

Book Review Essay

Energy, Governance and Sustainability

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This work is divided into three sections: 1. Foundations, 2. Experiences and 3. Governance Gaps. However, it contains XIV chapters, each of which is written by an expert in the field. For example, Erin Daly, former Vice Dean of the Delaware Law School, focuses on environmental constitutionalism and good practices; Klaus Bosselmann, co-founder of the first institute for environmental law in Berlin, discusses Germany's experiences of environmental law; and, Cristiane Derani, with expertise in the environmental arena dating back to 1991, argues why agriculture, energy and development are currently under a strained relationship.

This book brings together an important number of academics focusing on environmental law and energy, each part comprising of original cutting-edge research in this field, providing global examples of how regulation can improve practices, policies and future directions and recommendations related to *Energy, Governance and Sustainability*.

The book, in its first part (Foundations) explores and provides a vast background on how enhancing 'carbon taxation' through novel concepts such as 'climate rent', could eventually make fossil fuels 'uneconomical'¹. In this sense, Bosselmann In Chapter I, argues how even though climate change is a global threat, local governments and communities, to some extent, are doing more to combat global warming than the 'global community' in itself (presumably the collective members of the UN) and how, as a consequence, the trend shifts from global to local solutions. To this end, this chapter proposes the alternative solution of shifting the current paradigm of state-centered to Earth-centered governance. In other words, Bosselmann shows how the general discourse is moving away from internationally negotiated targets to domestically driven reforms with genuine climate responsibility.

Moreover, Daly & May in chapter II, provide examples of how to address environmental rights through constitutionalism, with particular guidelines for the development of shale

¹ The transition in which fossil fuels can become uneconomical could be done by assuming some kind of common property in which the concept of climate rent reflects common ownership and common responsibility. By considering this idea, Bosselmann suggests three main outcomes that can be delivered: 1. a successful taxation to common good, 2. international cooperation and 3. National Action Plans.

gas. This section usefully gives examples of relevant provisions written into the Constitution of the United States to illustrate how some states have enacted legislation that promotes the implementation of unconventional shale gas and how the US Congress has not exhibited much enthusiasm yet for regulating it. Chapter II, at the same time, flags the importance of Courts in this issue, as at a national level, they are currently resolving policy questions about shale gas development, more in-depth within the constitutional context. To illustrate this, Daly & May use the *Robinson Township* – decision from the Pennsylvania Supreme Court as an example of good practice in environmental constitutionalism, with the aim of fostering advance practices in shale gas governance and development. In *Robinson Township v. Commonwealth* 108A.3d 901 (Pa. 2013), the Supreme Court ruled that state agencies and judges will have to pay more attention to the public's right to clean air and water when making permit decisions, in accordance with Section 27 of the Declaration of Rights in the Pennsylvania Constitution².

Furthermore, in this first part, future challenges are identified, such as the questionability of achieving environmental justice through the use and application of multi-dimensional perspectives -mainly because the concept of 'environmental justice' remains contingent upon the sociological, political and cultural context in which it is meant to be applied. Finally, it is explained with a case study in Kenya, how access to energy, specifically, renewable energies can operate as one of the main drivers for poverty alleviation, as these technologies are frequently cheaper than conventional fuels in underdeveloped rural areas.

The second part of the work (Experiences), starts by providing a case study of Singapore, as an example of what a smart city should be like. In this sense, one of the central characteristics of these cities is the pursuit of sustainable development policies, in which the main aim is to reduce the growth of greenhouse gas (GHG) emissions. An example of a policy or regulation which drives forward this sustainable development objective consists in subsidizing energies –including renewables—to accelerate the growth of the green energy industry. For this, Singapore's government has set aside more than US\$640 million to fund research and implement clean energy programs such as the Design for Efficiency (DfE) scheme. Later, Daya-Winterbottom, offers the perspective of a New Zealand case study, considering how resource management regulation as a tool can help restrict environmentally damaging forms of energy production. He also provides specific details on how New Zealand's geography helps it in the utilization of renewable energies and hence achieve its target of 90% of electricity generation from renewables.

