02	1.01	1.02	1.07	1.42	208.22	1.02	18.32
6	1.07	1.38	1.18	1.30	1.47	82.41	364.14	827.81	1142.94	949.89	3428.72	1.16	566.96
7	1.16	1.34	1.21	1.25	1.21	1.30	1.26	1.77	309.01	594.41	1060.23	1.31	164.62
8	1.31	1.51	1.36	1.45	1.65	2.19	73.50	543.53	1073.73	866.65	3287.99	902.03	563.07
9	1.50	17.72	2.13	2.16	2.64	114.04	529.21	695.89	2975.71	2717.74	3048.60	2788.28	1074.64
10	1.70	1.88	1.70	1.75	1.74	2.01	2.68	32.51	566.59	616.08	2978.57	572.79	398.33
11	2.98	2.04	1.84	1.95	1.89	1.99	2.66	4.04	497.87	579.59	738.17	534.64	197.47
12	3.49	2.20	2.14	2.10	2.04	2.21	2.54	3.17	17.54	101.01	149.90	2.13	24.21
13	2.13	2.36	2.18	2.25	2.18	2.25	2.23	2.23	2.84	3.64	19.22	2.28	3.82
14	2.28	2.52	2.33	2.40	2.33	2.40	2.37	2.37	2.79	3.55	4.70	2.42	2.71
15	2.42	2.74	2.47	2.55	2.47	2.60	3.33	4.37	41.67	150.34	542.86	190.82	79.05
16	2.57	2.90	3.07	2.96	3.21	3.71	4.45	5.40	129.78	153.81	236.00	38.34	48.85
17	2.76	3.06	2.76	2.85	3.15	4.47	5.71	44.21	220.01	1658.08	235.37	2.86	182.11
18	2.91	3.22	2.91	3.00	2.96	3.05	2.96	4.00	5.72	14.64	181.29	3.00	19.14
19	3.05	3.38	3.05	3.20	3.19	3.80	4.66	5.90	28.7840	.17	206.97	45.17	29.28
20	5.56	5.69	5.22	3.35	4.09	4.66	5.50	7.08	63.6046	.91	192.78	8.59	29.42
													202.55

Otpimistic market -scenario hydrothermal with wind addition - inflow 3 (912in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	179.14	545.24	1162.62	807.30	224.89
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	0.69	0.89	242.43	44.03	24.49
4	0.83	1.06	0.87	0.84	0.82	0.84	0.98	58.54	697.85	841.06	1158.78	618.48	281.74
5	1.00	1.16	1.00	1.06	1.04	1.06	1.06	1.07	1.01	1.24	20.63	1.06	2.70
6	1.10	1.30	1.14	1.28	1.43	76.80	298.07	630.14	834.94	691.56	2335.12	1.14	406.17
7	1.15	1.34	1.21	1.25	1.20	1.28	1.22	1.66	100.34	427.37	816.50	1.27	112.98
8	1.29	1.49	1.35	1.44	1.61	2.10	58.81	413.34	778.76	549.38	2235.39	732.09	398.09
9	1.51	57.65	2.08	2.12	2.55	102.41	412.53	469.55	1636.53	1521.28	1871.02	1826.03	658.77
10	1.64	1.84	1.67	1.73	1.71	1.90	2.43	15.24	348.28	382.93	1825.94	430.17	251.29
11	2.78	1.99	1.80	1.92	1.84	1.88	2.42	3.21	145.23	355.07	522.85	399.51	120.04
12	3.22	2.14	2.07	2.05	1.98	2.08	2.32	2.77	3.42	23.42	99.40	1.98	12.24
13	2.04	2.30	2.14	2.22	2.12	2.13	2.08	2.03	2.49	3.07	3.89	2.12	2.39
14	2.17	2.44	2.27	2.35	2.25	2.26	2.20	2.15	2.46	3.01	3.92	2.24	2.48
15	2.30	2.63	2.39	2.48	2.38	2.43	2.98	3.65	4.95	22.07	140.21	108.19	24.72
16	2.42	2.78	2.94	2.85	3.05	3.36	3.85	4.36	18.9122	.34	121.08	14.60	16.88
17	2.59	2.93	2.66	2.77	3.01	3.98	4.79	5.35	26.98	375.09	41.62	2.58	39.53
18	2.71	3.07	2.78	2.90	2.83	2.83	2.71	3.37	4.45	5.36	26.47	2.70	5.18
19	2.84	3.22	2.92	3.09	3.04	3.46	4.07	4.67	5.58	6.12	32.72	6.87	6.55
20	4.89	5.22	4.83	3.23	3.85	4.18	4.72	5.42	6.43	6.62	28.28	6.55	7.02
													130.66

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 3 (913in3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	179.14	545.24	1162.62	807.30	224.89
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	0.69	0.89	242.43	44.03	24.49
4	0.83	1.06	0.87	0.84	0.82	0.84	0.98	58.54	697.85	841.06	1158.78	618.48	281.74
5	1.00	1.16	1.00	1.06	1.04	1.06	1.06	1.07	1.01	1.24	20.63	1.06	2.70
6	1.10	1.30	1.14	1.28	1.43	76.80	298.07	630.14	834.94	691.56	2335.17	1.15	406.17
7	1.14	1.29	1.17	1.21	1.16	1.24	1.21	1.73	272.75	509.42	816.56	1.22	134.18
8	1.21	1.38	1.25	1.60	1.76	8.77	111.17	556.93	778.84	1916.88	2235.54	732.17	528.96
9	1.38	6.08	1.99	2.09	2.67	293.24	526.44	1659.23	1636.70	1521.45	1871.20	1826.21	779.06
10	1.43	1.59	1.44	1.49	1.48	2.41	16.95	325.18	460.04	1469.85	546.77	430.27	271.58
11	2.77	1.72	1.55	1.65	1.59	2.04	2.85	77.51	437.15	1418.29	522.96	142.06	217.68
12	2.91	1.84	2.03	1.76	2.00	2.31	2.61	3.14	28.39	112.24	131.57	1.72	24.38
13	1.76	1.98	1.84	1.90	1.83	1.84	1.80	2.08	2.90	3.65	29.91	1.83	4.44
14	1.87	2.10	1.95	2.02	1.94	1.95	1.90	1.99	2.83	3.55	14.66	1.94	3.22
15	1.98	2.26	2.66	2.13	2.45	3.11	3.91	4.59	99.7229	.42	1099.26	108.29	113.32
16	2.08	2.38	3.07	2.88	3.18	3.54	4.24	4.85	41.4523	.84	129.75	23.67	20.41
17	2.23	2.52	2.72	2.77	3.30	4.66	5.98	16.46	709.585.8	7	843.07	2.24	133.45
18	2.33	2.63	2.39	2.48	2.42	2.44	2.68	3.90	5.27	6.14	37.25	2.34	6.02
19	2.45	2.76	2.50	2.64	4.90	4.45	5.02	5.51	12.59	6.42	32.81	299.03	31.76
20	4.19	4.83	4.69	2.76	4.08	4.43	5.18	6.07	14.21	6.71	28.38	7.02	7.71
													161.56

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 3 (913bin3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin3													
1	11.85	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	165.00	0.45	15.13
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	179.14	604.61	1236.41	874.02	241.55
3	0.66	0.73	0.65	0.67	0.65	0.67	0.66	0.67	0.63	0.83	284.36	62.96	29.51
4	0.78	0.99	0.81	0.79	0.77	0.79	0.92	162.65	756.94	911.67	1235.48	682.20	312.90
5	0.95	1.11	0.95	0.96	0.94	0.96	0.96	0.97	0.91	1.13	78.96	0.97	7.48
6	1.00	1.18	1.04	1.17	1.31	240.57	396.56	761.73	972.71	830.29	2577.21	1.06	482.15
7	1.05	1.19	1.08	1.12	1.07	1.15	1.12	1.60	364.56	711.03	957.62	1.14	170.31
8	1.13	1.29	1.16	1.49	1.64	53.66	326.24	768.41	916.54	2151.77	2477.33	876.65	631.44
9	1.30	21.30	1.87	1.97	24.60	440.14	803.26	1981.65	1945.72	1835.24	2200.38	2169.27	952.23
10	1.31	1.46	1.32	1.37	1.37	2.22	96.00	485.56	629.05	1783.51	819.98	610.37	369.46
11	2.56	1.59	1.43	1.53	1.47	1.89	2.64	307.52	606.11	1731.81	698.60	458.93	318.01
12	2.71	1.71	1.89	1.64	1.86	2.15	2.43	2.93	121.35	388.56	425.97	1.60	79.57
13	1.65	1.85	1.72	1.79	1.71	1.72	1.69	1.95	2.72	3.82	126.58	1.72	12.41
14	1.76	1.97	1.83	1.90	1.82	1.83	1.79	1.87	2.66	3.35	90.80	1.83	9.45
15	1.86	2.14	2.51	2.01	2.31	2.94	3.70	21.62	172.32	133.74	1545.96	190.23	173.44
16	1.97	2.25	2.91	2.72	3.01	3.35	4.02	18.43	154.76	121.34	429.87	119.67	72.03
17	2.12	2.39	2.58	2.63	3.13	4.43	39.13	102.84	936.97	38.21	1082.95	2.13	184.96
18	2.22	2.51	2.27	2.36	2.31	2.32	2.55	3.72	7.89	32.90	147.35	2.23	17.55
19	2.34	2.64	2.39	2.52	4.68	4.25	4.80	5.26	45.0227	.63	137.41	868.38	92.28
20	4.00	4.61	4.48	2.65	3.91	4.24	4.96	5.81	47.3822	.35	127.47	24.18	21.34
													209.66

Otpimistic market -scenario hydrothermal - inflow 4 (911in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.56	0.57	282.70	878.76	469.29	136.29
3	0.63	0.72	0.65	0.67	0.62	0.68	11.87	244.52	731.22	736.27	1174.84	0.72	241.95
4	0.75	0.83	0.74	0.76	0.74	0.76	0.81	67.87	948.77	1259.05	1411.77	1232.74	410.47
5	406.71	0.95	1.06	4.39	60.87	387.29	679.73	975.48	1428.74	3508.82	1386.68	0.92	736.81
6	0.97	1.08	0.97	1.00	0.97	1.00	1.02	1.06	3.44	258.25	728.36	736.61	144.56
7	1.07	1.24	1.12	1.15	1.12	1.20	1.22	1.67	288.27	396.81	699.03	1.21	116.26
8	1.21	1.79	1.53	1.53	1.44	1.80	2.06	99.40	537.45	641.33	981.76	483.50	229.57
9	27.01	1.56	1.76	1.77	1.99	23.85	342.46	815.59	1123.78	3225.28	3556.28	1029.64	845.92
10	388.34	1.72	1.55	1.61	1.60	1.66	1.60	1.60	1.96	2.45	95.58	11.59	42.60
11	1.70	1.96	1.76	1.81	1.75	2.01	2.56	31.48	580.35	802.81	1091.18	759.51	273.24
12	1.84	2.04	2.07	2.28	2.24	2.93	34.50	423.88	898.91	766.27	856.65	533.46	293.92
13	1.99	2.20	2.04	2.11	2.40	7.93	125.93	698.65	868.58	2888.79	3106.46	2790.41	874.79
14	2.13	397.56	2.98	2.26	2.39	2.85	3.23	3.77	127.74	426.47	740.15	616.86	194.03
15	2.28	2.58	2.33	2.41	2.33	3.18	4.11	111.25	648.84	582.45	765.77	613.53	228.42
16	2.42	2.74	2.47	2.56	2.47	2.61	2.52	2.78	3.84	4.86	43.68	2.57	6.29
17	2.62	2.90	2.62	2.71	2.67	2.76	2.67	2.72	3.89	4.86	115.16	2.72	12.36
18	2.76	3.06	2.76	2.86	2.81	3.86	5.07	53.14	642.95	230.77	2757.69	2.86	309.22
19	2.91	3.22	4.03	3.69	3.39	4.18	4.90	6.21	190.68	183.43	644.83	61.98	92.79
20	3.05	3.38	3.82	4.16	3.94	4.97	5.77	14.89	235.66	196.41	2308.05	175.83	246.66
													271.83

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 4 (911bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.62	0.64	237.00	813.70	413.58	122.43
3	0.68	0.79	0.70	0.73	0.68	0.74	3.57	199.84	672.15	670.80	1098.96	0.77	220.87
4	0.80	0.89	0.79	0.81	0.80	0.82	0.86	47.65	882.04	1174.28	1326.99	1147.98	382.06
5	355.75	1.06	1.18	1.49	10.34	285.54	478.21	814.80	1259.23	3169.49	1217.20	1.02	632.94
6	1.07	1.18	1.07	1.10	1.07	1.10	1.12	1.16	1.66	78.35	524.39	525.80	94.92
7	1.16	1.34	1.21	1.25	1.21	1.30	1.32	1.81	94.75	288.06	498.78	1.31	74.46
8	1.31	1.92	1.65	1.65	1.55	1.93	2.21	26.56	426.40	512.49	827.29	368.17	181.09
9	6.98	1.72	1.94	1.95	2.19	2.73	88.75	517.45	766.61	2717.74	3048.60	683.72	653.36
10	106.22	1.88	1.70	1.75	1.74	1.80	1.75	1.75	2.13	2.66	15.51	3.23	11.84
11	1.84	2.13	1.91	1.95	1.89	2.17	2.77	3.71	395.61	579.59	738.17	536.32	189.00
12	1.99	2.20	2.23	2.45	2.41	3.15	3.89	116.85	675.75	543.12	633.52	162.54	179.17
13	2.13	2.36	2.18	2.25	2.56	3.69	23.44	475.57	645.49	2382.60	2600.34	2284.37	702.25
14	2.28	123.96	3.18	2.40	2.54	3.04	3.44	4.01	27.26	116.35	523.76	194.11	83.86
15	2.42	2.74	2.47	2.55	2.47	3.37	4.36	16.68	216.35	175.95	542.86	190.82	96.92
16	2.57	2.90	2.62	2.70	2.62	2.75	2.66	2.93	4.06	5.14	9.53	2.71	3.60
17	2.76	3.06	2.76	2.85	2.81	2.90	2.81	2.87	4.09	5.11	20.38	2.86	4.61
18	2.91	3.22	2.91	3.00	2.96	4.06	5.33	13.20	205.81	62.36	1986.13	3.00	191.24
19	3.05	3.38	4.23	3.87	3.56	4.39	5.13	6.51	49.95	42.47	206.97	17.62	29.26
20	3.20	3.54	4.00	4.35	4.13	5.20	6.04	7.44	67.89	46.91	1864.60	37.45	171.23
													201.28

