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# A treatise for energy law

Raphael J. Heffron\*, Anita Rønne\*\*, Joseph P. Tomain\*\*\*,  
Adrian Bradbrook\*\*\*\* and Kim Talus\*\*\*\*\*

## ABSTRACT

It is now over 20 years since the seminal paper on energy law as a discipline was published. The aim of this article is to review what currently constitutes energy law after this 20-year hiatus. There are two main ambitions of this article, which we hope will have a similar impact on the field. The first is to develop for scholars and practitioners a view of what constitutes energy law—and to make this accessible to both law and non-law energy scholars. The second is to advance a set of core principles that guide energy law, in essence a treatise for energy law. We advocate for a paradigm shift in our current understanding of what constitutes energy law. We advance that it should revolve around this set of guiding principles; however, we acknowledge that to some degree it is perhaps not a paradigm shift due to the current absence of any core principles of energy law. Nevertheless we argue that in our advancing of a guiding set of principles we set out a new path for the study of energy law and thus we aim to change what constitutes energy law and challenge the assumptions of existing researchers as globally society moves towards a transition to low-carbon economies.

## 1. INTRODUCTION

A review of what constitutes ‘energy law’ as a discipline in academic literature is currently needed with the last such review completed over 20 years ago.<sup>1</sup> There are many reasons for this both in legal practice and in research. Over the past three decades, largely because of privatization and liberalization of energy markets across the globe, the ongoing ‘energy transition’ (primarily related to climate change considerations), and the internationalization of and changes in energy markets, energy law as a legal discipline has grown and matured.

In practice, energy law has flourished, with energy law and related legal practice becoming one of the major practice areas.<sup>2</sup> Indeed, in considering energy law from a practice perspective, governments have identified the importance of energy and put it high on the political agenda due both to its environmental impact and its economic consequences. There have for example, been government ‘Energy Departments’ and energy

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1 A Bradbrook, ‘Energy Law as an Academic Discipline’ (1996) 14(2) *Journal of Energy & Natural Resources Law* 193.

2 For example, energy practices can range from 10% to 50% of a firm’s revenues in many cases.

regulators in many countries for a long time—spurred by the oil crisis of the 1970s for the former and by the liberalization trends in the 1980s and 1990s for the latter. Further, now legal job advertisements in the energy sector have increased both in academia and practice. Private law firms across the globe have created specific energy practice areas focusing on all facets of energy markets, from extraction to production to transportation and end use. As noted elsewhere, ‘there are hundreds of different industries, and only a few have, so far, given rise to a particular professional and academic sub-discipline’, and energy is one where this has happened.<sup>3</sup>

In academia, while a debate of what constitutes energy law has continued for three decades this has only occurred to a very limited extent. The aim of this article is to return to this debate and update and advance the literature. Although to some degree environmental, climate change and energy law are interrelated, energy law has not evaluated itself and grown theoretically as the other two have. For example, we identify later in this article how environmental law has developed core principles that have not only been adopted legally into international, European, national and local law, but also outside the legal profession by the business sector and the general public.

The origin and debate of what constitutes energy law is evident in the leading texts on energy law, albeit only mentioned to a limited extent. It is only recently, however, that academics are moving to analyse this in more detail again and advance energy law as an academic field.<sup>4</sup> And it should be remembered that the last paper to do this was Adrian Bradbrook’s 1996 seminal paper entitled ‘Energy Law as an Academic Discipline’.<sup>5</sup> In other areas of the law and in energy studies this is completed on a more regular basis. In contrast, energy law has suffered from attempts at splintering it further with some scholars suggesting separate legal areas for oil and gas (*lex petroli*), and for mining (*lex mineralia*); however, recently Daintith has critiqued extensively the aim of scholars to state there should be such a energy law area as *lex petrolea*<sup>6</sup> and the same can be said for *lex mineralia*.

This article reviews what currently constitutes energy law after a near 20-year hiatus in doing so (21 years since Bradbrook’s paper),<sup>7</sup> and also advances principles that guide energy law. In essence, we advocate for a paradigm shift in our current thinking of energy law; to some degree it should be stated it is not a paradigm shift due to there being no core set of principles of energy law. We argue that in our advancing of guiding principles we set out a new path for the study and practice of energy law and thus we aim to shift what constitutes energy law and assist in challenging and developing current assumptions of existing researchers. This is of vital importance as globally countries are transitioning to low-carbon economies. Further, energy law also has to reach out beyond just the energy law community and appeal to more practitioners, and interdisciplinary energy researchers as well as the public. In this context energy law has been less successful than environmental law where its principles (stated in Table 1<sup>8</sup>) have been far more effective and have found their way into legislation at local, national and international levels.

3 K Talus, *EU Energy Law and Policy: a Critical Account* (OUP 2013).

4 There are a number of early texts and papers in this regard, see eg: (i) MM Roggenkamp and others (eds), *Energy Law in Europe* (1st edn, OUP 2001) 7 and (3rd edn, OUP 2016) 8 and on the concept of *EU Energy Law* 188. (ii) RJ Heffron and K Talus, ‘The Evolution of Energy Law and Energy Jurisprudence: Insights for Energy Analysts and Researchers’ (2016) 19 *Energy Research and Social Science* 1–10; (iii) RJ Heffron and K Talus, ‘The Development of Energy Law in the 21st Century: A Paradigm Shift?’ (2016) 9(3) *Journal of World Energy Law and Business* 189; (iv) A Wawryk, ‘International Energy Law as an Academic Discipline’ in P Babie and P Leadbeter (eds), *Law as Change: Engaging with the Life and Scholarship of Adrian Bradbrook* (University of Adelaide Press 2014) 223.