In the following chapter, Guerry focuses on the legal requirements to achieve an energy transition. In this sense, for a better understanding, she guides the reader through a comparison of the political evolution of energy transitions in Germany and France, whilst providing a brief history of the construction of the concept. This is useful because

² "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people." PA. CONST. art. I, § 27 (the "Environmental Rights Amendment").

the concept of energy transition has many meanings. Hence, in order to clarify them, Guerry suggests two main connotations: the first, referring to a governmental strategy in which the main objective consists of transforming one system of energy production and consumption into a more sustainable one. Whilst the second mainly refers to a cultural change in which the main objective is to harmonize the link between humans and nature.

Parejo-Navajas is the author of Chapter XI, '*learning from Europe: some ideas for the energy improvement of the US existing building stock*'. In this chapter, she provides insights on how to create improvements in energy efficiency of existing building stock whilst enhancing a regulatory package for energy efficiency measures. In this sense, she recommends that relevant European Union regulations, such as energy labelling for home appliances can be replicated in the United States, mainly as she argues that energy efficiency measures play a key component in the fight against climate change.

From sustainable buildings to sustainable sewage, this is the last chapter of part II. In this chapter (which is nicely reminiscent of the formative work by Jamie Benidickson, *The Culture of Flushing: A Social and Legal History of Sewage* (UBC Press, 2007)) Scanlan provides the reasons why improving and cleaning sewage facilities is necessary if we want to reduce national carbon footprints. This is an incredibly novel chapter and one that actually does flag up some serious issues. This chapter highlights the unknown renewable energy potential within the urban sewage system, which can simultaneously help deliver two benefits: 1. reduction of greenhouse gas emissions and 2. Improved energy costs. Scanlan focuses on three mini case studies to illustrate national best practices already being implemented in Austria (1) and the United States (2).

Part III, Governance Gaps, commences by outlining how, despite the fact that the oil industry is a profitable industry, its exploitation comes with serious human and environmental costs, - largely attributable to oil spills, gas flaring, habitat destruction, water and air pollution and land degradation. As a consequence of these hideous effects, in some cases, people are environmentally-displaced. In this scenario, one of the main challenges to be achieved is to attain justice for them. Okonkwo illustrates this situation with Nigeria's case, as oil accounts for more than 80% of the government's budgetary revenue and for around 90% of exports. She concludes that there is a need for a new framework to be built on internationally agreed principles that can be legally enforceable mainly by including environmental damage that forces people to migrate. In addition to this, she also highlights the importance and urgency to start challenging governments—in this case Nigeria—for failing in protecting citizen's rights.

The last chapter is written by Christiane Derani, in which she analyses the relationships between agriculture and energy production and agriculture and markets and explores what these entail within human relations. Later in this chapter, Derani provides an in-depth analysis of the trinomial relation between energy policy, markets and agriculture by highlighting the premise that without the production of sustainable energy, achieving sustainable development is not possible. In this sense, to conclude this chapter, Derani provides a set of recommendation for current policies, followed by future directions in the energy market arena.

Part I Foundations

Chapter I: *Germany's 'Energiewende': what can environmental law scholarship learn from it?*

Klaus Bosselman

This chapter, firstly explores the role of environmental lawyers in achieving energy transitions and ecological sustainability, as the main targets in the realm of environmental law. The main thesis of Bosselman is that through accurate regulation, public goods can be protected. By providing this background, Bosselman focuses on Germany as a case example, addressing energy issues from the perspective of the 'ecologicalization' of the law, which mainly comprises an attempt to conceptualize human rights and legislation from an ecological perspective. This idea, started during the 1980s and was based on a jurisprudential debate around the rights of nature. Currently, the concept asks how ecological boundaries can help in defining future generations' human rights and make the State responsible for achieving 'sustainability'. The definition of 'sustainable' to which Bosselman refers is the one found in 1987 United Nations Report *Our Common Future*³.