Otpimistic market -scenario hydrothermal with wind addition - inflow 4 (912in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	0.62	167.66	690.42	318.15	98.44
3	0.71	0.81	0.72	0.75	0.71	0.75	1.80	168.11	582.76	579.28	964.36	0.80	191.80
4	0.83	0.92	0.81	0.84	0.82	0.84	0.85	14.43	748.39	1012.49	1158.78	1027.95	330.66
5	296.23	1.11	1.17	1.48	13.11	272.22	400.10	619.96	929.47	2053.36	947.19	1.06	461.37
6	1.10	1.19	1.09	1.11	1.08	1.10	1.12	1.11	1.52	19.61	399.51	428.86	71.53
7	1.15	1.34	1.21	1.25	1.20	1.28	1.28	1.69	56.14	91.99	382.99	1.27	45.23
8	1.29	1.89	1.62	1.63	1.52	1.87	2.07	15.00	298.82	362.77	561.78	298.24	129.04
9	3.90	1.70	1.90	1.93	2.13	2.51	66.72	345.64	482.84	1521.28	1871.02	519.63	401.77
10	112.49	1.84	1.67	1.73	1.71	1.72	1.64	1.62	1.92	2.34	4.63	2.87	11.35
11	1.77	2.07	1.86	1.92	1.84	2.04	2.51	3.16	111.27	355.07	522.85	400.75	117.26
12	1.90	2.14	2.16	2.38	2.33	2.88	3.40	32.33	414.16	159.02	440.52	119.86	98.59
13	2.04	2.30	2.14	2.22	2.48	3.32	6.04	110.41	151.27	956.34	1328.59	1130.00	308.10
14	2.17	125.98	3.05	2.35	2.45	2.79	3.06	3.38	4.00	14.22	135.84	111.95	34.27
15	2.30	2.63	2.39	2.48	2.38	3.07	3.77	4.48	90.69	29.33	140.21	108.19	32.66
16	2.42	2.78	2.52	2.62	2.51	2.56	2.44	2.61	3.41	4.14	4.61	2.48	2.92
17	2.59	2.93	2.66	2.77	2.70	2.71	2.59	2.53	3.39	4.05	4.91	2.58	3.04
18	2.71	3.07	2.78	2.90	2.83	3.66	4.54	5.24	22.67	6.04	810.32	2.70	72.45
19	2.84	3.22	3.96	3.70	3.38	3.94	4.42	5.03	5.88	6.15	32.72	6.38	6.80
20	2.98	3.37	3.77	4.13	3.89	4.60	5.11	5.63	6.50	6.62	745.25	7.18	66.58
													124.22

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 4 (913in4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	0.62	167.66	690.42	318.15	98.44
3	0.71	0.81	0.72	0.75	0.71	0.75	1.80	168.11	582.76	579.28	964.36	0.80	191.80
4	0.83	0.92	0.81	0.84	0.82	0.84	0.85	14.43	748.39	1012.49	1158.78	1027.95	330.66
5	296.23	1.11	1.17	1.48	13.11	272.22	400.10	619.96	929.47	2053.36	947.19	1.06	461.37
6	1.10	1.19	1.09	1.11	1.08	1.10	1.12	1.11	1.52	19.61	379.02	421.61	69.22
7	1.14	1.29	1.17	1.21	1.16	1.24	1.29	1.74	74.76	110.60	397.09	1.22	49.49
8	1.21	1.97	1.66	1.66	1.54	1.94	2.18	25.99	345.32	432.91	615.63	275.26	142.27
9	2.52	1.52	1.95	1.96	2.23	10.00	117.31	469.66	482.95	1521.45	1871.20	519.74	416.87
10	107.36	1.59	1.44	1.49	1.48	1.49	1.44	1.68	2.42	2.90	92.34	3.10	18.23
11	1.53	2.14	1.91	1.65	1.83	2.44	3.06	31.09	437.15	355.17	1781.07	400.86	251.66
12	1.64	1.84	2.21	2.46	2.39	3.17	26.86	141.72	414.26	159.12	1626.54	22.27	200.37
13	1.76	1.98	1.84	2.32	2.96	24.51	127.57	110.51	1239.50	956.50	1328.75	1130.17	410.70
14	1.87	334.24	2.94	2.02	2.58	3.01	3.33	3.70	15.99	38.30	150.88	121.54	56.70
15	1.98	2.26	2.05	2.13	3.03	4.01	4.83	37.96	130.99	29.42	1099.26	43.43	113.45
16	2.08	2.38	2.16	2.24	2.15	2.20	2.14	3.08	4.10	4.93	8.55	2.14	3.18
17	2.23	2.52	2.30	2.37	2.32	2.54	2.94	3.62	4.51	5.08	21.20	2.24	4.49
18	2.33	2.63	2.50	3.00	3.71	4.73	5.82	11.05	22.77	257.75	810.47	2.34	94.09
19	2.45	2.76	5.18	3.94	3.44	4.21	4.85	5.61	17.25	6.42	32.81	6.68	7.97
20	2.56	2.89	4.27	4.43	4.01	4.97	5.62	6.21	14.21	222.17	28.38	7.27	25.58
													147.35

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 4 (913bin4)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in4													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	0.62	209.54	750.07	413.61	114.85
3	0.66	0.74	0.67	0.69	0.65	0.69	9.78	210.24	637.70	639.88	1034.10	0.75	211.38
4	0.78	0.86	0.76	0.79	0.77	0.79	0.79	48.69	809.42	1089.41	1236.02	1106.22	357.94
5	343.44	1.05	1.11	8.88	64.51	366.08	575.31	755.29	1067.80	2289.46	1088.86	0.97	546.90
6	1.00	1.09	0.99	1.02	0.99	1.00	1.02	1.02	1.40	80.27	543.47	600.43	102.81
7	1.05	1.19	1.08	1.12	1.07	1.15	1.19	1.62	237.65	324.82	499.17	1.14	89.35
8	1.13	4.33	1.54	1.54	1.43	1.81	7.24	94.95	443.31	546.29	833.97	375.39	192.74
9	9.67	1.43	1.83	1.84	2.03	75.58	391.00	730.44	740.42	1836.11	2201.37	794.85	565.55
10	371.75	1.46	1.32	1.37	1.36	1.37	1.32	1.55	2.23	14.06	326.62	19.45	61.99
11	1.41	1.97	1.76	1.53	1.70	2.26	14.69	132.42	606.11	525.76	2110.97	580.91	331.79
12	1.52	1.71	2.05	2.30	2.23	9.38	121.31	460.02	583.19	497.87	1956.18	112.46	312.52
13	1.65	1.85	1.72	2.18	2.77	111.89	431.07	389.73	1522.76	1371.06	1628.64	1599.94	588.77
14	1.76	471.83	2.76	1.90	2.43	2.83	3.13	3.48	92.82	151.29	474.75	419.45	135.70
15	1.86	2.14	1.94	2.01	2.86	3.79	33.23	152.71	427.28	133.74	1546.82	166.23	206.22
16	1.97	2.25	2.05	2.12	2.04	2.09	2.03	2.91	3.88	12.13	38.48	2.03	6.17
17	2.12	2.39	2.18	2.25	2.20	2.42	2.79	3.44	4.30	4.84	108.20	2.13	11.61
18	2.22	2.51	2.38	2.85	3.53	4.51	26.53	45.26	113.79	759.07	1050.26	2.23	167.93
19	2.34	2.64	4.94	3.77	3.28	4.02	4.64	5.36	50.27	27.63	137.41	27.57	22.82
20	2.45	2.76	4.08	4.24	3.83	4.76	5.38	5.95	47.38	683.63	127.47	33.74	77.14
													205.23

Otpimistic market -scenario hydrothermal - inflow 5 (911in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.56	0.53	0.67	394.32	590.69	82.53
3	0.63	0.70	0.62	0.63	0.62	0.64	0.63	0.64	306.82	633.89	1155.35	950.90	254.34
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.77	59.50	465.93	1194.24	1232.74	246.54
5	0.85	1.22	1.09	62.44	814.62	1105.08	1136.11	3434.77	4098.57	3508.82	4014.03	0.92	1514.88
6	0.97	58.36	1.35	14.16	9.57	73.09	266.71	640.25	1086.14	1119.28	1216.63	12.50	374.92
7	1.07	1.24	1.12	1.15	1.12	1.35	1.77	333.20	963.74	1077.58	3697.30	1112.97	599.47
8	1.21	1.40	1.26	55.69	1.83	99.45	433.74	891.09	1243.05	3309.65	3626.75	1071.30	894.70
9	959.06	1.56	1.41	1.46	1.46	1.51	1.60	2.23	343.21	656.36	1056.95	1.50	252.36
10	1.55	1.72	1.55	1.61	1.60	1.66	1.87	2.51	352.53	594.73	1125.75	796.06	240.26
11	1.70	1.88	2.24	2.25	2.51	73.86	330.12	597.01	1054.66	3056.84	1091.18	759.51	581.15
12	12.01	2.66	2.43	2.73	2.36	13.19	138.09	620.56	898.91	2972.76	3176.47	421.85	688.67
13	1.99	2.20	2.04	2.11	2.04	2.11	2.09	2.67	15.76	121.87	426.71	26.29	50.66
14	2.13	2.37	2.18	2.26	2.18	2.26	2.23	2.29	3.27	17.63	415.60	110.21	47.05
15	2.28	2.58	2.33	2.41	2.33	2.46	2.38	2.46	3.51	4.43	105.42	9.84	11.87
16	2.42	2.74	3.29	3.02	3.51	20.73	124.67	550.39	777.71	546.01	735.51	2.57	231.05
17	2.62	3.46	3.43	3.24	4.18	4.76	5.16	43.17	513.50	247.97	705.27	2.72	128.29
18	2.76	3.70	3.40	3.83	4.09	4.98	5.58	140.20	642.95	2028.99	675.04	245.64	313.43
19	5.19	117.374.5	9	4.32	4.10	5.28	17.77	61.75	612.75	213.59	2369.06	193.00	300.73
20	3.05	4.90	4.18	4.13	4.28	4.44	5.02	5.89	39.4738	.91	169.01	7.01	24.19
													341.88

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 5 (911bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.62	0.58	0.74	303.11	531.03	69.98
3	0.68	0.76	0.67	0.69	0.68	0.69	0.69	0.70	264.92	571.80	1080.08	877.48	233.32
4	0.80	0.89	0.79	0.81	0.80	0.82	0.81	0.82	41.80	359.47	1116.42	1147.98	222.68
5	0.90	1.36	1.22	11.36	671.78	943.73	966.66	3095.40	3758.94	3169.49	3674.50	1.02	1358.03
6	1.07	11.61	1.48	1.66	1.64	16.778	2.66	447.58	931.72	949.89	1050.45	1.85	291.53
7	1.16	1.34	1.21	1.25	1.21	1.46	1.91	111.97	815.49	908.26	3358.31	943.64	512.27
8	1.31	1.51	1.36	8.77	1.97	27.46	321.85	648.43	1073.73	2970.99	3287.99	902.03	770.62
9	698.95	1.72	1.55	1.60	1.60	1.65	1.76	2.44	92.30	457.89	717.36	1.65	165.04
10	1.70	1.88	1.70	1.75	1.74	1.80	2.03	2.73	95.41	399.68	768.46	572.79	154.31
11	1.84	2.04	2.43	2.43	2.72	6.07	81.03	394.69	706.02	2549.97	738.17	536.32	418.64
12	3.52	2.86	2.62	2.94	2.54	3.47	30.26	199.83	675.75	2466.24	2670.00	115.48	514.63
13	2.13	2.36	2.18	2.25	2.18	2.25	2.23	2.85	3.94	22.66	122.49	4.47	14.33
14	2.28	2.52	2.33	2.40	2.33	2.40	2.37	2.44	3.48	4.49	116.68	16.61	13.36
15	2.42	2.74	2.47	2.55	2.47	2.60	2.52	2.61	3.72	4.69	17.05	4.92	4.23
16	2.57	2.90	3.48	3.19	3.72	5.15	21.27	163.14	554.83	158.77	249.58	2.71	97.61
17	2.76	3.64	3.62	3.42	4.41	5.01	5.44	6.30	152.83	141.59	235.37	2.86	47.27
18	2.91	3.89	3.58	4.03	4.30	5.23	5.86	26.70	205.81	1585.06	221.17	69.25	178.15
19	5.45	27.23	4.82	4.53	4.29	5.54	6.67	17.76	191.62	54.63	1925.33	45.17	191.09
20	3.20	5.13	4.38	4.32	4.48	4.65	5.25	6.16	7.36	7.96	41.33	7.33	8.46
													263.30

Otpimistic market -scenario hydrothermal with wind addition - inflow 5 (912in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	0.62	0.70	216.03	440.80	55.21
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	69.50	418.49	886.33	758.26	178.20
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	1.48	254.28	919.87	1027.95	184.19
5	1.00	1.33	1.21	15.86	638.88	858.07	806.80	2103.78	2418.41	2053.36	2510.27	1.06	950.84
6	1.10	3.09	1.43	1.62	1.60	16.586	4.98	337.02	679.68	691.56	810.21	1.74	217.55
7	1.15	1.34	1.21	1.25	1.20	1.43	1.81	78.65	523.43	579.31	2285.23	767.59	353.63
8	1.29	1.49	1.35	16.29	1.91	58.32	269,24	495.04	778.76	1916.74	2235.39	732.09	542.32
9	589.06	1.70	1.53	1.59	1.58	1.59	1.66	2.17	20.43	279.09	513.60	1.56	117.96
10	1.64	1.84	1.67	1.73	1.71	1.72	1.89	2.41	21.34	114.67	546.66	430.17	93.95
11	1.77	1.99	2.34	2.37	2.61	6.34	29.50	120.50	437.04	1418.12	522.85	400.75	245.52
12	3.24	2.75	2.52	2.83	2.44	3.15	21.50	125.12	414.16	1366.60	1626.36	83.07	304.48
13	2.04	2.30	2.14	2.22	2.12	2.13	2.08	2.52	3.28	3.81	25.26	3.81	4.48
14	2.17	2.44	2.27	2.35	2.25	2.26	2.20	2.21	2.97	3.65	23.08	4.43	4.36
15	2.30	2.63	2.39	2.48	2.38	2.43	2.32	2.35	3.16	3.82	4.43	4.16	2.90
16	2.42	2.78	3.31	3.06	3.49	4.47	5.12	31.87	120.71	23.74	129.64	2.48	27.76
17	2.59	3.45	3.43	3.29	4.11	4.40	4.60	4.81	9.99	5.78	41.62	2.58	7.55
18	2.71	3.66	3.38	3.82	4.01	4.57	4.91	5.44	22.67	257.61	37.15	21.04	30.92
19	4.78	26.70	4.47	4.29	4.02	4.83	5.50	5.98	18.39	6.33	777.77	6.87	72.49
20	2.98	4.76	4.10	4.11	4.19	4.17	4.53	4.87	5.50	5.81	6.20	5.80	4.75
													169.98

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 5 (913in5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	0.62	0.70	216.03	440.80	55.21
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	69.50	418.49	886.33	758.26	178.20
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	1.48	254.28	919.87	1027.95	184.19
5	1.00	1.33	1.21	15.86	638.88	858.07	806.80	2103.78	2418.41	2053.36	2510.27	1.06	950.84
6	1.10	3.09	1.43	1.62	1.60	16.586	4.98	337.02	679.68	691.56	807.69	1.70	217.34
7	1.14	1.29	1.17	1.21	1.16	1.55	1.96	250.85	707.29	579.33	2285.33	2263.01	507.94
8	1.21	1.38	1.25	56.50	1.95	77.18	339.65	586.69	778.84	1916.88	2235.54	2200.58	683.14
9	321.01	1.52	1.37	1.42	1.41	1.42	1.78	2.44	116.06	410.91	570.60	1.40	119.28
10	1.43	1.59	1.89	1.49	1.62	1.94	2.48	14.06	337.38	383.03	546.77	430.27	143.66
11	1.53	1.72	2.90	2.56	2.87	31.70	124.99	355.16	437.15	1418.29	1781.07	128.79	357.39
12	2.86	2.49	2.43	2.86	2.41	3.43	108.96	158.94	1510.04	1366.76	440.63	118.70	310.04
13	1.76	1.98	1.84	1.90	1.83	1.99	2.69	3.42	22.2638	.44	106.41	3.88	15.70
14	1.87	2.10	1.95	2.02	1.94	2.29	2.52	3.09	3.98	19.80	149.37	13.22	17.01
15	1.98	2.26	2.05	2.13	2.04	2.10	2.01	2.55	3.67	4.47	16.90	4.33	3.87
16	2.08	2.38	4.09	3.23	3.82	13.608	7.24	36.75	120.80	749.72	129.75	2.14	92.14
17	2.23	3.58	3.61	3.31	4.51	4.74	4.94	5.18	27.00	5.87	41.72	2.24	9.08
18	2.33	4.17	3.64	4.09	4.26	4.96	5.35	6.04	22.77	257.75	810.47	5.96	94.32
19	4.23	10.22	4.27	4.13	3.96	5.13	6.07	6.56	18.49	6.42	777.92	6.97	71.20
20	2.56	5.06	4.18	4.10	4.29	4.24	4.80	5.21	5.91	6.21	6.44	5.79	4.90
													200.80