5 Bradbrook (n 1).

6 T Daintith, ‘Against “*lex petrolea*”’ (2017) 10 (1) *The Journal of World Energy Law and Business* 1.

7 It is now 21 years, but this project was begun in early 2016. See also the seminal paper Bradbrook (n 1).

8 These principles are eg identified in the UN Environment Programme (UNEP), *Training Manual on International Environmental Law* (Chapter 3)—11 ‘emerging principles and concepts’ in international environmental law, derived from the Stockholm Declaration of 1972 and the Rio Declaration of 1992—some of the principles listed in this training manual are more general and overlap with each other, so we have reduced the 11 listed and added to them to reflect more recent literature. See also World Commission on Environment and Development, *Our Common Future* (1987), and more recent literature like P Sands and others, *Principles of International Environmental Law* (3rd edn, CUP 2012); P Birnie, A Boyle and C Redgwell, *International Law and the Environment* (3rd edn, OUP 2009) 26f; JH Jans and HHB Vedder, *European Environmental Law* (3rd edn, Europa Law Publishing 2008) 35ff and HC Bugge and C Voigt, *Sustainable Development in International and*

**Table 1. Principles of environmental law***Principles of environmental law*

- 
- The principle of a high level of environmental protection
  - The polluter pays principle
  - The principle of prevention
  - The precautionary principle
  - The principle that environmental damage should, as a matter of priority, be remedied at source
  - The principle of responsibility for transboundary harm
  - The principle of public participation
  - The principle of sustainable development
  - The principle of integration
  - Intergenerational and intragenerational equity
  - Access and benefit sharing regarding natural resources
- 

In addition, in considering the energy transition, energy law has to some degree been a forgotten discipline.<sup>9</sup> There are few legal principles of law specific to the energy field and most energy issues have to be resolved by general principles of law established in other contexts (such as contracts, torts or property law). Even where specific laws exist in relation to energy, they are often inadequate and ill-suited to impact upon the energy transition, and even if ‘Laws on the book are one thing. Laws implemented and enforced are another.’<sup>10</sup> There are numerous examples where general areas of law rather than energy-related laws have been the decisive factor in legal decision-making. One illustration is the Deepwater Horizon incident in the USA in 2010, where the legal solution came from tort law rather than any principles or theories of energy law itself.<sup>11</sup> In the solar access context, where disputes arise over shading of solar collectors by buildings or vegetation on neighbouring properties, similar use had to be made of the tort of private nuisance to provide a remedy for the solar user in cases such as *Prah v Maretti*.<sup>12</sup> The fault lies with both the legislature and the courts. The courts have been slow and reluctant to develop new principles and the legislatures have failed to take appropriate action to support the energy transition. In the future there should surely at the very least be some reference to principles and/or theories of energy law in the resolution of energy-related disputes.<sup>13</sup>

## 2. A REVIEW OF WHAT CONSTITUTES ENERGY LAW

In advancing the principles of energy law, the question arises of what energy law is. There is a rather limited academic literature, which discusses this but more recently several key leading texts from 2015 and 2016 have raised this issue. These latter texts and the key literature are discussed in the proceeding paragraphs.

*National Law* (Europa Law Publishing 2008). The principles are also reflected in ‘hard’ law such as the Climate Change Convention and the ESPOO Convention; the Treaty on the Functioning of the EU; Case law and in national legislation.

- 9 This has been an ongoing problem for decades: see AJ Bradbrook, ‘Energy Law: The Neglected Aspect of Environmental Law’ (1993) 19 *Melbourne University Law Review* 1.
- 10 DN Zillman, and others, (eds), *Beyond the Carbon Economy: Energy Law in Transition* (OUP 2008) 551 Ch. 24 (Conclusion).
- 11 For a discussion of the outcome of liability and in relation to the Deepwater Horizon incident, see R Heffron, S Ashley and WJ Nuttall, ‘The Global Nuclear Liability Regime Post Fukushima Daiichi’ (2016) 90 *Progress in Nuclear Energy* 1.
- 12 (1981) 2 *Solar Law Reporter* 1013 (Circuit Ct); (1982) 108 *Wis 2d* 223, 321 *NW 2d* 182 (Wisconsin Sup Ct). Discussed in (1983) 21 *Duquesne L Rev* 1159. See also AJ Bradbrook, *Solar Energy and the Law* (Law Book Co 1984).
- 13 Contrast this conservatism and inaction with the occasional judicial cry for change. As long ago as 1904, CJ Griffith of the High Court of Australia posed obiter the possibility of a novel easement of access to the sun’s rays to protect solar access: *Commonwealth v Registrar of Titles for Victoria* (1918) 24 *CLR* 348, 354.

Many of the key texts (literature) in this area since the Bradbrook article 20 years ago ask the question—what is energy law—in some way, but all fall short of advancing a more complete definition, or suggesting a theoretical framework or advancing guiding principles. As the following discussion below highlights, scholars<sup>14</sup> have been demonstrating thinking in this direction, but as of yet they have not made the final step towards advancing what constitutes energy law on a more holistic basis. Indeed, the same can be said for practitioners, who have perhaps had more success in contributing to the development of energy law, with contributions ranging from model-contracts<sup>15</sup> to practitioner texts, case law developments and legal issues from day-to-day practice. However, as of yet, energy law has not benefited from a set of principles like environmental or climate change law, which have through these principles engaged more effectively with non-law scholars and practitioners, and also the judiciary and policymakers.<sup>16</sup>

### Assessing the literature

There is a core set of leading texts on energy law. Many of these debates in Chapter 1 of the book what is energy law. However, few debate this in depth but there are several in need of highlighting. In considering one of the leading texts in this area, *EU Energy Law*<sup>17</sup> (Roggenkamp and others), it is evident this is the case. The latter text has a section on ‘Energy Law as an Academic Discipline’ and it details the definition (according to Bradbrook’s seminal definition) and also his eight ‘social considerations’ and seven ‘jurisprudential considerations’. The multidisciplinary of energy law is mentioned while an important statement is made that ‘Although energy law is gradually developing as an academic discipline in Europe it is still very diverse in its approach.’ Both the first and second editions of the book follow each other in this context (8 in 1st edn, 10 in 2nd edn). Importantly the observation is also made that ‘. . . developments at EC level may lead to a more common approach to and standardization in this field’. With the third edition stating the same 15 years later, it adds a view on EU energy law as the evolution of a distinctive legal field and not merely a case of applying general EU law to the energy sector, and concludes that ‘there is no longer any doubt that a discrete sub-genre of EU law has emerged’ (188). Another supplement is a statement on the need to consider the boundaries of ‘European Energy Law’ (1234).

In *EU Energy Law and Policy: a Critical Account*, Talus asks the question ‘Is there such a thing as “European Energy Law?”’ He does not give a comprehensive definition for ‘energy law’ or EU energy law but argues that ‘The answer one might give to this question depends on the specificity of the particular problems experienced by the energy industries in relation to EU law, the level of interest – public, professional, academic and commercial – in these problems, EU law’s response to them, and distinctive, significant features which permit focus on the economic regulation of energy by the EU and in the EU with some degree of insulation from other industries.’<sup>18</sup>

It is important in this context to refer to the engagement of other legal scholars with energy law, something that does not take place to the degree energy lawyers could hope for. For example, in the *Oxford Handbook of EU Law*, although the editors note ‘It is a truism that the European Union has grown out of (nearly) all recognition since its birth as the European Coal and Steel Community in the early 1950s)’ and in essence acknowledge the importance of managing energy resources. However, the book fails to have any chapter on energy, and consequently fails to account for one division of the Commission—they overlook 1 out of the 12 EU Commissions.<sup>19</sup>

14 In particular, Daintith (n 6) notes the benefit of developing a subject discipline within law; see section ‘A Review of what Constitutes Energy Law’ in the article: *ibid*, Daintith (n 6).

