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SDG 7: Access to Affordable, Reliable, Sustainable and Modern Energy for All

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Developed by the EEIST Consortium, in summary this paper first explores the content of SDG 7. It then surveys the international rules and processes that may assist and/or hinder the progressive realization of SDG 7. The paper closes by considering the role and influence of selected international institutions and non-state actors in advancing and implementing SDG 7.

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ECONOMICS OF ENERGY INNOVATION
AND SYSTEM TRANSITION

Abstract

The global strategic priorities articulated in Sustainable Development Goal (SDG) 7, Affordable and Clean Energy, underscore a narrative of two “economies” and the conscious evolution of political prioritization in economic structuring. SDG 7 represents an aspiration to move away from the “old”, entrenched, “brown” economic activities that developed out of the Industrial Revolution, built upon conventional fossil fuels and exhaustible natural resources, and towards “new”, low-, or zero-carbon-based “green” economic activities that are built upon clean energy, electrification, and the decarbonization of all aspects of modern life. This narrative gives rise to numerous legal complexities and challenges for international law, derived from its structure, content, and functions related to energy activities. This paper first explores the content of SDG 7. It then surveys the international rules and processes that may assist and/or hinder the progressive realization of SDG 7. The paper closes by considering the role and influence of selected international institutions and non-state actors in advancing and implementing SDG 7.

Key words

SDG 7, sustainable energy, energy poverty, human rights, climate change, trade and investment, global governance, international institutions, non-state actors.

1. Introduction

The global strategic priorities articulated in Sustainable Development Goal (SDG) 7, Affordable and Clean Energy, underscore a narrative of two “economies” and the conscious evolution of political prioritization in economic structuring. SDG 7 represents an aspiration to move away from the “old”, entrenched, “brown” economic activities that developed out of the Industrial Revolution, built upon conventional fossil fuels and exhaustible natural resources, and towards “new”, low-, or zero-carbon-based “green” economic activities that are built upon clean energy, electrification, and the decarbonization of all aspects of modern life. This narrative gives rise to numerous legal complexities and challenges for international law, which are explored in this chapter. To set the scene for that exploration, three preliminary remarks are in order.

First, while energy is central to the advancement of most, if not all, of the SDGs, the transition to a low-carbon or “sustainable” energy matrix is only now starting to find clear expression in international law. Until relatively recently, little public international law existed that was specifically related to energy access, renewable energy, and energy efficiency.[1]

This lack of specificity is partly due to clean technology choices and measures historically being considered as national or local issues and partly to the absence of transboundary effects

[1] For overviews, see Peter Cameron, Xiaoyi Mu & Volker Roeben (eds.), *The Global Energy Transition: Law, Policy and Economics for Energy in the 21st Century* (Hart, 2020); Mohammad Ershadul Karim et al., “Energy Revolution for Our Common Future: An Evaluation of the Emerging International Renewable Energy Law” (2018) 11(7) *Energies* 1769; Jorge E. Viñuales, *The International Law of Energy* (CUP, 2021), chaps. 1, 8; Stuart Bruce, “International Law and Renewable Energy: Facilitating Sustainable Energy for All?” (2013) 14(1) *Melbourne Journal of International Law* 19.

from these technologies.[2] Even beyond sustainable energy, as a general matter, no identifiable "international energy law" has emerged in the system of public international law.[3] As a result, it is not possible to establish a simple and direct link between SDG 7 and an identifiable group of treaties. Instead, the entire corpus of public international law has to be read from the perspective of "energy" and, more specifically, of the transition to low-carbon energy. It would therefore be more appropriate to speak of an "international law of energy".[4]

Second, by corollary, the relationship between international law and sustainable energy is, by definition, unstructured, evolving, and complex. Whereas international law can serve as a means to pursue SDG 7, it may also be an obstacle. In fact, the very same rules can have this dual effect. For example, an investment agreement can serve to protect a fossil fuel company from measures requiring the internalization of its negative externalities or, conversely, a renewable energy company from measures interfering with its supply of clean electricity. One consequence of this point is that the transition to a sustainable energy matrix is being induced and organized through a wide range of "policy" or "soft law" instruments, which are superimposed on a bedrock of binding rules that either are non-energy specific or focus on conventional energy sources. It is principally through the evolution of soft law since the early 1980s that the energy transition has gained normative force on the international plane, culminating in the United Nations' (UN) Sustainable Energy for All (SEforALL) initiative in 2011[5] and SDG 7 in 2015. The targets established by SDG 7 are an extension of this process.

Third, as a consequence, while the targets of SDG 7 may be universal, their mode and scale of realization cannot be so. In practice, much of SDG 7 and the global energy transition will be implemented through regional and national laws, regulations, policies, incentives, and actions, according to domestic capabilities and circumstances. The implementation of those choices may be supported (or thwarted) by myriad international law rules, principles, and norms and by varying degrees of international diplomatic and institutional action.

