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IX.3 The energy trilemma

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Abstract

This chapter provides an overview of the energy trilemma, a concept at the heart of both energy policy and energy law. The chapter explains its origins and discusses the three core components of the energy trilemma: energy security; competition in and realising economic development through energy markets; and environmental protection. Each of the three aspects will first be discussed at a conceptual level, before scrutinising the legislation adopted in pursuit of these goals. The chapter illustrates how the three components interact and form a policy trilemma that energy law strives to unwind. As will be seen, the concept of the energy trilemma is fundamental to energy law at international, regional, and national levels. The chapter concludes by querying what may lie ahead for the energy trilemma as a legal concept in an accelerating energy transition.

Keywords

Energy trilemma, energy security, competition, markets, environmental protection, climate change, trias, interplay of competing constitutional objectives, practical concordance

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IX.3.1 Introduction

Energy law is a normative field of law, heavily influenced and shaped by (changing) political priorities. Very broadly speaking, three different trends or phases in its development may be distinguished. In the first phase, which lasted until the end of the 1980s, legislators mainly focused on ensuring security of energy supplies through the use of monopolies. There was broad acceptance of heavy state involvement in the energy sector, owing to the fundamental role played by energy in the daily lives of a country's population. The defining moment of this phase was the oil crisis of 1973,¹ which affected both energy law and energy policy around the globe. Two examples may be used to

¹ Roggenkamp and others (2016) para 1.07.

illustrate this. Following the crisis, in the EU, the ECJ in the *Campus Oil* case for the first time showed an awareness that a steady flow of energy in modern societies can literally become a matter of life and death (when thinking, for instance, about energy supplies to hospitals).² In the US the oil crisis resulted in a push for the internationalisation of energy policy, resulting in the creation of the International Energy Agency (IEA), with the explicit aim of securing energy supplies.³ Energy was considered as something that needed to be secured for consumer nations.

While this line of thought continues to be relevant (and still is part of modern energy law today), over the course of the 1990s a second issue emerged, one given equal weight – energy prices. The perception during this second phase was that existing monopolies were inefficient, leading to higher energy prices, and that these monopolies needed to be broken up, energy markets liberalised, and the competition introduced into the market.⁴ The tool used to achieve this aim was energy law. From the tail end of the 1990s onwards, legal frameworks governing energy markets were re-designed to allow for market liberalisation, opening a significant number of markets up to competition. As a result, consumers today can choose from a range of hundreds of energy suppliers – there is far more choice available than was previously the case.⁵ While final customers may choose a supplier based solely on price, they may also be motivated by security of his supply concerns (ensuring the lights stay on), and increasingly, the environmental impact of the energy source.

The third trend relates to environmental protection and concerns over climate change. The 1970s saw an increase in the awareness (in some countries and regions) of the correlation between the environment, the climate, and energy. From a legal perspective, this third phase is mainly addressed through national laws, though regional and even international law continue to play substantial roles. A growth in environmental laws may be perceived from the late 1970s onwards, with these increasingly impacting the energy sector (for instance, environmental impact assessments for power plants, and protection of certain species and habitats with oil or gas potential). At an international level, the adoption of the United Nations Framework Convention on Climate Change (UNFCCC)⁶ in 1992 was a landmark moment in the consideration of climate issues. In the early 2000s, governments around the globe started to alter their energy subsidies, re-structuring them to substantially boost renewable energy production. The regulation of renewable energy is an example of energy law serving environmental and climate protection purposes, while aiming to ensure other goals of the trilemma, such as energy security. Developments in recent years (in a world where renewable energy production is increasingly being integrated into energy markets and subsidies are being reduced) indicate that regulation of the sector is coming to be dominated by another aspect of the energy ‘trilemma’ – markets and economic development.

This showcases the interplay of the three main components of the energy trilemma.

² Case 72/83 *Campus Oil Ltd v Minister for Industry and Energy* [1984] ECR 2727 paras 34–5.

³ For more on this, see Chapter 7 of this book.

⁴ For more on this, see Chapter 2 of this book.

⁵ For more on this, see Part 3 of this book.

⁶ United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 (UNFCCC).

Energy security, economic development, environmental protection: which country in the world would not like to satisfy all three at the same time? However, reconciling the three interests is quite a challenge, as the example of renewable energy highlights. It is difficult to have an environmentally friendly energy supply that is cheaper than other options and guarantees a steady stream of energy 24/7. This area of tension is described by the energy trilemma, and the aim of modern energy policy – which is being implemented via energy law – is to integrate all three aspects; the *holy grail of energy law and policy*.

