

The energy transition at a critical juncture

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ABSTRACT

Amid the Ukraine war, the energy transition has reached a critical juncture: decisions taken by key governmental or commercial actors may irreversibly threaten efforts to limit the rise in global average temperature to 1.5°C. After defining the notions of ‘energy transition’ and ‘critical juncture’, this article describes how the ‘international law of energy’ may both entrench a socio-technical regime based on fossil fuels and promote the transition towards renewable energy. These categories serve to frame several contributions to a symposium, which assist in mapping the rules, processes, and institutions that organize the decisional options of key actors as they try to drive the energy transition through this critical juncture. We conclude by recalling the practical utility of this dynamic map and the pressing need for an authoritative compass to give interpretive direction to the legal organization of the entitlements, obligations, and decisional options of key actors in reorienting energy activities to avoid the catastrophic tipping points of climate change.

I. INTRODUCTION

References to a renewable or low-carbon ‘energy transition’ pervade discussions of energy policy,¹ climate change,² geopolitics,³ and general economic policy.⁴ This technological

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¹ See, e.g. IEA, ‘Global Energy Transitions Stocktake: Tracking Progress Towards the Paris Agreement’ (2023) <www.iea.org/topics/global-energy-transitions-stocktake> accessed 1 December 2023; IRENA, *World Energy Transitions Outlook 2023: 1.5°C Pathway* (Abu Dhabi: IRENA, 2023) vol. 1; REN21, ‘Renewables Global Status Report’ (2023) <www.ren21.net/reports/global-status-report> accessed 1 December 2023 (devoted to the growing share of renewable energies as a key indicator of the energy transition).

² Energy (electricity, heat, and transport) is by far the main source of greenhouse gas emissions (73%). See the sector disaggregation available at Hannah Ritchie, Max Roser and Pablo Rosado ‘CO₂ and Greenhouse Gas Emissions’ (Our World in Data) <<https://ourworldindata.org/co2-and-greenhouse-gas-emissions>> accessed 1 December 2023.

³ Thijs van de Graaf and Michael Bradshaw, ‘Stranded Wealth: Rethinking the Politics of Oil in an Age of Abundance’ (2018) 94 *International Affairs* 1309; Global Commission on the Geopolitics of the Energy Transformation, *A New World: The Geopolitics of the Energy Transformation* (Abu Dhabi: IRENA, 2019) [*A New World*]; Manfred Hafner and Simone Tagliapietra, *The Geopolitics of the Global Energy Transition* (Springer, Berlin 2020); Daniel Scholten, *The Geopolitics of Renewables* (Springer, Berlin 2018); Andreas Goldthau and others, ‘How the Energy Transition Will Reshape Geopolitics’ (2019) 569 *Nature* 29; Roman Vakulchuk, Indra Overland and Daniel Scholten, ‘Renewable Energy and Geopolitics: A Review’ (2020) 122 *Renewable and Sustainable Energy Reviews* 109, 547; J.-F. Mercure and others, ‘Reframing Incentives for Climate Policy Action’ (2021) 6 *Nature Energy* 1133.

⁴ The two Bretton Woods institutions—the International Monetary Fund (IMF) and the World Bank—have devoted increasing attention to the energy transition. Aside from reports and policy notes, the IMF maintains a Climate Change Indicators Dashboard, which provides information on electricity generation and installed capacity by energy and technology type: IMF, ‘Energy Transition’ (Climate Change Indicators Dashboard, 7 October 2022) <<https://climatedata.imf.org/datasets/0fbab7fb7e0e4050b82bba40cd7a1bd5/explorer>> accessed 1 December 2023. The World Bank has a Climate Change Action Plan:

transition—also called an ‘energy transformation’ to emphasize its socio-economic dimension⁵—refers today to the need to provide energy products (such as electricity, heat, and refined fuels) with limited or no reliance on the use of resources that emit greenhouse gases (coal, oil, and gas). The spatial scale at which governmental and commercial decisions on how to transition to a low-carbon economy varies, but it generally revolves around the national State and its territorial subdivisions, with the notable exception of the European Union (EU).⁶

This spatial organization of the global energy sector based on territorial sovereignty is of major significance for the energy transition in the wake of Russia’s invasion of Ukraine. The energy transition has reached what may be described, in social science terminology, as a ‘critical juncture’. This term refers to ‘situations of uncertainty in which decisions of important actors are causally decisive for the selection of one path of institutional development over other possible paths.’⁷ Critical junctures are typically detected with hindsight as ‘events and developments in the distant past, generally concentrated in a relatively short period, that have a crucial impact on outcomes later in time.’⁸ We will explain shortly why, in our view, the current juncture of the energy transition may already be termed ‘critical’. But we must state first why public international law—specifically, the corpus of rules, institutions, and processes that we call the ‘international law of energy’—is important in this context.

Briefly stated, the conduct of key actors at a critical juncture has a major impact on the pathways that are institutionally followed, both legally and organizationally. Conversely, international law organizes the decisional options of such actors. Understanding the roles played by international law at critical junctures takes on a certain urgency amid the vital transition away from a ‘socio-technical’ regime based on fossil fuels, which designates an ‘interlinked mix of technologies, infrastructures, organizations, markets, regulations, and user practices that together deliver societal functions’ for long periods and are generally resilient to change without some combination of technical innovation, weakening of social institutions, or exogenous shock.⁹ Although many models of socio-technical transitions have accounted for the unequal abilities of different actors (producers, consumers, and governments) to influence systemic change,¹⁰ it is seldom acknowledged that this inequality stems, in no small part, from their legal entitlements, which derive from the (mostly territorial) allocation of jurisdiction over energy resources and activities, as well as from the rules that organize international energy transactions and their negative externalities.¹¹ International law and organization are indeed the only institutional mechanisms available at a global level to ‘norm’ energy decisions—i.e. to assign binding or persuasive normative priority to one decision or developmental pathway over another—which are

World Bank Group Climate Change Action Plan 2021–2025: Supporting Green, Resilient, and Inclusive Development (World Bank Group, Washington DC 2021). It has also done extensive research, published in the form of reports and notes, on the energy transition: see, e.g. World Bank, *Scaling Up to Phase Down: Financing Energy Transitions in the Power Sector* (World Bank Group, Washington DC 2023).

⁵ *A New World* (n 3) 14. See further s II.B, below.

⁶ This exceptional status is reflected in key instruments. For example, the EU is the only ‘regional economic integration organization’ to be a contracting party to the Paris Agreement, which primarily operates through ‘nationally determined contributions’ (NDCs) of States parties. A joint NDC is therefore prepared to cover the economies of EU Member States: art 4(16)–(18) of the Paris Agreement, adopted 12 December 2015, in force 4 November 2016, UNTS 3156. The EU is also a contracting party to the ECT and is presently the respondent in at least two investment disputes: *Nord Stream 2 AG v European Union*, PCA Case No. 2020-07, Procedural Order No. 10 (27 October 2022) (suspended because bank accounts of the claimant, majority-owned by a subsidiary of Russia’s State-owned PJSC Gazprom, are targeted by US sanctions); *Klesch Group Holdings Limited and others v European Union*, ICSID Case No. ARB(AF)/23/1 (arising from windfall taxes imposed by Denmark and Germany pursuant to EU Council Regulation 2022/1854).

⁷ Giovanni Capoccia, ‘Critical Junctures’ in Orfeo Fioretos, Tullia G Falletti and Adam Sheingate (eds), *The Oxford Handbook of Historical Institutionalism* (Oxford University Press, Oxford 2016) 89–106, 89.

⁸ *ibid.*

⁹ Frank W Geels and others, ‘Sociotechnical Transitions for Deep Decarbonization’ (2017) 357 *Science* 1242, 1242.

¹⁰ See, e.g. Francis GN Li, Evelina Trutnevte and Neil Strachan, ‘A Review of Sociotechnical Energy Transition (STET) Models’ (2015) 100 *Technological Forecasting and Social Change* 290.

¹¹ Jorge E Viñuales, *The International Law of Energy* (Cambridge University Press, Cambridge 2022) [Viñuales, *Energy*], chap 2.

otherwise made at the national, regional, or sectoral levels of specific governmental or commercial actors. In other words, international law and organization can be particularly important at a critical juncture if they effectively influence the direction of travel selected by key actors.¹²

At this point, an additional complexity arises, namely, that the rules, institutions, and processes which together comprise the international law of energy are far from clearly defined. One effort to set an analytical perimeter and describe this body of law has been made specifically with the energy transition in mind.¹³ If there is an international set of rules, institutions, and processes norming the energy choices of key actors at this critical juncture, then it must be characterized and adequately mapped. This exercise facilitates a deeper investigation into the directions of travel that are enabled or constrained by international law and how particular rules, institutions, and processes may influence the decisions of key actors, including the adoption of 'foreign legal policies' by which they may pursue international cooperation or geopolitical advantage through the strategic practice of international law.¹⁴

This article introduces the more granular contributions to our guest-edited symposium on *The Energy Transition at a Critical Juncture* by providing a frame within which each contribution will add detail to the international legal map of a broader socio-economic and normative battleground. After introducing the term 'energy transition' in its three main dimensions (Section II), we characterize the present moment as a 'critical juncture' in that transition (Section III). We then describe how the set of rules, institutions, and processes that are presently norming the decision-making processes of key actors at the international level—i.e. the international law of energy—can influence the dynamics of the energy transition (Section IV). Against this background, we situate the discussions taken up in each of the 11 other contributions, which assist in mapping the rules, processes, and institutions that organize the decisional options of key actors as they try to drive the energy transition through this critical juncture (Section V). We conclude by recalling the practical utility of this dynamic map of the international law of energy—the legal infrastructure for what political scientists call 'global energy governance'—and the pressing need for an authoritative 'compass' to give interpretive direction to the legal organization of the entitlements, obligations, and decisional options of key governmental and commercial actors in reorienting energy activities towards the agreed temperature threshold of 1.5°C (Section VI).¹⁵

II. ENERGY TRANSITION IN THREE DIMENSIONS

There is no uniform definition of the energy transition. In the first edition of the *World Energy Transition Outlook*, published by the International Renewable Energy Agency (IRENA) in June 2021, the following characterization was provided:

The energy sector, known for its slow pace of change, is undergoing a dynamic transition. The imperatives of *climate change*, *energy poverty* and *energy security* to underpin development and industrial strategy have made the widespread adoption of renewables and related

¹² For clarity, international 'organization' in this article refers not merely to specific international organizations (IOs), such as the organs and specialized agencies of United Nations, but generally to the modern sociological phenomenon of the formally legal organization of governmental relations among States (including IOs and what is called 'global governance' by political scientists) and, by extension, economic relations among commercial actors. See Michel Virally, 'Panorama du droit international contemporain: Cours général de droit international public' (1983) 183 *Recueil des Cours* 9, 251ff.

¹³ Viñuales, *Energy*, n 11, above, chap 1.