Continuing with the subject of ecological sustainability as a main goal, Bosselman provides a background of the origins of ecological integrity⁴, the main aim being to:

Maintain or restore marine, terrestrial and freshwater sites on public conservation lands and waters to a healthy, natural functioning condition
(Department of Conservation, 2009, p. 17)

Moving forward, Bosselman jumps into a common good owned by all and by no-one at the same time: the atmosphere. This good cannot be commercialized, privatized or nationalized and it has deteriorated over the last centuries, as it was in a regulatory "no-man's land". In this context, law plays a powerful role to protect the atmosphere, since it can lead to global agreements such as carbon taxing - an element of the polluter pays principle - to ensure global action through international treaties, and promote global cooperation within the concept of the "sovereignty paradox"⁵. Bosselmann also calls for a 'global civic ethic' as in the UN-initiated Commission of Global Governance, to achieve social justice, intergenerational justice and ecological integrity, whilst simultaneously, recommending institutional reforms based on a partnership between states and civil society. This chapter is useful since it provides options on climate governance; whether through international negotiations or local initiatives, we as a society, should expect a gradual improvement in this area.

³ "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

⁴ Its origins are found in the 1972 US Clean Water Act followed by the 1974 Great Lakes Water Quality Agreement between Canada and the United States.

⁵ This concept is based on the notion that if nations want to win back their policy-making capacity, the best way to achieve this is by cooperating with each other.

Moving on to Chapter II: *10 Good Practices in Environmental Constitutionalism that can contribute to Sustainable Shale Gas Development*, James R. Mary and Erin Daly, inform us that the adverse effects of employing shale gas development can be seen in water quality impact, methane leakage (both affecting human health and biodiversity) and community disruption. To this end, May and Daly provide ten good practices in environmental constitutionalism to achieve environmental sustainability in the development of shale gas reserves. They do this by providing constitutional cases in which the law establishes specific restrictions to ensure environmental protection and aver that by achieving these safeguards, human rights can simultaneously be guaranteed.

Next we have Chapter III, *Human Rights Vs. Human needs: debating the language for universal access to modern energy services* by Manuel Peter and Samonte Solis.

Here, Peter and Solis cover the dichotomy issue of human rights Vs. human needs, illustrating how energy poverty keeps marginalizing the poorest by limiting basic human 'needs'. In this sense, by following Waldon's premise, 'needs' draw the path to establish human rights. Solis and Peter focus in finding the differences between 'needs' and 'rights', which can be summarized as follows: rights constantly demand action and accountability; rights keep evolving by not remaining static over time and seek to adapt to human nature, and, rights are always targeting institutions for their recognition, fulfilment and immediate implementation. Needs, on the other hand, remain on the realm of language and as a result, stay passive; needs could be used as a governmental discourse, are mainly considered as inherently related to human rights satisfaction and are related to attaining human dignity. In this sense, framing issues as a 'need', will take longer to tackle, therefore, the necessity to use appropriate language in relation to specific issues and demand immediate action. Overall, this chapter's main argument flags that the "*language of rights has greater potential to accommodate and successfully articulate the significance of access to modern energy services within its moral and systematic practice*" (Peter and Solis, 2016). This is mainly due to the fact that the language of rights demands action and accountability that is continuous and in most cases, is persistent until the provision being sought is fully and actually enjoyed.

Elodie Le Gal, in her Chapter IV: *Social science perspectives on risk to implement an environmental justice analysis*, links 'risk' research, social sciences and environmental justice to produce evidence as to why communities reject low-carbon energy projects. Le Gal, so as to provide a better understanding on this subject, narrates the evolution of environmental justice, from its 1970's origins as a civil rights movement intrinsically linked to the idea of environmental racism. However, the concept of environmental justice has arguably evolved over the years in complex ways. Nowadays, environmental justice seeks to protect and empower communities "*with tools to strengthen their resilience against the potential adverse social spillovers generated by environmental risks that have been materialized*" (Gal, 2016). The main contribution of Le Gal, consists of the idea that current environmental justice issues emerge in the transition towards a clean energy future. Nonetheless, there is still a gap in the research that needs to be covered, that is to say, we need to focus on the environmental injustices that arise in low-carbon energy contexts. In this sense, it is necessary to acknowledge that through

the use of systems-thinking and by linking research on risk, environment and social sciences, the design and implementation of policies can avoid environmental injustice risks from low-carbon energy technologies.