15 For example, model contracts have been developed by many organizations, in particular Association for International Petroleum Negotiators (AIPN), the International Bar Association, and the Organisation for Economic Cooperation and Development (OECD).

16 For example, the polluter-pays-principle is a great example of this.

17 MM Roggenkamp and others, *Energy Law in Europe* (3rd edn, OUP 2016).

18 Talus (n 3).

19 Preface, see: A Arnulf and D Chalmers, *The Oxford Handbook of European Union Law* (OUP 2015).

There are other texts that review to a limited extent what energy law is. The International Union for Conservation of Nature (IUCN) Academy of Environmental Law Research Studies produced a text on *Compendium of Sustainable Energy Laws*.<sup>20</sup> They call for a broadening of the definition of energy law away from just addressing: 'how to generate electricity, mine coal, extract oil and gas, and distribute energy sources'. It needs also to focus on energy efficiency, demand side management, and the sustainable use of energy. Indeed, they call for a 'law of sustainable energy' discipline (Preface X). However, they fail in part to consider the full energy life cycle and, therefore, their approach remains a limited view of energy law. In contrast, Bradbrook and Wahnschaft<sup>21</sup> propose guidelines on sustainable energy production and consumption. They produce a 'non-legally binding statement of principles for a global consensus on sustainable energy production and consumption'. This includes a focus on efficiency in supply and consumption; energy pricing; mitigation of environmental impacts; consumer information and environmental education; policies and strategies for implementation and international cooperation (196–201). To a degree, this article is an exception to the rest of the literature and this article aims to build on these authors' efforts.

Makuch and Pereira produce a different edited collection on *Environmental and energy law*.<sup>22</sup> However, it is mainly an environmental text and is to a degree a good example of the failure to appreciate environmental law and energy law as separate disciplines. Another example of a similar omission is McHarg and others, where again while energy law is mentioned in the title, the focus of the book is on Property Law (though in an energy law context), and the meaning of 'energy law' is not defined.<sup>23</sup> A more advanced approach is the book, *Energy law and the environment*, by Rosemary Lyster and Adrian Bradbrook, where the authors explain the relevance of the environment and environmental law to energy but emphasize the need for energy law, both at national and international levels, to develop its own independent goals and principles to provide for a sustainable energy future.<sup>24</sup>

This article aims to build on the previous literature and the directions many scholars pointed towards in advancing a set of principles for energy law. In the next section these principles are advanced and then in the following section stated in more depth.

### 3. ENERGY LAW'S SEVEN PRINCIPLES

What prompted this search for Energy Law's guiding principles was a workshop (organized by two of the authors and attended by a third) where we presented and discussed the Evolution of Energy Law.<sup>25</sup> The evolution of energy law is guided by certain influences, one of which is 'energy justice'. Energy justice has its own conceptual basis, which is recognized in several early and now more influential articles. However, energy justice has its own principles and this prompted what would be energy law's guiding principles. Energy justice as a concept and its principles have an interdisciplinary focus.<sup>26</sup> Energy law has to concern itself also with what law is and what it should be and this prompted a need to examine and identify what the guiding principles of energy law should be and the role that law can have in the development of the concept of energy justice.

The prompt to determine guiding principles of a discipline are many. For energy law and climate change scholars the need for guiding principles is clear. It will assist in the understanding of the design and development of a legal field that has been shaped in a piecemeal fashion in response to different geopolitical

20 RL Ottinger, N Robinson and V Tafur (eds), *Compendium of Sustainable Energy Laws* (CUP 2005).

21 AJ Bradbrook and RD Wahnschaft, *The Law of Energy for Sustainable Development* (CUP 2005).

22 KE Makuch and R Pereira, *Environmental and Energy Law* (OUP, Wiley-Blackwell 2012).

23 A McHarg and others, *Property and the Law in Energy and Natural Resources* (OUP 2010).

24 R Lyster and AJ Bradbrook, *Energy Law and the Environment* (CUP 2006).

25 The early movers in this project can be said to be those who attended a workshop organized jointly by R Heffron and K Talus entitled 'The Development of the Theory of Energy Law' (Helsinki, Finland, November 2015) and commented by Anita Rønne. Two publications have followed this workshop and these have been: (i) Heffron and Talus, 'The Evolution of Energy Law' (n 4); (ii) Heffron and Talus, 'The Development of Energy Law' (n 4).

26 RJ Heffron and D McCauley, 'The Concept of Energy Justice across the Disciplines' (2017) 105 *Energy Policy* 658.

**Table 2. Principles of climate change law***Principles of climate change law*

- 
1. Principle of Common but Differentiated Responsibilities
  2. The Precautionary Principle
  3. Principle of Intragenerational Equity
  4. Principle of Intergenerational Equity
  5. Principle of developed states to take the lead and protecting the most vulnerable
  6. Sustainable development concept
  7. Principle of cost-effectiveness
  8. Principle of cooperation and knowledge transfer
  9. Principle of accountability and transparency
  10. Principle of the Common Concern of Humankind
- 

circumstances and increasing environmental and costs awareness impacting the whole global society. Its related subject, environmental law, has a clear core and guiding principles as stated earlier in Table 1. Climate change law, a related sub-discipline where energy contributes the majority share of greenhouse gas emissions (and CO<sub>2</sub> emissions), also has its own core set of principles which are stated above in Table 2.<sup>27</sup> These principles are first and foremost reflected in the Framework Convention for Climate Change but further elaborated upon by the International Law Association, Committee on Legal Principles Relating to Climate Change.<sup>28</sup> The core aim of setting out principles is to seek the increased application of human rights on a particular issue, and this is the same whether it be for the environment, the climate or the energy sector.

As may be understood several of the climate change principles coincide with the listed principles under environmental law and indeed also principles relating to human rights.

Despite the longer existence of energy law, it lacks such principles. To redress this omission, we propose that there are seven guiding principles that have developed in practice and legislation which are stated below in Table 3 and then explained in more detail in the following text of this section.