IX.3.2 The energy trilemma

The first important recognition of this trilemma in international law occurred via the 1987 Brundtland report on sustainable development.⁷ The report focused on three components of sustainable development – ‘economic growth, environmental protection and social equity’ – emphasising their interconnection and the (urgent) need to integrate all three in political decision making to a far greater degree.⁸

For the energy sector, chapter 7 of the Brundtland report translated the three interests into what would later become known as the energy trilemma. The chapter concluded that ‘a safe, environmentally sound, and economically viable energy pathway that will sustain human progress into the distant future is clearly imperative’.⁹ This was the birth of the three pillars of the trilemma: economic viability, security of supply, and environmental protection.¹⁰ While scholars named the pillars differently¹¹ (or suggested adding further pillars),¹² the three components, as defined within the Brundtland report, have been widely accepted by international organisations.

The same is true for the name of the concept itself. While some academics refer to the concept as ‘the energy triangle’ (highlighting the fact that all three components shall mutually reinforce and further each other),¹³ other legal writers refer to ‘the energy trilemma’¹⁴ (emphasising the difficulties inherent in reconciling these interests, which may pull the legislature in different directions).¹⁵ It is nonetheless important to note that in terms of content, both terms can mean the same thing.¹⁶ The following sections discuss each of the three components in turn.

⁷ WCED (1987).

⁸ *ibid* ch 1 paras 90–92.

⁹ *ibid* ch 7 para 116.

¹⁰ Oliver and Sovacool (2017) 72.

¹¹ Sautter, Landis and Dworkin (2009) 478.

¹² Olabi (2016) 1–6.

¹³ Zillman and others (2018) 3.

¹⁴ For instance: Heffron, McCauley and Sovacool (2015) 168–77; Gunningham (2013) 184–93; Maurin and Vivoda (2016) 369–81.

¹⁵ Oliver and Sovacool (2017) 72; Fleming (2017) 32; Heffron, McCauley and Sovacool (2015) 169.

¹⁶ Though they do not necessarily have to, with the term ‘energy triangle’ frequently used in other contexts. It may, for instance, describe a geographic region – see Palkin (2012) – or three separate sectors of the energy industry – see Fessler (2019).

IX.3.2.1 Energy security

It is striking that, in legal treaties, precise definitions of the term 'energy security' fail to feature.¹⁷ As a result, the task of defining the term has been the subject of much academic debate, with a review of academic literature in 2011 by Sovacool uncovering 45 different definitions of the term.¹⁸ Energy security therefore means very different things to different individuals and to different nations.¹⁹ The concept is highly context dependent, since an energy-importing country is likely to have priorities (security of supply) that are different from those of an energy-exporting country (security of demand).²⁰

Haghighi defines energy security as 'adequacy of energy supply at a reasonable price', which suggests that energy should be physically available and its price should be reasonable.²¹ Barton, Redgwell, Rønne and Zillman, meanwhile, define energy security as 'the conditions under which a country and its citizens [. . .] and companies have access to sufficient energy resources at reasonable prices for the foreseeable future, without a serious risk of major disruption of service'.²²

Traditional consumer country definitions of energy security, thus, often consist of three different aspects: the availability, reliability and affordability of energy supplies.²³ While there are some recent trends towards the inclusion of additional criteria,²⁴ an analysis of such criteria is beyond the scope of this chapter.²⁵ The following subsections of this chapter briefly sketch the three core components of energy security (availability, reliability/resilience and affordability) and highlight the associated challenges.

IX.3.2.1.1 Availability Availability refers to the ability of consumers to secure the energy that they need.²⁶ This is becoming increasingly difficult, however, as energy demand has increased significantly across the globe over recent decades and future oil and gas developments will involve deposits that are scarcer, farther from existing demand centres and harder to extract.²⁷

Diversification of sources is one key component to ensuring the availability of energy supplies. If a country or region has several sources of energy, it matters little if one or even two suppliers turn their backs on them.

An alternative means of ensuring the availability of energy is through energy

¹⁷ See, for instance, The Treaty on the Functioning of the European Union (consolidated version, 7 June 2016) 2016 OJ C 202/47 (TFEU) art 194(1).

¹⁸ Sovacool (2011) 3.

¹⁹ Luft, Corin and Gupta (2011) 44; Ciuta (2010) 124–5; Valentine (2011) 56.

²⁰ Luft, Corin and Gupta (2011) 44. For a discussion of the Dutch so-called evergreen contracts in the context of energy security see Chapter 2 of this book.

²¹ Haghighi (2007) 14.

²² Barton and others (2004) 9.