Chapter V: *Scaling up local solutions: creating an enabling legal environment for deployment of community-based renewable micro-grids* allows Jessica Wentz and Chiara Pappalardo to pinpoint in this section, access to energy as a main driver to alleviate poverty, increase economic growth in rural communities and achieve social progress. However, having access to electricity will not automatically lead to this. In this chapter, Wentz and Pappalardo argue that energy access is more likely to achieve such results when electricity is used for productive purposes with the aim of enhancing income and welfare. In rural communities, these activities can be developed mainly in the fields of agriculture, rural enterprise, health and education. An example of this happened in Kenya with the Mpeketoni Electricity Project (MEP). In this case, the community-owner project contributed to achieving a high degree of rural development by having significant impacts on local economic and social development. It could be said that access to electricity boosted the productivity of the worker by 100-200 percent and at the same time, improved financial institutions, education and local businesses. In this context, Wentz and Pappalardo suggest that a community-based approach would enable a better understanding of the local conditions where the project will take place. Simultaneously, this approach would help in assessing energy demand, the population's income (ability to pay), and with deciding which productive activities the communities would be able to develop if they have access to electricity. This section also addressed the regulatory barriers such as tariff restrictions, financial constraints for micro-grids and provides three informative case studies to illustrate that this approach, with directed and 'personalized' implementation of national policies and projects, can deliver more benefits.

PART II of the work delves into **Experiences**, commencing with Chapter VII: *Energy and Smart Cities: perspectives from a city-state, Singapore* by Lye Lin-Heng and Melissa Low.

According to Lin-Heng and Low, smart cities comprise three main elements: 1. low carbon generation, 2. efficient distribution and 3. optimized consumption. These factors combine to achieve economic development, public safety, energy and human services (including health). The role of law in smart cities plays a key role, with the starting point being that individuals possess the right to a healthy environment. Also, laws provide clearer structures through which to address and enhance environmental policies and influence individuals' behavior. Singapore's application of the polluter pays principle is remarkable, since they apply this principle to car ownership through a new carbon emission-based scheme.

Next we have Chapter VIII: *Judicial perspectives on renewable energy* by Trevor Daya-Winterbottom which illustrates how judicial perspectives in New Zealand can operate as a means for achieving strong commitment to reducing GHG emissions and uptake in the use of renewables. For example, regarding the use of wind energy and how turbines impact 'visual pollution' Daya-Winterbottom stresses how the benefits of implementing

these technologies outweigh the drawbacks in terms of environmental impacts and economic costs. Certain circumstances, however, will affect this decision, such as, for example, when the land is sacred for the community. Hence the necessity of identifying optimal wind generation areas for its implementation. Regarding the use of tidal energy, this chapter considered the *Energy Kapairā Ltd v. Northland Regional Council* case. Here, a cost-benefit analysis was not necessary, but instead, the implementation of a robust environmental plan to monitor periodically the activities of the project, mainly those that could affect commercial fisheries, marine fauna due to noise, endangered species and Maori's cultural values, was required. To monitor the project, the Court decided that the best approach was to divide it into three stages: in order to proceed from stage one to two, minor damages would have occurred during stage one, and so on. This innovative case highlights how a tidal project should proceed, with better anticipatory measures in terms of locations and marine spatial planning.

Anais Guerry in Chapter IX offers us A reflection on some legal aspects of decision control in the energy transition process: a comparison of France and Germany. Here she asserts that 'energy transition' designates different approaches, from new energy services, new business energy models, to a moral imperative to save the world for the sake of future generations. However, broadly speaking, the term refers to a governmental strategy to switch energy use to a new sustainable model. At the individual level, it seeks a cultural change between individuals and their environment in order to harmonize the relationship between both. The term energy transition, from this perspective, demands individuals to participate to achieve this 'global change' as human activities have a direct effect on the natural functioning on the planet. In this context, Guerry argues that communities possess the potential to organize themselves and live autonomously in their local area and react to environmental crises by adapting to them and not breaking down. Implementing this, however, requires that the civil society take advantage of existing legal tools such as the French Energy Transition Act or the German Renewable Energy Act, in order to influence local governments and then, scale it up to broader reaches. In other cases, catastrophes such as Chernobyl 1986, can push societies to cooperate and demand, for example, the city council to switch to renewables as happened in Schonau, Germany. This case illustrates how local citizens forced a local referendum through the introduction of a popular initiative to provide the city with renewable energy. However, as the association won the referendum, they were forced to assume the responsibility for the distribution of electricity in the town. In order to do so, individuals founded a cooperative named *Elektrizitätswerke Schonau* (EWS). This is a successful story as EWS became the first German electricity operator to use only renewables and as a consequence, it is seen as a symbol of responsible energy worldwide.