#### 4. THE PRINCIPLES OF ENERGY LAW EXPLAINED

##### The principle of sovereignty over onshore and offshore energy resources

The principle of permanent sovereignty over natural resources is closely connected with energy resources. The discussion over sovereignty over natural resources, petroleum in particular, emerged after the end of the colonial period.<sup>29</sup> Prior to this, the international oil companies controlled exploration and production of

27 This set of principles are from the *The Oxford Handbook of International Climate Change Law*, see: CP Carlarne, KR Gray and RG Tarasofsky (eds), *The Oxford Handbook of International Climate Change Law* (OUP 2016). And in terms of the principles see the following chapters within that text: Chapter 1—International Climate Change Law: Mapping the Field (by the editors); Chapter 8—Precaution and Climate Change (JB Wiener); Chapter 9—Principles and Emerging Norms in International Law: Intra- and Inter-generational Equity (C Redgwell); Chapter 10—Common Concern of Humankind (F Soltau); and Chapter 11—Human Rights Principles and Climate Change (JH Knox). The principles are articulated in the Climate Change Convention art 3 and also reflected in other articles and in the Kyoto and Paris Agreements.

28 Conference Resolution 2/2014: Declaration of Legal Principles Relating to Climate Change and conference report for the Washington Conference (2014), Sofia 2012 and the Hague 2010 on Legal Principles Relating To Climate Change.

29 For example, UNGA Res 1803 (XVII) 1962 proclaimed '[t]he right of peoples and nations to permanent sovereignty over their natural wealth and resources.' For an interpretation, see *Texaco Overseas Petroleum Company and California Asiatic Oil Company v The Government of the Libyan Arab Republic* awards. The award on the merit (19 January 1977), available in 53 *ILR* (1979) 389, *Clunet* (1977) 350. For the preliminary award of 27 November 1975, see 53 *ILR* (1979) 389.

**Table 3. The seven principles of energy law***Principles of energy law*

- 
1. The Principle of National Resource Sovereignty
  2. The Principle of Access to Modern Energy Services
  3. The Principle of Energy Justice
  4. The Principle of Prudent, Rational and Sustainable Use of Natural Resources
  5. Principle of the Protection of the Environment, Human Health & Combatting Climate Change
  6. Energy Security and Reliability Principle
  7. Principle of Resilience
- 

petroleum resources in many of the colonial and post-colonial states and, by default, the government's revenue by regulating production. This placed severe constraints of national sovereignty and the wealth these energy resources could mean for a country.

In the post-World War II era, which was marked by rising nationalism in the post-colonial world, many of the ex-colonial countries started to demand a change. Similarly, governmental interference with energy activities through regulation started to grow. That era is marked by the creation of Organization of the Petroleum Exporting Countries (OPEC) and several important United Nations (UN) Resolutions on the permanent sovereignty over natural resources. The 1962 UN General Assembly resolution recognized the 'inalienable right of all states freely to dispose of their natural wealth and resources accordance with their national interests'<sup>30</sup> was followed by UN General Assembly Resolution 3281 (XXIX) 1974 providing that:

Full permanent sovereignty of every State over its natural resources and all economic activities. In order to safeguard these resources, each State is entitled to exercise effective control over them and their exploitation with means suitable to its own situation, including the right to nationalization or transfer of ownership to its nationals, this right being an expression of the full permanent sovereignty of the State. No State may be subjected to economic, political or any other type of coercion to prevent the free and full exercise of this inalienable right.

Likewise, the principle of national sovereignty was agreed as a specific principle in the Stockholm and Rio Declarations of 1972 and 1992, respectively.<sup>31</sup> Today permanent national sovereignty over resources is recognized under international law and its exercise is established under national constitutions.<sup>32</sup>

The close connection between sovereignty and energy is not only significant for energy- or hydrocarbon-producing states. Energy supply is also considered a sovereign issue in many of the energy importing and consuming states. The organization and division of competences within the European Union (EU) energy law and policy area is an example of this. The 'sovereignty exception' under Article 194 (2) of the Treaty on the Functioning of the EU (TFEU) provides that '[EU energy policy] measures shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply [...]'. The rationale of this provision is that Member States have decided that these issues are and should remain within the scope of national sovereignty.<sup>33</sup> It is moreover

30 *ibid.*

31 Declaration of the UN Conference on the Human Environment 1972 and Declaration of the UN Conference on the Environment and Development 1992, Principle 21.

32 For the upstream energy context and sovereignty, see E Smith and others, *International Petroleum Transactions* (Rocky Mountain Mineral Law Foundation 2010) or E Pereira and K Talus, *Upstream Law and Regulation: A Global Guide* (Globe Law and Business 2017).

33 For the EU context, see A Johnston and G Block, *EU Energy Law* (OUP 2012) or Talus (n 3).



reflected directly in the Directive 94/22/EC on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons, preamble and Article 2.

### The principle of access to modern energy services

It has been belatedly recognized in recent decades that in order for sustainable development to occur in developing nations it is essential that modern energy services are available to the general community. The importance of this issue was first recognized in 1986 in the Report of the World Commission on Environment and Development (the Brundtland Report).<sup>34</sup> The issue gained momentum in 2000 in a joint report, *World Energy Assessment: Energy and the Challenge of Sustainability*, prepared by the UN Development Programme (UNDP), the UN Department of Economic and Social Affairs (UN DESA), and the World Energy Council. The report called for world action to provide access to energy services for all, and emphasized the strong nexus between energy and poverty. The 2000 Report was strengthened and updated by a further 2004 Report prepared by UNDP.<sup>35</sup>

'Energy services' is needed rather than simply 'energy' as it is not energy in itself that society requires, as energy has no intrinsic value, but rather the lifestyle changes that modern energy services provide. Energy services result from the combined operation of primary energy sources, energy-related technologies, labour, materials and infrastructure.<sup>36</sup> Traditional energy services provided simply for fire, based on the burning of biomass in the form of wood, or dung for cooking and heating and animals for transport. Modern energy services, in contrast, provide for lighting, cooling, refrigeration, clean cooking and transport.

The increasing recognition of the importance of access to energy services is apparent from a comparison between the UN General Assembly's Millennium Development Goals (MDGs), declared in the 2000 Millennium Declaration,<sup>37</sup> and the Sustainable Development Goals (SDGs), also declared by the General Assembly in *Transforming Our World: The 2030 Agenda for Sustainable Development*.<sup>38</sup> In the former case, the goals make no mention of energy. In contrast, Goal 7 of the SDGs is expressly devoted to energy: 'Ensure access to affordable, reliable, sustainable, and modern energy for all.' Each of the SDGs contains a number of targets. Target 7.1 declares: 'By 2030, ensure universal access to affordable, reliable and modern energy services.'