¹⁴ See Guy de Lacharrière, *La politique juridique extérieure* (Economica, Paris 1983); Frédéric Mégret, 'Foreign Legal Policy as the Background to Foreign Relations Law? Revisiting Guy de Lacharrière's *La politique juridique extérieure*' in Helmut Philipp Aust and Thomas Kleinlein (eds), *Encounters Between Foreign Relations Law and International Law: Bridges and Boundaries* (Cambridge University Press, Cambridge 2021) 108–129. For application to the energy transition, see Jorge E Viñuales, 'Geopolitics of the Energy Transformation' (2021) 2 *Revue Européenne du Droit* 148.

¹⁵ In labelling the scientific and diplomatic consensus around 1.5°C as a 'threshold', we draw on an influential literature regarding planetary or Earth system 'boundaries' and 'tipping points', beyond which the widespread consequences are potentially catastrophic. But this should not be taken to suggest that the adverse impacts of climate change, short of the dangerous 1.5°C threshold, are any less harmful or risky for specific communities and natural systems that are already exposed to injury.

technologies an essential solution. Policy drivers, technology developments and *international cooperation* have moved these technologies from niche to mainstream, especially in the past decade....

A *consensus* has formed that an energy transition grounded in renewable sources and technologies that increases efficiency and conservation is the only way to give us a fighting chance of limiting global warming to 1.5°C by 2050.¹⁶

This is a useful characterization because it touches upon three important dimensions of the transition: technological, socio-economic, and normative. Each is unpacked later. (Our added emphases to IRENA's characterization will be revisited in discussing the normative dimension.)

A. Technological dimension

The technological dimension is the one that receives most attention. In this context, the notion of an energy 'transition' refers to the technical aspects of a socio-technical transition,¹⁷ whereby niche technologies for the generation and use of energy initially 'break in', then gain a growing share of the energy mix, and eventually generalize or consolidate alongside other technologies.

The ongoing socio-technical transition focuses on the increasing reliance on renewable energies—whether modern (wind energy and solar photovoltaics (PVs) or traditional (hydroelectricity and biomass)—to provide not only electricity but also, to a growing extent, thermal (heating and cooling) and transportation services, which account for the largest share of total end-use energy consumption.¹⁸ Of course, a focus on sources of electricity generation is incomplete; even from a technological perspective, much is driven by use-related technologies, including storage and consumption. Thus, technological developments in rechargeable batteries, grid storage, electric vehicles, energy efficiency in buildings, and industrial processes are closely intertwined with those of electrification and renewable energies. The pulse—and vicissitudes—of this technological dimension of the transition are tracked by annual publications of IRENA, the International Energy Agency (IEA),¹⁹ and the Renewable Energy Policy Network for the 21st Century (REN21).²⁰

Alongside electrification, most decarbonization pathways anticipate a widespread shift towards 'green' or 'blue' hydrogen—produced respectively from electrolysis powered by renewable energy or from natural gas with carbon capture, utilization, and storage (CCUS)—as a low-carbon fuel to replace oil, coal, or gas in energy storage, long-distance transportation, and hard-to-abate industrial processes such as steel production.²¹ Green hydrogen production provides a timely illustration of a proven technology that has faced challenges in breaking out of its niche into a major share of the energy mix, with historical underinvestment in production capacity due to high costs of renewable energy and electrolyzers as compared with cheap natural gas.²²

¹⁶ IRENA, *World Energy Transitions Outlook: 1.5C Pathway* (IRENA, Abu Dhabi 2021), 17.

¹⁷ Frank W Geels and Johan Schot, 'Typology of Sociotechnical Transition Pathways' (2007) 36 *Research Policy* 399; Arnulf Grubler, 'Energy Transitions Research: Insights and Cautionary Tales' (2020) 50 *Energy Policy* 8; Geels and others (n 9).

¹⁸ REN21, *Renewables 2022: Global Status Report* (Paris: REN21 Secretariat, 2022), at 42.

¹⁹ Particularly its flagship annual report: *World Energy Outlook 2022* (IEA, November 2022).

²⁰ See (n 1).

²¹ On the shortfall of planned hydrogen projects to meet decarbonization pathways, see *Global Hydrogen Review 2022* (IEA, 2022), 5–6.

²² Given the price surge in natural gas following economic recovery from the COVID-19 pandemic, then the war in Ukraine, 'renewable hydrogen could become the cheapest option for producing hydrogen ... if production capacity was available': *ibid* 93–94.

B. Socio-economic dimension

The socio-economic dimension of the energy transition refers to its societal implications. A 2019 report from the Global Commission on the Geopolitics of the Energy Transformation, chaired by the former president of Iceland, emphasizes this in clear terms:

This ongoing transition to renewables is not just a shift from one set of fuels to another. It involves a much deeper transformation of the world's energy systems that will have major social, economic and political implications which go well beyond the energy sector. The term "energy transformation" captures these broader implications.²³

The socio-economic transformation associated with the energy transition has been analysed from a variety of angles, including its economic,²⁴ geopolitical,²⁵ and equity implications.²⁶ However, this work rarely addresses the legal implications of the transformation, which remain confined to specialized contributions on topics such as the lawfulness of certain key measures intended to guide the transformation;²⁷ emergent issues regarding 'critical raw materials' (EU) or 'critical minerals' (IEA, US) underpinning renewable energy technologies;²⁸ domestic, regional, and international trade and investment adjudication;²⁹ energy justice;³⁰ or some partial syntheses. Yet, a focus on the socio-economic dimension of the energy transition unveils the many normative faultlines raised by the transformation, given the redistributive effects of economic competition and political struggle among different stakeholders. A recent report from the International Energy Forum, summarizing the results of a series of North-South dialogues, reflects the expectation of a 'multidimensional'—rather than linear—global energy transition, understood as one which is 'inclusive of different situations in different parts of the world, reflecting varied starting points, diversity of policy approaches; and is equitable'.³¹

The risk, of course, is that the discourse of inclusivity and diversity may be co-opted by policymakers and interest groups as a euphemism for the preservation and expansion of fossil fuels, with devastating effects for the peoples of the very States using this tactic, whether they are typically grouped with the Global South or the Global North. In an integrated world economy, moreover, the redistributive effects of the energy transition cannot be clearly drawn along such lines. For example, the mass stranding of the financial value of fossil fuel assets would disproportionately impact net exporters of oil and gas, including Canada, Russia, the USA, and members of the Organization of Petroleum Exporting Countries (OPEC).³² Yet, through pension funds

²³ A *New World* (n 3) 14.

²⁴ Global Commission on the Economy and Climate, *New Climate Economy: Unlocking the Inclusive Growth Story of the twenty-first Century: Accelerating Climate Action in Urgent Times* (New Climate Economy, Washington DC 2018).

²⁵ See (n 3).

²⁶ The equity dimension has different expressions. One is the debate regarding a 'just transition'. For reviews of the literature across several disciplines, see Xinxin Wang and Kevin Lo, 'Just Transition: A Conceptual Review' (2021) 82 *Energy Research & Social Science* 112, 291; Anthony Stark, Fred Gale and Hannah Murphy-Gregory, 'Just Transitions' Meanings: A Systematic Review' (2023) 36 *Society & Natural Resources* 1277; Vilja Johansson, 'Just Transition as an Evolving Concept in International Climate Law' (2023) 35 *Journal of Environmental Law* 229.

²⁷ Mark Wu and James Salzman, 'The Next Generation of Trade and Environment Conflicts: The Rise of Green Industrial Policy' (2014) 108 *Northwestern University Law Review* 401; Michael A Mehling and other, 'Designing Border Carbon Adjustments for Enhanced Climate Action' (2019) 113 *American Journal of International Law* 433.

²⁸ Ilaria Espa, *Export Restrictions on Critical Minerals and Metals: Testing the Adequacy of WTO Disciplines* (Cambridge University Press, Cambridge 2015); Oliver Hailes, 'Lithium in International Law: Trade, Investment, and the Pursuit of Supply Chain Justice' (2022) 25 *Journal of International Economic Law* 148; Nidhi Srivastava, 'Trade in Critical Minerals: Revisiting the Legal Regime in Times of Energy Transition' (2023) 82 *Resources Policy* 103, 491.

²⁹ Anatole Boute, 'Energy Trade and Investment Law: International Limits to EU Energy Law and Policy' in Martha M Roggenkamp and others (eds), *Energy Law in Europe: National, EU and International Regulation* (3rd edn, Oxford University Press, Oxford 2016) 137–185.

³⁰ Raphael J Heffron, 'Applying Energy Justice into the Energy Transition' (2022) 156 *Renewable and Sustainable Energy Reviews* 111, 936; Raphael J Heffron and Darren McCauley, 'The Concept of Energy Justice Across the Disciplines' (2017) 105 *Energy Policy* 658.

³¹ IEF, *Shaping a Living Roadmap for Energy Transition* (August 2023), preface.

³² J.-F. Mercure and others, 'Macroeconomic Impact of Stranded Fossil Fuel Assets' (2018) 8 *Nature Climate Change* 588.

and equity markets, most of the financial risk of stranded assets falls on private investors, concentrated in wealthy members of the Organisation of Economic Co-operation and Development (OECD).³³ While the risk exposure of OECD investors may be mitigated by portfolio diversity, however, the impact of stranded assets would be sharper for OPEC members that depend on national oil companies as a source of revenue and economic stability.³⁴ This example underscores how the socio-economic dimension of the energy transition is legally organized by rules, institutions, and processes that transmit resources and risk within and across borders.

C. Normative dimension

The normative dimension of the energy transition captures these many socio-economic faultlines. From an analytical perspective, this dimension lies not only in how different stakeholders use law and institutions—or attempt to change them—to advance their positions in the power struggle arising from each faultline but also in the more general direction of travel.³⁵ As captured by IRENA's characterization of the energy transition, quoted earlier, the transition is driven by certain goals—decarbonization to tackle 'climate change', access to tackle 'energy poverty', and 'energy security'—which must be pursued through 'international cooperation' based on a stated 'consensus' of limiting global average temperature to 1.5° C.³⁶

There has not been the same degree of consensus as to which of the three goals of sustainability, access, and security should assume priority—hence, an ostensible 'energy trilemma'—or which roles must be played by key governmental and commercial actors in reorienting energy activities towards the agreed temperature threshold. However, the entrenchment of that threshold in Article 2(1)(a) of the Paris Agreement has provided a focal point for both cooperation and disagreement,³⁷ whether among States in subsequent climate negotiations, among participants in domestic legislation and litigation, or among commercial actors and their diverse stakeholders.³⁸ A longstanding assumption of the energy trilemma, moreover, is that fossil fuels are more affordable and secure than sustainable energy sources, which was undermined by surging oil and gas prices amid the invasion of Ukraine.³⁹ At the same time, trade and investment treaties have arguably constrained States from adopting measures to neutralize Russia's weaponization of energy infrastructure and supply dependencies.⁴⁰ As the socio-economic faultlines are shifting, therefore, they underscore the significance of international law as a normative battleground in the energy transition.⁴¹

III. DETECTING THE CRITICAL JUNCTURE

The criticality of a past juncture is normally associated with the path-breaking impact of decisions made by key actors.⁴² Although a socio-technical transition cannot be ascribed to a single cause—whether technological, economic, political, or environmental—it is through the conceptual prism of a critical juncture that concentrated periods of decision-making may be

³³ Gregor Semieniuk and others, 'Stranded Fossil-Fuel Assets Translate to Major Losses for Investors in Advanced Economies' (2022) 12 *Nature Climate Change* 532.