²³ Yergin (2006) 70–71; Elkind (2010) 121; IEA, 'Energy Security – Ensuring the Uninterrupted Availability of Energy Sources at an Affordable Price' (IEA) <<https://www.iea.org/areas-of-work/ensuring-energy-security>> accessed 27 May 2020; Toman (2002) 20–21; Scheepers and others (2006) 29, 35–7; Sovacool (2011) 6–7; Florini (2010) 151.

²⁴ Kruyt and others (2011) 291 *et seq.*; Bjørnebye (2010) 71; Sovacool (2011) 9–10; Kruyt and others (2009) 2167.

²⁵ For a detailed discussion and critique, see: Fleming (2017) 41–7.

²⁶ Elkind (2010) 121.

²⁷ *ibid* 122.

independence. A strong reliance on energy imports has been traditionally viewed as problematic from an availability perspective.²⁸ A country may be classified as ‘energy independent’ if it is able to meet its energy needs without depending on any foreign sources.²⁹ However, the idea of energy independence has come under criticism in recent times, with the concept being described as outdated.³⁰ Scholars like Elkind, Nivola and Carter argue that energy security is not so much about achieving energy independence, but about realising and, above all, managing existing dependencies.³¹

IX.3.2.1.2 Reliability/resilience Reliability refers to the extent that energy services are protected from disruption.³² The traditional definition of reliability concerns infrastructure (predominantly pipelines and cables).³³ Reliability of infrastructure in the context of energy security is a pre-condition for the availability of energy supplies – there may be a source of gas (availability), but if there is no infrastructure to transport the gas (reliability) to the user, then there is still no energy security.

In recent times there has been a discussion regarding whether the traditional term (reliability) should not be replaced by a different one, resilience. Indeed, international energy organisations have already adapted their definitions of energy security to this end.³⁴ Resilience, as a concept, originates from the field of physics. In that field, it describes the resistance of a material against several impacting sources. Accordingly, the International Energy Agency states that ‘modern energy systems need to be able to withstand shocks from a wide range of sources, including natural disasters, geopolitical conflicts, and new and emerging threats related to the ongoing digitalisation of energy systems’.³⁵ Meeting these diverse demands may be better described as a show of resilience than reliability.

IX.3.2.1.3 Affordability An end user that is unable to afford an energy supply will find themselves in want of energy despite its physical availability. Therefore, the price of energy is a crucial component of energy security;³⁶ it is necessary to ensure that energy services are affordable for citizens and companies alike.³⁷

Energy prices are always negotiable, and thus regions like Europe are keen to maximise their bargaining power by showing their suppliers that they are not entirely reliant on them. This is evidenced in the gas sector through the funding of LNG-receiving terminals in Europe (as an alternative to Russian pipeline gas) and the discussions regarding domestic European shale gas extraction.³⁸ The logic remains the same: existing suppliers

²⁸ Nivola and Carter (2010) 105 *et seq.*

²⁹ *ibid.*

³⁰ Elkind (2010) 125; Nivola and Carter (2010) 105 *et seq.*

³¹ *ibid.*

³² Sovacool (2011) 9.

³³ For more on this, see Chapter 51 of this book.

³⁴ IEA (n 23).

³⁵ *ibid.*

³⁶ Zillman and others (2018) 6; Hancher and Janssen (2004) 93.

³⁷ Sovacool (2011) 9–10; Kruyt and others (2011) 295. See also: Chapter 58 of this book.

³⁸ Commission, ‘Communication on the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing in the EU’ (Communication) COM(2014) 23 final/2, p 2.

must ensure that the price of their gas exceeds neither the price of LNG imports nor the point of economic viability for domestic (shale) gas production, as European countries could otherwise be incentivised to supply themselves through these sources.

The legal leverage of energy security is anchored in the constitutional documents of many regions and countries, through state objectives. State objectives are norms that oblige the state to further a given aim by all possible means and to align state actions with that objective.³⁹ Crucially, objectives do not convey subjective rights to individuals,⁴⁰ but they are legally binding upon the state, which has to permanently regard and fulfil them when implementing new laws.⁴¹