The magnitude of the issue is apparent from the fact that according to the most recent international report on the issue, the 2016 report on the realization of the SDGs, there are still 40 per cent of people living in developing countries still relying on polluting and unhealthy fuels for cooking or gas supplies. The majority of these people live in Africa and south Asia. At present over 65 per cent of the population of sub-saharan Africa is without electricity.<sup>39</sup>

There is currently active legal debate on four related issues:

- Does a right of access to energy services exist in human rights law?
- If not, what other international law strategies exist to provide for universal access to energy services?
- What role can domestic law play in promoting and/or guaranteeing universal access to energy services?
- Is there a role for the judiciary to play in this context?<sup>40</sup>

34 *Our Common Future*, UN Doc A/42/427 (1987) 8.

35 UN Development Programme, *World Energy Assessment: Overview 2004 Update* (2004).

36 See n 25.

37 GA Res 55/2, UN Doc A/Res 55/2 (2000).

38 A/Res/70/1 (2015).

39 See: UN 2017. Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all <<http://unstats.un.org/sdgs/report/2016/goal-07/>> accessed 30 September 2017.

40 There are numerous academic writings on these issues: see, eg S Bruce, 'International Law and Renewable Energy: Facilitating Sustainable Energy for All' (2013) 14 *Melbourne Journal of International Law* 1; T Kaime and R Glicksman, 'An International Legal Framework for

### The principle of energy justice

Energy justice is a growing moral, philosophical and ethical movement that developed in the late 20th and early 21st centuries. It has been defined as:

[Achieving] a global energy system that fairly disseminates both the benefits and costs of energy services, and one that contributes to more representative and impartial energy decision-making.<sup>41</sup>

This social justice issue looks beyond traditional government and industry concerns regarding energy security, economic development and technology to consider morality in decision-making. It is relevant to both international issues (such as the right of people in developing countries to escape the poverty trap by the provision of universal access to energy services and to avoid environmental damage resulting from exploitation from multinational energy corporations or the disposal of nuclear waste shipped from developed nations), and to domestic issues (such as ensuring the affordability of energy supply for the poor or outlawing the forcible abandonment of homes and villages for the creation of new large-scale hydroelectric projects).

The energy justice movement emerged out of and has the same philosophical background as the more general issues of environmental justice and atmospheric and climate justice. The existing literature divides energy justice into three core themes: distributional justice, procedural justice and recognition justice.<sup>42</sup>

Distributional justice seeks to ensure that it is not always the disadvantaged and poor people who suffer most from the siting of energy projects and those objections to new energy projects are examined thoroughly by governments and judicial planning bodies without undue pressure from developers. The denial of distributional justice has tended to occur in the past in relation to governmental decision concerning, for example, the siting of wind generators, coal plant projects and nuclear power plants. It is argued that all segments of society should benefit and suffer equally from such decision-making.

Procedural justice involves the equal ability of all social groups to be able to participate in decision-making processes in proposed energy developments. While this protection exists already in international environmental law in the 1998 Aarhus Convention,<sup>43</sup> its application in individual cases can often appear compromised. Thus decisions may be taken without full disclosure of all relevant issues to affected parties, and bias and political pressure from powerful vested interests may be unfairly influential when proposed energy developments are assessed. The unequal distribution of subsidies to different energy sources may also result in inappropriate decision-making.

Recognition justice involves a consideration of differing community opinions and perspectives based on such matters as gender, race and cultural background as well as ensuring that certain groups and places are not devalued or disrespected. Modern illustrations of the problem include disrespect to local antiwind farm groups by vested interests in the renewable energy field and the downplaying, ignoring and devaluing opponents of nuclear energy plants. Recognition justice seeks to ensure a level playing field for all stakeholders in energy development decision-making.<sup>44</sup>

SE4All: Human Rights and Sustainable Development Law Imperatives' (2015) 38 *Fordham International Law Journal* 1405; M Clemson, 'Human Rights and the Environment: Access to Energy' (2012) 16 *New Zealand Journal of Environmental Law* 39; A Bradbrook and J Gardam, 'Placing the Access to Energy Services Within a Human Rights Framework' (2006) 28 *Human Rights Quarterly* 389.

41 BK Sovacool and others, 'Energy Decisions Reframed as Justice and Ethical Concerns' (2016) 1 *Nature Energy* 1 <[www.nature.com/natureenergy](http://www.nature.com/natureenergy)>.

42 These issues are considered in detail in D McCauley and others, 'Advancing Energy Justice: The Triumvirate of Tenets' (2013) 3 *International Energy Law Review* 107.

43 2161 UNTS 447 (entry into force 31 October 2001).

44 For recent analyses of the energy justice movement, see the writings of L Guruswamy, *Global Energy Justice: Law and Poverty* (West 2016) and 'The Contours of Energy Justice' in Shawkat Alam and others (eds), *International Law and The Global South* (CUP 2015) 529ff.

### The principle of prudent, rational and sustainable use of natural resources

Sustainable use of natural resources is a term referred to in several conventions either directly<sup>45</sup> or by using alternative expressions like ‘conservation’<sup>46</sup>, ‘sustainable management’<sup>47</sup>, ‘optimal, efficient and rational use’ or ‘reduce and eliminate unsustainable patterns of production and consumption’ as stated in the Rio Declaration on Environment and Development (1992), Principle 8.<sup>48</sup> Already the Stockholm Declaration (1972),<sup>49</sup> however, included the principle (No 5) that non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment are shared by all mankind.

The principle of sustainable use is also reflected in the objective of United Nations Framework Convention on Climate Change (UNFCCC) Article 2 to ‘allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner’ in Article 3.4 ‘should promote sustainable development . . . protect the climate system against human-induced change’ and more directly under the commitments of all Parties to ‘Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs . . ., including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems’, cf Article 4.1 (d). To reduce harmful atmospheric emissions sustainable use of energy comes to the very forefront implying promotion of energy efficiency, energy conservation and use of renewable energy as also reflected in the Kyoto Protocol (1997) Article 2. Likewise, the Paris Agreement (2015) acknowledges the need to promote universal access to sustainable energy in developing countries, as well as the deployment of renewables.

