Comparing the Law of Energy Transition in Europe – Concluding Essay

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A. Introduction

The energy transition presents significant challenges for all states involved. To "transition" implies moving away from traditional system structures in response to new objectives, and replacing them with fundamentally innovative, even "disruptive," management concepts. This process of change is complicated by the inherent complexity of the energy transition itself, as well as by the variability of its technical, economic, political, and legal frameworks. Legally, the situation is particularly complex due to the involvement of numerous old and new stakeholders in the energy sector. The interplay between power plant operators, grid operators, storage and other facility managers, energy traders, consumers, aggregators, efficiency consultants, service providers, as well as actors from the IT industry[1], and many others, multiplies the legal relationships that must be addressed. At the same time, sufficient planning and investment security is required for market participants, which can be facilitated through expedited administrative procedures and the reduction of bureaucratic barriers. Additionally, it is crucial to ensure broad societal support over decades, while avoiding the risks of "energy poverty," whether in households or industries. Since none of this can be achieved overnight, the energy transition is also fraught with prognostic uncertainties regarding all of its accompanying factors. The Russian invasion of Ukraine underscored the sector's vulnerability to geopolitical influences, and with the increasing tensions in global trade, particularly in relation to China and the USA, more dark clouds loom on the horizon.

1 See for example Markus, in this volume, 129 (137 ff.).

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1. The Benefits of Comparative Legal Analysis

In addressing the complexity and uncertainty inherent in the energy transition, a useful approach is to look at foreign legal systems. This is particularly relevant in the context of the energy transition, following the commitment of nearly 200 signatory states to the Paris Agreement, in which they agreed to shared goals while maintaining autonomy in their implementation. An analysis from a comparative law perspective can reveal different strategies for pursuing these objectives, and once effective practices are identified, they can encourage adoption and replication.[2]

Comparative legal analysis remains valuable even when broad areas of energy and climate law, as thoroughly discussed in Part A of this volume, are already deeply integrated into European law. The legal framework governing the "Energy and Climate Union,"[3] established in 2015, has expanded through initiatives such as the European Green Deal, the "Fit for 55" legislative package, and the REPowerEU Plan, resulting in an increasingly rigorous and detailed set of requirements—often in the form of directly applicable regulations under Article 288(2) TFEU. Despite the increasing rigidity and specificity of these regulations, the legal framework remains largely "final" in nature. In principle, the EU legislature, as exemplified by legal acts on the promotion of renewable energy and energy efficiency, essentially limits itself to the setting of common goals, within which member states must then define their own national objectives, while maintaining the discretion to decide on the "form and means" of implementation, in accordance with the definition of "directives" in Article 288(3) TFEU. The relative degree of flexibility granted to member states — despite numerous often excessive (and sometimes "overregulated") detailed procedural requirements, such as obligations regarding organization, information, and cooperation — inevitably leads to different implementation strategies. A comparative analysis of these strategies is therefore indispensable when considering the common goals to be achieved at EU level.[4]

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2 For detailed discussion, see Till Markus, 'Zur Rechtsvergleichung im nationalen und internationalen Umweltrecht' 80 (2020) ZaöRV, 650, particularly 666 ff.

3 See European Commission, Communication 'Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy' (25 February 2015) COM (2015) 80 final.

4 Successful examples of comparative legal analysis, especially in energy law, can be found in Markus (n 2) and Johannes Saurer/Jonas Monast, 'Symposium Foreword: The Law of Energy Transition in Federal Systems' (2021) 10 Transnational Environmental

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Moreover, legislative implementation of European directives at the national level is not sufficient on its own. The effectiveness of EU legal acts ultimately depends on their efficient incorporation into the administrative practices of member states. Comparative studies of cooperation and coordination mechanisms, as well as the administrative realities that differ from one country to another, can provide valuable insights.[5] Finally, a comparison of national regulatory structures, which are both directed by and interlinked with EU law, can generate impulses for the further development of supranational law, fostering a "reciprocal development process" that benefits both national and EU-level legal frameworks.[6]

2. "Proper" Comparative Legal Analysis

Comparative legal analysis, however, cannot merely consist of a sequence of descriptive and more or less disorganized country reports on specific legal questions.[7] This is particularly true in the field of public law concerning energy supply, which has traditionally been regarded as a core element of state sovereignty.[8] This domain is embedded within the specific traditions of national (economic) administrative law, constitutional law, and the respective state organizations. Furthermore, seemingly comparable legal concepts and institutions (such as "public service") may carry entirely

Law, pp. 205 ff.; see also Martha Roggenkamp/Catherine Redgwell/Anita Ronne/Inigo del Guayo (eds), *Energy Law in Europe* (OUP), 3d ed. 2016, with detailed conclusions of the editors to the national reports in Part IV (Chapter 16).

5 The European Commission also takes this into account by continuously commissioning in-depth studies on the implementation of EU law, particularly regarding its practical effectiveness in the administrative realities of member states. For example, the primary author of this chapter, along with colleagues from other EU countries, is involved in a detailed study (including stakeholder surveys) on the implementation of Regulation (EU) 2022/869, which provides guidelines for trans-European energy infrastructure.

6 Eberhard Schmidt-Aßmann, *Das Allgemeine Verwaltungsrecht als Ordnungsidee*, Springer, Heidelberg 1998, 37; see also Johann-Christian Pielow, Grundstrukturen öffentlicher Versorgung, Jus Publicum 58, Mohr-Siebeck, Tübingen 2001, 106 f.

7 For examples from environmental law, see 'Beispiele' by Markus (n 2) 658.

8 This is also reflected in the reservation in favour of national energy policy expressed in Article 192 para. 2 (c) and Article 194 para. 2 second subpara., TFEU.

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different meanings from one country to another.[9] There is always the risk, therefore, of merely comparing apples and oranges, a phenomenon often referred to as the *false friends syndrome*.[10] Legal systems are, of course, also shaped by "soft" factors, such as social norms, ideologies, or even the mentalities of the country in question. For example, attitudes toward climate-related impacts in Mediterranean countries is markedly different from those in the windswept, rain-laden regions of northern Europe.