The US, while having a statute concerning the issue (the Energy Independence and Security Act),⁴² does not in its constitution feature an explicit energy security clause. Energy regulation is instead given constitutional footing through the ‘commerce clause’ (Article 1(8)(3) of the US Constitution), which *inter alia* allows the federal government to regulate ‘commerce with foreign nations’ – including energy commerce.⁴³ In the EU, energy security features as a state objective in Article 194(1)(b) TFEU and Article 194(2) TFEU, as well as indirectly in specific sectorial articles, such as Article 122(1) TFEU and Article 192(2)(c) TFEU.⁴⁴ Germany and France also have such objectives within their constitutions. Articles 20(1) and 28(1) of the German Constitution, while not addressing energy security explicitly, have been interpreted by the German Federal Constitutional Court (as well as the Federal Administrative Court) as placing an obligation on the state to secure a steady supply of energy to German customers.⁴⁵ Likewise, while the French Constitution does not contain an explicit reference to the concept, Article 7 Law no. 48-1268 has been deemed to be part of ‘the constitutional bloc’.⁴⁶ It prescribes that the French parliament is responsible for the control and use of energy, and that it must regulate energy activities and ensure that energy as a public service is provided to French citizens.

IX.3.2.2 Competition/economic development and energy markets

Market liberalisation (and the breaking up of monopolies) has been a major global trend in the energy sector.⁴⁷ The introduction of competition brought with it freedom of generation and consumption, and the unbundling of the energy sector to facilitate non-discriminatory access to the grid. Unbundling enables competition and economic development via the entry of new competitors into energy markets.⁴⁸ To achieve this,

³⁹ de Sadeleer (2002) 310; BVerfGE 14, 263 (275); 59, 57 (108).

⁴⁰ Stern (1994) 1486 and 1714.

⁴¹ See for instance BVerfGE 14, 263 (275); 59, 57 (108); Fleming (2017) 180.

⁴² Energy Independence and Security Act Public Law 110–140 (2007).

⁴³ Paddock and Youngblood (2012) 164.

⁴⁴ For more, see: Fleming (2017) 184.

⁴⁵ BVerfGE 66, 248 (258); BVerfG JZ 1990, 335; BVerwGE 98, 275 *et seq.*; 122 162/163.

⁴⁶ See: Constitution française du 4 octobre 1958 (Constitution of the 5th Republic of France) preamble; Conseil constitutionnel, ‘Juin 2014: La Charte de l’environnement de 2004’ (*Conseil constitutionnel*) <<https://www.conseil-constitutionnel.fr/la-qpc/juin-2014-la-charte-de-l-environnement-de-2004>> accessed 8 July 2020.

⁴⁷ Zillman and others (2018) 3.

⁴⁸ Roggenkamp and others (2016) paras 16.28–16.29.

the traditional, monopolistic energy companies that were often vertically integrated (simultaneously engaged in production, transmission and supply activities) were unbundled. This allowed for competition in each of these sectors. The legal implementation of liberalisation occurred mainly at the regional level.⁴⁹

IX.3.2.3 Environmental protection

Environmental protection and climate change mitigation came to the fore in international law in 1992 through the adoption of the UNFCCC, which established for the first time a framework for the reduction of Greenhouse Gas (GHG) emissions.⁵⁰ This global framework was translated into binding obligations for individual countries via the 1997 Kyoto Protocol,⁵¹ with Article 3.1 establishing the now infamous 1990 baseline for GHG emissions. The Kyoto Protocol required developed countries to reduce their GHG emissions in the period 2008–2012 by 5 per cent compared to the baseline.

Hard negotiations followed the end Kyoto Protocol's first commitment period. The result of these negotiations was the 2015 Paris Agreement,⁵² which aims to reach zero net GHG emissions in the second half of the 21st century.⁵³ This aim is to be achieved via Nationally Determined Contributions (NDCs) that each country or region needs to draw up. With the energy sector accounting for around 25 per cent of global GHG emissions, huge changes are needed to ensure that NDCs are met.⁵⁴ There are some observable trends in this area: while emission trading schemes were initially favoured, direct support for low-CO₂ or carbon-free energy sources and carriers (including hydrogen and biofuels) has become the norm.⁵⁵

At regional and national levels, environmental protection features as a constitutional or quasi-constitutional objective in many countries. In the EU, for instance, environmental protection features in the constitutional documents, obliging the EU to integrate environmental protection considerations into all EU policies.⁵⁶ In Germany, environmental protection features in Article 20a of the Constitution as a state objective (*Staatszielbestimmungen*), while in 2004, the French Constitution was supplemented by an Environmental Charter (*La Charte de l'environnement de 2004*). This charter also forms part of the aforementioned 'constitutional bloc'. Norway (not a member of the EU but instead of the EFTA) has gone further, integrating environmental protection as a

⁴⁹ For more on this, see Chapters 47 and 50 of this book.

⁵⁰ UNFCCC art 4.

⁵¹ Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162.