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 5 (913bin5)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin5													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	0.46	0.44	0.45	0.47
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.65	0.62	0.64	256.20	495.85	63.14
3	0.66	0.73	0.65	0.67	0.65	0.67	0.66	0.67	181.29	473.70	953.59	825.63	203.30
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.79	8.84	299.95	989.39	1106.22	200.89
5	0.95	1.26	1.15	70.11	769.93	1002.94	953.28	2347.31	2651.90	2289.46	2753.44	0.97	1070.22
6	1.00	17.87	1.30	15.89	10.87	70.18	220.54	437.52	807.57	830.72	946.72	1.57	280.15
7	1.05	1.19	1.08	1.12	1.07	1.44	12.21	346.94	838.77	796.64	2528.28	2516.31	587.18
8	1.13	1.29	1.16	95.94	1.82	245.70	444.67	805.09	917.02	2152.73	2478.40	2453.78	799.89
9	427.53	1.43	1.29	1.34	1.29	1.30	1.63	5.33	381.80	581.58	847.61	1.29	187.79
10	1.31	1.46	1.74	1.37	1.49	1.79	2.28	88.66	493.05	553.66	820.44	610.37	214.80
11	1.41	1.59	8.82	2.37	2.66	263.99	413.58	528.59	606.11	1732.69	2110.97	427.98	508.40
12	2.66	2.31	2.26	2.66	2.25	30.02	378.81	500.23	1819.59	1681.03	616.21	407.16	453.77
13	1.65	1.85	1.72	1.79	1.71	1.86	2.53	3.21	107.19	150.63	369.36	8.50	54.33
14	1.76	1.97	1.83	1.90	1.82	2.16	2.37	2.91	16.39	106.85	471.25	92.45	58.64
15	1.86	2.14	1.94	2.01	1.93	1.98	1.90	2.41	3.46	4.50	96.76	4.09	10.41
16	1.97	2.25	3.88	3.06	3.62	89.80	152.73	150.88	405.64	1000.28	429.87	2.03	187.17
17	2.12	3.40	3.43	3.14	4.29	4.51	4.70	14.97	123.24	38.21	157.32	2.13	30.12
18	2.22	3.97	3.47	3.89	4.06	4.72	5.10	39.37	113.79	759.07	1050.26	29.38	168.28
19	4.03	35.70	4.08	3.94	3.78	4.90	20.43	28.47	104.20	27.63	1017.64	39.38	107.85
20	2.45	11.69	4.00	3.92	4.11	4.05	4.59	4.99	6.71	5.95	33.68	5.55	7.64
													259.72

Otpimistic market -scenario hydrothermal - inflow 6 (911in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911in6							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	138.30	0.54	12.74	0.55	0.54	0.56	58.36	499.90	1199.64	1311.66	1523.01	980.28	477.17
3	0.63	0.76	13.50	288.19	410.22	582.85	891.56	1230.66	1591.58	3884.92	1459.15	0.72	862.89
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.96	512.40	685.75	972.56	265.07	203.51
5	73.47	0.95	0.96	0.91	0.90	0.92	1.01	1.31	500.00	706.09	1352.57	730.23	280.78
6	281.94	230.08	1.23	1.00	0.97	1.10	1.34	67.86	624.01	742.56	1050.33	1.07	250.29
7	1.07	1.24	1.12	1.15	1.12	1.20	1.33	2.09	348.55	508.74	896.99	1.21	147.15
8	1.21	1.42	1.26	1.31	1.26	1.35	1.31	1.63	21.54	89.60	401.65	1.36	43.74
9	1.41	1.56	1.41	1.46	1.46	1.51	1.68	6.16	490.19	964.91	1160.33	535.59	263.97
10	1.55	2.14	1.87	1.86	2.49	328.19	585.60	1001.89	3413.02	3141.01	1125.75	796.06	866.78
11	1.70	1.88	1.70	1.81	1.75	1.81	2.11	3.05	512.86	802.81	1091.18	1.84	202.04
12	1.84	2.04	1.84	2.23	2.19	2.74	16.43	386.16	898.91	2972.76	856.65	1.99	428.82
13	1.99	2.20	2.04	2.83	2.37	2.49	3.04	8.43	403.59	606.66	823.52	567.33	202.21
14	2.13	2.37	2.18	2.26	2.42	3.21	4.04	156.06	794.32	693.25	796.05	137.28	216.30
15	3.43	2.58	2.33	2.41	2.33	2.46	2.41	3.35	33.60	43.02	202.23	102.85	33.58
16	3.86	3.40	2.47	2.56	2.47	2.61	2.52	2.52	2.99	3.98	42.40	4.79	6.38
17	2.62	2.90	2.62	2.71	2.67	2.76	3.36	4.62	147.77	243.23	705.27	24.23	95.39
18	4.05	3.74	3.07	3.03	3.69	5.18	33.10	215.40	642.95	2028.99	675.04	245.64	321.99
19	2.91	4.09	4.32	4.56	4.21	5.52	34.23	195.67	612.75	1955.76	2369.06	193.00	448.84
20	3.05	3.38	3.05	3.21	3.10	3.21	3.28	4.56	10.27	42.61	230.06	13.57	26.95
													284.33

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 6 (911bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911b in6							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	138.30	0.54	12.74	0.55	0.54	0.56	58.36	499.90	1199.64	1311.66	1523.01	980.28	477.17
3	0.63	0.76	13.50	288.19	410.22	582.85	891.56	1230.66	1591.58	3884.92	1459.15	0.72	862.89
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.96	512.40	685.75	972.56	265.07	203.51
5	73.47	0.95	0.96	0.91	0.90	0.92	1.01	1.31	500.00	706.09	1352.57	730.23	280.78
6	281.94	230.08	1.23	1.00	0.97	1.10	1.34	67.86	624.01	742.56	1050.33	1.07	250.29
7	1.07	1.24	1.12	1.15	1.12	1.20	1.33	2.09	348.55	508.74	896.99	1.21	147.15
8	1.21	1.42	1.26	1.31	1.26	1.35	1.31	1.63	21.54	89.60	401.65	1.36	43.74
9	1.41	1.56	1.41	1.46	1.46	1.51	1.68	6.16	490.19	964.91	1160.33	535.59	263.97
10	1.55	2.14	1.87	1.86	2.49	328.19	585.60	1001.89	3413.02	3141.01	1125.75	796.06	866.78
11	1.70	1.88	1.70	1.81	1.75	1.81	2.11	3.05	512.86	802.81	1091.18	1.84	202.04
12	1.84	2.04	1.84	2.23	2.19	2.74	16.43	386.16	898.91	2972.76	856.65	1.99	428.82
13	1.99	2.20	2.04	2.83	2.37	2.49	3.04	8.43	403.59	606.66	823.52	567.33	202.21
14	2.13	2.37	2.18	2.26	2.42	3.21	4.04	156.06	794.32	693.25	796.05	137.28	216.30
15	3.43	2.58	2.33	2.41	2.33	2.46	2.41	3.35	33.60	43.02	202.23	102.85	33.58
16	3.86	3.40	2.47	2.56	2.47	2.61	2.52	2.52	2.99	3.98	42.40	4.79	6.38
17	2.62	2.90	2.62	2.71	2.67	2.76	3.36	4.62	147.77	243.23	705.27	24.23	95.39
18	4.05	3.74	3.07	3.03	3.69	5.18	33.10	215.40	642.95	2028.99	675.04	245.64	321.99
19	2.91	4.09	4.32	4.56	4.21	5.52	34.23	195.67	612.75	1955.76	2369.06	193.00	448.84
20	3.05	3.38	3.05	3.21	3.10	3.21	3.28	4.56	10.27	42.61	230.06	13.57	26.95
													284.33

Otpimistic market -scenario hydrothermal with wind addition - inflow 6 (912in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 912in6							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	138.30	0.54	12.74	0.55	0.54	0.56	37.48	394.09	981.78	1059.81	1259.30	821.36	392.25
3	0.71	0.85	8.39	262.08	320.97	523.27	774.01	1022.27	1304.24	2965.53	1201.59	0.80	698.73
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.98	317.80	509.89	775.89	187.75	149.85
5	18.38	1.11	1.07	1.06	1.04	1.06	1.06	1.31	202.52	330.07	896.11	421.59	156.36
6	90.25	82.10	1.34	1.11	1.08	1.19	1.41	3.39	311.10	378.62	693.57	1.14	130.53
7	1.15	1.34	1.21	1.25	1.20	1.28	1.38	1.80	77.92	271.39	511.11	1.27	72.69
8	1.29	1.51	1.35	1.40	1.34	1.42	1.36	1.64	2.08	7.74	105.79	1.40	10.69
9	1.51	1.70	1.53	1.59	1.58	1.59	1.73	2.28	87.15	395.66	570.49	130.43	99.77
10	1.64	2.27	1.99	1.99	2.61	77.83	306.23	441.20	1594.28	1469.68	546.66	430.17	406.38
11	1.77	1.99	1.80	1.92	1.84	1.85	2.10	2.85	90.87	355.07	522.85	1.86	82.23
12	1.90	2.14	1.93	2.33	2.27	2.71	3.20	26.78	414.16	1366.60	440.52	1.98	188.88
13	2.04	2.30	2.14	2.94	2.45	2.48	2.91	3.40	15.35	37.68	160.60	100.23	27.88
14	2.17	2.44	2.27	2.35	2.48	3.10	3.71	4.41	130.17	94.91	150.77	7.57	33.86
15	3.34	2.63	2.39	2.48	2.38	2.43	2.35	3.07	3.96	4.43	22.49	4.71	4.72
16	3.71	3.40	2.52	2.62	2.51	2.56	2.44	2.39	2.76	3.51	4.60	4.28	3.11
17	2.59	2.93	2.66	2.77	2.70	2.71	3.18	3.94	5.02	5.76	41.62	4.84	6.73
18	3.83	3.70	3.07	3.07	3.65	4.73	5.40	5.87	22.67	257.61	37.15	21.04	30.98
19	2.84	4.02	4.23	4.50	4.12	5.02	5.78	6.44	18.39	239.82	777.77	6.87	89.98
20	2.98	3.37	3.06	3.23	3.10	3.11	3.12	3.96	5.07	5.87	11.93	5.94	4.56
													144.90

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 6 (913in6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 913in6							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	406.91	888.39	1518.95	875.27	307.78
2	138.30	0.54	12.74	0.55	0.54	0.56	37.48	394.09	981.78	1059.81	1259.30	821.36	392.25
3	0.71	0.85	8.39	262.08	320.97	523.27	774.01	1022.27	1304.24	2965.53	1201.59	0.80	698.73
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.98	317.80	509.89	775.89	187.75	149.85
5	18.38	1.11	1.07	1.06	1.04	1.06	1.06	1.31	202.52	330.07	896.11	421.59	156.36
6	90.25	82.10	1.34	1.11	1.08	1.19	1.41	3.39	311.10	378.62	683.22	1.15	129.66
7	1.14	1.29	1.17	1.21	1.16	1.26	1.51	1.95	238.25	341.79	557.78	1.22	95.81
8	1.21	1.52	1.34	1.29	1.24	1.33	1.55	1.88	13.80	59.18	294.40	1.29	31.67
9	1.38	1.52	1.37	1.42	1.41	1.42	1.99	3.43	411.06	410.91	570.60	387.56	149.51
10	1.43	2.34	2.03	2.01	2.93	320.22	496.85	441.31	1594.45	1469.85	1826.12	133.80	524.44
11	1.53	1.72	1.55	1.65	1.59	1.61	2.48	10.24	437.15	355.17	1781.07	1.61	216.45
12	1.64	1.84	1.66	3.23	2.63	3.11	18.03	148.63	414.26	1366.76	1626.54	1.72	299.17
13	1.76	1.98	1.84	87.20	2.74	2.63	3.22	3.83	86.19	107.40	161.45	134.79	49.59
14	1.87	2.10	1.95	2.53	2.96	3.70	4.41	63.59	141.18	915.38	150.88	4.11	107.89
15	3.00	2.26	2.05	2.13	2.04	2.46	3.19	4.07	31.57	12.71	44.36	4.88	9.56
16	3.53	3.18	2.16	2.24	2.15	2.20	2.11	2.46	3.38	4.34	32.19	4.58	5.38
17	2.23	2.52	2.28	2.37	2.32	2.97	3.96	4.89	27.08	5.87	843.07	4.43	75.33
18	3.48	3.45	2.93	2.99	3.86	5.39	9.77	11.05	678.71	257.75	37.25	5.99	85.22
19	2.45	3.88	4.36	4.60	4.14	5.41	6.46	6.56	647.89	239.95	777.92	6.43	142.51
20	2.56	2.89	2.62	2.76	2.66	3.14	4.13	5.09	6.28	6.71	28.38	6.22	6.12
													181.66

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 6 (913bin6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 913in6							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	407.13	888.77	1519.47	875.65	307.91
2	138.30	0.54	12.74	0.55	0.54	0.56	37.48	394.31	982.21	1136.74	1336.57	888.93	410.79
3	0.66	0.78	34.29	305.16	416.44	580.06	840.83	1098.37	1381.01	3105.87	1278.85	0.75	753.59
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.92	360.78	569.58	840.76	231.63	167.43
5	56.92	1.05	1.02	0.96	0.94	0.96	0.96	1.19	284.75	490.17	1034.46	598.42	205.98
6	277.87	246.50	1.23	1.02	0.99	1.09	1.29	20.47	404.24	549.91	813.78	1.06	193.29
7	1.05	1.19	1.08	1.12	1.07	1.17	1.40	12.82	327.74	446.54	761.96	1.14	129.86
8	1.13	1.41	1.25	1.21	1.16	1.25	1.44	1.76	64.41	102.26	390.78	1.21	47.44
9	1.30	1.43	1.29	1.34	1.29	1.30	1.82	62.61	572.41	581.58	847.61	552.97	218.91
10	1.31	2.16	1.87	1.85	22.35	472.12	769.97	614.80	1904.25	1784.38	2156.16	436.97	680.68
11	1.41	1.59	1.43	1.53	1.47	1.50	2.30	82.48	606.11	525.76	2110.97	1.50	278.17
12	1.52	1.71	1.55	9.87	2.45	4.75	100.18	476.16	583.19	1681.03	1956.18	1.60	401.68
13	1.65	1.85	1.72	322.37	2.56	2.47	3.02	12.14	319.49	379.78	497.21	447.51	165.98
14	1.76	1.97	1.83	2.38	2.78	5.54	28.16	165.81	448.92	1324.18	474.75	4.81	205.24
15	2.82	2.14	1.94	2.01	1.93	2.32	3.01	3.85	130.54	93.37	162.38	31.65	36.50
16	3.33	3.02	2.05	2.12	2.04	2.09	2.00	2.33	3.20	4.12	133.95	4.34	13.72
17	2.12	2.39	2.17	2.25	2.20	2.83	3.76	4.65	123.42	38.21	1082.95	4.22	105.93
18	3.31	3.28	2.79	2.85	3.67	20.77	44.14	45.26	906.02	759.07	147.35	30.98	164.12
19	2.34	3.71	4.16	4.39	3.95	6.41	37.63	28.47	875.13	721.34	1017.64	17.53	226.89
20	2.45	2.76	2.50	2.65	2.54	3.01	3.95	4.87	22.56	22.35	127.47	5.96	16.92
													236.55