³⁴ Amy Myers Jaffe, 'Stranded Assets and Sovereign States' (2020) 251 *National Institute Economic Review* R25.

³⁵ For a general account of how law may be harnessed to promote, hinder, or legitimize socio-technical transitions, see Jorge E Viñuales, *The Organisation of the Anthropocene: In Our Hands?* (Brill, Leiden 2018), 60–70.

³⁶ See (n 16).

³⁷ Cf. Lauge N Skovgaard Poulsen, 'Beyond Credible Commitments: (Investment) Treaties as Focal Points' (2019) 64 *International Studies Quarterly* 26.

³⁸ Kishanthi Parella, 'International Law in the Boardroom' (2023) 108 *Cornell Law Review* 839.

³⁹ Jorge E Viñuales, 'The Ukraine War and the Energy Transition' (2023) 4 *Revue Européenne de Droit* 113.

⁴⁰ Anatole Boute, 'Weaponizing Energy: Energy, Trade, and Investment Law in the New Geopolitical Reality' (2022) 116 *American Journal of International Law* 740 (suggesting that States could 'nationalize energy assets, unbundle pipeline from supply activities, screen investments for security risks, and diversify import routes'). See further Fergus Green and Ingrid Robeyns, 'On the Merits and Limits of Nationalising the Fossil Fuel Industry' (2022) 91 *Royal Institute of Philosophy Supplements* 53.

⁴¹ Viñuales, *Energy* (n 11) chap 8.

⁴² Capoccia, 'Critical Junctures' (n 7) 89–90.

detected as having a significant, snowballing influence. In its technical sense, historical institutionalists have described critical junctures as short periods (relative to the duration of the path-dependent processes they initiate) wherein the range of decisional options for key actors has expanded in comparison to the preceding period, creating a situation of heightened contingency wherein their choices are likely to have a significant impact on subsequent paths of development.⁴³ Critical junctures are seldom examined in literature on international law,⁴⁴ although the notion is mentioned in recent legal histories that emphasize contingency or path dependence.⁴⁵ Three brief illustrations from modern energy history may therefore be useful, concerning oil, nuclear energy, and natural gas. Then, we turn to the present criticality of the Ukraine war and energy crisis in a changing climate. Although the present juncture may have expanded the range of decisional options for some actors in the global energy sector, with potentially catastrophic consequences, a vital inquiry for international lawyers is to identify which rules, institutions, and processes assign binding or persuasive normative priority to one decision or developmental pathway over another, either entrenching the old socio-technical regime or promoting the new. That inquiry is taken up in the section IV and frames the rest of this symposium.

A. Historical illustrations

Each of our three illustrations may be situated in the latter stage of deeper transition away from an organic economy (based on photosynthesized biomass, used as fuel for heat and as food for conversion into the mechanical energy of human and animal muscle) towards a predominantly mineral economy (based on extracted fuels, initially coal, and other natural resources) throughout the Industrial Revolution.⁴⁶ Different types of mineral economy underpin the old socio-technical regime, based on fossil fuels, and the new regime, based on critical minerals used in renewable energy systems and batteries (e.g. cobalt, copper, lithium). Energy historians have traditionally referred to industrial patents as markers of this deeper transition, not least Watt's steam engine in 1769.⁴⁷ A reinterpretation, however, has emphasized the decisions of factory owners to harness the spatiotemporal agility of coal in disciplining workers, despite the abundance and low cost of hydropower.⁴⁸ These two positions in a historiographical debate, for present purposes, show how key actors enjoy a margin of decisional agency in their innovation or adoption of particular resources and technologies, notwithstanding a degree of economic determinism. Such agency is never exercised in a normative vacuum.

Our first illustration of a critical juncture in modern energy history arises from a series of reports between 1912 and 1914 by a Royal Commission on Fuel and Engines, which recommended the British conversion of the world's largest navy from coal to oil, mostly for technical reasons of speed and mobility in competition with German naval expansion.⁴⁹ In adopting this recommendation, the British Government acquired a majority stake in the Anglo-Persian Oil Company, as it was then known, and entered less formal arrangements with Royal Dutch Shell

⁴³ Giovanni Capoccia and R Daniel Kelemen, 'The Study of Critical Junctures: Theory, Narrative, and Counterfactuals in Historical Institutionalism' (2007) 59 *World Politics* 341, 348.

⁴⁴ Cf. Karen J Alter, 'The Evolution of International Law and Courts' in Orfeo Fioretos (ed), *International Politics and Institutions in Time* (Oxford University Press, Oxford 2017), chap 12.

⁴⁵ Ingo Venzke and Kevin Jon Heller (eds), *Contingency in International Law: On the Possibility of Different Legal Histories* (Oxford University Press, Oxford 2021).

⁴⁶ Viñuales, *Energy* (n 11) 10–12.

⁴⁷ Vaclav Smil, 'World History and Energy' (2004) 6 *Encyclopedia of Energy* 549, 555–556.

⁴⁸ Andreas Malm, *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming* (Verso, London 2016).

⁴⁹ A leading history of the oil industry opens with Winston Churchill's conversion to the proposed switch from coal to oil, who was then First Lord of the Admiralty and both established the Commission and presented its recommendations to Cabinet: Daniel Yergin, *The Prize: The Epic Quest for Oil, Money and Power* (Touchstone, New York, NY 1991), 11–12, 150–164.

to diversify its supply.⁵⁰ Over the long term, British dependence on the Company formed part of the complex causality that turned Iran into a major oil producer and—following the weaponization of oil by other Middle Eastern exporters and the 1979 Islamic Revolution—stoked a global search for onshore and offshore hydrocarbons to increase energy security. Notably, the 1951 nationalization of the Anglo-Iranian Oil Company triggered several experiments in international adjudication and treaty-making to overcome the perceived pitfalls of diplomatic protection in securing strategically important foreign investments during the era of decolonization,⁵¹ suggesting that the 1914 decision to acquire shares in the Company marked a critical juncture for both the oil industry and international law.

Our second illustration is not strictly a critical juncture because the range of decisional options was constrained rather than expanded. It concerns the unsuccessful transition towards nuclear energy as a dominant source of utility-scale electricity—‘too cheap to meter’, suggested one official, while reducing air pollution—which never met these high expectations.⁵² Although this failure is often attributed to the 1979 accident at Three Mile Island, alongside an ascendent environmental movement, the key causes were in fact ‘a mixture of economic and political factors that coalesced in 1974’.⁵³ Despite the favourable conditions for nuclear energy created by the 1973 oil shock, discussed below, an electrical energy crisis—resulting from ill-suited business models and a wave of bankruptcies due to high upfront costs and overestimated sales—reached a turning point in 1974 from which the US nuclear energy industry never recovered. In 1975, US President Ford announced plans to build 200 nuclear power plants over the next decade. However, this juncture illustrates how the decisions of key actors in situations of uncertainty may be no match for countervailing economic and political developments. Short-lived renaissances, in the US and elsewhere, have faced massive shifts in public opinion following high-profile accidents, notably Chernobyl in 1986 and Fukushima in 2011, as well as more complex chains of causality that hindered a shift to electricity generation based on nuclear energy, with negative implications for climate change.⁵⁴

Our third illustration concerns the revival of natural gas production in the US, which provides a more recent backcloth to international decision-making at the current juncture. The innovative combination of horizontal drilling with hydraulic fracturing (fracking) allowed for the extraction of gas—later oil—from shale rock, which from 2005 reversed decades of declining US fuel production, reduced emissions from electricity generation by replacing coal, and by 2019 secured the position of the US as the world’s largest producer of fossil fuels for the first time in 40 years.⁵⁵ A critical decision, however, was the federal government’s little-noticed approval of an export terminal for liquified natural gas (LNG) in 2011, with the first shipment leaving for Brazil in 2016. From a geopolitical vantage, this ‘shale revolution’ provided the necessary energy independence for the US to maintain oil sanctions against Iran—thus contributing to the 2015 Joint Comprehensive Plan of Action on the Iranian nuclear programme—and led to LNG exports competing against Russian gas throughout Asia and Europe. Indeed, the US creation of

⁵⁰ Anand Toprani, *Oil and the Great Powers: Britain and Germany, 1914 to 1945* (Oxford University Press, Oxford 2019), chaps 1 and 2.

⁵¹ Doreen Lustig, *Veiled Power: International Law and the Private Corporation 1886–1981* (Oxford University Press, Oxford 2020), chap 6; Anthony C Sinclair, ‘The Origins of the Umbrella Clause in the International Law of Investment Protection’ (2004) 20 *Arbitration International* 411.

⁵² Robert D Lifset, ‘Nuclear Power in America: The Story of a Failed Energy Transition’ (2019) 24 *Environmental History* 524, 524.

⁵³ *ibid* 524–527.

⁵⁴ Darren McCauley and others, ‘Energy Justice and Policy Change: An Historical Political Analysis of the German Nuclear Phase-Out’ (2018) 228 *Applied Energy* 317; Pushker A Kharecha and Makiko Sato, ‘Implications of Energy and CO₂ Emission Changes in Japan and Germany after the Fukushima Accident’ (2019) 132 *Energy Policy* 647.

⁵⁵ Daniel Yergin, *The New Map: Energy, Climate, and the Clash of Nations* (Allen Lane, London 2020), 3–66.

an LNG export industry empowered the EU to diversify its gas supply from the outset of the Ukraine war and, by 2027, to end Russian energy imports.⁵⁶

B. Ukraine war and energy crisis in a changing climate

The energy crisis triggered by Russia's invasion of Ukraine—and the resulting military conflict and economic sanctions—may be similarly analysed as a critical juncture, although we lack the benefit of hindsight. There is a superficial resemblance with the 1973 oil shock, when major energy exporters—namely, members of the Organization of Arab Petroleum Exporting Countries, a subset of OPEC—weaponized their market position for political reasons.⁵⁷ While Russia has similarly weaponized energy, the frequent analogies with 1973 are incomplete at best, even deceptive.⁵⁸ Specifically, Russia's military offensive unfolds at a critical juncture in the energy transition to a low-carbon economy.⁵⁹ This difference is crucial because, unlike the policies adopted to respond to the 1973 crisis—which accepted a need to diversify energy resources and source countries but generally did not question the predominance of oil—the current energy crisis is in many ways a clash between two competing socio-technical regimes, one based on fossil fuel technologies and the other on renewable energies. The criticality of the current juncture therefore lies in whether it threatens the viability of the ongoing energy transition and, more precisely, whether it threatens the legally entrenched consensus of curbing greenhouse gas emissions to limit the global average temperature to 1.5°C.