A truly "holistic" approach to comparative legal analysis must consider these particular contextual factors[11] — reflecting national "legal cultures" — yet this naturally makes the process especially time-consuming and demanding.[12] According to prevailing opinion, comparative law methodology should always be "functional" in nature.[13] At the heart of comparative law is the need to precisely define the legal and factual issues (*tertium comparationis*) to be addressed, independent of system categories or concepts derived from the analyst's own legal system. The objective is to identify functional equivalents for solutions in the legal systems being compared.

3. Further Approach

A more in-depth analysis of the law governing the energy transition in Europe, particularly within the framework of "functional" comparative legal analysis as described above, cannot be fully accomplished based on

9 See, for example, the comparison between the French "service public" and the German concept of "Daseinsvorsorge" with regard to energy supply, as discussed by Pielow (n 6) 111 ff., 288 ff.

10 Johannes Veigel, 'Die funktionale Methode bei der Rechtsvergleichung' 30 (2021) Juridica International, 71 ff., 72 <https://doi.org/10.12697/JI.2021.30.09> accessed 18 February 2025, also considering, Jaakko Husa, *A new Introduction to Comparative Law*, Bloomsbury 2015, 119.

11 See Markus (n 2) 74 in accordance with Konrad Zweigert/Hein Kötz, *Einführung in die Rechtsvergleichung*, Mohr-Siebeck, 3. ed. 1996 Tübingen 33 ff.; for in-depth detail on the necessarily context-dependent comparative law *Kischel,* Rechtsvergleichung, 2019, particularly 269 ff.

12 In the context of the energy transition, various reports and "factsheets" from the European Commission on the implementation status in member states, as well as the country reports (Country Insights) on the energy transition in IEA member countries, available under "Countries & Regions" on the IEA website, provide useful guidance. See http://iea.org/countries.

13 For an in-depth discussion of the method of functional comparative law and the controversy surrounding it, see Uwe Kischel, *Rechtsvergleichung*, 2019, 93 ff.; also Veigel (n 10).

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the contributions to this volume. For one, the contributions reports only cover a selection of European countries including several EU member states and the UK. Furthermore, the country-specific studies vary in content and thematic emphases. However, the informational value of the provided insights in national systems of energy law is considerable. Based on these, it is possible to identify some notable similarities, as well as significant differences and certain shortcomings in the energy transition laws of the countries studied. These will be outlined in the following sections, with the understanding that, due to space constraints, the selection of issues to be discussed is necessarily subjective on the part of the authors.

B. General & systemic perspectives

1. Understanding of "energy transition"

It is commonly agreed that the 'energy transition' is about turning away from the use of fossil fuels, now with the goal of comprehensive 'decarbonisation' or 'net zero'. In legal terms, this understanding stems less from energy law than from various countries' cross-sector climate protection legislation, for example in the UK and Germany. A legally binding or generally accepted definition, however, exists neither at the European, nor, as far as can be seen from the contributions to this book, at the national level. The term 'energy transition' notably appears as a legal term in the title of the French "Loi relative à la transition énergétique pour la croissance verte" of 2015.[14] However, it is not described in any more detail within the law itself. Instead, reference is made to the definition of 'green growth' in the French Energy Code. This definition, however, marks the generally recognised cornerstones of what is generally understood by energy transition, namely: the economical use of natural resources (particularly of fossil fuels), increasing energy efficiency and decarbonisation, as well as the expansion of renewable energies. At the same time, the French law calls for a socially acceptable energy policy that promotes innovation and supports the competitiveness of businesses, in addition to 'combating energy poverty'.[15] Similarly, the German Federal Energy Industry Act (Energiewirtschaftsgesetz), without using the term 'Energiewende', states in its article 1 para 1 that the purpose

14 Act no. 2015–992 of 17 August 2015, J.O.R.F. no. 189 of 18 August 2015.
15 Cf. article 100–1 Code de l'Énergie.

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of the Act is "to provide the general public with a secure, low-priced, consumer-friendly, efficient, environmentally friendly and greenhouse gas-neutral grid-based supply of electricity, gas and hydrogen, which is increasingly based on renewable energies." In the end, the term 'energy transition' proves to be more of a topos of political programme than a binding legal or statutory term. As part of the 'ecological' transition, the term energy transition is also being used in the names of ministries, for example in France and also in Spain. Interestingly, the energy crisis in the EU resulting from the war in Ukraine led to the renaming of the Italian Ministry of Ecological Transition as the Ministry of Environment and Energy Security.

2. Target hierarchies and conflicts / trade-offs

National climate and energy policies are converging along the EU's long-term decarbonisation targets; only a few countries go beyond the targets set by the EU (net zero by 2050). However, the way in which interim goals are weighted and related to each other varies substantially from one country to another. In this context, reference is often made to the tension within the energy trilemma encompassing security, affordability and the maximization of environment- and climate-friendliness. In legal terms, addressing this tension always requires a balancing of competing interests. Ideally, each individual concern is taken into account as comprehensively as possible (as is known in German law as the 'optimization rule').

Nevertheless, differences in the importance attached to a 'secure' and 'affordable' energy supply can be observed across the EU: In the UK in particular, the energy transition prioritises security of supply and affordability and builds incentives for increased competition within the domestic energy industry. The above mentioned Section 1, para 1 of the German Federal Energy Industry Act (Energiewirtschaftsgesetz) lays down similar priorities. This stance contrasts in particular with the perspective presented in the chapter on the law of energy transition in Italy in general perspective by *Fabrizio Fracchia* in this book, who sees the ultimate purpose of the energy transition as being in service to "intergenerational responsibility".[16] This position is possibly influenced by the 'climate decision' (*Klimabeschluss*) of the German Federal Constitutional Court and the 'intertemporal freedom safeguard' developed there in favour of future generations. However, the

16 See Fracchia, in this volume, 183 (196).

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German court by no means recognised 'intergenerational justice' as an 'absolute' value, but explicitly required that this objective must always be weighed against other conflicting constitutional values (including the requirement of a secure and affordable energy supply). This holds true across EU countries, as none of the existing court decisions on climate-related sate obligations, suggest a one-sided focus on 'intergenerational responsibilities'.