Otpimistic market -scenario hydrothermal - inflow 7 (911in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911in7							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.62	734.85	1290.94	1523.01	1363.66	409.73
3	0.63	0.70	0.62	0.63	0.62	0.64	0.63	0.64	204.23	584.77	1044.80	0.72	153.30
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.77	0.86	47.75	493.66	258.08	67.20
5	12.88	0.95	0.84	0.91	0.90	0.92	0.91	0.96	74.35	378.47	694.58	328.28	124.58
6	0.97	1.08	0.97	1.00	0.97	1.04	1.48	357.40	1042.04	1119.28	3767.94	927.50	601.81
7	342.53	1.24	1.22	1.41	1.67	317.90	742.21	1126.87	3793.87	1077.58	3697.30	1112.97	1018.06
8	1130.67	415.70	60.04	13.85	1.87	278.22	518.13	1003.39	1243.05	3309.65	3626.75	1071.30	1056.05
9	1.41	2.05	1.41	1.49	1.50	1.98	17.66	391.85	970.59	994.27	3556.28	1029.64	580.84
10	3.70	1.72	1.98	2.07	2.31	78.31	375.81	728.85	1089.21	3141.01	3485.91	796.06	808.91
11	401.39	1.88	1.70	1.81	1.75	2.23	2.88	124.29	810.47	802.81	3415.62	759.51	527.19
12	1.84	2.04	1.84	1.96	1.89	1.96	1.89	2.15	2.94	14.25	81.66	3.50	9.83
13	1.99	2.20	2.04	2.11	2.04	2.11	2.14	3.03	108.52	474.15	826.34	686.48	176.10
14	2.13	2.37	2.18	2.26	2.18	2.26	2.23	2.68	3.80	95.84	439.53	38.50	49.66
15	4.02	2.58	2.33	2.41	2.33	2.46	2.56	3.34	19.6342	.90	444.76	140.69	55.83
16	15.90	15.09	3.46	3.85	3.68	4.51	36.41	520.50	777.71	2468.98	2896.96	2539.28	773.86
17	2.62	30.53	4.57	36.12	4.16	8.27	23.38	167.53	673.17	247.97	705.27	176.05	173.30
18	2.76	3.06	2.76	2.86	2.81	2.91	2.81	3.41	4.75	5.81	179.83	4.43	18.18
19	2.91	3.72	3.09	3.43	3.25	4.13	4.88	5.99	172.74	213.59	644.83	193.00	104.63
20	3.05	3.38	3.05	3.21	3.10	3.21	3.65	5.27	50.90	186.95	299.06	175.83	61.72
													359.54

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 7 (911bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	0.69	675.26	1206.80	1438.16	1278.83	383.62
3	0.68	0.76	0.67	0.69	0.68	0.69	0.69	0.70	165.39	524.32	973.01	0.77	139.09
4	0.80	0.89	0.79	0.81	0.80	0.82	0.81	0.82	0.92	13.85	386.04	211.80	51.60
5	4.29	1.06	0.94	1.02	0.99	1.02	1.01	1.07	17.78	273.53	569.74	229.51	91.83
6	1.07	1.18	1.07	1.10	1.07	1.15	1.62	255.47	890.55	949.89	3428.72	774.17	525.59
7	241.82	1.34	1.32	1.53	1.81	107.03	528.06	957.52	3454.77	908.26	3358.31	943.64	875.45
8	961.34	322.59	9.4	7	2.16	2.01	88.84	400.06	840.05	1073.73	2970.99	3287.99	902.03	905.11
9	1.50	2.26	1.55	1.64	1.64	2.18	2.72	110.40	646.17	652.58	3048.60	683.72	429.58
10	2.81	1.88	2.16	2.26	2.52	8.18	101.72	522.90	736.31	2633.81	2978.57	572.79	630.49
11	110.42	2.04	1.84	1.95	1.89	2.41	3.11	24.05	600.34	579.59	2908.62	536.32	397.72
12	1.99	2.20	1.99	2.10	2.04	2.10	2.04	2.31	3.16	3.74	8.16	3.75	2.96
13	2.13	2.36	2.18	2.25	2.18	2.25	2.29	3.24	19.59	138.01	603.28	225.22	83.75
14	2.28	2.52	2.33	2.40	2.33	2.40	2.37	2.85	4.05	11.48	126.83	5.06	13.91
15	4.27	2.74	2.47	2.55	2.47	2.60	2.71	3.54	4.66	5.72	127.90	28.52	15.85
16	4.99	4.39	3.67	4.07	3.89	4.77	5.76	150.66	554.83	1731.18	2107.93	1793.03	530.76
17	2.76	4.94	4.82	5.61	4.39	5.25	5.92	38.45	220.01	141.59	235.37	41.70	59.23
18	2.91	3.22	2.91	3.00	2.96	3.05	2.96	3.59	4.98	6.10	46.62	4.65	7.25
19	3.05	3.90	3.25	3.60	3.41	4.33	5.11	6.27	42.60	54	.63	206.97	45.17	31.86
20	3.20	3.54	3.20	3.35	3.25	3.35	3.82	5.51	12.94	43	.11	192.78	37.45	26.29
														281.10

Otpimistic market -scenario hydrothermal with wind addition - inflow 7 (912in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.68	570.02	1024.25	1259.30	1147.94	333.83
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	34.24	341.46	805.08	0.80	98.95
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	0.87	1.69	312.51	84.34	33.85
5	1.39	1.11	0.98	1.06	1.04	1.06	1.06	1.07	1.35	56.43	347.98	78.74	41.11
6	1.10	1.19	1.09	1.11	1.08	1.11	1.52	79.03	632.01	691.56	2335.12	623.80	364.14
7	240.92	1.34	1.32	1.52	1.77	105.50	444.89	733.45	2210.73	579.31	2285.23	767.59	614.46
8	898.92	338.75	16.46	4.18	1.95	88.75	336.06	565.23	778.76	1916.74	2235.39	732.09	659.44
9	1.51	2.20	1.53	1.63	1.62	2.05	2.46	64.41	404.30	410.81	1871.02	519.63	273.60
10	2.63	1.84	2.10	2.21	2.43	8.24	76.97	346.68	459.94	1469.68	1825.94	430.17	385.74
11	116.38	1.99	1.80	1.92	1.84	2.25	2.78	7.76	367.97	355.07	1780.89	400.75	253.45
12	1.90	2.14	1.93	2.05	1.98	1.98	1.90	2.10	2.74	3.17	3.56	3.30	2.39
13	2.04	2.30	2.14	2.22	2.12	2.13	2.13	2.82	3.65	21.29	161.35	134.68	28.24
14	2.17	2.44	2.27	2.35	2.25	2.26	2.20	2.53	3.37	3.97	26.36	4.25	4.70
15	3.85	2.63	2.39	2.48	2.38	2.43	2.48	3.06	3.79	4.43	26.39	7.80	5.34
16	4.43	4.09	3.47	3.86	3.64	4.18	4.78	28.15	120.71	749.57	1063.29	992.92	248.59
17	2.59	5.11	4.45	11.15	4.09	4.58	4.93	5.27	26.98	5.78	41.62	5.67	10.19
18	2.71	3.07	2.78	2.90	2.83	2.83	2.71	3.08	3.99	4.67	5.59	3.94	3.42
19	2.84	3.68	3.10	3.45	3.24	3.90	4.41	4.89	5.78	6.33	32.72	6.87	6.77
20	2.98	3.37	3.06	3.23	3.10	3.11	3.44	4.46	5.66	6.56	28.28	7.18	6.20
														189.72

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 7 (913in7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1009.81	1304.49	1518.95	912.09	420.01
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.68	570.02	1024.25	1259.30	1147.94	333.83
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	34.24	341.46	805.08	0.80	98.95
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	0.87	1.69	312.51	84.34	33.85
5	1.39	1.11	0.98	1.06	1.04	1.06	1.06	1.07	1.35	56.43	347.98	78.74	41.11
6	1.10	1.19	1.09	1.11	1.08	1.11	1.52	79.03	632.01	691.56	2335.17	611.77	363.14
7	214.57	1.29	1.31	1.54	1.81	254.34	503.62	733.47	2210.78	1974.89	2285.33	682.67	738.80
8	805.39	77.85	2.16	2.04	1.92	98.82	395.32	615.72	778.84	1916.88	2235.54	732.17	638.55
9	1.38	2.22	1.37	1.70	1.67	2.22	9.61	121.60	482.95	1521.45	570.60	519.74	269.71
10	2.55	1.59	2.23	2.31	2.60	28.45	293.56	441.31	460.04	1469.85	1826.12	1655.47	515.51
11	10.17	1.72	1.55	1.65	2.03	2.66	13.22	105.83	437.15	1418.29	522.96	400.86	243.17
12	1.64	1.84	1.66	1.76	1.70	1.71	1.80	2.57	3.35	8.30	16.72	3.41	3.87
13	1.76	1.98	1.84	1.90	1.83	1.84	2.23	3.25	28.07	107.40	161.45	1130.17	120.31
14	1.87	2.10	1.95	2.02	1.94	1.95	1.99	3.03	4.11	23.35	113.15	4.37	13.48
15	3.78	2.26	2.05	2.13	2.40	2.47	3.09	3.75	4.73	10.34	99.79	15.40	12.68
16	4.35	3.88	3.35	3.90	3.67	4.42	6.51	36.75	990.81	749.72	1063.46	47.40	243.18
17	2.23	35.47	4.90	30.47	4.03	4.77	5.27	8.96	27.08	5.87	843.07	5.00	81.43
18	2.33	2.63	2.39	2.48	2.42	2.44	3.06	3.83	4.87	5.54	31.06	3.80	5.57
19	2.45	3.83	3.11	3.53	3.27	4.19	4.87	5.41	12.73	6.42	777.92	6.69	69.54
20	2.56	2.89	2.62	2.76	2.66	3.54	4.76	5.96	14.21	6.71	745.40	7.27	66.78
														215.67

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 7 (913bin7)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin7													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	291.32	1010.22	1304.97	1519.47	912.48	420.16
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.68	570.31	1099.99	1336.57	1226.24	353.13
3	0.66	0.73	0.65	0.67	0.65	0.67	0.66	0.67	50.88	441.82	869.76	0.75	114.05
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.79	0.82	9.88	357.41	218.11	49.38
5	6.39	1.05	0.93	0.96	0.94	0.96	0.96	0.97	2.65	202.24	500.76	249.85	80.72
6	1.00	1.09	0.99	1.02	0.99	1.01	1.39	251.27	756.72	830.72	2578.20	743.20	430.63
7	306.33	1.19	1.21	1.42	5.89	346.92	702.60	875.18	2444.07	2210.85	2528.28	821.52	853.79
8	952.02	237.48	14.31	7.68	1.79	293.95	504.41	840.47	917.02	2152.73	2478.40	877.12	773.12
9	1.30	2.09	1.29	1.60	1.53	2.03	77.80	399.77	740.42	1836.11	847.61	794.85	392.20
10	2.34	1.46	2.05	2.12	2.39	247.12	451.62	614.80	629.05	1784.38	2156.16	1999.24	657.73
11	81.29	1.59	1.43	1.53	1.88	2.46	87.88	373.54	606.11	1732.69	698.60	580.91	347.49
12	1.52	1.71	1.55	1.64	1.58	1.60	1.67	2.39	14.5277	.66	94.70	3.19	16.98
13	1.65	1.85	1.72	1.79	1.71	1.72	2.09	3.05	121.02	379.78	497.21	1599.94	217.80
14	1.76	1.97	1.83	1.90	1.82	1.83	1.87	2.85	24.80	115.38	386.99	20.93	46.99
15	3.57	2.14	1.94	2.01	2.27	2.33	2.92	3.54	33.1487	.65	174.01	98.66	34.51
16	5.01	3.67	3.17	3.69	3.48	4.18	39.06	150.88	1406.95	1000.28	1505.95	176.97	358.61
17	2.12	130.494.6	6	129.42	3.83	4.53	17.03	42.19	123.42	38.21	1082.95	4.76	131.97
18	2.22	2.51	2.27	2.36	2.31	2.32	2.92	3.65	4.65	6.31	132.51	3.62	13.97
19	2.34	3.66	2.96	3.37	3.13	4.00	4.65	5.17	45.1827	.63	1017.64	28.25	95.66
20	2.45	2.76	2.50	2.65	2.54	3.39	4.56	5.71	47.3822	.35	985.03	33.74	92.92
													274.09

Otpimistic market -scenario hydrothermal - inflow 8 (911in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.43	0.54	0.48	0.55	0.54	0.58	212.42	707.66	1572.44	3868.77	1523.01	0.59	657.33
3	0.63	0.70	0.62	0.63	0.62	0.64	0.63	0.64	0.60	0.82	425.00	261.83	57.78
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.77	1.25	82.09	514.03	1.12	50.38
5	0.85	0.95	0.84	0.91	0.90	0.92	0.91	0.92	0.91	0.94	1.21	0.92	0.93
6	0.97	1.08	0.97	1.00	0.97	1.06	1.53	381.40	1024.16	1119.28	1264.23	1154.68	412.61
7	476.52	224.52	74.02	328.55	10.10	99.68	391.62	789.37	1277.70	1077.58	3697.30	1.21	704.01
8	1.21	1.40	1.26	1.31	1.26	1.35	1.31	1.31	1.48	1.93	68.93	1.94	7.06
9	1.41	1.56	1.41	1.46	1.46	1.51	1.73	14.16	514.88	921.07	1160.33	915.18	294.68
10	1.55	1.72	1.55	1.61	1.60	1.66	2.08	26.64	524.03	789.18	1125.75	1.70	206.59
11	1.70	1.88	1.70	1.81	1.75	1.81	1.90	2.70	316.56	572.67	953.03	148.55	167.17
12	1.84	2.18	2.06	2.31	3.05	98.12	151.37	467.68	839.34	766.27	856.65	1.99	266.07
13	1.99	2.20	2.04	2.11	2.05	2.69	3.38	27.41	477.36	573.20	826.34	686.48	217.27
14	32.11	2.37	2.18	2.26	2.18	2.26	2.40	3.45	147.18	645.33	796.05	650.00	190.65
15	2.28	2.58	2.33	2.41	2.33	2.46	3.07	4.68	584.26	582.45	2966.71	613.53	397.42
16	2.42	2.74	2.47	2.56	2.59	3.55	4.41	117.02	775.98	546.01	2896.96	2.57	363.27
17	2.62	2.90	2.62	2.71	3.06	4.08	4.71	20.24	177.43	185.12	546.14	204.18	96.32
18	2.76	9.55	3.66	3.82	4.23	4.68	5.16	37.91	252.00	230.77	2757.69	245.64	296.49
19	2.91	3.22	2.91	3.06	2.96	3.29	4.46	6.05	212.48	213.59	2369.06	3.05	235.59
20	3.05	3.38	3.05	3.21	3.10	3.21	3.20	4.42	8.56	50.54	286.12	69.10	36.75
													235.45