The 17 Sustainable Development Goals adopted by the UN General Assembly in 2015,<sup>50</sup> expanded the range of the Millennium Development Goals from 2000<sup>51</sup> to cover among other issues energy and the use of natural resources directly. A goal to reach is thus *Affordable and Clean Energy* (No 7). Other additional goals like *Sustainable Cities and Communities* (No 11), *Responsible Consumption and Production* (No 12) and *Climate Action* (No 13) also have direct reference and relevance to the sustainable use of natural resources.

Sustainable use of natural resources is also embedded at the EU level. Environmental protection requirements must thus be integrated into the definition and implementation of the Union policies and activities, in particular, with a view to promoting sustainable development, cf the TFEU, Article 11. Moreover, Union policy on the environment shall contribute to pursuit of preserving, protecting and improving among others the prudent and rational utilization of natural resources, and combating climate change. The objective of Union policy on energy should promote energy efficiency and energy saving and the development of new and renewable forms of energy, cf Article 194. A long range of directives have over the years implemented these

45 The Biodiversity Convention 1992, art 2 includes an explicit definition of ‘sustainable use’ as ‘use . . . in a way and at a rate that does not lead to long-term decline of biological diversity’. Other examples are the Convention on the Law of the Non-navigational Uses of International Watercourses 1997, art 5 uses ‘optimal and sustainable utilization’. Convention on Co-operation for the Protection and Sustainable Use of the River Danube 1994 includes the term in the title and in the text but at the same time refers to ‘conservation’, rational use and sustainable management, preamble, arts 2, 5 and 6. Likewise, the UN Fish Stocks Agreement 1995, employs both ‘sustainable use’, ‘conservation’ and ‘long-term sustainability’; the International Tropical Timber Agreement 1992 art 1(e) and (l), ‘sustainable utilization’ and also ‘management’ and ‘conservation’ and the Convention to Combat Desertification and Draught 1994 refers to ‘sustainable use’, ‘sustainable management’, ‘conservation’ and ‘efficient use’, cf arts 2, 3, 10(4), 11, 17 and 19.

46 The World Charter for Nature 1982, Principle 3; UNCLOS 1982, Preamble and art 61 (living resources); and UNFCCC 1992, art 4 (d).

47 UNFCCC, *ibid*.

48 1992 Rio Declaration on Environment and Development, adopted 14 June 1992. See also International Law Association, *ILA New Delhi Declaration of Principles of International Law Relating to Sustainable Development* (2 April 2002), which as its first principle lists that ‘States are under a duty to manage natural resources, including natural resources within their own territory or jurisdiction, in a rational, sustainable and safe way. . . and to the conservation and sustainable use of natural resources’. Moreover, ‘States must take into account the needs of future generations in determining the rate of use of natural resources’ and have a ‘duty to avoid wasteful use of natural resources . . .’.

49 Declaration of the UN Conference on the Human Environment adopted in Stockholm, 16 June 1972.

50 UN Res A/70/1, *Transforming Our World: The 2030 Agenda for Sustainable Development*, adopted on 21 October 2015.

51 UN Res A/55/2, *United Nations Millennium Declaration*, adopted on 18 September 2000.

political goals into binding commitments on all Member States on eg waste, water, renewables and energy efficiency.

Examples of the EU policy implementation may be found in the Sixth Environment Action Programme<sup>52</sup> where sustainable use and management of resources are referred to as one of the priority areas and called for the preparation of ‘a thematic strategy on the sustainable use and management of resources. . .’ and in practical terms reducing the environmental impact of resource use.<sup>53</sup> Natural resources are defined as encompassing all raw materials including biomass, water, wind, geothermal, tidal and solar energy. The need to take into account the life cycle and global perspective when tackling unsustainable use of natural resources is emphasized. Sustainable use of natural resources is also recognized as critical for further economic development and became the core point under one of the seven flagship initiatives within the ‘Europe 2020 Strategy.’<sup>54</sup> This Strategy aims to support the shift towards a resource efficient and low-carbon economy and decouple economic growth from resource and energy use. It stresses how resource efficiency will prevent environmental degradation, biodiversity loss and unsustainable use of resources.<sup>55</sup>

Like the EU also some states have adopted constitutional provisions or acts that require sustainable use of the natural environment and natural resources.

Further, all the mentioned international agreements and resolutions recognize that there are limits on the utilization of land, water and ocean, and natural resources if irreversible damage is to be avoided. Whether international law today imposes upon states a customary obligation of sustainable use of natural resources may be arguable but it is beyond doubts that sustainable use of natural resources are accepted as a global objective and has an increasing recognition internationally in treaty law. As far as shared and common resources are concerned there has been established a clear practise endorsing the existence of a general obligation to ensure conservation and sustainable use of the high seas, the deep sea-bed, the Antarctica and the Moon<sup>56</sup> and that these resources are the common heritage of humankind.

### The principle of the protection of the environment, human health and combatting climate change

Energy and the environment are physically linked in the natural fuel cycle. From exploration and extraction through processing and transportation and then to distribution, consumption, and disposal of the natural resources that are used to produce energy, environmental consequences follow. Consequently, energy law and policy and environmental law and policy cannot be treated as distinct areas of regulation. Most notable, the phenomenon of climate change exacerbates the environmental problems attendant with the energy system—the energy sector being the main contributor of CO<sub>2</sub> emissions. These environmental problems include degradation of natural environments and the imposition of risks and fatalities on humans.

Inevitably, there are trade-offs<sup>57</sup> between energy and the environment that must be addressed; and, more importantly, overcome. Historically, the traditional energy narrative focused on economic growth. Cheap, readily available and reliable energy has been and remains a core input into any sophisticated economy. In addition to accessible energy, today energy and national security, as well as environmental protection, are the central parameters for any contemporary energy policy.<sup>58</sup> All forms of energy have their negative

52 Decision No 1600/2002/EC of the European Parliament and of the Council (22 July 2002) OJ L242/1.

53 cf Thematic Strategy on the sustainable use of natural resources, COM (2005) 670.

54 COM (2010) 2020.

55 See Report ‘On the Progress of the Thematic Strategy on the Sustainable Use of Natural Resources’ (SEC 2011) 1068 of 20 September 2011, 8 and ‘A Resource-Efficient Europe’, COM (2011) 21 and the ‘Roadmap for a Resource-Efficient Europe’, COM (2011) 571.