Meanwhile the Russian-Ukraine war has further accelerated efforts towards decarbonisation, for example causing the European Commission to devise and implement its RePowerEU-strategy. Under this strategy, the expansion of renewable energies – also referred to in Germany as *Freiheitsenergien* or "freedom energy"[17] – and energy efficiency will play a central role in reducing dependence on energy imports from outside the EU.

At the same time, however, the energy crisis triggered by the Russian attack also led to the reactivation of fossil energies, with the extension – quantitatively and/or over time – of domestic oil and gas production in Denmark and Great Britain, and to the renaissance of nuclear power, especially in France. As is well known, nuclear energy was previously integrated into the EU's approach to the energy transition, largely in response to diplomatic pressure from France. Specifically, it was recognised as a low-carbon technology in the EU's taxonomy legislation, and later as a net-zero technology in the Net Zero Industry Act. This, along with its high base load capacity, is encouraging other countries to also expand their use of nuclear power. This is the case notably in Sweden, where nuclear power already accounts for 28 % of electricity generation, and in Poland, which plans to build six new reactors by 2033. In the UK, nuclear power accounts for a good 14 % of the electricity mix (2023) and new plants, for which the EU already approved state aid, are under construction. In Italy,[18] an (open-ended) 're-evaluation' of nuclear power is pending and in Denmark, public opinion is turning against the 'nuclear ban' of early 1985.[19] Notwithstanding the ongoing expansion of renewable energies, existing climate protection measures have been relativised, especially in the UK, in view of the progress already made in reducing CO_2 emissions in this country, and

17 This is how the Federal Minister of Finance, Christian Lindner, spoke about them at the special session of the German Bundestag on the war in Ukraine on 27 February 2022, cf. Bundesregierung, 'Bulletin no. 25–4 of 27 February 2022' < https://www.bundesregierung.de/resource/blob/992814/2008588/627752e2e498a2a857553f6c91bde8f6/25-4-bmf-ukraine-data.pdf?download=1> accessed 17 March 2025.

18 See Fracchia, in this volume, 183 (194 f.).

19 See Mortensen, in this volume, 223 (225).

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in order to create a "pragmatic, appropriate and realistic approach" for the continued transition process.[20] One example of this relativised shift is the delay of the ban on internal combustion engines in the transport sector from 2030 to 2035. In the meantime, new dependencies on energy imports from non-EU countries are already on the rise thanks to the procurement of "climate-friendly", in particular "green" hydrogen.

3. Highly diverse transformation paths

Overall, the highly varied natural settings (e.g. large potential for water-based energy in the north, particularly in Sweden), regulatory contexts (e.g. degrees of centralization, illustrated by the different legal approaches of Germany and France), as well as the national energy mix of a given country, continue to drive regulatorily divergent strategies regarding their "transformation pathways"[21].

(a) Timelines of energy transition

This heterogeneity is already reflected in the historic beginnings of different countries' energy transitions: Denmark made a particularly early start, with the oil crises of the 1970s providing a powerful impetus and including a massive expansion of biomass-fired district heating systems,[22] as did, albeit to a lesser extent, Sweden.[23] In other countries, however, the energy transition did not become an earnest policy issue before the turn of the millennium. In Germany, for example, it has only been rapidly accelerating since the reactor accident at Fukushima;[24] the situation is similar in France.[25] The phase-out of coal-fired power generation has also progressed more rapidly and with less political noise in, for example, France and Spain than in other countries. Meanwhile, the UK also just took its last coal-fired power plant off the grid in September 2024 – far ahead of the controversial and hesitant phase-out processes in Germany and particularly in Poland.

20 See Ogbumgbada/McKenzie, in this volume, 205 (218).
21 Inspired by Johannes Saurer, 'Transformationspfade in Energiesystemen' (2019) 2, Der moderne Staat (dms) 282 (283 ff.).
22 See Mortensen, in this volume, 223 (230 f.).
23 See Malafry, in this volume, 241 (245).
24 See Markus, in this volume, 129 (132 f., 141 ff.).
25 See Lamoureux, in this volume, 167 (178).

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(b) (Path) Dependencies of multiple preconditions

Transformation paths are impacted by these historical developments, and this is particularly the case in countries that have a very traditional energy mix. There is a stark contrast in the speed and possible approaches to transitioning away from fossil fuel toward renewable energy sources between countries that continue to rely on coal, particularly Poland and to a lesser extent Germany, and those, like France, where nuclear power plays a dominant role. Other countries have long had a high proportion of wind, solar and/or hydro power (the latter accounts for 40 % of the electricity mix in Sweden) and/or biomass, as in Denmark. The German 'double phase-out' of nuclear energy (by April 2023) and of coal-fired power generation (by 2038 at the latest) will lead to correspondingly greater challenges in the procurement and distribution of renewable energies (including hydrogen) and accompanying measures (electricity storage, grid expansion and management, gas-fired base load power plants as a 'bridge technology').

Other framework conditions for the transition process include the density of settlement and of industrialisation in each country. Sweden's population, for example, is predominantly rural,[26] whereas in highly urban Germany the transport of wind power, which is mainly generated on the coasts, to the centre and south of the country adds additional complexity.[27] Additionally, there are geographical and climatic characteristics that impact transition plans, particularly where there is greater potential for wind and solar energy production.

(c) Heterogeneity in the expansion of renewable energies and energy efficiency

In line with the requirements of EU law, all countries surveyed in this book (including the UK, even after Brexit) focus their approach to the energy transition on expanding renewable energies and increasing energy efficiency. Beyond this overarching approach, countries demonstrate vastly different ambitions and interests in how to achieve their goals.

26 See Malafry, in this volume, 241 (241, 261).
27 See Fehling, in this volume, 301 (316).

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(aa) Expansion paths for RE

The lowest ambition to expand renewable energy sources are seen in Poland, given the continued dominance of coal-fired power generation (for the time being until 2049). The situation is similar in France due to the country's decades-long reliance on nuclear energy or rather due to the revitalization thereof in the wake of the energy crisis triggered by the war in Ukraine.