The history of the energy transition concept arguably originates from 1970's USA, when Amory Lovins argued that renewable and efficient energies can replace fossil fuels⁶. Nonetheless, this idea did not fully materialize until the 1990's when it was introduced as a legislative strategy in Germany. In France's case, the expression takes place circa

⁶ Amory Lovins, *Soft Energy Paths: towards a durable peace* (Friends of the Earth International, 1977)

2002 and it is arguably more accurate to associate this concept with the idea of a profound change in the current model of energy production and consumption, focusing mainly in switching from the consumption of heavy fuels to the production of less intensive carbon energies.

In Chapter X: *Learning from Europe: some ideas for energy improvement of the US existing building stock* we are offered some pragmatic insights by Teresa Parejo-Navajas as to the best ways to reduce GHG emissions from buildings, namely through improving energy efficiency systems and operations, as well as investing in on-site power generation. This investment needs to be done now, as existing buildings are responsible for 41% percent of energy consumption and 36% of CO₂ emissions in the EU, and 39% of total energy use and around 38% of CO₂ emissions in the United States⁷.

However, there are complications in reducing GHG emissions from buildings in the EU, as energy codes in Europe are implemented and enforced by local governments. Hence the importance of the following streamlined EU Directives regarding energy efficiency standards for both the new and the existing building stock. To illustrate this, a set of Directives were implemented. In this particular matter, the most important for Parejo-Navajas, are the following:

- i. Directive 2009/28/EC applies to the building stock and it obliges Member States to set-up specific targets for renewable heating and cooling.
- ii. Directive 2009/125/EC: known as the eco-design Directive which sets the minimum efficiency standards for technologies used in the building sector (ventilation, boilers, pumps, etc.). In this sense, inefficient products or with poor performance are remove from the market.
- iii. Directive 2010/30/EU: this Directive is on energy labels, which obliges Member States to establish efficiency labeling schemes for a number of technologies used within the building sector. The primary element of the label is a seven-class scale, ranging from A-G, this can be extended to A+, A++ and A+++ and the lowest class will be those marked with F,E or D. The main aim of the labelling is to inform consumers and empower them to make better informed decisions. However, Parejo-Navajas should also mention a way to improve labelling as many consumers are not familiar with the meaning of the labels. According to Thaler and Sustein⁸, a better way to label products for example, will be if the label contains information on how much money consumers will save if they decide to buy the product.
- iv. Directive 2010/31/EU: aims to encourage Member States in the introduction and adoption of intelligent energy consumption metering systems by the time a building is constructed or when is going through major renovations⁹.

⁷ European Commission, *Report from the Commission to the European Parliament and the Council, Financial Support for Energy Efficiency in Buildings, Staff Working Document, COM (2013)225 final* (2013)

⁸ Thaler, R., & Sunstein, Cass R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, Conn.; London: Yale University Press.

⁹ Currently, the UK is aiming that by 2020 most households will have smart meters as a strategy to reduce household energy consumption at the domestic level.

- v. Commission Regulation (EU) 244/2012: this Regulation establishes a comparative methodological framework for calculating optimal cost levels of minimum energy performance requirements for building and the elements within the building.
- vi. Directive 2012/27/EU establishes a common framework for the promotion of energy efficiency within the Union, with the aim of achieving the 2020 20 percent¹⁰ energy efficiency target. It sets a roadmap for further energy efficiency improvements beyond that date and states an obligation to renovate central government buildings taking into account, outdoor and indoor climatic requirements, local conditions and cost effectiveness.
- vii. Directive 2012/27/EU: obliges EU countries to establish financing facilities for energy efficiency measures which is very much related with the energy performance contracts (EPCts).