56 See also Birnie, Boyle and Redgwell (n 8) 199ff. A Boyle and D Freestone (eds), *National Law and Sustainable Development* (OUP 1999) 9, 29. The Delhi Declaration, ILA Expresses a Duty of States to Ensure Sustainable Use of Natural Resources, cf MC Cordonier Segger ‘Sustainable Development in International Law’ in *Sustainable Development in International and National Law* by Bugge and Voigt (n 8), 187.

57 A Okun, *Equality and Efficiency: The Big Trade-Off* (Brookings Institution Press 1975).

58 JP Tomain, *Ending Dirty Energy Policy: Prelude to Climate Change* (CUP 2011) chs 3 and 4.

impacts—on the environment, human health, energy security and the economy. The key is always to analyse each energy source for its full life cycle impacts. However, in comparison one thing stands out: fossil fuels have more clear, more numerous, more severe, and more permanent risks than most of the alternatives. Moreover, getting beyond the carbon economy is not just an environmentalist issue but also survival necessity.

Two significant consequences follow from linking energy and the environment. First, a clean power policy can be designed. Traditional energy policies that relied on cheap and readily available fossil fuels, are no longer consistent with the demands placed on the system. Consequently, renewable resources, low-carbon resources, and energy efficiency are an increasingly important part of the energy mix. Secondly, and more importantly, contemporary and future energy policy is dramatically affected and linked to climate change. While, it can be argued, easily enough, that a clean energy future is valuable in and of itself; a clean future is also usefully aligned with, and complementary to, addressing the challenges of climate change.

Climate change has structural characteristics such that it has been described as a super wicked problem<sup>59</sup> that now demands a new form of regulation, one linking energy law and policy with environmental law and policy. Regulators can no longer rely on their ability to implement *ex post* regulations that address and fix a problem, such as an oil spill or even a nuclear plant malfunction that has occurred in the past. Instead, forward-thinking *ex-ante* regulations are necessary to reduce carbon emissions in an effort to forestall further climate damage.<sup>60</sup>

Energy regulators must realize that the energy/environmental future presents complex problems which are multidisciplinary, intergenerational, multijurisdictional, and imbued with scientific, technological, economic and social uncertainties. Additionally, climate change is a non-linear problem with challenges of its own including: ‘time is running out’ for a solution; no central authority can solve the problem; and by not addressing the problem now, the cost of doing so in the future will only increase.<sup>61</sup> Nevertheless, it is a future we must address today because waiting will be costly. Central to addressing the problem of climate change is to recognize the interrelationships between energy and the environment and the detrimental human consequences that follow from ignoring this linkage.<sup>62</sup>

### Energy security and reliability principle

Energy security is at the heart of any modern energy policy system and is reflected in a large number of national energy laws and regulations. Its significance is connected with the general importance of energy for the society.<sup>63</sup> The concept refers to two distinct but related energy policy objectives. It refers to security of supply, which typically means the continuous availability of energy at a reasonable cost. Most modern energy policies also add the social or environmental costs to this definition.<sup>64</sup> It also refers to security of demand, which means the continuous demand for energy products produced within the country in question. Traditionally this refers to hydrocarbons, but it also includes energy from renewable energy sources like hydropower.

While security of supply is a somewhat universal energy policy objective, its practical application at the level of national law and policy depend on the national specificities.<sup>65</sup> For an energy importing country or

59 K Levin and others, ‘Overcoming The Tragedy of Super Wicked: Straining Our Future Selves to Ameliorate Global Climate Change’ (2012) 45 Policy Science 123; RJ Lazarus, ‘Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future’ (2009) 94 Cornell Law Review 1153.

60 SA Shapiro and JP Tomain, *Achieving Democracy: The Future of Progressive Regulation* (2014) ch 8.

61 Energy Innovation Policy and Technology LLC, *The Costs of Delay: Waiting Until 2020 Could Coast Nearly \$400 Billion* (2015).

62 *Encyclical Letter of the Supreme Pontiff Francis, on Care for Our Common Home: Laudato Si’* (2015) 70–91.

63 Emphasized, eg in the case law of the Court of Justice of the EU. See Case 72/83 *Campus Oil v Minister for Industry* [1984] ECR 2727.

64 For notions of security of supply, see K Talus, ‘Security of Supply – An Increasingly Political Notion’, in B Delvaux, M Hunt and K Talus (eds), *EU Energy Law And Policy Issues* (Euroconfidentiel 2008).

65 Various elements of energy security have been discussed in detail in B Sovacool (ed), *Handbook of Energy Security* (Routledge 2011).

region security of supply relates to, among other things, import security. This is sought through import diversification, both in terms of sources of supply and transportation routes, sufficient investment into the import infrastructure, mandatory storage obligations and so on. It also translates into an interest in alternative energy sources, including unconventional sources of oil and gas as well as renewable energy. For an energy producing country, security of supply objective can be sought through very different measures. In cases where the national demand can be met, at least partially, by national supply, the security of supply policy is not always based on securing sufficient imports but by preventing exports. This can be achieved through a national petroleum supply reservation policies.<sup>66</sup>

### Principle of resilience

The energy sector of the economy can be assessed in two parts—transportation and electricity although fossil fuels dominate both systems. The crucial difference between the two, however, is that they each have their own particular physical characteristics. Transportation fuels, for example, can be easily identified and stored. Electricity is fungible and storage only possible short term at best. More importantly, the electricity system must be in balance at all times as well as readily available.

Regardless of these differences, however, energy for both sectors must be reliably available. Additionally, both systems must be resilient. Because transportation fuels are easily storable and dispersed throughout a country, the transportation system is relatively resilient. Not so for the electricity system. In fact, resilience is now become a major concern to the electricity sector as a result of a series of disruptive weather events that have shut down the delivery of electricity at great economic costs. Consequently, the energy future must pay close attention to the concept of resilience.

In the USA, the National Academy of Sciences has defined resilience as ‘the ability to prepare plan for, store, recover from, and more successfully adapt to adverse events’.<sup>67</sup> Super Storm Sandy, Hurricane Katrina, and even a tree branch on a wire have all shut down the delivery of electricity while exposing the vulnerability of the electric system.<sup>68</sup> By way of example, the 2003 East Coast power outage is estimated to cost between \$4 and \$10 billion.<sup>69</sup> These severe weather events are occurring with increased frequency and have been attributed to global warming thus reinforcing the necessity of a future energy policy that is cognizant of and responsive to climate change.