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 8 (911bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.43	0.54	0.48	0.55	0.54	0.58	212.42	642.46	1487.58	3698.69	1438.16	0.64	623.59
3	0.68	0.76	0.67	0.69	0.68	0.69	0.69	0.70	0.66	0.89	328.29	216.47	45.99
4	0.80	0.89	0.79	0.81	0.80	0.82	0.81	0.82	0.99	61.64	403.41	1.18	39.48
5	0.90	1.06	0.94	1.02	0.99	1.02	1.01	1.02	1.00	1.04	1.33	1.02	1.03
6	1.07	1.18	1.07	1.10	1.07	1.17	1.67	277.79	873.86	949.89	1094.82	985.29	349.16
7	366.42	69.881	5.70	232.74	1.90	57.05	284.69	567.56	1108.32	908.26	3358.31	1.31	581.01
8	1.31	1.51	1.36	1.40	1.36	1.45	1.41	1.41	1.59	2.06	14.32	2.08	2.61
9	1.50	1.72	1.55	1.60	1.60	1.65	1.90	2.67	342.43	595.43	798.78	594.17	195.42
10	1.70	1.88	1.70	1.75	1.74	1.80	2.26	3.10	348.08	571.68	768.46	1.84	142.17
11	1.84	2.04	1.84	1.95	1.89	1.95	2.05	2.92	79.12	182.77	629.71	33.88	78.50
12	1.99	2.35	2.22	2.48	3.28	15.903	5.74	135.33	622.85	543.12	633.52	2.13	166.74
13	2.13	2.36	2.18	2.25	2.19	2.88	3.61	4.36	145.75	179.80	603.28	225.22	98.00
14	4.52	2.52	2.33	2.40	2.33	2.40	2.56	3.67	35.32	208.46	573.06	208.02	87.30
15	2.42	2.74	2.47	2.55	2.47	2.60	3.26	4.69	188.94	175.95	2461.25	190.82	253.35
16	2.57	2.90	2.62	2.70	2.74	3.75	4.66	18.48	553.31	158.77	2107.93	2.71	238.60
17	2.76	3.06	2.76	2.85	3.22	4.30	4.97	5.79	45.3844	.61	168.25	53.13	28.42
18	2.91	4.83	3.85	4.02	4.44	4.92	5.42	6.64	153.31	62.36	1986.13	69.25	192.34
19	3.05	3.38	3.05	3.20	3.10	3.45	4.68	6.34	58.8954	.63	1925.33	3.20	172.69
20	3.20	3.54	3.20	3.35	3.25	3.35	3.35	4.63	6.56	8.29	181.52	22.65	20.57
													168.38

Otpimistic market -scenario hydrothermal with wind addition - inflow 8 (912in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.43	0.54	0.48	0.55	0.54	0.58	162.02	576.12	1286.99	2952.00	1259.30	0.68	520.02
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	0.69	0.82	220.97	75.74	25.34
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	0.93	15.16	327.73	1.16	29.31
5	1.00	1.11	0.98	1.06	1.04	1.06	1.06	1.07	1.01	1.08	1.15	1.06	1.06
6	1.10	1.19	1.09	1.11	1.08	1.15	1.59	96.10	637.00	691.56	845.28	803.11	256.78
7	359.02	80.262	2.40	262.59	1.85	59.03	237.99	434.32	806.84	579.31	2285.23	1.27	427.51
8	1.29	1.49	1.35	1.40	1.34	1.42	1.36	1.34	1.49	1.89	4.77	1.95	1.76
9	1.51	1.70	1.53	1.59	1.58	1.59	1.78	2.34	94.78	372.86	570.49	453.40	125.43
10	1.64	1.84	1.67	1.73	1.71	1.72	2.09	2.69	95.95	353.43	546.66	1.73	84.40
11	1.77	1.99	1.80	1.92	1.84	1.85	1.91	2.57	15.49	105.74	446.54	23.09	50.54
12	1.90	2.27	2.15	2.41	3.12	15.072	6.02	78.65	379.76	159.02	440.52	1.98	92.74
13	2.04	2.30	2.14	2.22	2.13	2.66	3.19	3.60	25.0083	.61	161.35	134.68	31.24
14	4.05	2.44	2.27	2.35	2.25	2.26	2.35	3.14	4.09	41.08	150.77	121.43	28.21
15	2.30	2.63	2.39	2.48	2.38	2.43	2.92	3.87	36.9129	.33	1099.10	108.19	107.91
16	2.42	2.78	2.52	2.62	2.62	3.39	4.00	4.83	120.28	23.74	1063.29	2.48	102.91
17	2.59	2.93	2.66	2.77	3.07	3.85	4.26	4.51	5.18	5.45	23.51	11.72	6.04
18	2.71	4.47	3.62	3.81	4.14	4.33	4.60	5.04	9.43	6.04	810.32	21.04	73.30
19	2.84	3.22	2.92	3.09	2.96	3.18	4.09	4.93	6.01	6.33	777.77	2.87	68.35
20	2.98	3.37	3.06	3.23	3.10	3.11	3.05	3.87	5.04	5.99	25.28	6.90	5.75
													104.46

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 8 (913in8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.69	0.50	50.68
2	0.43	0.54	0.48	0.55	0.54	0.58	162.02	576.12	1286.99	2952.00	1259.30	0.68	520.02
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	0.69	0.82	220.97	75.74	25.34
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	0.93	15.16	327.73	1.16	29.31
5	1.00	1.11	0.98	1.06	1.04	1.06	1.06	1.07	1.01	1.08	1.15	1.06	1.06
6	1.10	1.19	1.09	1.11	1.08	1.15	1.59	96.10	637.00	691.56	845.31	803.14	256.78
7	333.32	64.881	9.94	262.11	1.85	59.39	255.61	465.07	806.87	579.33	2285.33	1.22	427.91
8	1.21	1.38	1.25	1.29	1.24	1.32	1.26	1.26	1.55	2.07	23.30	1.99	3.26
9	1.38	1.52	1.37	1.42	1.41	1.42	2.00	6.43	406.17	410.91	570.60	519.74	160.36
10	1.43	1.59	1.44	1.49	1.55	2.27	11.04	135.98	460.04	383.03	1826.12	1.50	235.62
11	1.53	1.72	1.55	1.65	1.59	1.60	2.17	3.09	135.85	355.17	522.96	28.74	88.13
12	1.64	2.26	2.19	2.50	3.56	82.57	103.91	124.94	414.26	159.12	1626.54	1.72	210.43
13	1.76	1.98	1.84	2.05	2.74	3.29	3.86	5.80	112.36	107.40	161.45	134.79	44.94
14	4.00	2.10	1.95	2.02	1.94	1.95	2.62	3.77	98.0895	.00	1135.10	121.54	122.50
15	1.98	2.26	2.05	2.13	2.04	2.31	3.47	4.82	130.99	790.76	1099.26	108.29	179.20
16	2.08	2.38	2.16	2.82	2.90	3.90	4.69	28.99	120.80	749.72	129.75	2.14	87.70
17	2.23	2.52	2.28	3.40	4.03	4.82	5.04	5.09	13.30	5.87	30.27	15.54	7.87
18	2.33	4.69	3.61	3.85	4.32	4.53	4.90	5.50	22.77	6.14	810.47	21.14	74.52
19	2.45	2.76	2.50	2.73	2.95	4.30	5.50	6.24	18.49	239.95	777.92	2.48	89.02
20	2.56	2.89	2.62	2.76	2.85	3.54	4.26	5.09	6.40	6.71	28.38	7.27	6.28
													131.05

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 8 (913bin8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin8													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.45	32.60	570.97	0.50	50.70
2	0.43	0.54	0.48	0.55	0.54	0.58	162.02	576.42	1287.49	3092.31	1336.57	0.62	538.21
3	0.66	0.73	0.65	0.67	0.65	0.67	0.66	0.67	0.63	0.76	262.23	198.87	38.99
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.79	0.87	50.02	373.11	1.09	35.95
5	0.95	1.05	0.93	0.96	0.94	0.96	0.96	0.97	0.91	0.98	1.04	0.97	0.97
6	1.00	1.09	0.99	1.02	0.99	1.05	1.45	289.38	762.04	830.72	986.90	948.18	318.74
7	433.40	208.57	80.84	353.46	11.22	205.19	352.76	654.70	945.09	796.64	2528.28	1.14	547.61
8	1.13	1.29	1.16	1.21	1.16	1.23	1.18	1.18	1.45	1.94	86.79	1.87	8.47
9	1.30	1.43	1.29	1.34	1.29	1.30	1.82	69.76	567.00	581.58	847.61	794.85	239.21
10	1.31	1.46	1.32	1.37	1.43	2.10	81.90	435.44	629.05	553.66	2156.16	1.39	322.22
11	1.41	1.59	1.43	1.53	1.47	1.48	2.01	4.12	430.99	525.76	698.60	127.08	149.79
12	1.52	2.10	2.04	2.33	28.74	307.83	367.04	420.82	583.19	497.87	1956.18	1.60	347.61
13	1.65	1.85	1.72	1.92	2.56	3.08	12.39	73.39	380.13	379.78	497.21	447.51	150.27
14	19.35	1.97	1.83	1.90	1.82	1.83	2.47	3.56	348.89	353.53	1587.71	419.45	228.69
15	1.86	2.14	1.94	2.01	1.93	2.18	3.28	34.94	427.28	1041.41	1546.82	190.23	271.33
16	1.97	2.25	2.05	2.67	2.74	3.70	7.68	132.16	405.64	1000.28	429.87	2.03	166.09
17	2.12	2.39	2.17	3.23	3.83	7.23	5.73	10.21	44.8188	.21	129.93	100.98	29.24
18	2.22	19.43	3.43	3.66	4.12	4.31	4.67	13.86	113.79	32.90	1050.26	115.65	114.03
19	2.34	2.64	2.39	2.61	2.82	4.11	5.25	15.17	104.20	721.34	1017.64	2.37	156.91
20	2.45	2.76	2.50	2.65	2.73	3.39	4.07	4.87	27.4722	.35	127.47	33.74	19.70
													186.74

Otpimistic market -scenario hydrothermal - inflow 9 (911in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911in9							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	683.61	463.30	427.72	216.80	381.13	486.96	717.53	995.97	1572.44	1311.66	1523.01	0.59	731.73
3	0.63	4.37	0.62	0.63	0.62	0.64	0.66	151.87	791.26	1051.82	1431.93	0.72	286.31
4	0.75	0.83	0.74	0.76	0.79	1.60	255.28	699.89	1541.59	3761.19	1411.77	1232.74	742.33
5	723.86	499.92	1138.54	783.63	847.10	1113.73	1136.11	3434.77	4098.57	3508.82	1386.68	1049.79	1643.46
6	798.10	419.730.9	7	6.54	1.44	240.19	436.38	871.75	1312.37	3478.71	1264.23	1154.68	832.09
7	18.99	1.62	1.35	1.44	1.50	18.05	318.82	710.83	1123.53	1077.58	1229.57	1.21	375.37
8	1.21	224.341.7	2	1.78	1.76	20.23	330.62	782.69	1243.05	1035.91	1194.94	1071.30	492.46
9	1.41	1.56	1.41	1.61	1.89	73.40	365.01	804.27	1123.78	3225.28	3556.28	1029.64	848.80
10	475.01	82.99	2.27	1.61	2.06	19.99	354.76	700.46	1089.21	952.66	3485.91	796.06	663.58
11	113.14	8.64	2.08	2.48	24.09	490.72	745.17	771.69	3342.78	3056.84	3415.62	2958.31	1244.30
12	775.07	1424.88	375.76	395.86	33.14	10.658	4.87	161.03	704.78	766.27	856.65	722.99	526.00
13	1.99	10.30	2.58	2.66	3.25	121.87	425.11	698.65	3202.55	729.75	3106.46	659.02	747.02
14	2.13	2.61	2.76	3.11	2.60	2.43	2.90	3.59	121.22	492.30	796.05	551.01	165.23
15	2.28	2.58	2.33	2.41	2.33	2.46	2.38	2.59	3.57	8.60	146.27	4.06	15.15
16	2.42	3.14	2.47	2.69	2.68	3.58	4.65	132.98	777.71	546.01	2896.96	577.09	412.70
17	2.62	530.802.6	2	2.71	2.80	3.57	4.44	29.07	559.30	247.97	2827.28	262.84	373.00
18	4.52	3.06	2.76	2.86	2.81	3.51	4.62	34.97	642.95	230.77	2757.69	227.74	326.52
19	177.98	3.22	2.91	3.06	3.25	3.78	4.34	5.67	58.41	172.45	644.83	27.71	92.30
20	3.05	3.38	3.05	3.21	3.10	3.21	3.10	3.15	3.59	4.59	5.94	6.16	3.79
													539.72

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 9 (911bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911b in9							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	683.61	463.30	427.72	216.80	381.13	486.96	717.53	921.12	1487.58	1226.83	1438.16	0.64	704.28
3	0.68	0.92	0.67	0.69	0.68	0.69	0.72	53.27	730.40	975.90	1347.97	0.77	259.45
4	0.80	0.89	0.79	0.82	0.85	1.06	209.70	633.27	1456.77	3591.30	1326.99	1147.98	697.60
5	657.04	335.38	980.79	645.44	702.01	951.79	966.66	3095.40	3758.94	3169.49	1217.20	890.53	1447.55
6	652.36	327.581.0	7	1.61	1.58	74.09	328.12	723.20	1142.94	3139.59	1094.82	985.29	706.02
7	1.88	1.75	1.47	1.56	1.62	2.05	105.21	503.33	964.53	908.26	1060.23	1.31	296.10
8	1.31	69.69	1.85	1.92	1.89	2.34	109.78	559.91	1073.73	866.65	1025.66	902.03	384.73
9	1.50	1.72	1.55	1.78	2.07	6.38	98.36	508.58	766.61	2717.74	3048.60	683.72	653.22
10	143.05	13.79	2.48	1.75	2.25	2.97	92.76	497.72	736.31	616.08	2978.57	572.79	471.71
11	20.03	2.83	2.25	2.68	3.47	154.51	531.82	548.47	2835.82	2549.97	2908.62	2451.60	1001.01
12	551.87	1171.23	99.52	111.74	3.93	3.44	8.30	38.67	503.36	543.12	633.52	499.86	347.38
13	2.13	3.34	2.76	2.85	3.48	25.49	115.06	475.57	2696.27	506.67	2600.34	213.67	553.97
14	2.28	2.79	2.95	3.31	2.77	2.59	3.08	3.83	24.56	144.06	573.06	166.49	77.65
15	2.42	2.74	2.47	2.55	2.47	2.60	2.52	2.75	3.79	4.98	33.93	4.30	5.63
16	2.57	3.32	2.62	2.85	2.84	3.79	4.91	24.99	554.83	158.77	2107.93	173.63	253.59
17	2.76	178.402.7	6	2.85	2.95	3.76	4.68	5.99	172.10	141.59	2046.99	156.46	226.77
18	4.76	3.22	2.91	3.00	2.96	3.69	4.86	6.57	205.81	62.36	1986.13	61.99	195.69
19	40.35	3.38	3.05	3.20	3.41	3.96	4.55	5.94	20.1138	.04	206.97	7.46	28.37
20	3.20	3.54	3.20	3.35	3.25	3.35	3.25	3.29	3.76	4.80	6.21	6.43	3.97
													429.35