According to Parejo-Navajas, even though these Directives exist, there are still some barriers to tackle. For example, more than half the EU member states do not have any specific regulation for existing buildings and when Member States need to present their reports, they are not detailed enough, or in some cases, they describe an overly optimistic picture. This occurs at the same time that statistical data about energy performance of buildings is irregular¹¹ in most the EU countries.

In addition to the legislation, Parejo-Navajas identifies a series of incentives that have been introduced over eight categories: 1. preferential loans, 2. subsidies, 3. grants, 4. third party financing, 5. trading (white certificates/energy certificates), 6. tax rebates, 7. tax reductions and 8. value added tax (VAT). Nonetheless, regarding the EU's experience, Parejo-Navajas avers that the best method for regulating energy consumption is to introduce a carbon tax on both households and businesses along with the objective of reducing the use of coal and increasing the share of renewables. As a consequence, imports decrease through lowering private energy consumption. Parejo-Navajas refers to another case study, "The Green Deal" in the UK, as this eliminated the need for the consumer to pay up-front for energy efficiency appliances and instead of this, consumers pay the cost of the measures by savings on the electricity bills¹².

Melissa K. Scanlan's Chapter XII: *Sustainable Sewage* offers the reader a truly informative sojourn into a less-familiar regulatory concern – that of energy recovery from sewage. This makes perfect sense, as Scanlan points out, there are many (arguably constant) sources of renewable energy in sewage facilities, but the biggest of all (no pun intended!) are biosolids, which can be anaerobically transformed to create biogas. This works as follows: the heat from the power generation units can be recovered and later be used to heat the digesters¹³. As a result, the production of biogas has the potential

¹⁰ The 20-20-20 targets are 20 per cent reductions in greenhouse gas emissions from 1990 levels by 2020.

¹¹ According to a recent review of EU methodologies for energy benchmarking, at the European Level, the unavailability of building energy use databases has restricted the development of benchmarking tools.

¹² The Green Deal, however was disbanded by Ofgem in 2015 two years after launching, as it not only increased supplier's costs but also energy bills.

¹³ Louise Downing, 'Severn Trent "Poo Power" Helps Fuel homes, Save on costs', Bloomberg, 1 October 2014, available at <https://about.bnef.com/blog/severn-trent-poo-power-helps-fuel-homes-save-on-costs/>

to displace the wastewater treatment facility's use of fossil fuels. Moreover, another benefit of this approach is that when contaminants are removed, biogas can be used as a vehicle fuel or the methane can be turned into liquid biofuel, methanol. The importance in switching the current paradigm is that currently, treating water is an energy-intensive process, with an average flow of 10 million gallons per day used, as much energy as almost 3,000 average households in the US. In addition to this, the costs of running these facilities in the United States alone can go up to 4 billion USD. In the US, the emissions resulting from wastewater facilities accounts for 2.2 % of methane emissions and 1.2 % of nitrous oxide emissions.

Municipal wastewater contains three different types of energy that can be utilized:

- 1- Thermal energy or heat energy: this is energy contained in the wastewater which operates under the specific heat capacity of the water itself.
- 2- Hydraulic energy: this source of energy can be divided in two types:
 - a. Kinetic energy: the result of the energy obtained from the movement of the water (velocity).
 - b. potential energy: the energy due to water elevation
- 3- Chemical or calorific: the energy content stored in the various organic chemicals in the wastewater.

To successfully achieve a transformation in the sewage systems, Scanlan points out that it is necessary to follow the next two steps: firstly, we need to change the treatment process from 'aerobic to anaerobic or alternatively, from anoxic to microbes'. And secondly, we need to capture the energy contained in the sewage and mobilize it to power the municipal wastewater treatment facility. In case there is a surplus, the energy can be used to power other nearby energy users. This is with the purpose of reducing the dependence on fossil fuels energies. This chapter has shown us that there is a necessity to redesign sewage treatment facilities to be more energy efficient or alternatively, to recapture for use or sale, the energy contained in sewage, as with this, GHG emissions reductions can be achieved whilst simultaneously gaining economic savings from energy efficiency measures.

Finally, the compendium enters **Part III**, with an exploration of **Governance Gaps**. Chapter XIII, *Environmentally Displaced Persons in the Niger Delta, Challenges and Prospects* by Eloamaka Carol Okonkwo kicks off the substantive case-study component of the work.