In addition to climate change, though, concerns about resilience also involve cyber security threats. US Department of Energy, for example, acknowledges that the electricity system faces imminent danger from cyber attacks which are, in fact, growing more frequent and sophisticated.<sup>70</sup>

In either the case of a catastrophic weather occurrence or a cyber attack, electricity system operators must make resilience investments for several reasons including preventing or minimizing damage to avoid or reduce adverse event; providing alternatives to enable the system to continue operations during such an event; and promoting a rapid return to normal operations after disruption. In short, resilience measures relate both to the impact on reliability as well as on the impact of the system to recover more rapidly.

As our energy systems transform, greater attention must be paid to the threats and risks presented by climate change and other disruptions. As we describe throughout the book, both the transportation and electricity systems are moving away from their traditional dependence on fossil fuels to an increased reliance on renewable resources and energy efficiency. Additionally, the production, transportation and consumption of

66 K Talus and E Pereira, ‘National Petroleum Supply Reservations: Background and Comparison’ (2014) 7(6) *Journal of World Energy Law and Business* 527.

67 The National Academies Committee on the Increasing Resilience to Hazards and Disasters, *Disaster Resilience: A National Imperative* (2012).

68 G Blake, *The Grid: The Fraying Wires between Americans and Our Energy Future* (2016).

69 US–Canada Power System Outage Task Force, Final Report on the August 14, 2003 Blackout in the USA and Canada: Causes and Recommendations (April 2004).

70 US Department of Energy, *Transforming the Nation’s Electricity System: The Second Installment of the Quadrennial Energy Review* (2017).

energy are moving away from a traditional reliance on large-scale centralized energy producers and distributors to an increased reliance on distributed energy resources that are smaller in scale and closer to consumers. This transition towards decentralization has a dual impact. On the one hand, competition in the energy sector is increased because of new entrants. On the other hand, as energy becomes more dispersed and available at smaller scales, resilience can be improved because the consequences of a disruptive event can be reduced.

## CONCLUSION

Since the time of St Thomas Aquinas and his *Treatise of Law*, scholars have been attempting to establish guiding principles of law.<sup>71</sup> The aim of this article has been to attempt something similar but for energy law. Indeed, in another *Treatise*, Jean-Jacques Rousseau's *Treatise on Education* *Emile, or On Education*—he was aiming to reform our thinking about education. This is also the aim of our 'Treatise of Energy Law' to reform what constitutes energy law and how scholars and practitioners should interact with it.

Energy law's related areas (or sister subjects) of environmental and climate law have many principles which are outlined in sections 'Introduction' and 'Energy law's seven principles'. These two areas have been defining and developing them for close to several decades now. One of the reasons energy law has not followed environmental and climate change law in having its own principles is because of the lack of consensus of what energy law is. It remains an issue in energy law scholarship. Evidence of this is presented in the section 'A review of what constitutes energy law'. Further, it is notable that in 2017 energy law was accepted as a section in one of the world's oldest annual legal conferences—the Society of Legal Scholars Annual Conference<sup>72</sup>—which was held in Dublin (Ireland) from 5 to 8 September 2017. It was the 108th time this legal conference has been held and it only now has an energy law section—and it is now recognized alongside the other 27 sub-disciplines of law. The first energy law keynote speakers at this event notably, in essence, both presented on the issue of what constitutes energy law scholarship and energy law.<sup>73</sup>

As the definition of energy law scholarship has evolved to some degree since Bradbrook's seminal article in 1986, in more recent scholarship it reads as 'energy law is the regulation of energy related rights and duties of various stakeholders over energy resources over the energy life-cycle'.<sup>74</sup> And this definition and Bradbrook's will no doubt be debated in the literature in years to come. However, for energy law to further develop, and to ensure it takes into account the advance of society, new international agreements such as Paris COP21, new technology and new government policies for transitioning to low-carbon economics, it is time for energy law to have its own set of guiding principles. This article states that there are seven energy law principles (and a more detailed description is included in section 'The principles of energy law explained').

These principles should act as a guide to policymakers, academics, lawyers, judges and arbitrators when adjudicating, enforcing, making or formulating documentation, laws, regulations, judgments, etc on energy law. The majority of these are already in operation to varying degrees in practice and the aim of this article is to advance these principles as the guiding principles of energy law for both research and practice. These seven principles of energy law can also enable other energy scholars to engage more directly with energy law. And in terms of thinking of the study and the definition of energy law in the future, there is a need for more interdisciplinary engagement. Indeed, both the keynotes at the aforementioned 108th Society of Legal

71 And indeed this is what the scholar William Bainbridge was doing in his text (which followed the word by Archibald Brown: W Bainbridge, *A Treatise on the Law of Mines and Minerals*, A Brown (ed) (4th edn, Butterworths 1878).

72 See Society of Legal Scholars Annual Conference <<http://www.slsconference.uk/>> (accessed September 2017).

73 It should be noted that both keynotes were allowed choose their own titles for their keynote addresses. The two keynote speakers were: Professor Peter Cameron (Centre for Energy, Petroleum, Mineral Law and Policy, University of Dundee) and Professor Catherine Redgwell (University of Oxford). Professor Raphael Heffron is the first Convener of the Energy Law Section at the Society of Legal Scholars.

74 Heffron and Talus, 'The Evolution of Energy Law' (n 4) 4.

Scholars Energy Law section highlighted the importance of interdisciplinary scholarship as a characteristic of energy law.

Finally, the question arises as to whether in light of societal drivers<sup>75</sup> or changes in eras of energy law<sup>76</sup> energy law as a discipline is modernizing? Indeed, scholars have noted this term ‘modern energy law’ in the literature to-date<sup>77</sup> and as society moves towards low-carbon economies energy law needs a new treatise based on a core set of principles as advanced in this article to modernize itself.

75 Such drivers of energy law are stated as: safety; security; economics; infrastructure; and justice. See: (i) Heffron and Talus, ‘The Evolution of Energy Law’ (n 4); and (ii) RJ Heffron, *Energy Law* (Round Hall/Thomson Reuters 2015).

76 As US authors note, but their ‘Eras of Energy Law’ are specific to the USA, whereas Heffron and Talus, ‘The Evolution of Energy Law’ (n 4) and (ii) Heffron and Talus, ‘The Development of Energy Law’ (n 4) provide an international perspective as to the evolution of energy law, see J Eisen and others, *Energy, Economics and the Environment* (4th edn, Foundation Press 2015).

77 See: (i) DN Zillman, ‘Evolution of Modern Energy Law: a Personal Retrospective’ (2012) 30(4) *Journal of Energy and Natural Resources Law* 485 and (ii) RJ Heffron, ‘The Global Future of Energy Law’ (2016) 7 *International Energy Law Review* 290.