(bb) Energy efficiency

The objective of massive energy savings, the primary concern under EU law ('energy efficiency first'), is also viewed differently in the countries studied in this book: In some chapters, energy efficiency is not identified as a stand-alone objective or it is merely a secondary consideration, while in the Polish contribution, for instance, the dominant use of domestic coal means that a drastic reduction in energy use, especially in the building sector, is seen as something of a 'silver bullet' for energy system transformation.[28] The efforts toward energy efficiency in Denmark[29] and Sweden[30] starting in the 1970s should be highlighted here, where plans to further increase energy efficiency in these countries focus primarily on the transport and the industry sector.

One should bear in mind that economists criticise ever more rigid legal constraints on energy usage and warn of significant economic risks.[31] Reference is made to the enormous future increase in demand for electricity, resulting from sector coupling and power-to-x technologies (e-mobility, heat pumps, etc.). In any case, rising energy prices, rising emissions trading system (ETS) costs, as well as carbon taxes could prompt industrial and private consumers to increase their energy efficiency on their own initiative.

28 See Nowak/Knap, in this volume, 279 (284 ff.).
29 See Mortensen, in this volume, 223 (224 ff.).
30 See Malafry, in this volume, 241 (244 ff.).
31 See for example and among many others Clemens Fuest (IFO Institute, Munich), 'Das Energieeffizienzgesetz bedroht das Wirtschaftswachstum' in: Handelsblatt (11 May 2023) < https://www.handelsblatt.com/meinung/gastbeitraege/gastkommentar-das-energieeffizienzgesetz-bedroht-das-wirtschaftswachstum-/29142748.html> accessed 18 February 2025.

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(d) (Other) Innovative technologies

The promotion of renewable forms of propulsion in the transport sector also varies depending on the energy mix of the respective country. As already mentioned, the UK postponed its ban on internal combustion engine vehicles by five years to 2035. France plans to complete this phase-out even later, by 2040. Nevertheless, in all countries analysed in this book, the electrification of the transport sector is a top priority. Therefore, and for reasons of energy efficiency, hydrogen and e-fuel concepts tend to play only a subordinate role. The situation is similar for energy in buildings, especially if, as in Denmark, Sweden and the UK, widespread district heating networks, which are already subject of special network regulation, can be used.

Meanwhile, a transnational consensus seems to be emerging regarding the role of hydrogen in the energy transition. It is to be used primarily for decarbonisation in energy-intensive industries and also in heavy-duty and non-electrified rail transport. It is not (yet) considered to have a significant future in the domestic heating sector or private transport, due to, among other things, the lack of a supply infrastructure. Still, some more ambitious plans exist, particularly in Poland (including for electricity generation, heating and the entire transport sector),[32] while in Denmark the production of e-methanol supported by hydrogen (e.g. for shipping, but also for export purposes) is already being tested in a large-scale plant in Kassø.[33] Germany is also very ambitious when it comes to hydrogen: As a result of the Ukraine crisis, targets to build up electrolyser capacities by 2030 have been doubled and the development of a nationwide 'hydrogen core [transport] network' is on the way.[34] A legal framework for hydrogen production as well as pipeline infrastructure and their regulation (network access!) reportedly exists in Germany, France and the UK as well as, to some extent, in Poland.

Overall, from the rainbow of hydrogen, the initial focus on 'green' hydrogen ('no carbon' hydrogen, produced using excess renewable energy) is being relativised, partly as a result of the French push in favour of 'low carbon' hydrogen, especially from nuclear energy (pink hydrogen).[35] The use of

32 See Nowak/Knap, in this volume, 279 (280 ff.).
33 See Mortensen, in this volume, 223 (227).
34 See Markus, in this volume, 129 (154 f.)
35 See Lamoureux, in this volume, 167 (180 f.).

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'blue' hydrogen from fossil sources also increasingly appears as an option. 'Blue' hydrogen will primarily be used in combination with carbon capture and storage (CCS) technology, which in turn has long been recognised by the Intergovernmental Panel on Climate Change as an unavoidable tool and is actively being pursued by the EU Commission. CCS as well as carbon capture and utilization (CCU) are considered particularly suitable for those industrial production processes (e.g. cement production) in which the use of other 'green' technologies (e.g. hydrogen) is unprofitable. Broad legal regulations already exist in the UK and in Denmark, driven by the availability of considerable potential storage sites in the North Sea. Denmark is already emerging as an important storage location for the removal of CO_2 from Belgium and, in the future, from Germany.[36] Contrary to the previously more restrictive legal situation, the German federal government recently initiated a draft bill to expand CCS technology.[37] In Denmark, where biogas is already widely used and partially processed using carbon separation to feed into the natural gas grid, bioenergy with carbon capture and storage (BECCS) is to take on a larger role. Indeed, the country plans to deploy BECCS also for power to x-purposes in the future.

There is growing recognition that de-fossilisation alone will not lead to climate neutrality. Thus, ecosystem and geochemical negative emission technologies (NETs) are attracting more attention, and lawmakers are taking initial steps to adapt to this reality. CCS and CCU as already mentioned above are the target of regulation but need to be considered more broadly as part of holistic carbon management approaches, since the net-negative accounting of emissions is a complex topic linked to questions of product life cycle analysis, monitoring, reporting and accounting. One example of a strategic approach to NETs is Germany, which is currently working on its long-term strategy for negative emissions and recently announced the cornerstones for its carbon management strategy. Countries across Europe are slowly implementing terms and measures according to their individual approaches, but the process has only just begun, both at the national and the European level.

36 See Mortensen, in this volume, 223 (236 f.).

37 See draft law to amend the Carbon Dioxide Storage Act of 21 June 2024 (BT-Drs. 20/11900); on similar initiatives in other EU states, i.a. France, see European Commission, Communication 'Towards an ambitious Industrial Carbon Management for the EU' COM (2024) 62 final 4 ff.

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3. Interim conclusion

There are relevant differences between EU-countries' approaches to the energy transition when it comes to their sectoral strategies, their pace and their use of decarbonisation options other than renewables (nuclear power, NETs, CCS etc.). Countries have significantly different perspectives on phase-out policies and binding decisions. As a result, the energy mix across Europe remains diverse.