Most of the attention regarding oil exploitation focuses on environmental and health damage. However, Okonkwo concentrates on the socio-economic impacts of this industry and evaluates how these activities can lead to environmental displacement. To have a better understanding of the context, Okonkwo considers three definitions of environmentally displaced people¹⁴ and highlights that in all three, there are common components. The major similarity that appears are the terms 'traditional habitat, traditional homeland and habitual residence'. In all three, as well, the definition of 'life' and 'force' implicitly appeared. There are three main characteristics of environmental refugees: 1. temporarily displaced due to catastrophes, 2. those that are permanently

¹⁴ The definitions that are taken into account are by El-Hinnaw with the main reference point being the refugee's perspective and restricted internal movement. Myers and Kent, on the other hand, considered both internal and external movement

displaced due to drastic environmental changes and 3. those that need to migrate due to the gradual deterioration of their environmental conditions. However, the definition used in this chapter is the following:

Any person who, as a result of a natural disaster, gradual environmental changes, and/or human-induced environmental stressor that threatens his life or physical integrity, is forced to relocate elsewhere because of the incident, and is unable to seek aid from the country where he has relocated to, or the country of his nationality, if relocation is internal (Okonkwo, 2016)

For the specific case of the Niger-Delta, oil-related activities entail the following impacts: destruction of tourism facilities and reduction in hospitality industries; destruction of cultural and spiritual areas, conflicts, violent clashes with police, forced evictions and displacements. In some cases, death could ensue as a result of all of them. In addition to the social impacts, agricultural and farm lands have been damaged and degraded, as well as, fish and wildlife. As a result of damaging fisheries and agriculture, the income of peoples living from this activity is also affected. As a consequence of this constant living standard deterioration, people from the Niger Delta started to protest against the environmental degradation, simultaneously to this, vandalism within disenfranchised groups of youths significantly increased, moving from kidnapping to militancy and terrorism.

Given this scenario, it could be said that, indeed, environmental degradation can lead to many displacements without providing any alternatives – at least in the Niger Delta—and the collapse of local economies and civil norms. In these circumstances, there is a necessity to create a novel framework to protect environmentally displaced people. In addition, to enhance this new framework, the implementation of a guiding principle to make countries accountable would be highly valuable, as with this, it would be easier to accomplish compliance monitoring and assist in the delivery of reports to international institutions. If more attention would focus on this issue, the creation of NGO's would take place to defend the rights and interests of the displaced people.

In the final chapter, Chapter XIV, *Agriculture, Energy and Development: an uneasy relationship*, Christiane Derani informs us that as a result of the World War II the world witnessed the emergence of a completely new way of producing food and distributing it around the world. Even though this change brought some positive outcomes, it also produced concerns regarding environmental toll, rural workers, subsistence agriculture and conflicts among farmers practicing industrialized commercial agriculture. Among the practices that provoked the increase of agricultural production were the uses of oil-power transportation and crop conservation. Both activities helped to improve product quality but also increased the production scale, and with that, came the necessity for the application of chemical fertilizers, pesticides and preservatives.

Currently, at the top of 'globalization', the agriculture fields shows a spatial concentration of food, feed and biomass production areas which require a complex web of transport distribution. All these activities bring as a consequence, high levels of energy and materials consumption. The synergies of these practices result in rising urbanization, decreasing fertility of soils, climate change with extreme weather (droughts or heavy rain) among other negative effects. Plus the fact that the whole process of commercial agriculture is arguably completely inefficient in terms of energy

use. In this sense, and as was declared in the *Report on International Year of Sustainable Energy for All*¹⁵, sustainable development is not possible without sustainable energy. Under this scheme, according to Derani, the right path to follow is that of considering that energy sustainability requires the development of systems that help in supporting the optimal use of energy resources within an equitable and social approach, whilst simultaneously, minimizing all environmental impacts. It is important to mention that according to the Food and Agriculture Organization (FAO) around 30% of the world's energy consumption and approximately 20% of the total of greenhouse gas emissions are generated by the agriculture sector¹⁶. Achieving sustainable energy is not an easy task, although, for Derani, to accomplish this, the production structure should consider both the inflow of energy for the production and maintenance of the system and the entire flow of energy in the form of water, nutrients, and light ranging from agriculture products to food, feed and power generation. This energy flow for moving the factors of production and generating the product that is consumed during the process, needs to be regenerated to prove sustainable. Moreover, an important argument here is that energy is the foundation of human organization and is described on page 301 as following:

“The way in which humans acquire it and make use of it characterizes every social organization, especially its mode of economic production. Thus, any structural change made to energy sources, to the destination of energy, its conservation, dissipation or reuse, will impact in the structures of economic, cultural and social organizations (Derani, 2016)”

However, humans do not produce, rather they appropriate and direct material and energy to specific ends. During this transformational process, what enters in the economy is the natural value of resources and what is rejected, could be considered as valueless waste. The main outcome, and according to the law of thermodynamics, the energy or matter that is absorbed during the economic process occurs in the state of low entropy (appropriate free energy) and comes out in a state of high entropy (energy held in non-reusable chaotic disorder). This is followed by the second law of thermodynamics, which states that systems are continuously transformed into disorder. From this perspective, the cost of every biological or economic process is always bigger than the product created. As a result, in entropy's terms, the economic activities are always conducted at a deficit¹⁷.

Under the same Umbrella, Derani covers the expression 'renewable energy'. In this context, it is suggested that the energy source can be used for longer and more times due to the process of dissipation it goes through not leading directly to the exhaustion of the source, as happens with traditional fuels such as oil. For this reason, the use of

¹⁵ The Secretary-General. A Global Action Agenda Pathways for Concerted Action toward Sustainable Energy for All [Internet]. New York: United Nations; 2012. Available from: <http://www.se4all.org/sites/default/files/l/2014/01/SEFA-Action-Agenda-Final.pdf>

¹⁶ FAO. Greenhouse Gas Emissions from Agriculture, Forestry and Other Land Use [Internet]. Rome: United Nations; 2017. Available from: <http://www.fao.org/resources/infographics/infographics-details/en/c/218650/>

¹⁷ Nicholas Georgescu-Roegen. The Degrowth: Entropy, Ecology, and Economy. Senac 2013

solar and wind energy are the main examples of renewable energies as their sources are endless.

Given the current context in which there is major consumption of natural resources and the increment of all economic activities, there is a constant augmentation of energy input into the productive processes and thus agriculture. In this scenario, sustainability must find pathways within both national and international law. As a matter of fact, as Derani argues, these efforts were more visible in 1972 in the Declaration of the United Nations at the Conference on Human Resources in Stockholm. In which it is stated that here is the duty to adjust development without depleting planetary natural resources, but rather saving it for the future¹⁸. However, for Derani, there is still a need to develop a framework for a set of rules and production processes that integrate energy in a less dissipative and more efficient way, at national and international levels for the legitimacy of the rules.

Overall, the book *“Energy, Governance and Sustainability”* offers a fresh perspective on current environmental issues and how, in some cases, these can be addressed through the implementation of novel legal frameworks, finding the links between environmental justice, human rights and energy transitions. This book comprises individual chapters each covering a different subject through a set of specific case studies, from developing countries to developed ones. As a result, this clearly offers different perspectives of how the application of law can help in improving both environmental and socio-economic circumstances.

This book offers an interesting and innovative journey for the reader. It not only deals with legal aspects, but it also provides the reader with novel insights of current environmental issues and how these can have a great impact on human life particularly well-illustrated in the case study of the Niger-Delta, where Okonkwo exemplified how the oil industry has led not only to environmental degradation, but also to vandalism amongst youths, displacement, kidnapping, militancy, and terrorism.

Finally, the fact that in this work many experts in the fields of energy policy, governance and law analyze an array of different subjects related to sustainability worldwide, offers the reader a unique perspective on how these tools can help address climate change. It is within this framework that current and future challenges are recognized in the promotion of renewable energies and that we can arguably aim for a successful low-carbon, global energy transition.

¹⁸ Principle 4: ‘Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat, which are now gravely imperiled by a combination of adverse factors. Nature conservation, including wildlife must therefore receive importance in planning for economic development’

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