In terms of the technical definition of a critical juncture, it may sound strange to say that a period of war and energy crisis has expanded the range of decisional options for governmental and commercial actors. Russia's invasion led to an immediate surge in EU fossil fuel subsidies as the only feasible option to ensure affordable supply in the short term, while Ukraine was existentially constrained in its options by the imperative of self-defence. For the longer trajectory of the energy sector, however, the war brought about a state of heightened contingency regarding the success or failure of the necessary transition towards renewable sources, for at least two reasons. First, as mentioned, a longstanding assumption of the energy trilemma was undermined, namely, that fossil fuels are more affordable and secure than sustainable energy sources. Second, whereas EU energy policy was previously locked in (both legally and infrastructurally) to a state of dependence on Russian oil and gas,⁶⁰ this major artery of world energy trade is now being severed.

Such severance and its wider consequences have expanded the range of decisional options for key actors in the energy sector. For example, India decided not to join in the Western imposition of economic sanctions but instead took advantage of discounted Russian oil: imports increased from 50,000 barrels per day in 2021 to nearly 1 million barrels per day in June 2022.⁶¹ While the war wreaked havoc on global commodity markets, the two largest US oil firms, ExxonMobil and Chevron, reported the highest profits in their histories, deciding to pay out dividends and buy back shares (thus increasing their market capitalization) rather than to increase investment in production capacity.⁶² In parallel, the EU 'used the crisis to strengthen [its] aim to accelerate the clean energy transition' and, in May 2023, 'produced more electricity from wind and solar

⁵⁶ Arvind P Ravikumar, Morgan Bazilian and Michael E Webber, 'The US Role in Securing the European Union's Near-Term Natural Gas Supply' (2022) 7 *Nature Energy* 465.

⁵⁷ Viñuales, *Energy* (n 11) 21–25.

⁵⁸ Viñuales, 'The Ukraine War and the Energy Transition' (n 39).

⁵⁹ *World Energy Outlook 2022* (n 19) 26.

⁶⁰ Anatole Boute, *Energy Dependence and Supply Security: Energy Law in the New Geopolitical Reality* (Oxford University Press, Oxford 2023), chap 2.

⁶¹ Rajan Menon and Eugene Rumer, *Russia and India: A New Chapter* (Carnegie Endowment for International Peace, September 2022) <https://carnegieendowment.org/files/Menon_Rumor_-_Russia_India-v4.pdf> accessed 9 December 2023, 14.

⁶² Isabella M Weber, 'Big Oil's Profits and Inflation: Winners and Losers' (2022) 65 *Challenge* 151, 152–153.

than from fossil fuels' for the first time in history.⁶³ The respective decisions of India, US oil majors, and the EU were taken in an uncertain situation of expanded options that were occasioned by the invasion of Ukraine. They might have decided otherwise. The essential lesson is that key governmental and commercial actors at this juncture of war and energy crisis have faced an expanded range of decisional options as to whether they double down on fossil fuels or accelerate the transition towards a new socio-technical matrix, which at the time of writing has spilled over into heated debates on the phasing out of fossil fuels at the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC).⁶⁴

The high stakes of possible pathways at this critical juncture may be fully grasped only if we keep in mind that continued investment in fossil fuel production and consumptive technologies is expected to tip the balance of the climate system and other biophysical subsystems underpinning the dynamics of the Earth system. The research unveiling these risks has deep roots, but their scale and timeframe have recently been captured in policy-actionable concepts, such as 'planetary boundaries' and 'tipping points',⁶⁵ which are now familiar in UN and EU policy discourse.⁶⁶ Moreover, the concept of 'carbon budgets' (the total net amount of CO₂ that can still be emitted while limiting global warming to specified levels) is closely linked to international law through the scientific work of the Intergovernmental Panel on Climate Change (IPCC), which confirms that there is a rapidly closing window in which emissions of greenhouse gases must be drastically reduced.

The latest Synthesis Report of the IPCC provides an estimation of the remaining carbon budgets to comply with the global average temperature threshold set in Article 2(1)(a) of the Paris Agreement:

The best estimates of the remaining carbon budgets from the beginning of 2020 are 500 GtCO₂ for a 50% likelihood of limiting global warming to 1.5°C and 1150 GtCO for a 67% likelihood of limiting warming to 2°C. ...

If the annual CO₂ emissions between 2020 and 2030 remained, on average, at the same level as 2019, the resulting cumulative emissions would almost exhaust the remaining carbon budget for 1.5°C (50%) and deplete more than a third of the remaining carbon budget for 2°C (67%). Estimates of future CO₂ emissions from existing fossil fuel infrastructures without additional abatement already exceed the remaining carbon budget for limiting warming to 1.5°C (50%) (*high confidence*). Projected cumulative future CO₂ emissions over the lifetime of existing and planned fossil fuel infrastructure, if historical operating patterns are maintained and without additional abatement, are approximately equal to the remaining carbon budget for limiting warming to 2°C with a likelihood of 83% (*high confidence*).⁶⁷

As to estimates of the time within which the temperature threshold could be reached or exceeded, a recent study estimates that 1.5°C warming may occur between 2033 and 2035.⁶⁸

⁶³ Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions: State of the Energy Union Report 2023 (pursuant to Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action) COM/2023/650 final.

⁶⁴ Fiona Harvey, 'Failure to Agree Fossil Fuel Phase-out at Cop28 "will push world into climate breakdown"' (*The Guardian*, 9 December 2023) <www.theguardian.com/environment/2023/dec/09/failure-to-agree-to-phase-out-fossil-fuels-at-cop28-will-push-world-into-climate-breakdown> accessed 9 December 2023.

⁶⁵ For a recent synthesis, see Johan Rockström and others, 'Safe and Just Earth System Boundaries' (2023) 619 *Nature* 102.

⁶⁶ On the relevance of environmental discourses to international law and politics, see John S Dryzek, 'Discourses' in Lavanya Rajamani and Jacqueline Peel (eds), *The Oxford Handbook of International Environmental Law* (2nd edn, Oxford University Press, Oxford 2021), chap 2. Cf. Claiton Fyock, 'What Might Degrowth Mean for International Economic Law? A Necessary Alternative to the (un)Sustainable Development Paradigm' (2022) 12 *Asian Journal of International Law* 40.

⁶⁷ IPCC, *Synthesis Report of the IPCC Sixth Assessment Report (AR6): Summary for Policymakers* (March 2023), B.5.2 and B.5.3.

⁶⁸ Noah S Diefenbaugh and Elizabeth A Barnes, 'Data-Driven Predictions of the Time Remaining until Critical Global Warming Thresholds Are Reached' (2023) 120 *Proceedings of the National Academy of Sciences* e2207183120. This is consistent with the

An influential study in 2018 emphasized the vast and unprecedented implications of crossing such critical thresholds:

If the threshold is crossed, the resulting trajectory would likely cause serious disruptions to ecosystems, society, and economies. Collective human action is required to steer the Earth System away from a potential threshold and stabilize it in a habitable interglacial-like state.⁶⁹

Thus, the criticality of the current juncture of war and energy crisis has the ordinary meaning of not only setting a new course of institutional development but, more profoundly, potentially triggering a range of interconnected and cascading tipping points in biophysical subsystems, which could redefine the underlying Earth system conditions that humanity has so far taken for granted.

IV. NORMING DECISIONS AT A CRITICAL JUNCTURE

At a critical juncture, different roles may be played by rules, institutions, and processes in shaping the decisional entitlements of key actors. In describing and illustrating these roles, we will introduce two legally relevant analytical categories—entrenchment and promotion—that frame the discussion at a level which is suitable to describe the technological and socio-economic dimensions inherent to the energy transition as well as the formally legal aspects of its normative dimension.⁷⁰ Then, we illustrate how these seemingly static roles of entrenchment and promotion play out in a dynamic energy transition.

A. Entrenchment of the old regime

The first role played by international law is to ‘entrench’ the outgoing socio-technical regime in a variety of ways, including through the allocation to States of originary entitlements over energy resources (territorial sovereignty, sovereign rights under the law of the sea, other bases of jurisdiction, regulatory powers, taxation powers, etc.), the allocation to commercial actors of derivative entitlements under domestic law and international energy transactions (concessions, contracts, trade flows, foreign investments, etc.), and, more generally, the international organization of both governmental and commercial decision-making according to legal and institutional expressions of past policy priorities that may confer resilient protections on the old regime. Up to a point, this entrenchment role is not a defect of international law; to provide a modicum of stability in economic entitlements throughout a range of political changes—elections, revolutions, decolonization, State succession—has been a signal achievement of law in the international community. But there is a difference between the utility in respecting acquired rights or international obligations from one political regime to the next and, today, the urgent transition towards an entirely new socio-technical regime, for the sake of stabilizing greenhouse gases and thereby avoiding irreversible changes to the biophysical preconditions for any kind of international community.

A good, but by no means the only, illustration of this entrenchment role is provided by the current travails of the Energy Charter Treaty (ECT),⁷¹ manifested in its so-called ‘modernization’ process and the proposed withdrawal of EU Member States.⁷² The analysis of this illustration

IPCC’s own estimates. See IPCC, Synthesis Report of the IPCC Sixth Assessment Report (AR6), Summary for Policymakers, statement B.1.

⁶⁹ Will Steffen and others, ‘Trajectories of the Earth System in the Anthropocene’ (2018) 14 Proceedings of the National Academy of Sciences 8252.

⁷⁰ Viñuales, *Energy* (n 11) chap 1.

⁷¹ Energy Charter Treaty, adopted 17 December 1994, in force 16 April 1998, 2080 UNTS 95 [ECT].

⁷² Bart-Jaap Verbeek, ‘The Modernization of the Energy Charter Treaty: Fulfilled or Broken Promises?’ (2023) 8 Business and Human Rights Journal 97.

must be nuanced to avoid naïve conclusions. It is clear that, at its roots, the ECT was an attempt to streamline the legal organization of a specific set of international energy transactions, namely, eastward foreign investment in fossil fuels and westward cross-border trade and transit out of the former Soviet Union.⁷³ With the main trade artery severed as a result of the Ukraine war,⁷⁴ coupled with a revitalized effort by the EU to diversify away from both Russian imports and fossil fuels in general,⁷⁵ the residual nuisances of the ECT became all too visible. Foremost was the use of the ECT's investor-State dispute settlement (ISDS) mechanism by EU-based investors to bring dozens of claims against EU Member States, particularly the Czech Republic,⁷⁶ Italy,⁷⁷ and Spain.⁷⁸ Well before the war, many governments had already moved to unwind the perceived anomaly of intra-EU ISDS claims, notably after a landmark 2018 judgment that such claims have an adverse effect on the autonomy of EU law.⁷⁹ While the bulk of these claims came from investors in the renewable energy sector—arguably promoting the transition—the public antipathy towards investment arbitration under the ECT was bolstered by high-profile attempts to recoup losses from measures to phase out or otherwise restrict fossil fuel activities

⁷³ See Thomas W Wälde (ed), *The Energy Charter Treaty: An East-West Gateway for Investment and Trade* (Kluwer Law International, The Hague 1996), particularly the foreword by Dutch Prime Minister Ruud Lubbers narrating his seminal ideas launched at the European Council held in Dublin on 25 June 1990.

⁷⁴ *World Energy Outlook 2022* (n 19) 19–20.