C. Steering instruments and legal barriers

From a comparative law perspective, the legal instruments that serve the implementation of national decarbonisation strategies are of particular interest. Do they provide legal certainty, and with it the planning and investment security, that all stakeholders in the energy sector have repeatedly demanded? What legal obstacles do these instruments encounter? And do they really advance the energy transition?

1. Regulatory frameworks – between hard and soft law

(a) Transition "planning"

In compliance with the Paris Agreement, which calls on the parties to make nationally determined contributions (NDC), and the Governance Regulation (EU) 2018/1999, which serves to implement it uniformly throughout the EU, all Member States surveyed here have Integrated National Energy and Climate Plans (NECP). These NECPs describe the guiding principles for the five dimensions of the European Energy and Climate Union, and also the policies, measures and programmes planned for their implementation. Whether or not this can already be considered a pan-European concordance may be drawn into question when one considers the sometimes quite detailed supplementary recommendations of the EU Commission for the revision of the NECP's.[38] These plans were to be updated by 30 June

38 See, for example, European Commission, '8th Report from the EU Commission on the State of the Energy Union' (24 October 2023) COM (2023) 650 final.

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2024 and this deadline was met by all countries observed in this book, with the exception of Poland.[39]

National energy and climate plans are indeed binding under international and EU law. Nevertheless, plans' are a largely undefined legal category. The same applies to accompanying and purely political (net zero) strategies,[40] programmes and the like. Their binding effect ultimately depends on how they are normatively embedded in national legal systems, which would require more in-depth investigation.

(b) Statutory law

There are also striking differences in the way the energy transition is being accompanied by formal legislation / statutory law. Germany, Denmark, Sweden and the UK have their own climate protection laws with emission reduction targets for individual sectors, including the energy industry. However, the sub-targets and measures of the 'energy transition' are often regulated in a barely manageable multitude of individual laws and supplementary regulations such as ordinances and decrees. In Italy, for example, there is an 'incessant flow of legislation' that is addressed by initiatives for regulatory, bureaucratic or organizational simplification;[41] the same applies in Germany. The practical benefit of a separate and cross-sectoral climate protection law depends, in turn, on the position such a law occupies in the national hierarchy of norms – does it have normative priority, or does it operate (solely) at the same level as other (energy) laws?

France offers a good example of how energy and climate policy objectives can be combined at (only) one normative level: The targets set out in the French 'Energy Transition for Green Growth Act' (2015) were incorporated into the extensive Code de l'énergie, which covers all stages of the energy related value-chain.[42] The situation is similar with the British Energy Act of 2023, which takes up the goals of the Climate Change Act of 2008

39 Cf. European Commission, 'National energy and climate plans' <https://commission.europa.eu/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en> accessed 06 November 2024.

40 For example in the UK, see Ogbumgbada/McKenzie, in this volume 205 (208 ff.); for Italy, see Fracchia, in this volume, 183 (186 ff.).

41 See Fracchia, in this volume 183 (188).

42 See Lamoureux, in this volume 167 (169 ff.).

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and the Net Zero Strategy of 2021, along with sectoral energy strategies, and comes along as a fairly modern and comprehensive set of rules, with detailed sections on CCS, hydrogen (infrastructures) and even fusion energy.[43] In contrast to the French model, the UK's Energy Act mainly amends and supplements already existing laws such as the Electricity or Nuclear Acts,[44] so that the UK continues to show a plethora of multi-branched individual laws. Nevertheless, the Energy Act seems to be approaching a consolidation and simplification of the entire energy-related legislation – also needed in other countries[45] – which is primarily geared to climate targets. It may also serve as a best practice model for other countries where the system of standards remains rather fragmented.[46] Possible and, due e.g. to technical developments, increasingly necessary amendments and modifications to such 'umbrella laws' must, of course, be designed in such a way that maintains a generally clear and consistent set of rules.

Ultimately, the fundamental and directional decisions taken on the design of the energy transition should ideally extend beyond the narrow time frame of individual legislative periods and thus be designed to be 'timeless' to a certain extent. In this regard, the Danish practice of consensus politics is worthy of mention. Consensus agreements, while often time consuming, are used in Denmark to safeguard energy policy decisions in the long term. They are agreed across party lines in parliament and specific (implementing) legislation is only enacted on this basis. This practice can contribute to legal and planning certainty as well as to broad social acceptance – even if one has to admit that the 'consensus democracy' is a typically Danish phenomenon and may be impossible in the legislative cultures of other countries.

2. Diversity of instruments

Similarities, but also significant differences, exist with regard to the nature and manner of state control instruments.

43 Cf. insofar section 156 of the Energy Act.

44 For more details see Ogbumgbada/McKenzie, in this volume, 205 (207 ff.).

45 For Germany, see Fehling, in this volume 301 (319 ff.); for Sweden, see Malafry in this volume, 241 (273 f.).

46 In Italy, the government has recently been tasked with reorganising the existing legislation on renewable energy sources in order to significantly reduce and rationalise the legal provisions, and to ensure a higher degree of legal certainty and a simplification of procedures (see Fracchia, in this volume, 183 (187 ff.).

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(a) Set of measures between the state and the market

In all countries included in this volume, a mix of command and control instruments on the one hand, and market-based or incentive instruments on the other, can be discerned. The range of methods used in the former extends from legal prohibitions, such as those used in the German coal and nuclear phase-out, or advertising and traffic bans for emission-intensive vehicles, to behavioural mandates like the required use of non-fossil fuels or innovative heating types, including compulsory connection to district heating systems.[47] At the other end of the spectrum, there are incentive instruments, namely in the form of direct or indirect state funded subsidies. In between these two extremes, we find hybrid systems with market-based elements, most notably the obligation to participate in public tenders for certain types of (RE or baseload) power plants, as well as purely levy-based steering by means of energy and/or CO_2 taxes, the latter being in place in Sweden since 1991.[48]

As mentioned, combinations of the different types of instruments are possible and even common. The more diverse the steering mix becomes, the more coordination is necessary in order to avoid counter-productivity. This applies e.g. to the legal support of certain technical development paths under the aspect of new (desirable) energy technologies: If the aim is to promote the growth of e-mobility, the question arises as to whether and to what extent this should be at the expense of other technologies, such as e-fuels. A similar situation applies to the balancing of highly volatile feed-ins of electricity from wind and solar power into traditional electricity grids: here, it is important to coordinate grid requirements with those for flexible balancing mechanisms and the use of electricity storage. Furthermore, regulations on the operation of electricity storage systems and hydrogen infrastructures (electrolyser, H2 pipelines, etc.) must be seamlessly integrated into the existing competition and unbundling regime of the EU energy market.