⁵² UNFCCC, Decision 1/CP.21, 'Adoption of the Paris Agreement' (29 January 2016) UN Doc FCCC/CP/2015/10/Add.1, annex.

⁵³ Paris Agreement to the United Nations Framework Convention on Climate Change (adopted 12 December 2015, entered into force 4 November 2016) T.I.A.S. No. 16-1104, art 4.1.

⁵⁴ Zillman and others (2018) 5.

⁵⁵ *ibid.*

⁵⁶ The Treaty on European Union (consolidated version, 7 June 2016) 2016 OJ C 202/13 (TEU) art 3(3); TFEU arts 11, 191(2) TFEU; Case 302/86 *EC Commission v Denmark* [1989] 1 CMLR 619, paras 8–9; Case 240/83 *Procureur de la République v Association de défense des brûleurs d'huiles usagées (ADBHU)* [1985] ECR 531, paras 13, 15.

fundamental right of citizens in its constitution.⁵⁷ The US Constitution, by contrast, has been called ‘pre-ecological’, and contains no reference to environmental concerns – thus, federal environmental law in the United States is entirely statutory.⁵⁸

IX.3.3 Reconciliation of diverging interests in the energy trilemma

As previously mentioned, while there may be cases where all three components of the trilemma can mutually reinforce one another, there are also cases where the interests described in the previous sections may pull the legislature in different directions (for instance environmental protection and securing energy supplies in the case of shale gas extraction).⁵⁹ In the latter cases, the legislature may have a dilemma (or even the energy trilemma) on their hands, and must decide which of the interests to prioritise when drafting new energy laws and regulations.

Given that, as discussed in the sections above, all three interests may legally be described as constitutional state objectives, a possible way out of the trilemma is the reconciliation of these objectives via their translation into concrete rules.⁶⁰ If constitutional objectives are in apparent conflict, a strategy of ‘harmonisation’ or ‘optimisation’ may be pursued when drafting laws.⁶¹ Where particular interests, however, are at odds with one another, the legal theory concept of ‘practical concordance’ may provide a ‘legal emergency exit’ from the energy trilemma.⁶²

IX.3.4 Conclusion

The energy trilemma as a concept of energy law and policy emerged only over the last few decades. Its three components aptly reflect the three phases of development of energy law as an academic discipline. While finding the ‘holy grail’ is increasingly important, it has also become increasingly difficult for policymakers and legislators to keep the three interests aligned. The current energy transition is likely to become the true litmus test for the implementation of the concept into legislation. While the production of renewable energy is increasingly becoming a ‘normal’ aspect of many energy systems in the world, further challenges lie ahead. Whereas previously environmental protection and energy security were the key considerations in renewable energy regulation, the last couple of years have seen a reprioritisation, with more attention being paid to market integration and economic development.

The introduction of new technologies (like energy storage) or new concepts (like microgrids and energy communities) may be even more difficult to reconcile with, for

⁵⁷ Kongeriket Norges Grunnlov (Constitution of the Kingdom of Norway) art 112.

⁵⁸ Cannon (2015) 29.

⁵⁹ Fleming (2017) 5. See also: Chapter 27 of this book.

⁶⁰ This is the so-called ‘trias’ of objectives, principles and rules – see: Fleming (2019) 165–6.

⁶¹ Case 9/56 *Meroni & Co., Industrie Metallurgiche, S.p.A. v High Authority of the European Coal and Steel Community* [1957–58] ECR 135, pp 151–2 refers to ‘permanent reconciliation’. The term ‘harmonisation’ first appears in Case 5/73 *Balkan-Import-Export v Hauptzollamt Berlin-Packhof* [1973] ECR 1091, para 24, and was later reiterated in Case 29/77 *S.A. Roquette Frères v French State – Administration des Douanes* [1977] ECR 1835, paras 3, 29–31; Case C-44/99 *The Queen v Minister of Agriculture, Fisheries and Food, ex parte Fishermen’s Organisations and others* [1995] ECR I-3115, para 37.

⁶² For a detailed discussion, see: Fleming (2017) 196–200.

instance, the idea of unbundling and competition in the energy sector. A small local energy community might only be profitable if it can produce, transmit and supply energy. However, if the energy transition is going to be a truly global phenomenon, this represents just the tip of the iceberg for energy regulation.

For the road ahead it may, however, be important to remember that the challenges posed by the trilemma are not insurmountable. Law as a discipline has developed mechanisms for the reconciliation of different interests, and the example of practical concordance might serve as a useful reference point. Should lawyers consider the skills inherent in their discipline and apply them to the future regulation of the energy sector, these challenges will be overcome.

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