⁷⁵ Communication from the Commission, REPowerEU Plan (18 May 2022) COM(2022) 230 final.

⁷⁶ *Wirtgen, Wirtgen and JSW Solar (zwei) GmbH & Co.KG v. Czech Republic*, PCA Case No. 2014-03, Final Award (11 October 2017); *Natland Investment Group NV and others v. Czech Republic*, PCA Case No. 2013-35, Partial Award (20 December 2017); *Antaris Solar GmbH and Göde v. Czech Republic*, PCA Case No. 2014-01, Award (2 May 2018); *WA Investments-Europa Nova Limited v. Czech Republic*, PCA Case No. 2014-19, Award (15 May 2019); *Voltaic Network GmbH v. Czech Republic*, PCA Case No. 2014-20, Award (15 May 2019); *Photovoltaik Knopf Betriebs-GmbH v. Czech Republic*, PCA Case No. 2014-21, Award (15 May 2019); *I.C.W. Europe Investments Limited v. Czech Republic*, PCA Case No. 2014-22, Award (15 May 2019).

⁷⁷ *Blusun S.A., Jean-Pierre Lecorcier and Michael Stein v. Italy*, ICSID Case No. ARB/14/3, Final Award (27 December 2016), Decision on Annulment (13 April 2020); *Eskosol S.p.A. in liquidazione v. Italy*, ICSID Case No. ARB/15/50, Award (4 September 2020); *CEF Energia BV v. Italy*, SCC Case No. 158/2015, Award (16 January 2019); *Belenergia S.A. v. Italy*, ICSID Case No. ARB/15/40, Award (6 August 2019); *Greentech Energy Systems A/S & Ors. v. Italy*, SCC Arbitration V (2015/095), Award (23 December 2018); *SunReserve Luxco Holdings SRL v. Italy*, SCC Case No. 132/2016, Final Award (25 March 2020); *ESPF Beteiligungs GmbH, ESPF Nr. 2 Austria Beteiligungs GmbH, and InfraClass Energie S GmbH & Co. KG v. Italy*, ICSID Case No. ARB/16/5, Award (14 September 2020); *Silver Ridge Power BV v. Italy*, ICSID Case No. ARB/15/37, Award (26 February 2021).

⁷⁸ *Charanne and Construction Investments v. Spain*, SCC, Award (21 January 2016); *Isolux Netherlands, BV v. Spain*, SCC Case V2013/153, Final Award (17 July 2016); *Eiser Infrastructure Limited and Energia Solar Luxembourg S.a.r.l. v. Spain*, ICSID Case No. ARB/13/36, Award (4 May 2017); *Novenergia II—Energy & Environment (SCA), SICAR v. Spain*, SCC Case No. 2015/063, Final Award (15 February 2018); *Masdar Solar & Wind Cooperatief U.A. v. Spain*, ICSID Case No. ARB/14/1, Award (16 May 2018); *Antin Infrastructure Services Luxembourg S.à.r.l. and Antin Energia Termosolar B.V. v. Spain*, ICSID Case No. ARB/13/31, Award (15 June 2018), Decision on the Rectification of the Award (29 January 2019); *NextEra Energy Global Holdings B.V. and NextEra Energy Spain Holdings B.V. v. Spain*, ICSID Case No. ARB/14/11, Decision on Jurisdiction, Liability and Quantum Principles (12 March 2019), Final Award (31 May 2019); *9REN Holding S.a.r.l. v. Spain*, ICSID Case No. ARB/15/15, Award (31 May 2019); *Cube Infrastructure Fund SICAV and others v. Spain*, ICSID Case No. ARB/15/20, Decision on Jurisdiction, Liability and Partial Decision on Quantum (19 February 2019), Final Award (26 June 2019); *SoLEs Badajoz GmbH v. Spain*, ICSID Case No. ARB/15/38, Award (31 July 2019); *InfraRed Environmental Infrastructure GP Limited and others v. Spain*, ICSID Case No. ARB/14/12, Award (2 August 2019); *OperaFund Eco-Invest SICAV PLC and Schwab Holding AG v. Spain*, ICSID Case No. ARB/15/36, Award (6 September 2019); *BayWa r.e. Renewable Energy GmbH and BayWa r.e. Asset Holding GmbH v. Spain*, ICSID Case No. ARB/15/16, Decision on Jurisdiction, Liability and Directions on Quantum (2 December 2019); *Stadtwerke München GmbH and others v. Spain*, ICSID Case No. ARB/15/1, Award (2 December 2019); *RREEF Infrastructure (G.P.) Limited and RREEF Pan-European Infrastructure Two Lux S.à.r.l. v. Spain*, ICSID Case No. ARB/13/30, Award (11 December 2019); *RWE Innogy GmbH and RWE Innogy Aersa S.A.U. v. Spain*, ICSID Case No. ARB/14/34, Decision on Jurisdiction, Liability and Certain Issues of Quantum (30 December 2019); *Watkins Holdings S.à.r.l. and others v. Spain*, ICSID Case No. ARB/15/44, Award (21 January 2020); *The PV Investors v. Spain*, PCA Case No. 2012-14, Final Award (28 February 2020); *Hydro Energy 1 S.à.r.l. and Hydroxana Sweden AB v. Spain*, ICSID Case No. ARB/15/42, Decision on Jurisdiction, Liability and Directions on Quantum (9 March 2020); *Cavalum SGPS, S.A. v. Spain*, ICSID Case No. ARB/15/34, Decision on Jurisdiction, Liability and Directions on Quantum (31 August 2020); *STEG GmbH v. Spain*, ICSID Case No. ARB/15/4, Decision on Jurisdiction, Liability and Principles on Quantum (8 October 2020); *FREIF Eurowind Holdings Ltd v. Spain*, SCC Case No. 2017/060, Final Award (8 March 2021); *Biram and others v. Spain*, ICSID Case No. ARB/16/17, Award (22 June 2021); *REENERGY S.à.r.l. v. Spain*, ICSID Case No. ARB/14/18, Award (6 May 2022); *Green Power K/S and SCE Solar Don Benito APS v. Spain*, SCC Case No. V 2016/135, Award (16 June 2022); *Eurus Energy Holdings Corporation v. Spain*, ICSID Case No. ARB/16/4, Award (14 November 2022); *Infracapital F1 S.à.r.l. and Infracapital Solar B.V. v. Spain*, ICSID Case No. ARB/16/18, Award (2 May 2023); *Kruck and others v. Spain*, ICSID Case No. ARB/15/23, Award (6 October 2023). Several other intra-EU ECT cases were discontinued or are still pending as of 1 December 2023.

⁷⁹ CJEU, Case C-284/16 *Slowakische Republik v Achmea BV*, ECLI:EU:C:2018:158. Cf. J Robert Basedow, 'The Achmea Judgment and the Applicability of the Energy Charter Treaty in Intra-EU Investment Arbitration' (2020) 23 *Journal of International Economic Law* 271.

amid growing concern for climate change.⁸⁰ At the same time, many non-EU parties to the ECT had resisted its amendment, notably Japan as a major fossil fuel importer,⁸¹ such that the EU never realized its systematic vision for modernization.⁸²

Keeping in mind these nuances—and perceived nuisances—the ECT turmoil offers a good illustration of how the enduring application of a legal instrument and related institutional structures—including the *ad hoc* investment tribunals formed under its aegis—that were largely created to serve the needs of an old socio-technical regime may become a battleground between different constituencies representing or advocating for two competing regimes, one based on fossil fuels and the other on renewable energies. There is perhaps no better example of international law's role in entrenching a socio-technical regime than the ECT's 20-year sunset clause,⁸³ which would require a careful application of the law of treaties to avoid its consequences.⁸⁴

B. Promotion of the new regime

The second role of law is to empower, enable, or otherwise 'promote' a change in the socio-technical regime. At the domestic level, many countries have adopted green industrial policies, typically involving some form of support scheme for renewable energy generation, associated equipment industries, efficiency measures relating to buildings and vehicles, and a range of carbon pricing instruments, mainly taxes and emissions trading schemes. These measures are most frequently applied in the policy areas of energy, transportation (electrification replacing fossil fuels), and buildings (often energy-related measures). Recently, important players have announced their increased ambitions in green industrial policy, including China's 14th Five-Year Plan (2021–2025), which aims to peak CO₂ emissions by 2030 as its first step towards carbon neutrality by 2060;⁸⁵ India's latest Production Linked Incentive schemes for batteries

⁸⁰ In 2019, the Netherlands decided to phase out coal power plants by 2030, generating two claims of more than €1 billion. By early 2023, Uniper's proceeding was discontinued as a condition of its bailout by the German government and RWE's proceeding was suspended pending its appeal against an anti-arbitration declaration: *Uniper SE and others v. Kingdom of the Netherlands*, ICSID Case No. ARB/21/22, Order of the Tribunal Taking Note of the Discontinuance of the Proceeding and Decision on Costs (17 March 2023); *RWE AG and RWE Eemshaven Holding II BV v. Kingdom of the Netherlands*, ICSID Case No. ARB/21/4, Procedural Order No. 4 (22 October 2022). See also *Rockhopper Exploration Plc and others v. Italian Republic*, ICSID Case No. ARB/17/14, Final Award (23 August 2022) (awarding over €200 million for expropriation of the vested right to a production concession through a moratorium on offshore hydrocarbon extraction). Analogous fossil fuel disputes have been brought under NAFTA and USMCA: *Westmoreland Mining Holdings LLC v. Government of Canada*, ICSID Case No. UNCT/20/3, Award (31 January 2022) (declining jurisdiction *ratione temporis*); *Westmoreland Coal Company v. Government of Canada*, ICSID Case No. UNCT/23/2, Claimant's Notice of Arbitration (22 October 2022) (claiming damages for Albertan decision to phase out coal power); *TC Energy Corporation and TransCanada Pipelines Limited v. United States of America*, ICSID Case No. ARB/21/63, Request for Arbitration (21 November 2022) (claiming \$15 billion for revocation of presidential permit for Keystone XL pipeline); *Lone Pine Resources Inc. v. Government of Canada*, ICSID Case No. UNCT/15/2, Final Award (22 November 2022) (dismissing claims arising from legislative moratorium on shale fracking). However, the eyewatering awards sought by investors—and feared by vocal critics in view of industry valuations—are far from faits accomplis, once we consider the cumulative stages to be applied by tribunals: Oliver Hailes, 'Valuation of Compensation in Fossil Fuel Phase-Out Disputes' in Anja Ipp and Annette Magnusson (eds), *Investment Arbitration and Climate Change* (Alphen aan den Rijn: Kluwer Law International, 2024), chap 6. See also Anatole Boute, 'Investor Compensation for Oil and Gas Phase Out Decisions: Aligning Valuation Methods to Decarbonization' (2023) 23 Climate Policy 1087.

⁸¹ See, e.g. the clause-by-clause reiteration of Japan that 'it is not necessary to amend the current ECT provisions' in Energy Charter Secretariat, 'Policy Options for Modernization of the Energy Charter Treaty' (CC8 December 2019 STR, 6 October 2019) <www.energycharter.org/fileadmin/DocumentsMedia/CCDECS/2019/CCDEC201908.pdf> accessed 1 December 2023.