47 See Markus, in this volume, 129 (138 ff.).
48 See Malafry, in this volume, 241 (247).

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(b) In particular: promoting renewable energies

Meanwhile, the legal requirements for an increased expansion of renewable energies in electricity generation seem to be moving closer together – likely as a result of increasing competition in the sector, but also due to increasingly stringent and standardising EU requirements (RED III, among others). In the past, funding regimes with purchase obligations for grid operators at legally fixed feed-in tariffs or even pure subsidy regimes dominated. Only in exceptional cases did 'competitively' designed models exist, such as the Swedish electricity certificate system introduced as early as 2003, which has been operated jointly with Norway since 2012 and is now to be phased out.[49]

(aa) Increasing competition

Meanwhile, the mix of instruments is becoming more 'colourful' everywhere. Pure feed-in tariffs, market premiums and other subsidy systems are increasingly being replaced by public tenders (especially for offshore wind power), direct marketing with bilateral Power Purchase Agreements (PPAs) and the like. Furthermore, Contracts for Difference (CfDs), which have been the method of choice in the UK for years, are increasingly being discussed as an effective means of public-private hybrid financing of RE projects, both within and outside the EU.[50] They protect investors from the volatilities of wholesale energy markets through agreements with government agencies to mutually offset price differences on the electricity exchange over a period of about 10 to 15 years, based on a fixed price. This is intended to ensure a reliable amortisation of the RE project and also contribute to the stability of electricity prices. In addition to electricity generation from renewables, CfDs are also recommended for hydrogen and CCS projects and for (large-scale) projects to decarbonise energy-intensive industries (e.g. steel production), in the form of Carbon Contracts for Difference (CCfDs). However, the high cost of developing the necessary

49 See Malafry, in this volume, 241 (248 f.).

50 For a detailed account of developments in the UK, see Ason, in this volume, 379 (379 ff.).

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legal framework[51] and the inherent problems with state aid legislation[52] remain as challenges to their effectiveness.

(bb) Planning and social acceptance

Furthermore, the contributions in this volume unanimously emphasise the need for (further) acceleration and simplification of planning and approval procedures for RE projects, i.e. with binding requirements from national legislatures for the designation of priority areas for wind and for (large) solar power plants.[53] What is called for is a noticeable reduction in bureaucracy (cutting red tape), a streamlining of subsequent court proceedings as well as the expansion of the early participation of civil society in those proceedings.[54] In order to increase social acceptance of changes in energy infrastructure, legal requirements for operators to offer residents and municipalities the opportunity to co-invest in new projects, especially in wind park projects[55], and also the promotion of local energy communities,[56] are on the rise as well.[57]

In view of increasingly complex and interdependent energy systems, there are also calls for more holistic and integrated planning of electricity, gas and hydrogen plants, along with pipelines, storage facilities and

51 Ason, in this volume 379 (382), with references also to CfD practice in other countries on 379 (390 ff.). The introduction of CfDs was also considered in the draft of the German Renewable Energy Sources Act (EEG 2023), but they were not (yet) included in the final law, see Fehling, in this volume, 301 (309) with references to further high investment risks at 301 (319 f.). However, a comparable mechanism for financially supporting the development of a hydrogen core network was introduced in May 2024 in § 28r of the German Federal Energy Industry Act (Energiewirtschaftsgesetz).

52 See Fehling, in this volume, 301 (311 f.).

53 As to the recent "Solar (accelerating) package" in Germany see Fehling, in this volume, 301 (308 ff.).

54 See in particular for Italy, Mari, in this volume, 361 (372).

55 See for example the "Citizen's Energy Act" in some German States, like in North Rhine-Westphalia 19 Dec. 2023. The Federal Constitutional Court justified this encroachment on the entrepreneurial freedom of the plant operators – under certain conditions – with the improvement of social acceptance for new onshore wind turbines to promote the further expansion of this RE, cf. decision of 23 March 2022, BVerfGE 161, 63 ff.

56 See for Denmark, Mortensen, in this volume, 223 (238).

57 So e.g., as a result of another political agreement from 2023, in Denmark, see Anker/Mortensen, in this volume, 397 (400).

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large-scale industrial consumption systems.[58] To this end, in the UK, a state-owned but independent National Energy System Operator (NESO) was created in 2024 from parts of the former transmission system operator National Grid.[59] NESO is responsible for integrated planning and coordination among all electricity, gas and hydrogen networks "with a whole system perspective across energy sectors and by balancing the guiding principles net zero, ensuring security of supply, and ensuring efficiency and economy".[60]

(cc) Interim conclusion

Regarding the extension of renewable energies, all countries analysed are facing a new phase of regulatory challenges, while new technologies (like hydrogen and negative emission technologies) are now facing similar early challenges. Phase one consisted of setting up effective financial support schemes, but this is no longer the most important lever. Instead, new instruments are needed to:

(1) secure acceptance for an accelerated expansion
(2) reduce bureaucratic hurdles to speed up planning and installation of new plants
(3) solve conflicts between different objectives (especially climate and nature conservation)
(4) enable sector coupling (mainly driven by a hydrogen economy). In this regard we observe differences regarding choice of technology – some countries choose specific technologies at an early stage, others try to keep technology choice open.

(c) Role of public companies

The corporate structures in the energy sector also play an important role in the instrument mix. Energy transition targets are sometimes easier to

58 See e.g. Fehling, in this volume, 301 (322), and into the same direction the recently amended articles 14d (1) and 112b of the German Federal Energy Industry Act (Energiewirtschaftsgesetz).
59 According to Part 5 of the Energy Act 2023.
60 For further information see the new NESO website at NESO, <www.neso.energy> accessed 06 November 2024.