Otpimistic market -scenario hydrothermal with wind addition - inflow 9 (912in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 912in9							
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	683.61	463.30	427.72	216.80	381.13	486.96	618.90	824.44	1286.99	1059.81	1259.30	0.68	642.47
3	0.71	0.93	0.70	0.72	0.71	0.73	0.72	10.28	587.34	807.53	1151.70	0.80	213.57
4	0.83	0.92	0.81	0.84	0.83	1.05	180.54	547.10	1259.38	1012.49	3143.02	1027.95	597.98
5	564.39	350.99	966.66	665.19	684.03	876.84	806.80	2103.78	2418.41	2053.36	947.19	730.71	1097.36
6	624.09	343.421.0	9	1.59	1.54	73.05	273.47	488.86	834.94	2033.01	845.28	803.11	526.95
7	4.26	1.73	1.45	1.55	1.59	2.77	86.94	383.56	703.64	579.31	816.50	1.27	215.38
8	1.29	80.33	1.82	1.89	1.84	4.50	90.62	426.19	778.76	549.38	787.74	732.09	288.04
9	1.51	1.70	1.53	1.76	2.03	6.63	74.64	339.34	482.84	1521.28	1871.02	519.63	401.99
10	300.22	24.31	2.40	1.73	2.18	2.72	69.63	328.87	459.94	382.93	1825.94	430.17	319.25
11	25.57	2.72	2.18	2.60	7.23	136.52	410.43	355.06	1552.06	1418.12	1780.89	1598.88	607.69
12	524.18	1157.24	128.61	144.41	14.83	3.12	3.47	18.67	145.95	159.02	440.52	371.34	259.28
13	2.04	3.18	2.68	2.77	3.29	14.928	0.66	110.41	1239.34	107.31	1328.59	126.84	247.67
14	2.17	2.68	2.84	3.19	2.66	2.42	2.78	3.25	3.97	22.50	150.77	92.87	24.34
15	2.30	2.63	2.39	2.48	2.38	2.43	2.32	2.45	3.20	4.01	6.25	3.72	3.05
16	2.42	3.15	2.52	2.75	2.71	3.41	4.18	4.92	120.71	23.74	1063.29	47.30	106.76
17	2.59	162.482.6	6	2.77	2.83	3.42	4.05	4.63	14.96	5.78	842.92	26.70	89.65
18	4.22	3.07	2.78	2.90	2.83	3.36	4.19	5.00	22.67	6.04	810.32	16.53	73.66
19	23.57	3.22	2.92	3.09	3.24	3.60	3.99	4.69	5.45	6.08	32.72	5.82	8.20
20	2.98	3.37	3.06	3.23	3.10	3.11	2.97	2.90	3.22	3.94	4.95	5.23	3.50
													299.95

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 9 (913in9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.01	810.70	1148.02	808.54	272.26
2	683.61	463.30	427.72	216.80	381.13	486.96	618.90	824.44	1286.99	1059.81	1259.30	0.68	642.47
3	0.71	0.93	0.70	0.72	0.71	0.73	0.72	10.28	587.34	807.53	1151.70	0.80	213.57
4	0.83	0.92	0.81	0.84	0.83	1.05	180.54	547.10	1259.38	1012.49	3143.02	1027.95	597.98
5	564.39	350.99	966.66	665.19	684.03	876.84	806.80	2103.78	2418.41	2053.36	947.19	730.71	1097.36
6	624.09	343.421.0	9	1.59	1.54	73.05	273.47	488.86	834.94	2033.01	845.31	803.14	526.96
7	1.78	1.70	1.44	1.55	1.61	5.55	102.29	425.32	750.48	579.33	816.56	1.22	224.07
8	1.21	234.581.8	5	1.92	1.87	9.95	251.63	519.03	778.84	549.46	2235.54	471.23	421.43
9	1.38	1.52	1.37	1.89	2.20	69.03	288.54	469.66	482.95	1521.45	1871.20	519.74	435.91
10	314.98	2.63	2.32	1.49	2.41	22.44	334.35	441.31	460.04	1469.85	546.77	1655.47	437.84
11	2.96	2.43	2.04	2.62	29.89	428.50	467.24	1445.83	1552.22	1418.29	1781.07	1599.06	727.68
12	524.30	882.31	30.22	107.87	3.58	3.00	7.54	31.23	382.65	159.12	1626.54	91.00	320.78
13	1.76	3.11	2.60	2.77	3.56	78.29	129.82	110.51	1239.50	956.50	161.45	134.79	235.39
14	1.87	2.66	2.96	3.37	2.64	2.38	2.92	3.57	17.9695	.00	150.88	121.54	33.98
15	1.98	2.26	2.05	2.13	2.04	2.10	2.05	2.86	3.83	4.84	34.31	3.70	5.35
16	2.08	3.27	2.16	3.09	2.90	3.83	4.91	31.32	120.80	749.72	1063.46	47.40	169.58
17	2.23	416.682.2	8	2.37	3.13	3.85	4.69	5.34	27.08	375.23	41.72	26.80	75.95
18	4.11	2.63	2.39	2.49	3.23	4.11	5.22	8.42	22.77	257.75	37.25	21.14	30.96
19	35.70	2.76	2.50	2.64	4.09	4.14	4.53	5.37	6.12	6.42	32.81	6.07	9.43
20	2.56	2.89	2.62	2.76	2.66	2.67	2.56	2.58	3.70	4.64	5.75	5.71	3.43
													324.12

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 9 (913bin9)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin9													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	496.27	811.06	1148.47	808.90	272.38
2	683.93	463.54	427.95	216.80	381.34	487.22	619.21	824.82	1287.49	1136.74	1336.57	0.62	655.52
3	0.66	3.76	0.65	0.67	0.65	0.67	0.66	39.26	642.43	875.77	1227.38	0.75	232.77
4	0.78	0.86	0.76	0.79	0.78	0.98	223.60	608.80	1336.15	1089.41	3284.36	1106.22	637.79
5	626.12	400.45	1040.34	795.74	818.23	1023.01	953.28	2347.31	2651.90	2289.46	1088.86	868.26	1241.91
6	757.82	489.450.9	9	11.16	2.52	232.25	370.23	681.53	973.19	2269.05	986.90	948.18	643.61
7	13.33	1.57	1.33	1.43	1.49	46.11	305.09	606.32	884.89	796.64	958.11	1.14	301.45
8	1.13	316.541.7	3	1.79	1.75	56.39	350.20	722.64	917.02	762.60	2478.40	665.11	522.94
9	1.30	1.43	1.29	1.78	2.01	271.83	443.19	730.44	740.42	1836.11	2201.37	794.85	585.50
10	477.04	24.05	2.13	1.37	2.22	105.53	497.05	614.80	629.05	1784.38	820.44	1999.24	579.78
11	9.89	2.25	1.88	2.43	128.73	594.39	648.39	1768.77	1861.91	1732.69	2110.97	1942.68	900.41
12	717.59	1084.97	129.07	368.59	30.13	2.80	75.09	133.67	548.04	497.87	1956.18	342.41	490.53
13	1.65	3.32	2.44	2.59	3.34	145.44	436.33	389.73	1522.76	1371.06	497.21	447.51	401.95
14	1.76	2.50	2.78	3.17	2.48	2.23	2.75	3.37	97.51	353.53	474.75	419.45	113.86
15	1.86	2.14	1.94	2.01	1.93	1.98	1.94	2.71	3.61	25.07	138.36	3.50	15.59
16	1.97	3.10	2.05	2.92	2.74	3.63	19.66	137.78	405.64	1000.28	1505.95	176.97	271.89
17	2.12	570.282.1	7	2.25	2.97	3.66	4.46	22.80	123.42	796.86	157.32	128.21	151.38
18	3.91	2.51	2.27	2.37	3.07	3.92	4.97	42.28	113.79	759.07	147.35	115.65	100.10
19	153.53	2.64	2.39	2.52	3.91	3.96	4.33	5.14	31.1027	.63	137.41	5.80	31.70
20	2.45	2.76	2.50	2.65	2.54	2.56	2.45	2.47	3.54	4.44	5.50	5.48	3.28
													407.72

Otpimistic market -scenario hydrothermal - inflow 10 (911in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	14.42	787.28	1171.19	1511.93	596.80	340.44
3	0.63	0.70	0.62	0.63	0.62	0.64	0.63	0.64	299.06	600.60	1234.27	0.72	178.31
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.77	40.50	338.56	878.96	898.52	180.22
5	0.85	0.95	0.84	0.91	0.90	0.92	0.91	1.14	294.85	557.20	1089.94	914.69	238.68
6	0.97	1.08	0.97	1.00	0.97	1.00	1.06	1.39	313.84	674.30	984.55	361.96	195.26
7	1.07	1.24	1.12	1.15	1.12	1.20	1.17	1.44	94.13	461.06	1198.51	1.21	147.04
8	1.21	1.40	1.26	1.31	1.26	1.35	1.32	1.71	81.54	321.55	770.77	1.36	98.84
9	1.97	1.92	1.70	1.75	2.18	74.19	276.13	535.46	1053.70	994.27	1160.33	73.45	348.09
10	1.55	1.94	1.55	1.61	1.60	1.66	1.82	2.53	399.20	793.79	1125.75	666.01	249.92
11	362.15	831.931.7	0	1.81	1.85	2.43	2.83	95.43	579.98	673.17	711.50	1.84	272.22
12	1.84	2.04	1.88	1.97	2.18	2.99	91.00	447.29	880.03	766.27	3176.47	722.99	508.08
13	1.99	2.20	2.04	2.39	2.34	3.25	32.77	492.24	868.58	2888.79	3106.46	686.48	674.13
14	18.04	29.20	3.62	3.25	3.44	126.19	453.97	662.16	3132.56	2804.91	3036.55	2.28	856.35
15	2.28	2.58	2.33	2.41	2.33	2.92	3.82	39.82	690.42	582.45	2966.71	613.53	409.30
16	2.42	2.74	2.47	2.56	2.47	2.61	3.09	3.87	36.45	141.02	735.51	2.57	78.15
17	2.62	2.90	2.62	2.71	2.67	3.10	4.10	29.47	629.48	247.97	2827.28	2.72	313.14
18	2.76	3.06	2.76	2.86	2.81	2.91	3.22	4.64	120.09	226.87	675.04	18.03	88.75
19	2.91	3.22	2.91	3.06	2.96	3.48	4.21	5.59	145.13	208.49	644.83	55.30	90.17
20	38.74	3.38	3.05	3.54	3.69	4.58	5.53	8.43	246.97	196.41	2308.05	3.20	235.46
													283.56

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 10 (911bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.43	0.54	0.48	0.55	0.54	0.55	0.55	5.90	726.11	1091.03	1427.42	536.95	315.92
3	0.68	0.76	0.67	0.69	0.68	0.69	0.69	0.70	257.39	539.62	1156.52	0.77	163.32
4	0.80	0.89	0.79	0.81	0.80	0.82	0.81	0.82	11.41	290.04	811.21	825.20	162.03
5	0.90	1.06	0.94	1.02	0.99	1.02	1.01	1.26	206.77	377.91	939.60	764.81	191.44
6	1.07	1.18	1.07	1.10	1.07	1.10	1.16	1.53	220.53	473.02	834.06	259.13	149.67
7	1.16	1.34	1.21	1.25	1.21	1.30	1.26	1.56	48.12	347.64	1031.30	1.31	119.89
8	1.31	1.51	1.36	1.40	1.36	1.45	1.42	1.83	20.09	105.13	556.00	1.46	57.86
9	2.10	2.11	1.87	1.92	2.40	6.71	29.75	354.64	711.51	652.58	798.78	4.89	214.11
10	1.70	2.11	1.70	1.75	1.74	1.80	1.99	2.75	115.38	575.75	768.46	458.10	161.10
11	93.79	560.591.8	4	1.95	2.00	2.63	3.06	12.17	395.28	465.20	515.40	1.99	171.33
12	1.99	2.20	2.03	2.12	2.34	3.22	10.83	126.72	658.99	543.12	2670.00	499.86	376.95
13	2.13	2.36	2.18	2.56	2.51	3.48	4.49	144.08	645.49	2382.60	2600.34	225.22	501.45
14	4.29	3.85	3.86	3.47	3.66	26.98	125.53	213.75	2626.61	2299.06	2530.76	2.42	653.69
15	2.42	2.74	2.47	2.55	2.47	3.09	4.05	5.36	234.00	175.95	2461.25	190.82	257.27
16	2.57	2.90	2.62	2.70	2.62	2.75	3.26	4.09	5.32	27.37	249.58	2.71	25.71
17	2.76	3.06	2.76	2.85	2.81	3.27	4.32	6.00	201.63	141.59	2046.99	2.86	201.74
18	2.91	3.22	2.91	3.00	2.96	3.05	3.39	4.88	21.4260	.78	221.17	6.31	28.00
19	3.05	3.38	3.05	3.20	3.10	3.65	4.41	5.85	31.2952	.58	206.97	11.91	27.70
20	7.69	3.54	3.20	3.70	3.86	4.79	5.79	7.25	72.5246	.91	1864.60	3.34	168.93
													205.84

Otpimistic market -scenario hydrothermal with wind addition - inflow 10 (912in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.73	613.99	927.87	1239.03	483.32	272.39
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	70.55	352.56	955.69	0.80	115.45
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	1.00	203.78	675.30	718.95	133.82
5	1.00	1.11	0.98	1.06	1.04	1.06	1.06	1.13	17.93	221.55	698.23	608.35	129.54
6	1.10	1.19	1.09	1.11	1.08	1.10	1.12	1.40	56.05	319.33	633.52	98.29	93.03
7	1.15	1.34	1.21	1.25	1.20	1.28	1.22	1.47	11.00	236.94	794.90	1.27	87.85
8	1.29	1.49	1.35	1.40	1.34	1.42	1.36	1.71	6.17	63.78	426.99	1.40	42.47
9	2.07	2.07	1.84	1.90	2.33	6.93	21.55	110.54	447.22	410.81	570.49	2.66	131.70
10	1.64	2.06	1.67	1.73	1.71	1.72	1.85	2.42	28.25	356.15	546.66	344.39	107.52
11	101.37	588.111.8	0	1.92	1.95	2.44	2.74	3.30	111.16	135.23	363.97	1.86	109.65
12	1.90	2.14	1.97	2.06	2.26	2.94	5.25	35.74	403.31	159.02	1626.36	371.34	217.86
13	2.04	2.30	2.14	2.50	2.42	3.14	3.83	27.87	151.27	956.34	1328.59	134.68	218.10
14	3.86	8.44	3.66	3.33	3.45	15.9738	3.93	97.74	1058.29	915.23	1134.93	2.24	273.42
15	2.30	2.63	2.39	2.48	2.38	2.84	3.54	4.31	101.38	29.33	1099.10	108.19	113.41
16	2.42	2.78	2.52	2.62	2.51	2.56	2.93	3.47	4.25	5.06	129.64	2.48	13.60
17	2.59	2.93	2.66	2.77	2.70	3.01	3.78	4.63	22.43	5.78	842.92	2.58	74.90
18	2.71	3.07	2.78	2.90	2.83	2.83	3.06	3.97	5.15	6.02	37.15	5.05	6.46
19	2.84	3.22	2.92	3.09	2.96	3.34	3.88	4.64	5.61	6.30	32.72	6.27	6.48
20	6.44	3.37	3.06	3.55	3.65	4.28	4.93	5.52	6.56	6.62	745.25	3.00	66.35
													119.14