⁸² Johannes Tropper and Kilian Wagner, 'The European Union Proposal for the Modernisation of the Energy Charter Treaty – A Model for Climate-Friendly Investment Treaties?' (2022) 23 Journal of World Investment & Trade 813.

⁸³ art 47 of the ECT.

⁸⁴ Tibisay Morgandi and Lorand Bartels, 'Exiting the Energy Charter Treaty under the Law of Treaties' (2023) 34 King's Law Journal 145.

⁸⁵ 'The 14th Five-Year Plan of the People's Republic of China—Fostering High-Quality Development' (Asian Development Bank, Observations and Suggestions Series. No. 2021-01) <www.adb.org/sites/default/files/publication/705886/14th-five-year-plan-high-quality-development-prc.pdf> accessed 1 December 2023.

and solar PV modules,⁸⁶ alongside a proposed national carbon market;⁸⁷ various tax credits for ‘clean hydrogen’ (green and blue), electric vehicles, fuel cells, and CCUS technologies under the US Inflation Reduction Act (IRA),⁸⁸ and the EU’s Green Deal Industrial Plan for the Net-Zero Age.⁸⁹

Decarbonization policies have complex motivations and effects at the domestic level,⁹⁰ which are amplified in the context of international energy transactions. In some cases, these measures are indirectly trade-related—such as domestic subsidies or internal taxes and regulations that nevertheless impact international trade—or directly trade-focused—such as the carbon border adjustment mechanism (CBAM) introduced by the EU.⁹¹ In 2022, the German Presidency of the G7 also floated the idea of establishing a ‘climate club,’⁹² adopting a label coined by economist Nordhaus but without his explicit emphasis on a ‘uniform tariff percentage’ to impose a ‘trade sanction on nonparticipants.’⁹³ Yet, the CBAM does just that, by virtue of the EU customs union and common trade policy, coupled with exemptions for importing States that apply the EU emissions trading system.⁹⁴ It has been well observed that these arrangements approximate a true climate club,⁹⁵ which could be expanded on a bilateral or sectoral basis.⁹⁶

The CBAM has been presented politically as an environmental integrity measure, even a strong incentive for countries exporting into the EU to introduce or enhance their domestic carbon pricing policies. However, certain elements of CBAM’s design (e.g. the continuation of free emission allowances to industries exposed to ‘carbon leakage,’⁹⁷ the risk that production will be offshored and thus fail to reduce global emissions) may amount to offering protection to intra-EU carbon-intensive industries, on the debated grounds that they otherwise face unfair competition from producers based in low-ambition jurisdictions.⁹⁸ In addition to the division of competences under EU law, such measures operate within a regulatory space shaped by a range of constraints imposed by international law, most notably trade agreements but also principles of international environmental law.⁹⁹

⁸⁶ ‘Production Linked Incentive Schemes for 14 key sectors aim to enhance India’s manufacturing capabilities and exports’ (Ministry of Commerce & Industry, 2 August 2023) <<https://pib.gov.in/PressReleasePage.aspx?PRID=1945155>> accessed 1 December 2023.

⁸⁷ ‘Ministry of Power & Ministry of Environment, Forests & Climate Change to develop Carbon Credit Trading Scheme for Decarbonisation’ (Ministry of Power, Government of India, 11 May 2023) <<https://pib.gov.in/PressReleasePage.aspx?PRID=1923458>> accessed 1 December 2023.

⁸⁸ Inflation Reduction Act, 136 Stat 1818 (2022).

⁸⁹ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, and the Committee of the Regions, A Green Deal Industrial Plan for the Net-Zero Age COM(2023) 62 final.

⁹⁰ Cristina Peñasco, Laura Díaz Anadón and Elena Verdolini, ‘Systematic Review of the Outcomes and Trade-Offs of Ten Types of Decarbonization Policy Instruments’ (2021) 11 *Nature Climate Change* 257.

⁹¹ Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism [2023] L130/S2 [CBAM].

⁹² G7 Statement on Climate Club (Elmau, 28 June 2022) <<https://www.g7germany.de/resource/blob/974430/2057926/2a7cd9f0213a481924492942dd660a1/2022-06-28-g7-climate-club-data.pdf>> accessed 1 December 2023.

⁹³ William Nordhaus, ‘Climate Clubs: Overcoming Free-Riding in International Climate Policy’ (2015) 105 *American Economic Review* 1339, 1346–1352. Cf. Terms of Reference for the Climate Club (22 December 2022) <www.g7germany.de/resource/blob/974430/2153140/353c05448bb27a75534468d624f738848/2022-12-12-g7-erklarung-data.pdf?download=1> accessed 1 December 2023.

⁹⁴ art 2(6) of CBAM.

⁹⁵ Geraldo Vidigal and Ingo Venzke, ‘Of False Conflicts and Real Challenges: Trade Agreements, Climate Clubs, and Border Adjustments’ (2022) 116 *AJIL Unbound* 202, 204–205.

⁹⁶ Makane Moïse Mbengue and Elena Cima, ‘“Clubbing in the Club”: Could Climate-Related Trade Arrangements Set the Pace for Future Climate Cooperation?’ (2022) 116 *AJIL Unbound* 219; Giulia Claudia Leonelli, ‘The Long and Winding Road Towards the Creation of Climate Clubs: Transatlantic Negotiations, Potential Regulatory Models and Challenges Ahead’ (2023) 32 *Review of Comparative, European & International Environmental Law* 453.

⁹⁷ art 31 of CBAM.

⁹⁸ On the purposes and design of CBAM, see Giulia Claudia Leonelli, ‘Practical Obstacles and Structural Legal Constraints in the Adoption of “Defensive” Policies: Comparing the EU Carbon Border Adjustment Mechanism and the US Proposal for a Border Carbon Adjustment’ (2022) 42 *Legal Studies* 696.

⁹⁹ *ibid*; Mehling and others (n 27); Gracia Marín Durán, ‘Securing Compatibility of Carbon Border Adjustments with the Multilateral Climate and Trade Regimes’ (2023) 72 *International & Comparative Law Quarterly* 73.

Despite initial reports that India would litigate the alleged inconsistency of CBAM with the law of the World Trade Organization (WTO)—given that it would impose tariffs of up to 35% on imports of high-carbon goods like steel, iron ore, and cement—this battlefield over the promotion of a new socio-technical regime is now playing out in bilateral diplomacy alongside negotiation towards a highly anticipated EU–India free trade agreement.¹⁰⁰ At the same time, the EU and the US are negotiating a Global Arrangement on Sustainable Steel and Aluminium and a Critical Minerals Agreement to promote bilateral trade in the raw materials underpinning a transatlantic low-carbon economy.¹⁰¹ While these initiatives are framed in terms of increasing labour and environmental standards, they are equally driven by a fear that EU firms may be excluded from US automotive supply chains due to content requirements under the IRA.¹⁰² Despite their mixed motivations, these examples show how domestic or regional measures to promote a new socio-technical regime need not lead to international disputes—let alone great power rivalry—but may force the strategic adoption of foreign legal policies and thereby trigger a process of international law-making that promotes the energy transition on bilateral or plurilateral scales, serving to norm the decisions of key governmental and commercial actors throughout the global economy.

C. A dynamic transition

These two roles—entrenchment and promotion—describe somewhat static views of law. Such roles nevertheless serve to discern patterns in the legal dynamics of an energy transition. Although a full explanation cannot be offered in the confined context of this framing article,¹⁰³ at its core, the dynamics tend to follow a three-stage process whereby the emerging socio-technical regime finds expression, first, in the goals promoted by international instruments; then, in binding instruments regulating the undesired side effects (negative externalities) of energy transactions; finally, deeper in the legal organization of energy transactions themselves, for example, through the development of *ad hoc* legal frameworks for new types of transactions or the renovation of existing instruments—whether through amendment or interpretation—that ostensibly entrenched another socio-technical regime.

In broad strokes, this process can be illustrated by the recognition since the 1980s of the desirability of a larger share of renewable energies;¹⁰⁴ then the adoption of the UNFCCC and

¹⁰⁰ Adrija Chatterjee, Vrishti Beniwal and Swansy Afonso, 'India Prefers Negotiating with EU on Carbon Tax to WTO Complaint' (Bloomberg, 6 June 2023) <www.bloomberg.com/news/articles/2023-06-06/india-prefers-negotiating-with-eu-on-carbon-tax-to-wto-complaint> accessed 1 December 2023.

¹⁰¹ 'Joint EU-US Statement on a Global Arrangement on Sustainable Steel and Aluminium' (European Commission, 31 October 2021); 'EU Moves Forward with Critical Minerals Agreement Negotiations with the US' (European Commission, 14 June 2023).

¹⁰² Chad P Brown, 'Industrial Policy for Electric Vehicle Supply Chains and the US-EU Fight Over the Inflation Reduction Act' (Peterson Institute for International Economics, Working Paper 23-1, May 2023) <www.piie.com/sites/default/files/2023-05/wp23-1.pdf> accessed 1 December 2023.

¹⁰³ Cf. Viñuales, *Energy* (n 11) conclusion.

¹⁰⁴ In 1981, a UN Conference on New and Renewable Sources of Energy was held in Nairobi, although the understanding of the 'energy transition' referred mainly to diversification for energy security purposes. See Enrique V Iglesias, 'Objectives of the United Nations Conference on New and Renewable Sources of Energy' (1981) 5 OPEC Review 12. In 1992, Agenda 21 specifically referred to the need for more renewable sources as a result of climate change. See Report of the United Nations Conference on Environment and Development, UN Doc A/CONF.151/26/Rev.1 (Vol. 1), Resolution 1, Annex 2: Agenda 21 [Agenda 21], Basis for Action 9.9 ('[t]he need to control atmospheric emissions of greenhouse and other gases and substances' as part of the explanation for a 'growing reliance on environmentally sound systems, particularly new and renewable sources of energy'). That led to the launch of a World Solar Programme at a meeting in Harare in 1996 (Harare Declaration on Solar Energy and Sustainable Development, 17 September 1996, UN Doc A/53/395, annex, s II) and, subsequently, to the adoption by UNESCO of its 'World Solar Programme 1996–2005' (UNESCO, Records of the General Conference, Twenty-ninth Session, Paris, 21 October–12 November 1997, vol. 1: Resolutions). The turning point came when the UN General Assembly endorsed this goal in December 2000: see 'World Solar Programme 1996–2005', 20 December 2000, UN Doc. A/RES/55/205. During the 2000s, the 'promotion of new and renewable sources of energy' became a sub-item of the agenda of the UN General Assembly: 'Promotion of new and renewable sources of energy, including the implementation of the World Solar Programme', 13 March 2006, UN Doc A/RES/60/199, para 13.

a range of other instruments addressing climate change (still as a negative externality);¹⁰⁵ followed by the emerging socio-technical regime making inroads into the legal organization of international energy transactions, such as the emergence of specific instruments (e.g. *ad hoc* legal frameworks for offshore wind energy projects¹⁰⁶) and the deeper coordination of finance, technology, and policy via intergovernmental organizations (e.g. India's push for the International Solar Alliance¹⁰⁷), mirrored by growing reliance on existing legal structures from the old regime (e.g. ISDS of renewable energy disputes under the ECT) or the adjustment of existing instruments to ensure promotion of the new regime (e.g. public procurement carve-outs in trade agreements).¹⁰⁸ This dynamic has been extended in proposals to carve out fossil fuels or climate mitigation measures from investment treaties, such that the treaties would only cover renewable energy transactions.¹⁰⁹ Perhaps the most advanced proposal is for treaty-based climate clubs to coordinate the phasing out of fossil fuel extraction, the implementation of which would mark the demise of the old socio-technical regime.¹¹⁰

International law is thus both a reflection of the current state of the struggle between socio-technical regimes and a dynamic battleground wherein different rules, institutions, and processes are mobilized amid deeper socio-economic and normative struggles. Given the criticality of the current juncture, several features of this vast legal battleground, possibly even minor ones, may have a disproportional—non-linear—effect on how the struggle evolves and thereby the pulse of socio-technical transition towards a long-term habitable planet.