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implement through public companies like the state-owned transmission system operators in France (*RTE* for electricity), Denmark (*Energinet* for electricity, gas and gas distribution networks) and Sweden (*Svenska Kraftnät*). By contrast, in Germany the sell-off of electricity and gas transmission grids to mostly foreign investors, including the Dutch state-owned *TenneT*, began in the early 2000s. Recent attempts in Germany to establish a national (transmission) grid company with state participation, not least with a view to the cost-intensive expansion of the electricity transmission grid, including lines connecting to offshore wind farms, failed, largely due to budget deficits.[61] On the German electricity and gas distribution level, on the other hand, around 900 municipal energy suppliers are working to facilitate the energy transition at the local level. They are also involved at the municipal level through Germany's new *Wärmeplanungsgesetz* (Heat Planning and Decarbonisation of Heating Networks Act), which aims, among other things, to expand the district heating supply by means of renewable energies. In Denmark, by contrast, electricity distribution networks are operated by private companies, albeit with significant participation of electricity consumers.[62]

3. Legal barriers and areas of tension

In addition to the trade-offs already mentioned in section B. 2., it is also interesting to look at specific legal tensions that have been identified as obstacles to a rapid and effective energy transition.

(a) Energy infrastructure between climate and (other) environmental law

The widespread demand, also in view of increasing NIMBYism, for acceleration and simplification of the relevant planning and approval procedures for the expansion of wind power and large-scale solar installations has al-

61 After the state-owned KfW Bank took a stake in the 50Hertz electricity TSO in 2018, the Dutch TenneT TSO GmbH recently wanted to sell its high-voltage grid to this bank. After years of negotiations, the plan failed due to the German government's current budgetary problems, see TenneT, 'TenneT und KfW beenden die Verhandlungen über einen Komplettverkauf von TenneT Deutschland ergebnislos.' (21 June 2024) <https://tennet-drupal.s3.eu-central-1.amazonaws.com/default/2024-06/200624_Pressemitteilung%20TenneT_DE.pdf> accessed 06 November 2024.

62 See Mortensen, in this volume, 223 (226).

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ready been mentioned. This ultimately applies to all energy infrastructures and, with increasing and cross-sectoral 'electrification', in particular to the expansion of power transport and distribution lines. A reason given for protracted approval procedures in all countries is also the fact that plant constructions are subject to conflicting other – and often overly complex – (EU) environmental law, namely in the form of strict requirements for the protection of nature, land and biodiversity, as well as the marine environment in the case of offshore plants.[63] Sometimes national environmental law goes even further than EU law. For example, Sweden's extremely rigid environmental code is often criticised for creating challenges and, in addition to strict nature and biodiversity protection,[64] national defence concerns. The interests of Indigenous People (*Sámis*), including reindeer herding and subsistence hunting, have repeatedly been named as obstacles to acceleration and simplification of energy-related approvals.[65]

Possibly, those obstacles can be counteracted using the privileged regulations for the development of renewable energies of the EU Emergency Regulation 2022/2577,[66] which have now been largely incorporated into RED III.[67] National legislators must appropriately designate priority areas or renewable energy plants, grids and storage assets as being "in the overriding public interest and serving the public health and safety." As already demonstrated in some countries, and demanded in others,[68] whether this obligation sustainably supports the acceleration of procedures remains to be seen. In this context, reference is also made to the shortage of skilled personnel in public authorities. This is why, for example, legal requirements

63 For Germany: see Markus, in this volume, 129 (150 ff.); for Denmark: see Mortensen, in this volume, 223 (236). also with reference to international law agreements for the protection of the Wadden Sea; for Poland: see Nowak/Knap, in this volume, 279 (288 ff.).

64 In this respect, the ECJ has already had to intervene in favour of the approval of wind farms and against the protection of bats, cf. Malafry, in this volume, 241 (260).

65 For details, see Malafry, in this volume, 241 (252 ff.).

66 Council Regulation of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy, OJ EU L 335/36 (it was only valid for 18 months).

67 See in particular Article 15a et seq. of Directive (EU) 2018/2001, as amended by Directive (EU) 2023/2413 of 18 October 2023.

68 For Germany see Fehling, in this volume, 301 (320 f.); for Denmark see Anker/Mortensen, in this volume, 397 (417); for Sweden see Malafry, in this volume, 241 (252 ff.).

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for (shortened) procedural deadlines or the legal fiction of authorisation after procedural deadlines have expired may prove ineffective.[69]

Contradictions with regard to the EU emissions trading system have been identified as another challenge to the coordination of climate protection instruments. In particular, the cancellation of emission certificates, that are no longer used due to the expansion of renewable energies or the decommissioning of coal-fired power plants, is proving complicated. This results in a waterbed effect, in that the certificates that become 'free' in one country are used for emissions in other parts of the EU.[70] Furthermore, it remains to be seen what impact the implementation of a separate emissions trading system ('EU ETS II')[12] for sectors not covered by ETS I will have, in particular in the building and transport sectors.[71] Will it contradict the measures taken by states so far, for example on building renovation and the conversion of heating systems, or do the instruments complement each other in a meaningful way and also take social aspects into account (keyword 'energy poverty')?

(b) Confusion and conflicts over responsibilities

In countries that have a decentralised or federalised system of government, further challenges present themselves. Common criticism includes the unclear, conflicting or insufficiently coordinated legislative powers for energy system transformation and climate protection at the federal/national and regional level.[72] In the UK, a somewhat unique example of devolved powers, many relevant "UK-wide" laws are only applicable in England and Wales; while the devolved legislatures in Scotland and Northern Ireland (and sometimes Wales) determine the laws applicable to them.[73] Sweden has similar challenges with its tradition of strong municipal self-govern-

69 See Fehling, in this volume, 301 (301 ff.).
70 For more details, see Fehling, in this volume, 301 (313).
71 According in particular to Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system, OJ EU L 130, 134. See now and in particular Articles 30a et seq. of the consolidated ETS Directive 2003/87/EC.
72 For Germany: see Markus, in this volume, 129 (136 f.); for Italy: see Mari, in this volume, 361 (366 ff.).
73 See Ogbumgbada/McKenzie, in this volume, 205 (206 ff.).