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 10 (913in10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.35	780.07	168.72
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.73	613.99	927.87	1239.03	483.32	272.39
3	0.71	0.79	0.70	0.72	0.71	0.73	0.72	0.73	70.55	352.56	955.69	0.80	115.45
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.85	1.00	203.78	675.30	718.95	133.82
5	1.00	1.11	0.98	1.06	1.04	1.06	1.06	1.13	17.93	221.55	698.23	608.35	129.54
6	1.10	1.19	1.09	1.11	1.08	1.10	1.12	1.40	56.05	319.33	619.53	87.32	90.95
7	1.14	1.29	1.17	1.21	1.16	1.24	1.19	1.53	22.41	303.89	816.56	1.22	96.17
8	1.21	1.38	1.25	1.29	1.24	1.48	1.64	2.00	69.02	260.31	561.50	1.29	75.30
9	2.15	2.07	1.85	1.92	2.49	20.167	6.93	302.84	482.95	410.91	570.60	2.60	156.45
10	1.43	2.09	1.44	1.49	1.48	1.98	2.54	27.65	425.75	383.03	1826.12	137.51	234.38
11	31.28	544.331.5	5	1.65	2.13	2.78	3.13	28.04	368.65	355.17	404.79	1.61	145.42
12	1.64	1.84	2.35	2.23	2.48	3.41	92.28	156.35	414.26	159.12	1626.54	371.45	236.16
13	1.76	1.98	1.84	3.23	2.73	3.71	26.43	110.51	151.37	956.50	1328.75	134.79	226.97
14	3.91	3.50	3.70	3.26	3.53	35.43	124.56	949.89	1058.44	915.38	150.88	1.94	271.20
15	1.98	2.26	2.05	2.92	2.53	3.68	4.55	30.81	130.99	790.76	140.31	1038.75	179.30
16	2.08	2.38	2.16	2.24	2.54	3.02	3.58	4.13	11.3323	.84	129.75	2.14	15.77
17	2.23	2.52	2.28	2.44	3.13	4.45	5.26	16.46	27.08	375.23	843.07	2.24	107.20
18	2.33	2.63	2.39	2.48	2.42	2.44	3.39	4.73	17.67	6.14	810.47	4.62	71.81
19	2.45	2.76	2.50	2.64	3.58	4.09	4.65	5.50	16.49	6.42	32.81	6.87	7.56
20	6.64	2.89	2.62	3.86	3.89	4.68	5.54	6.19	14.21	222.17	28.38	2.59	25.31
													137.99

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 10 (913bin10)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin10													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	0.47	270.84	969.76	780.42	168.78
2	0.43	0.54	0.48	0.55	0.54	0.55	0.65	0.73	614.30	1000.38	1315.67	539.77	289.55
3	0.66	0.73	0.65	0.67	0.65	0.67	0.66	0.67	183.55	454.86	1025.14	0.75	139.14
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.79	3.32	247.75	736.92	786.51	148.40
5	0.95	1.05	0.93	0.96	0.94	0.96	0.96	1.02	72.35	315.32	823.74	737.35	163.04
6	1.00	1.09	0.99	1.02	0.99	1.00	1.02	1.29	195.24	420.65	745.76	270.14	136.68
7	1.05	1.19	1.08	1.12	1.07	1.15	1.11	1.42	84.02	405.87	958.11	1.14	121.53
8	1.13	1.29	1.16	1.21	1.16	1.38	1.53	1.87	225.64	360.88	768.21	1.21	113.89
9	2.02	1.95	1.74	1.81	6.64	99.66	297.42	457.88	740.42	581.58	847.61	12.35	254.26
10	1.31	1.92	1.32	1.37	1.36	1.82	2.34	121.05	591.03	553.66	2156.16	445.62	323.25
11	271.77	793.761.4	3	1.53	1.97	2.57	20.15	125.10	530.07	525.76	567.61	1.50	236.93
12	1.52	1.71	2.19	2.08	2.31	28.14	339.95	494.19	583.19	497.87	1956.18	551.46	371.73
13	1.65	1.85	1.72	3.03	2.56	24.57	123.52	389.73	470.58	1371.06	1628.64	447.51	372.20
14	13.64	17.66	3.48	3.07	3.32	138.44	427.02	1373.37	1484.13	1324.18	474.75	1.83	438.74
15	1.86	2.14	1.94	2.75	2.38	3.47	17.22	135.47	427.28	1041.41	452.31	1495.66	298.66
16	1.97	2.25	2.05	2.12	2.40	2.86	3.40	3.91	82.86	121.34	429.87	2.03	54.76
17	2.12	2.39	2.17	2.31	2.98	4.23	16.45	102.84	123.42	796.86	1082.95	2.13	178.40
18	2.22	2.51	2.27	2.36	2.31	2.32	3.23	4.50	101.56	32.90	1050.26	4.40	100.91
19	2.34	2.64	2.39	2.52	3.41	3.91	4.44	5.25	49.4227	.63	137.41	35.34	23.06
20	28.42	2.76	2.50	3.70	3.73	4.48	5.31	5.93	47.38	683.63	127.47	2.48	76.48
													200.52

Otpimistic market -scenario hydrothermal - inflow 11 (911in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.43	377.080.4	8	0.56	40.34	446.34	841.27	1294.20	1572.44	3868.77	4291.26	0.59	1061.15
3	0.63	38.04	310.76	231.79	0.72	189.89	505.42	860.96	1591.58	1320.23	4161.98	1125.26	861.44
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.90	475.34	759.60	1391.37	0.83	219.45
5	0.85	0.95	0.84	0.91	0.90	0.92	0.91	1.08	223.23	378.10	980.43	647.11	186.35
6	0.97	1.08	1.23	1.00	1.05	1.23	2.40	223.96	611.77	694.39	1060.88	1.07	216.75
7	1.07	1.24	1.12	1.15	1.12	1.20	1.33	14.66	696.14	1077.58	1229.57	3464.79	540.91
8	1.21	1.40	1.26	1.31	1.26	1.35	1.50	14.25	704.08	1035.91	1194.94	1040.84	333.28
9	267.85	1.56	1.41	1.46	1.46	1.60	1.98	27.37	537.12	940.26	1160.33	461.27	283.64
10	131.01	1.72	2.40	2.17	2.55	280.44	556.46	1001.89	1089.21	3141.01	1125.75	793.85	677.37
11	23.98	1.88	1.97	2.26	2.78	25.88	106.41	428.68	979.36	802.81	3415.62	759.51	545.93
12	2993.56	2.04	1.84	1.97	2.02	2.57	11.03	363.33	898.91	766.27	3176.47	597.41	734.78
13	474.29	610.84	27.10	9.72	157.91	782.83	683.09	2818.36	3202.55	2888.79	3106.46	2790.41	1462.70
14	2.13	2.74	2.33	2.26	2.18	2.82	3.31	4.06	403.88	527.41	660.35	449.10	171.88
15	4.06	35.62	3.56	3.61	3.21	4.18	39.17	553.44	807.98	2552.56	2966.71	613.53	632.30
16	2.42	2.74	2.47	2.56	2.47	2.61	2.52	2.52	3.40	4.47	101.94	34.88	13.75
17	2.62	2.90	2.62	2.71	2.67	2.76	3.34	4.57	140.74	229.51	705.27	2164.14	271.99
18	2046.93	205.016.7	4	10.71	3.81	4.56	5.53	120.95	591.68	230.77	675.04	2090.81	499.38
19	2.91	3.22	2.91	3.06	2.96	3.06	3.30	4.58	24.4258	.82	619.17	3.05	60.95
20	3.05	3.38	3.05	3.21	3.10	3.47	4.63	6.22	189.76	196.41	2308.05	68.30	232.72
													470.07

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 11 (911bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 911b in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.43	377.080.4	8	0.56	40.34	446.34	841.27	1294.20	1572.44	3868.77	4291.26	0.59	1061.15
3	0.63	38.04	310.76	231.79	0.72	189.89	505.42	860.96	1591.58	1320.23	4161.98	1125.26	861.44
4	0.75	0.83	0.74	0.76	0.74	0.76	0.76	0.90	475.34	759.60	1391.37	0.83	219.45
5	0.85	0.95	0.84	0.91	0.90	0.92	0.91	1.08	223.23	378.10	980.43	647.11	186.35
6	0.97	1.08	1.23	1.00	1.05	1.23	2.40	223.96	611.77	694.39	1060.88	1.07	216.75
7	1.07	1.24	1.12	1.15	1.12	1.20	1.33	14.66	696.14	1077.58	1229.57	3464.79	540.91
8	1.21	1.40	1.26	1.31	1.26	1.35	1.50	14.25	704.08	1035.91	1194.94	1040.84	333.28
9	267.85	1.56	1.41	1.46	1.46	1.60	1.98	27.37	537.12	940.26	1160.33	461.27	283.64
10	131.01	1.72	2.40	2.17	2.55	280.44	556.46	1001.89	1089.21	3141.01	1125.75	793.85	677.37
11	23.98	1.88	1.97	2.26	2.78	25.88	106.41	428.68	979.36	802.81	3415.62	759.51	545.93
12	2993.56	2.04	1.84	1.97	2.02	2.57	11.03	363.33	898.91	766.27	3176.47	597.41	734.78
13	474.29	610.84	27.10	9.72	157.91	782.83	683.09	2818.36	3202.55	2888.79	3106.46	2790.41	1462.70
14	2.13	2.74	2.33	2.26	2.18	2.82	3.31	4.06	403.88	527.41	660.35	449.10	171.88
15	4.06	35.62	3.56	3.61	3.21	4.18	39.17	553.44	807.98	2552.56	2966.71	613.53	632.30
16	2.42	2.74	2.47	2.56	2.47	2.61	2.52	2.52	3.40	4.47	101.94	34.88	13.75
17	2.62	2.90	2.62	2.71	2.67	2.76	3.34	4.57	140.74	229.51	705.27	2164.14	271.99
18	2046.93	205.016.7	4	10.71	3.81	4.56	5.53	120.95	591.68	230.77	675.04	2090.81	499.38
19	2.91	3.22	2.91	3.06	2.96	3.06	3.30	4.58	24.4258	.82	619.17	3.05	60.95
20	3.05	3.38	3.05	3.21	3.10	3.47	4.63	6.22	189.76	196.41	2308.05	68.30	232.72
													470.07

Otpimistic market -scenario hydrothermal with wind addition - inflow 11 (912in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 912in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.43	377.080.4	8	0.56	40.34	446.34	841.27	1209.36	1487.58	3698.69	4121.09	0.64	1018.66
3	0.68	9.64	265.97	189.67	0.79	71.73	447.85	790.72	1506.73	1235.42	3991.94	1046.00	796.43
4	0.80	0.89	0.79	0.81	0.80	0.82	0.81	0.96	372.64	691.76	1307.24	0.88	198.27
5	0.90	1.06	0.94	1.02	0.99	1.02	1.01	1.19	67.70	273.18	837.16	454.47	136.72
6	1.07	1.18	1.35	1.10	1.16	1.35	1.70	63.93	430.70	489.44	905.23	1.16	158.28
7	1.16	1.34	1.21	1.25	1.21	1.30	1.44	2.04	498.61	908.26	1060.23	3125.88	467.00
8	1.31	1.51	1.36	1.40	1.36	1.45	1.61	2.31	503.61	866.65	1025.66	873.80	273.50
9	80.68	1.72	1.55	1.60	1.60	1.76	2.18	2.80	362.28	610.41	798.78	139.59	167.08
10	27.86	1.88	2.63	2.37	2.77	32.17	368.50	659.37	736.31	2633.81	768.46	570.85	483.91
11	3.36	2.04	2.14	2.45	3.01	3.34	17.62	120.35	647.02	579.59	2908.62	536.32	402.15
12	2486.83	2.20	1.99	2.12	2.17	2.76	3.56	91.30	675.75	543.12	2670.00	189.50	555.94
13	138.35	447.764.2	7	3.78	37.35	572.27	223.52	2312.22	2696.27	2382.60	2600.34	2284.37	1141.92
14	2.28	2.93	2.48	2.40	2.33	3.00	3.52	4.32	113.42	158.83	220.48	123.74	53.31
15	4.31	8.25	3.78	3.84	3.41	4.43	5.39	166.30	585.04	1804.36	2461.25	190.82	436.77
16	2.57	2.90	2.62	2.70	2.62	2.75	2.66	2.67	3.59	4.71	15.28	5.82	4.24
17	2.76	3.06	2.76	2.85	2.81	2.90	3.52	4.81	30.3062	.61	235.37	1719.90	172.81
18	1602.83	130.905.8	2	5.45	4.00	4.79	5.81	18.89	184.29	62.36	221.17	1646.84	324.43
19	3.05	3.38	3.05	3.20	3.10	3.20	3.46	4.80	6.56	16.12	196.19	3.20	20.78
20	3.20	3.54	3.20	3.35	3.25	3.64	4.84	6.50	49.1246	.91	1864.60	21.97	167.84
													368.74

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 11 (913in11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.49	1256.06	1518.95	1369.01	394.70
2	0.43	377.080.4	8	0.56	40.34	446.34	730.17	1076.21	1286.99	2952.00	3328.49	0.68	853.31
3	0.71	8.81	257.91	198.50	0.80	153.50	423.26	706.34	1304.24	1067.58	3222.13	939.41	690.27
4	0.83	0.92	0.81	0.84	0.82	0.84	0.84	0.92	290.54	570.71	1118.09	0.91	165.59
5	1.00	1.11	0.98	1.06	1.04	1.06	1.06	1.08	6.61	69.47	622.09	359.42	88.83
6	1.10	1.19	1.32	1.11	1.14	1.32	1.61	18.24	303.07	348.29	691.14	1.15	114.22
7	1.14	1.29	1.17	1.21	1.16	1.24	1.44	1.99	441.09	579.33	2285.33	767.65	340.34
8	1.21	1.38	1.25	1.29	1.24	1.32	1.67	13.27	528.60	549.46	2235.54	454.18	315.87
9	7.90	1.52	1.37	1.42	1.49	1.99	2.38	17.25	399.38	410.91	570.60	272.87	140.76
10	30.20	1.59	2.80	2.35	2.85	106.35	448.36	441.31	1594.45	1469.85	546.77	126.73	397.80
11	2.79	1.72	2.06	2.46	3.18	10.992	8.83	117.68	437.15	355.17	1781.07	1599.06	361.85
12	524.30	1.84	1.66	2.21	2.23	2.83	12.54	140.99	414.26	1366.76	1626.54	37.23	344.45
13	38.43	340.798.9	0	3.48	121.43	493.20	137.90	992.46	1239.50	956.50	1328.75	1130.17	565.54
14	1.87	2.81	2.38	2.02	2.34	3.23	3.58	4.11	90.8995	.00	149.92	35.21	32.78
15	3.67	3.99	3.49	3.63	3.17	4.15	10.79	42.47	1024.62	790.76	1099.26	108.29	258.19
16	2.08	2.38	2.16	2.24	2.15	2.20	2.11	2.72	3.83	4.77	27.77	5.26	4.97
17	2.23	2.52	2.28	2.37	2.43	3.41	4.30	5.05	27.08	5.87	843.07	781.74	140.20
18	997.02	27.95	5.06	4.89	3.50	4.30	5.26	5.85	22.77	6.14	810.47	21.14	159.53
19	2.45	2.76	2.50	2.64	2.54	3.48	4.49	5.27	6.25	6.42	32.81	2.48	6.18
20	2.56	2.89	2.62	2.76	3.27	4.64	5.71	6.41	14.21	222.17	28.38	7.27	25.24
													270.03