V. MAPPING THE INTERNATIONAL LAW OF ENERGY

It is accordingly vital to map the rules, processes, and institutions that organize the decisional options of key actors as they try to drive the energy transition through this critical juncture. As mentioned, an analytical perimeter for the international law of energy has already been drawn,¹¹¹ shortly before Russia's invasion of Ukraine. The present symposium was arranged with a view to filling in the gaps on this dynamic map, adding new or overlooked details, and expanding its scope. At a critical juncture between the old and new regimes, the contributors were drawn from different generations of international lawyers working on economic aspects of energy from a range of places, backgrounds, and specialisms. The 12 contributions to this symposium are presented in four parts—*Foundations*, *Forms*, *Frictions*, and *Frontiers*—which are summarized below.

A. Foundations: unsettling sovereignty over energy resources

The three contributions to the first part—*Forms*—map the field in a manner that unsettles, or at least supplements, the spatial organization of the global energy sector based on territorial sovereignty. Traditionally, the entitlements of economic actors derive from and are policed by the presumptively lawful powers of States over natural resources and energy transactions,

¹⁰⁵ United Nations Framework Convention on Climate Change, adopted 9 May 1992, in force 21 March 1994, 1771 UNTS 107 [UNFCCC]. See Viñuales, *Energy* (n 11) 163–168.

¹⁰⁶ Volker Roeben, 'Governing Shared Offshore Electricity Infrastructure in the Northern Seas' (2013) 62 *International and Comparative Law Quarterly* 839; Hannah Katharina Muller and Martha M Roggenkamp, 'Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?' (2014) 29 *International Journal of Marine and Coastal Law* 716; Viñuales, *Energy* (n 11) 260–269.

¹⁰⁷ Yvona Jha, *The Making of the International Solar Alliance: India's Moment in the Sun* (Oxford University Press, Oxford 2023).

¹⁰⁸ Viñuales, *Energy* (n 11) chap 8.

¹⁰⁹ Joshua Paine and Elizabeth Sheargold, 'A Climate Change Carve-Out for Investment Treaties' (2023) 26 *Journal of International Economic Law* 258. This article evolved out of the OECD's ongoing initiative to align investment treaty practice with the Paris Agreement: *Investment Treaties and Climate Change: OECD Public Consultation (January–March 2022): Compilation of Submissions* (7 April 2022) <www.oecd.org/investment/investment-policy/OECD-investment-treaties-climate-change-consultation-responses.pdf> accessed 1 December 2023.

¹¹⁰ Harro van Asselt and Peter Newell, 'Pathways to an International Agreement to Leave Fossil Fuels in the Ground' (2022) 22 *Global Environmental Politics* 28.

¹¹¹ Viñuales, *Energy* (n 11) chap 1.

while those private entitlements are protected by trade and investment treaties and their negative externalities are regulated by human rights and environmental law. By drawing attention to both continuity and change in these legal foundations, each contribution identifies possible inroads for novel or neglected entitlements that may reorganize energy transactions rather than merely regulating their externalities.

The present article falls within the first part. We have framed how international law may both entrench the old regime and promote the transition towards renewable energy, examining some roles played by rules, institutions, and processes in shaping the decisional entitlements of key governmental and commercial actors at the critical juncture brought about by war and energy crisis in a dangerously changing climate.

In the second article, Le Moli challenges the framing of human rights as merely setting limits on the negative externalities of energy transactions.¹¹² By reviewing a range of domestic and international judicial practice, Le Moli shows how human rights also define ordinary entitlements over energy resources, which give rise to competing claims against States and commercial actors as to whether energy transactions may even be conducted. The stakes are potentially significant: human rights and the rights of collective subjects—peoples, Indigenous peoples—could be engaged to oppose the dangerous overinvestment in fossil fuel infrastructure, as well as the installation of renewable energy projects and the extraction of critical minerals in the energy transition.

While Le Moli challenges the statist foundations of the field, Hailes extends its analytical perimeter by framing food as an end-use energy product.¹¹³ The distinction between energy and food crises—ubiquitous amid the Ukraine war—may thus be reframed as competing entitlements over energy resources (gas, hydrogen) that can be converted into several end products (food, fuel, heat, electricity) to the benefit of different actors. Furthermore, Hailes shows how rules allocating entitlements over fossil fuels were inherited from earlier disputes over access to fertilizer resources for food production. By integrating those disputes into a long history of energy law, Hailes suggests that the transition towards green hydrogen as a dual-use industrial fuel and fertilizer feedstock may generate familiar sites of distributive conflict, calling for closer attention to the entitlements of collective subjects (food sovereignty), individuals (right to food), corporations (investment protection), and States (economic regulation) in securing resources for low-carbon production of dietary energy.

B. Forms: governing energy by international agreement

The second part—*Forms*—surveys that ways in which States have agreed to govern bilateral and plurilateral aspects of the global energy sector through an array of treaties, contracts, and non-binding commitments. This part accordingly reflects the challenges posed by publics, policymakers, and geopolitics to a particular model of treaty that has prevailed since the end of the last century, namely, plurilateral trade agreements (PTAs) containing binding standards of investment protection and typically weaker standards of environmental protection. Many States have recently reformed, replaced, or abandoned the typical PTA, while new types of agreements address energy trade with an emphasis on climate mitigation and energy transition. In parallel, bilateral energy relationships have been organized through diverse instruments,¹¹⁴ including commercial agreements and non-binding international agreements.¹¹⁵

¹¹² Geneva Le Moli, 'Beyond Externalities: Human Rights as a Foundation of Entitlements over Energy Resources.'

¹¹³ Oliver Hailes, 'From Guano to Green Hydrogen: Food Security and Fertilizer Disputes in International Energy Law.'

¹¹⁴ Tibisay Morgandi, 'State Energy Agreements Database' (2017) <<https://energybilaterals.org>> accessed 1 December 2023.

¹¹⁵ Cf. Curtis A Bradley, Jack Goldsmith and Oona Hathaway, 'The Rise of Nonbinding International Agreements: An Empirical, Comparative, and Normative Analysis' (2023) 90(5) University of Chicago Law Review 1281.

First, Espa considers a range of energy disciplines in the latest generation of PTAs through the prisms of energy security and sustainability.¹¹⁶ While early PTA chapters focused on securing access to both energy commodities and transit infrastructure, as well as energy market regulation, subsequent treaties have gradually integrated sustainability provisions to mitigate the environmentally harmful effects of trade in conventional energy resources. But the normativity and enforceability of environment chapters vary widely. Espa suggests that non-traditional agreements regarding environmental goods and services, fossil fuel subsidy reform, and renewable energy may play an important role in addressing the asymmetry in PTAs between the organization of energy transaction and the regulation of negative externalities.

Garcia Sanchez focuses on the organization of regional energy transactions under the US Mexico Canada Agreement (USMCA), which replaced the North American Free Trade Agreement (NAFTA) in 2020.¹¹⁷ Despite some hopes that the renegotiation of NAFTA would serve to integrate energy markets, the USMCA regulates energy in a fragmented fashion, variously reaffirming Mexico's right to regulate the hydrocarbon sector according to its constitution, requiring non-discrimination in energy trade and transit, restricting government assistance to State-owned entities, and containing an open-ended security exception alongside weak environmental provisions. Garcia Sanchez emphasizes the important roles of decision-making bodies and arbitral tribunals in balancing the policy goals underlying these contradictory provisions.

Amid the present turmoil over the ECT, Daszko considers the future roles that may be played by the ECT and its possible alternatives in protecting renewable energy investments and settling investor-State disputes.¹¹⁸ Daszko undertakes a two-fold inquiry into the 'known-knowns' of the ECT and its 'known-unknowns'. The known-knowns include the ECT's key provisions and their arbitral application in renewable energy disputes. The known-unknowns include the stalemate surrounding its proposed modernization, the implications of exiting the ECT, and a possible turn away from public international law towards State contracts and international commercial arbitration in the renewable energy sector. Daszko cautions against abandonment of the existing framework at this critical juncture, suggesting that the relative transparency of treaty-based arbitration of investment disputes arising from legislative incentives for renewable energy may be preferable to the more confidential arbitration of contractual commitments.

Finally, Zhang maps the international legal framework for one of the most important bilateral relationships in the global energy sector, more so amid the geopolitical tensions and economic sanctions in the wake of the Ukraine war: China and Russia.¹¹⁹ Despite occasional tensions in this energy partnership, neither State has relied on the dispute settlement body of the WTO, nor has any investor brought an arbitral claim under the 2006 China–Russia bilateral investment treaty. Instead, Zhang observes that a 'partnership-based relational approach' between China and Russia is characterized by normative and institutional flexibility, reflecting a preference for bilateralism over regionalism, pragmatic cooperation over rulemaking, and non-binding over binding commitments. In this way, the China–Russia energy partnership bears a closer resemblance to China's Belt and Road Initiative than to Russia's reliance on international law to secure energy and infrastructure relationships with other Eurasian States, and indeed with the EU.¹²⁰

C. Frictions: responding to a global energy crisis

The third part—*Frictions*—addresses the tensions and solutions raised by international law in responding to a global energy crisis. Two contributors focus on the European response to the

¹¹⁶ Ilaria Espa, 'Energy Disciplines in PTAs Between Security and Sustainability Concerns: A Comparative Perspective.'

¹¹⁷ Guillermo J Garcia Sanchez, 'Contradictions and Tensions in the Way the USMCA Regulates Energy.'

¹¹⁸ Agata Daszko, 'The Energy Charter Treaty at a Critical Juncture: Of Knowns, Unknowns, and Lasting Significance.'

¹¹⁹ Yuanyuan Zhang, 'International Law in the China-Russian Energy Partnership: Mapping the Partnership-Based Relational Approach.'