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ment: Swedish municipalities can thwart practically any planning decision impacting the location of energy infrastructures due to their planning monopoly.[74] Again and in general, more effective and standardised requirements are being demanded, in order to accelerate planning and approval, particularly from national and federal legislators.

Conflicts of responsibilities can also be identified in the area of executive power, depending on the number of authorities involved. In the UK, for example, the administrative landscape is quite diverse. By contrast, the planning and approval of offshore wind farms in Denmark is in the hands of the national energy regulatory authority.[75] The same applies in Germany to the Federal Maritime and Hydrographic Agency, although there are exceptions for installations in the territorial sea.[76] Furthermore, the planning of extra-high voltage lines that cross federal or state borders is carried out centrally by the (German) Federal Network Agency. In the interest of efficient law enforcement, it may be advisable to accelerate the establishment of such "bundling authorities", in line with the tendency towards the formation of so-called 'one-stop agencies' that already exist in EU law (including in the RED III).

(c) Energy transition and the money

Finally, the many challenges of the energy transition are increasingly posing serious financing problems. Immense investment is required and these investments often include (unattractive) very long-term amortisation, including investment in energy-intensive industries. Securing the required funding is again a question between the market and the state. In this respect, the hybrid instrument of contracts for difference (CfDs, particularly in the UK) was already mentioned above as a useful vehicle. Nevertheless, states are facing problems in raising the necessary funds, often due to already tight budgets. It is revealing in this respect that the Italian decarbonisation strategy appears quite prominently as part of the National Recovery & Resilience Plan, the implementation of which has the benefit of considerable available European funding (Next Generation EU).[77] In Poland, too, especially the expansion of renewable energies is being made contingent on

74 For details, see Malafry, in this volume, 241 (252 f.).
75 See Anker/Mortensen, in this volume, 397 (401 f.).
76 See Fehling, in this volume, 301 (307).
77 See Fracchia, in this volume, 183 (184 ff.).

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(further) EU funding.[78] In Germany, the provision of additional funds for the energy transition failed due to the 'debt brake' in the constitution and the serious reservations expressed by the Federal Constitutional Court.[79] Budgetary issues present challenges between national and sub-national governments: for example, the (German) federal and state governments increasingly transfer mandatory actions to local authorities, such as complex planning obligations relevant for local heating networks, but do not provide for sufficient counter-financing at the local level, causing significant budget shortfalls and financial constraints.

Finally, the aforementioned question of intergenerational justice arises again: The Italian Constitutional Court grappled with the problem from the point of view of state-owned debt and unequal financial burdens on young and old. In its judgement of 2019 the Court stated that "intergenerational equity also entails the need not to burden disproportionately the growth opportunities of future generations, guaranteeing them sufficient [financial] resources for a balanced development".[80] The dilemma that arises is obvious: on the one hand, energy system transformation and climate protection serve intergenerational justice; on the other hand, the latter is jeopardised to the extent that disproportionately high state funds are used or debts, to be paid by those same future generations, are incurred for this purpose.

Against this backdrop, the (further) development of alternative and innovative financing facilities is all the more important. More than ever, this also requires cooperation with the (private) financial services sector. At the same time, costs must be continuously reduced at all levels of the energy transition. This, in turn, requires, once again, better coordination of individual steering instruments and the most integrated development of the entire energy system possible.

D. Outlook / lessons to be learnt

The chapters presented in this book cover only a portion of EU states and the UK. The individual contributions also have different focuses and may not be free of subjective judgements. Nevertheless, some central conclusions can be formulated from the aggregate:

78 See Nowak/Knap, in this volume, 279 (284).
79 Cf. judgment of the Federal Constitutional Court of 15 November 2023 (2 BvF 1/22).
80 Quoted from Fracchia, in this volume, 183 (197) footnote 42.

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- Implementation of both the international and European requirements for decarbonisation of the energy sector is progressing quite rapidly throughout Europe. The expansion of renewable energies, which are increasingly able to hold their own in the competitive arena, is proving particularly successful.
- Nevertheless, national decarbonisation strategies differ quite significantly from one another. This is mainly due to different preconditions and traditions in terms of energy and social policy, as well as geographical/geological, economic and legal factors. In this sense, the energy transition in each country also proves to be an important part of the economic and legal culture of each country.
- The energy transition is susceptible to economic cycles and crises, including as a result of budget deficits and the war in Ukraine. In a pronounced 'discovery process', the course of the energy transition in each country is ultimately similar to the Echternach hopping procession – with some progress and repeated setbacks.
- States must balance their mix of instruments for the energy transition within the tension between (unilateral) sovereign/regulatory and (cooperative) market and incentive mechanisms. Despite all the differences in the details, they are converging, not least thanks to the unifying force of EU law. There are also striking similarities in the key legal obstacles to the energy transition, such as ongoing conflicts of responsibilities, lengthy and bureaucratic planning processes and pressing financing constraints.
- Despite all the differences, comparative law provides a number of noteworthy best practices. In view of the ever-changing challenges of the energy transition, for example in the ramp-up of a hydrogen energy economy, there is every reason to cultivate the dialogue among and between EU states more than ever.
- Also, and for a long time already, the European Commission has been making use of comparative law methodology, in particular when monitoring the status of implementation in the states. Hence, an intensified comparative exchange, also with this institution, must be recommended. This may serve the further necessary fine-tuning and coordination of European and national energy transitions, not least by identifying regulatory breaches (inconsistencies and incoherencies), as well as by avoiding unnecessary transaction costs, e.g. as a result of excessive bureaucratic requirements – all of this in the spirit of a 'just (energy) transition'.

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- Overall, comparative law may also contribute to the rationalisation of energy transition law. It is not without reason that a 'growing gap between official policies and reality' is emerging.[81] Best practice examples from other countries, based on tangible issues, can support the (desirable) return to more pragmatism.

Eventually, the practical success of energy transition depends upon pragmatic solutions. May the contributions in this volume help to consolidate dos and don'ts by strengthening the comparative law dialogue among us.

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81 See Fehling, in this volume, 301 ff..

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