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 11 (913bin11)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin11													
1	0.59	0.51	0.46	0.47	0.46	0.47	0.47	0.47	588.78	1256.53	1519.47	1369.51	394.85
2	0.43	377.290.4	8	0.56	40.34	446.58	730.52	1076.66	1287.49	3092.31	3469.81	0.62	876.93
3	0.66	35.57	301.02	239.56	0.74	193.39	478.39	771.79	1381.01	1144.52	3363.47	1012.91	743.59
4	0.78	0.86	0.76	0.79	0.77	0.79	0.78	0.86	332.68	632.49	1194.02	0.85	180.54
5	0.95	1.05	0.93	0.96	0.94	0.96	0.96	0.98	46.46	231.36	742.66	522.88	129.26
6	1.00	1.09	1.21	1.02	1.04	1.21	1.48	76.44	395.67	451.68	822.24	1.06	146.26
7	1.05	1.19	1.08	1.12	1.07	1.15	1.33	17.58	618.08	796.64	2528.28	912.64	406.77
8	1.13	1.29	1.16	1.21	1.16	1.23	1.56	65.66	725.80	762.60	2478.40	567.38	384.05
9	54.23	1.43	1.29	1.34	1.36	1.82	2.17	95.53	559.48	581.58	847.61	425.49	214.44
10	264.99	1.46	22.72	2.16	15.63	359.45	624.04	614.80	1904.25	1784.38	820.44	420.51	569.57
11	2.58	1.59	1.90	2.28	20.80	78.87	125.18	401.18	606.11	525.76	2110.97	1942.68	484.99
12	717.59	1.71	1.55	2.06	2.08	2.63	87.06	458.30	583.19	1681.03	1956.18	148.37	470.15
13	150.56	478.07	21.31	4.33	412.98	671.29	455.27	1421.92	1522.76	1371.06	1628.64	1599.94	811.51
14	1.76	2.64	2.24	1.90	2.20	3.04	3.38	11.13	161.38	353.53	472.52	145.38	96.76
15	3.46	23.29	3.30	3.42	2.99	4.53	87.82	163.56	1445.53	1041.41	1546.82	190.23	376.36
16	1.97	2.25	2.05	2.12	2.04	2.09	2.00	2.58	3.63	4.52	123.37	33.72	15.20
17	2.12	2.39	2.17	2.25	2.31	3.24	4.09	8.18	123.42	38.21	1082.95	1037.40	192.39
18	1292.62	112.884.8	2	5.19	3.34	4.09	5.01	30.40	113.79	32.90	1050.26	115.65	230.91
19	2.34	2.64	2.39	2.52	2.43	3.32	4.29	5.03	37.2427	.63	137.41	2.37	19.13
20	2.45	2.76	2.50	2.65	3.12	4.44	5.47	6.14	47.38	683.63	127.47	33.74	76.81
													341.02

Otpimistic market -scenario hydrothermal - inflow 12 (911in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911in12							
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	594.22	351.22	478.82	292.15	174.09	286.24	441.11	719.96	1432.80	1311.66	1523.01	3972.74	964.84
3	833.49	0.70	0.62	0.63	0.62	0.64	0.73	272.89	986.39	1275.69	1459.15	0.72	402.69
4	0.75	0.83	0.74	0.76	0.74	0.76	0.84	237.95	1129.81	1259.05	4065.70	0.83	558.23
5	0.85	0.95	43.49	44.01	61.58	579.44	945.48	1096.39	4098.57	1133.68	4014.03	1196.23	1101.23
6	0.97	1.08	1.13	1.11	1.06	1.33	96.87	758.47	1312.37	3478.71	3767.94	1.07	785.18
7	1.07	1.24	1.12	1.15	1.23	1.59	63.99	490.71	1112.52	1077.58	1229.57	1.21	331.91
8	1.21	1.40	1.51	1.65	1.85	297.88	590.92	1085.19	1243.05	3309.65	3626.75	1071.30	936.03
9	1.41	1.56	1.41	1.46	1.46	1.75	2.15	79.79	473.85	608.20	1160.33	896.15	269.13
10	1.55	17.39	8.16	12.13	350.41	624.33	929.24	1001.89	3413.02	3141.01	3485.91	3042.41	1335.62
11	77.15	1.88	1.95	1.95	2.52	31.25	324.04	572.59	1054.66	3056.84	3415.62	89.47	719.16
12	1.84	2.33	2.34	2.77	10.32	340.33	512.63	735.16	898.91	2972.76	3176.47	1.99	721.49
13	36.68	2.20	2.04	2.11	2.04	2.11	2.09	2.50	4.64	131.35	604.73	150.46	78.58
14	2.13	515.718.2	2	2.26	2.86	3.46	5.21	134.26	721.62	693.25	796.05	650.00	294.17
15	2.28	2.58	2.33	2.41	2.33	2.97	3.80	45.31	752.00	582.45	2966.71	613.53	414.89
16	2.42	2.74	2.47	2.56	2.47	2.61	2.52	3.03	4.34	23.20	187.20	141.91	31.46
17	2.62	40.73	4.31	4.40	25.00	238.28	261.14	2483.59	2754.71	2102.29	2827.28	262.84	917.27
18	234.81	3.06	2.76	3.40	3.40	4.51	5.47	77.98	642.38	230.77	2757.69	245.64	350.99
19	2.91	123.944.6	2	4.08	3.58	4.07	4.70	5.84	125.72	193.76	629.41	5.18	92.32
20	4.34	4.34	4.72	3.21	3.25	3.53	3.91	4.94	18.4244	.67	282.85	42.82	35.08
													548.31

Otpimistic market -scenario hydrothermal plus thermal equivalent to wind - inflow 12 (911bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 911b in12							
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	594.22	351.22	478.82	292.15	174.09	286.24	441.11	654.34	1352.15	1226.83	1438.16	3802.64	924.33
3	765.82	0.76	0.67	0.69	0.68	0.69	0.79	227.27	919.68	1192.35	1374.34	0.77	373.71
4	0.80	0.89	0.79	0.81	0.80	0.82	0.90	192.28	1057.55	1174.28	3895.79	0.88	527.21
5	0.90	1.06	3.57	3.37	10.65	400.21	789.61	926.94	3758.94	964.24	3674.50	1026.78	963.40
6	1.07	1.18	1.24	1.22	1.16	1.46	53.13	544.37	1142.94	3139.59	3428.72	1.16	693.10
7	1.16	1.34	1.21	1.25	1.33	1.72	11.30	377.51	954.26	908.26	1060.23	1.31	276.74
8	1.31	1.51	1.63	1.78	1.99	97.62	467.52	915.90	1073.73	2970.99	3287.99	902.03	810.33
9	1.50	1.72	1.55	1.60	1.60	1.92	2.36	7.64	148.28	415.18	798.78	579.28	163.45
10	1.70	2.68	2.82	2.75	89.68	439.81	600.91	659.37	2905.72	2633.81	2978.57	2535.36	1071.10
11	5.18	2.04	2.12	2.11	2.73	3.40	38.54	181.21	706.02	2549.97	2908.62	9.57	534.29
12	1.99	2.51	2.52	2.98	3.61	89.25	157.05	512.01	675.75	2466.24	2670.00	2.13	548.84
13	4.23	2.36	2.18	2.25	2.18	2.25	2.23	2.67	3.77	26.56	198.12	33.63	23.54
14	2.28	175.253.4	3	2.40	3.05	3.69	4.38	26.63	512.07	228.63	573.06	208.02	145.24
15	2.42	2.74	2.47	2.55	2.47	3.15	4.03	8.73	535.61	175.95	2461.25	190.82	282.68
16	2.57	2.90	2.62	2.70	2.62	2.75	2.66	3.20	4.58	5.68	50.45	28.43	9.26
17	2.76	12.50	4.54	4.65	6.06	144.29	154.75	1744.27	1983.14	1658.08	2046.99	156.46	659.87
18	64.07	3.22	2.91	3.58	3.57	4.74	5.74	17.00	205.57	62.36	1986.13	69.25	202.35
19	3.05	30.00	4.84	4.28	3.76	4.27	4.93	6.12	23.3346	.64	200.49	5.42	28.09
20	4.54	4.55	4.94	3.35	3.40	3.69	4.09	5.16	6.82	8.13	178.67	8.43	19.65
													444.15

Otpimistic market -scenario hydrothermal with wind addition - inflow 12 (912in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
						Costs 912in12							
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	594.22	351.22	478.82	292.15	174.09	286.24	367.79	586.81	1173.63	1059.81	1259.30	3175.98	816.67
3	778.14	0.79	0.70	0.72	0.71	0.73	0.77	170.18	773.70	1007.59	1201.59	0.80	328.04
4	0.83	0.92	0.81	0.84	0.82	0.84	0.89	72.58	902.55	1012.49	3143.02	0.91	428.13
5	1.00	1.11	1.34	2.13	9.72	361.49	645.11	707.86	2418.41	703.27	2510.27	838.49	683.35
6	1.10	1.19	1.22	1.22	1.15	1.43	19.41	415.27	834.94	2033.01	2335.12	1.14	470.52
7	1.15	1.34	1.21	1.25	1.32	1.67	7.00	281.94	695.75	579.31	816.50	1.27	199.14
8	1.29	1.49	1.60	1.75	1.93	96.89	393.06	615.66	778.76	1916.74	2235.39	732.09	564.72
9	1.51	1.70	1.53	1.59	1.58	1.82	2.16	2.53	82.07	121.02	570.49	442.26	102.52
10	1.64	4.14	2.70	2.66	117.55	383.61	464.72	441.20	1594.28	1469.68	1825.94	1655.29	663.62
11	11.80	1.99	2.06	2.07	2.62	3.08	28.51	113.10	437.04	1418.12	1780.89	3.46	317.06
12	1.90	2.43	2.43	2.87	3.41	80.52	120.36	158.83	414.16	1366.60	1626.36	1.98	315.15
13	3.80	2.30	2.14	2.22	2.12	2.13	2.08	2.38	3.16	3.86	100.82	12.40	11.62
14	2.17	354.963.2	7	2.35	2.91	3.32	3.77	4.30	111.82	94.91	150.77	121.43	71.33
15	2.30	2.63	2.39	2.48	2.38	2.89	3.52	4.37	116.97	29.33	1099.10	108.19	114.71
16	2.42	2.78	2.52	2.62	2.51	2.56	2.44	2.81	3.77	4.48	17.45	7.33	4.47
17	2.59	13.46	4.22	4.38	5.48	45.518	8.70	665.28	709.44	375.09	842.92	26.70	227.82
18	41.76	3.07	2.78	3.42	3.38	4.20	4.83	5.29	22.61	6.04	810.32	21.04	77.40
19	2.84	29.18	4.49	4.06	3.55	3.85	4.27	4.80	5.50	6.21	31.00	4.51	8.69
20	4.10	4.26	4.59	3.23	3.24	3.39	3.65	4.23	5.19	5.90	24.51	6.46	6.06
													301.85

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion -inflow 12 (913in12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913in12													
1	0.59	0.51	0.46	0.47	37.41	412.26	688.41	944.17	1480.86	1324.64	1518.95	1101.95	625.89
2	594.22	351.22	478.82	292.15	174.09	286.24	367.79	586.81	1173.63	1059.81	1259.30	3175.98	816.67
3	778.14	0.79	0.70	0.72	0.71	0.73	0.77	170.18	773.70	1007.59	1201.59	0.80	328.04
4	0.83	0.92	0.81	0.84	0.82	0.84	0.89	72.58	902.55	1012.49	3143.02	0.91	428.13
5	1.00	1.11	1.34	2.13	9.72	361.49	645.11	707.86	2418.41	703.27	2510.27	838.49	683.35
6	1.10	1.19	1.22	1.22	1.15	1.43	19.41	415.27	834.94	2033.01	2335.17	1.15	470.52
7	1.14	1.29	1.17	1.22	1.37	1.74	17.77	344.95	776.45	579.33	2285.33	1.22	334.42
8	1.21	1.38	1.58	1.76	1.99	265.78	495.73	615.72	2163.03	1916.88	787.83	732.17	582.09
9	1.38	1.52	1.37	1.49	1.68	2.19	2.56	23.51	303.04	366.46	570.60	519.74	149.63
10	1.43	9.70	8.26	2.75	405.53	498.82	496.85	1606.17	1594.45	1469.85	1826.12	430.27	695.85
11	3.81	1.72	2.08	2.07	2.90	26.70	124.76	355.16	437.15	1418.29	1781.07	3.47	346.60
12	1.64	2.46	2.54	3.07	18.63	135.80	379.15	158.94	1510.04	1366.76	1626.54	1.72	433.94
13	4.63	1.98	1.84	1.90	1.83	2.01	2.59	3.23	16.28	105.36	161.45	26.54	27.47
14	1.87	689.118.3	1	2.02	3.27	3.70	4.23	23.53	141.18	95.00	1135.10	101.30	183.64
15	1.98	2.26	2.05	2.13	2.75	3.52	4.33	31.59	130.99	790.76	1099.26	108.29	181.66
16	2.08	2.38	2.16	2.24	2.15	2.36	3.00	3.90	13.5611	.09	101.07	22.48	14.04
17	2.23	42.32	4.48	4.51	18.93	149.20	38.80	665.43	709.58	375.23	843.07	781.74	302.96
18	10.87	2.63	2.39	3.57	3.47	4.62	5.45	5.95	22.77	257.75	810.47	21.14	95.92
19	2.45	27.03	4.39	3.89	3.43	3.90	4.54	5.25	6.00	6.42	32.81	4.35	8.71
20	3.90	4.10	4.76	2.76	3.35	3.50	3.88	4.65	5.83	6.63	28.38	6.81	6.55
													335.80

Otpimistic market -scenario hydrothermal with wind addition and hydro expansion and thermal reduction -inflow 12 (913bin12)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Costs 913bin12													
1	0.59	0.51	0.46	0.47	37.41	412.48	688.73	944.57	1481.38	1325.12	1519.47	1102.39	626.13
2	594.51	351.42	479.08	292.15	174.09	286.24	368.00	587.11	1174.11	1136.74	1336.57	3320.87	841.74
3	844.41	0.73	0.65	0.67	0.65	0.67	0.71	212.38	834.43	1082.53	1278.85	0.75	354.78
4	0.78	0.86	0.76	0.79	0.77	0.79	0.83	192.97	968.33	1089.41	3284.36	0.85	461.79
5	0.95	1.05	2.96	18.63	56.71	524.17	780.00	849.60	2651.90	842.46	2753.44	983.58	788.79
6	1.00	1.09	1.11	1.11	1.05	1.31	79.40	592.06	973.19	2269.05	2578.20	1.06	541.64
7	1.05	1.19	1.08	1.13	1.26	1.61	75.96	447.76	912.61	796.64	2528.28	1.14	397.48
8	1.13	1.29	1.47	1.64	1.86	360.45	695.25	840.47	2396.24	2152.73	929.34	877.12	688.25
9	1.30	1.43	1.29	1.41	1.54	2.01	17.29	110.43	452.81	532.09	847.61	794.85	230.34
10	1.31	68.317	5.03	55.25	579.08	760.71	769.97	1929.37	1904.25	1784.38	2156.16	610.37	891.18
11	66.09	1.59	1.92	1.91	2.69	116.15	413.05	528.59	606.11	1732.69	2110.97	26.15	467.33
12	1.52	2.29	2.37	2.86	102.64	430.93	553.34	500.23	1819.59	1681.03	1956.18	1.60	587.88
13	69.52	1.85	1.72	1.79	1.71	1.88	2.43	3.04	92.95	375.02	497.21	123.52	97.72
14	1.76	977.538.1	2	1.90	3.07	5.95	17.06	116.94	448.92	353.53	1587.71	371.97	324.12
15	1.86	2.14	1.94	2.01	2.60	3.33	4.54	137.37	427.28	1041.41	1546.82	190.23	280.13
16	1.97	2.25	2.05	2.12	2.04	2.23	2.84	3.70	88.1844	.77	176.64	116.79	37.13
17	2.12	146.594.2	6	4.29	110.77	478.11	157.54	903.49	936.97	796.86	1082.95	1037.40	471.78
18	45.81	2.51	2.27	3.40	3.31	4.40	9.47	35.12	113.79	759.07	1050.26	115.65	178.76
19	2.34	110.754.1	9	3.72	3.27	3.73	4.34	5.01	25.8427	.63	137.41	4.16	27.70
20	3.73	3.92	4.55	2.65	3.20	3.35	3.71	4.45	5.58	19.12	127.47	16.15	16.49
													415.56

BIBL. LOEDTH. UNIV.