¹²⁰ See further Boue, *Energy Dependence* (n 60).

energy crisis generated by Russia's invasion of Ukraine. International law has indeed shaped that response, yet the EU is also reshaping its trade, investment, and energy policies, with (unintended) consequences for international law and the energy transition. Another contributor shifts our attention to one of the volatile heartlands of the fossil economy, the Kurdistan Region of Iraq, which generated a recent example of peaceful settlement of inter-State energy disputes by means of arbitration.

First, Marhold shows how several dimensions of European energy security potentially clash with cornerstones of international trade law.¹²¹ Specifically, Marhold examines the EU's effort to secure energy following Russia's invasion of Ukraine through relations with third States by means of trade agreements, *ad hoc* bilateral arrangements, and novel crisis-response tools. By testing these responses against EU and WTO law, Marhold identifies the emergence of a 'security-centred' approach to energy trade regulation in Europe and beyond—focused on security over strict compliance—while arguing that the very concept of energy security has evolved to encompass decarbonization goals.

Boute also considers the EU's response, focusing on whether the decision to cap the 'extraordinary' or 'surplus' revenues of renewable energy producers in wholesale electricity markets could give rise to investment treaty claims.¹²² As discussed, foreign investors have previously brought many claims under the ECT challenging the amendment of renewable energy incentives. Since then, due to declining costs and improved performance, renewable energy investments are increasingly made without subsidies. While acknowledging that consumer protection is essential for energy justice, Boute argues that interference with deregulated prices—instead of targeted support for users in vulnerable situations—may prevent renewable energy investors from recovering their costs, thus undermining the energy transition. Based on the existing case law, however, it would be difficult for any investor to prove that price controls have breached any specific commitment arising from electricity market regulation.

Finally, Demirkol zooms in on the February 2023 award of an arbitral tribunal organized under the rules of the International Chamber of Commerce (ICC) regarding a 1973 crude oil pipeline agreement between Iraq and Turkey and competing entitlements over natural resources in Iraqi Kurdistan.¹²³ In awarding \$1.5 billion to Iraq, the tribunal addressed a range of defence arguments under the law of treaties and general international law, including Turkey's reliance on a putative norm of *jus cogens* in arguing that its oil trade with the Kurdistan Regional Government was necessary to finance the prevention of genocide of the Yazidi community at the hands of the unrecognized Islamic State of Iraq and al-Sham (ISIS).¹²⁴ While this award provides guidance on many issues of international law and energy transit, it also represents a relatively successful example of peaceful dispute settlement amid the global energy crisis. Yet, the award itself created further frictions: the export of crude oil from Iraq to Turkey has since been halted and Turkey now alleges that it is the true award creditor due to accumulated interest on its counterclaim.

D. Frontiers: accelerating the energy transition through climate policy

The last part of this symposium—*Frontiers*—contemplates the future tensions that are likely to arise from efforts to accelerate the energy transition through climate policy, focusing on the problematic reception of international law by the legal systems of two major emitters: coal power in China and hydrocarbon extraction in the UK. Although the Ukraine war has challenged the

¹²¹ Anna-Alexandra Marhold, 'Towards a "Security-Centred" Energy Transition: Balancing the European Union's Ambitions and Geopolitical Realities.'

¹²² Anatole Boute, 'Energy Justice in Times of Crisis: Protection of Consumers and Market-Based Renewable Energy Investments.'

¹²³ Berk Demirkol, 'Peaceful Settlement of Inter-State Energy Disputes: Applicable Law, Defence Arguments, and Remedies in the ICC Arbitration between Iraq and Turkey.'

¹²⁴ *Republic of Iraq v Republic of Turkey*, ICC Case No. 20,273/AGF/ZF/AYZ/ELU, Final Award (13 February 2023).

assumption that fossil fuels are more affordable and secure than renewable sources, this part shows why international lawyers must remain alive to the domestic political economy of the energy transition,¹²⁵ including competition among purposes in energy policy at different levels of government and a lack of integration between climate and energy regulation.

Gao and Zhou examine the decisional drivers underlying China's short-lived transition away from coal power plants, which would have played a vital role in limiting global warming to 1.5°C.¹²⁶ In the last month of 2021, China approved more coal power plants than in the previous 11 months combined, responding to the sudden decision of many provincial governments to cut power supplies in September 2021 due to real shortage problems and a need to meet the central government's targets to reduce carbon intensity and energy consumption. Gao and Zhou focus on the competition among purposes of energy policy. They argue that a misalignment of incentives among different levels of government and the lack of well-functioning energy markets—which are presently dominated by State-owned entities—are two of the main difficulties facing the effective implementation of China's international obligations and top-down climate targets. Such dynamics also help to explain China's past WTO disputes, which have arisen from the central government's pursuit of policy goals through border measures due to difficulties in implementing those goals at a local level.

Shapovalova tackles another fundamental question arising from the competition among the purposes of energy governance: whether the reconciliation of fossil fuel regulation and climate change mitigation is impossible through the rules, processes, and institutions that coevolved with an outmoded socio-technical regime.¹²⁷ Despite recent initiatives to confront fossil fuels through international law, both within and alongside the UNFCCC, domestic legal frameworks still fail to integrate climate considerations in the regulation of oil and gas production. In the UK, the energy sector's objective of 'maximizing economic recovery' from the North Sea sits in obvious contradiction with a legally mandated target of net zero emissions by 2050. In the licensing of new projects, neither the requirement of an environmental impact assessment nor the 2022 introduction of a Climate Compatibility Checklist includes any evaluation of 'Scope 3' emissions (from downstream combustion of fossil fuels at the point of consumption). As discussed, the source of this contradiction is the traditional allocation of entitlements over natural resources to States—from which derive regulatory frameworks for oil and gas production—and the inability (so far) of human rights and environmental law to move beyond the regulation of harm caused by fossil fuels and to challenge the underlying entitlements of governmental and commercial actors to drill and emit with impunity.

VI. CONCLUSION: A MAP IN NEED OF A COMPASS

International law and organization are the only institutional mechanisms available at a global level to norm energy decisions, which are otherwise made at national, regional, or sectoral levels. Neither this framing article nor the overall symposium—nor the book-length analysis on which it relies—purports to offer a comprehensive map of the international law of energy. For one, there are geographical gaps: recent events have focused attention on Eurasian segments of the global energy sector, yet the transition is creating international collaborations (and dependencies) regarding renewable energy and critical minerals along new geopolitical lines.¹²⁸ The material reality of energy transactions often moves faster than policy discourse about it, let alone

¹²⁵ This applies equally to domestic policies regarding critical minerals. See, e.g. Thea Riofrancos, 'The Security-Sustainability Nexus: Lithium Onshoring in the Global North' (2023) 23 *Global Environmental Politics* 20.

¹²⁶ Henry Gao and Weihuan Zhou, 'Competition Among Purposes: The Chinese Experience in the Governance of Climate Change and Energy Transition'.

¹²⁷ Daria Shapovalova, 'Climate Change and Oil and Gas Production Regulation: An Impossible Reconciliation?'

¹²⁸ Emma Aisbett and others, 'International Green Economy Collaborations: Chasing Mutual Gains in the Energy Transition' (2023) 104 *Energy Research & Social Science* 103, 249; Boute, *Energy Dependence* (n 60) chap 6. See also Yinka Omorogbe and

the necessary adjustments to our map of international law. Nevertheless, the criticality of the present juncture, we argue, lies not only in the Ukraine war or the consequent energy crisis but also in whether decisions taken in response to those events threaten the viability of the ongoing energy transition.

Adding new or overlooked aspects and granularity to this dynamic map is important work for international lawyers in promoting the energy transition—both through scholarly analysis and by way of practical advice, advocacy, or adjudication—while maintaining professionalism in the good-faith interpretation of rules, processes, and institutions that serve to entrench an outmoded socio-technical regime. That is what this symposium tries to do. Yet, we need an authoritative compass to give interpretive direction to the organization of entitlements, obligations, and decisional options of key governmental and commercial actors. The temperature threshold entrenched in Article 2(1)(a) of the Paris Agreement has already provided a focal point for subsequent climate negotiations, political activism, domestic and international climate litigation, and manifold commitments—and action—of governments (e.g. nationally determined contributions, regulation, subsidies) and commercial actors (e.g. climate targets of financial asset managers and publicly listed companies). However, these developments have mainly adjusted the purposes of energy governance and the regulation of negative externalities. Beyond mere goals, the actual obligations to discontinue the conduct that has caused—and still drives—climate change lack sufficient articulation by an authoritative institution. Without such articulation, the legal organization of fossil energy transactions can hide in plain sight.

One of the more promising developments in providing such a compass is the recent wave of requests for advisory opinions from the International Court of Justice (ICJ),¹²⁹ the International Tribunal for the Law of the Sea (ITLOS),¹³⁰ and the Inter-American Court of Human Rights (IACtHR).¹³¹ These opinions would provide more granular guidance regarding the mitigation obligations of States under general international law, several multilateral treaties—including the UNFCCC, the Paris Agreement, the international human rights covenants, and the UN Convention on the Law of the Sea—and an important regional human rights treaty. Although the requests are framed in terms of climate change, the advisory opinions may serve to clarify the entitlements that can be lawfully derived from States by commercial actors in carrying out energy transactions and thus inform the development of domestic or EU legislation, global climate negotiations, and contentious cases before domestic, regional, and other international courts and tribunals.¹³²

Like the Paris Agreement and other influential instruments, any authoritative compass from the ICJ, ITLOS, or IACtHR would not be self-executing but rather depend on multi-level efforts to integrate international legal obligations into our dynamic map of the rules, processes, and institutions that organize international energy transactions. And to ensure that these norms inform the decisions of key governmental and commercial actors, with material consequences for the energy transition. The Ukraine war has already triggered the negotiation of international agreements to promote green industrial policy, but the old socio-technical regime could

Ada Okoye Ordor (eds), *Ending Africa's Energy Deficit and the Law: Achieving Sustainable Energy for All in Africa* (Oxford University Press, Oxford 2018).

¹²⁹ Request for an advisory opinion of the International Court of Justice on the obligations of States in respect of climate change, UNGA Res 77/276 (4 April 2023) UN Doc No. A/RES/77/276.

¹³⁰ Commission of Small Island States on Climate Change and International Law, 'Request for Advisory Opinion' (12 December 2022) <https://www.itlos.org/fileadmin/itlos/documents/cases/31/Request_for_Advisory_Opinion_COSIS_12.12.22.pdf> accessed 1 December 2023.

¹³¹ 'Solicitud de Opinión Consultiva sobre Emergencia Climática y Derechos Humanos a la Corte Interamericana de Derechos Humanos de la República de Colombia y la República de Chile' (9 January 2023) <https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2023/20230109_18528_petition.pdf> accessed 1 December 2023.

¹³² Christina Voigt, 'The Power of the Paris Agreement in International Climate Litigation' (2023) 32 *Review of European, Comparative & International Environmental Law* 237.

be entrenched along new geopolitical lines, perhaps creating *de facto* 'fossil clubs' in parallel to emerging climate clubs. The war itself has sent mixed signals and, at a critical juncture, each policy decision can have disproportional and far-reaching (non-linear) effects. Hence the urgency of understanding that such decisions are indeed normed by international law, even in the absence of specific rules, and of showing how this is so.