Against this background, this chapter is structured as follows. Section 2 explores the content of SDG 7 and its interactions with other SDGs. Section 3 surveys the international rules and processes that are most relevant for the progressive realization of SDG 7, focusing on human rights law, climate change law, trade law, investment law, and intellectual property law. Section 4 considers the role and influence of selected international institutions and non-state actors in advancing and implementing SDG 7. Section 5 concludes by considering the challenges that SDG 7 poses for international law.

2. The Contents of SDG 7 in the Context of the Other SDGs

SDG 7 establishes three essentially quantitative, outcome-based targets, covering universal access to energy (target 7.1), growth in the proportion of renewable energy in the global energy mix (target 7.2) and energy intensity as a function of gross domestic product (GDP)

[2] Catherine Redgwell, "International Legal Responses to the Challenges of a Lower Carbon Future: Energy Law for the Twenty-first Century", in Stephan Farrall, Tawhida Ahmed & Duncan French (eds.), *Criminological and Legal Consequences of Climate Change* (Hart, 2012), 36, 38.
[3] See Stuart Bruce, "International Energy Law", in *Max Planck Encyclopedia of Public International Law* (OUP, 2015).
[4] See Viñuales, n. 1, chap. 1.
[5] *International Year of Sustainable Energy for All*, UN Doc. A/RES/65/151, 16 February 2011.

(target 7.3). It also establishes two enabling targets related to international public finance to promote "access to clean energy technology and investment" (target 7.a)[6] and clean energy infrastructure development, especially for vulnerable states (target 7.b).[7] SDG 7 is designed to coordinate global action around high-level targets that are founded on years of intergovernmental policy development,[8] but it is silent in regard to states' domestic policy choices for its implementation. Each target is explored below.

Target 7.1 concerns intrinsic values related to human life and dignity. This much is reflected in its indicators, which emphasize the proportion of the population (1) with access to electricity and (2) that relies on clean fuels and technologies. The terms "clean fuels and technologies",[9] "modern energy", and "modern energy services" are not defined in the SDG's text or in international law, nor are they used uniformly among international organizations, although some guidance can be derived from the latter. For instance, the International Energy Agency defines "access to modern energy services" for tracking target 7.1 as "a household having reliable and affordable access to both clean cooking facilities and to electricity", initially for basic services and then rising to regional average levels of supply.[10]

Targets 7.2 and 7.3 contain ambiguous terms in at least three contexts: the definition of "renewable energy", what constitutes a "substantial" increase in its share globally, and the meaning of "rate of improvement" in energy efficiency globally. Targets 7.2 and 7.3 essentially replicate the renewable energy and energy efficiency goals in SEforALL, which sought to double the global renewable energy share from 15 percent to 30 percent and to double energy efficiency from 1.2 percent to 2.4 percent by 2030.[11] One significant difference – and step backwards – is that target 7.2 has replaced "double" from SEforALL with "substantially increase" renewable energy in the global energy supply. Although this phrasing does not impose an upper aspirational limit, challenges may arise in coordinating focused global collective action and in measuring progress without a quantitative target.[12] Nonetheless, because target 7.2 originated in international policy and SEforALL, it would be reasonable to use 30 percent as a benchmark for the minimum growth in renewables globally.[13] The reporting on target 7.3 indicates a similar quantitative goal (1.3–2.6 percent) to that which is included in SEforALL, despite its absence from the formal text.[14]

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[6] International Energy Agency (IEA) et al., *Tracking SDG 7: The Energy Progress Report* (World Bank, 2020), 3.
[7] Targets 7.a and 7.b are phrased in an overly complex manner and are not further deconstructed in this section, though the international law relevant to them is considered in section 3.
[8] See Bruce, n. 1, 27–34; Thoko Kaime & Robert Glicksman, "An International Legal Framework for SE4ALL: Human Rights and Sustainable Development Imperatives" (2015) 38(5) *Fordham International Law Journal* 1409.
[9] The SDG 7 tracking report monitors clean heating and cooking, measures that formed the basis for the same goal in the Sustainable Energy for All (SEforALL). See United Nations Secretary-General's (UNSG) Advisory Group on Energy and Climate Change, *Energy for a Sustainable Future: Report and Recommendations* (UNSG, 2010), 9–10.
[10] IEA, *Defining Energy Access: 2019 Methodology*, 2019, www.iea.org/articles/defining-energy-access-2019-methodology.
[11] UNSG's High-level Group on Sustainable Energy for All, *Sustainable Energy for All: A Framework for Action* (UNSG, 2012), 9.
[12] IEA et al., n. 6, 71.
[13] In addition to SEforALL, the origins of targets 7.2 and 7.3 are informed by the *Johannesburg Plan of Implementation of the World Summit of Sustainable Development*, UN Doc. A/CONF.199/20, 2002, Res. 2, Annex, chap. III, paras. 20(e), (h), (p). See *Compendium of Existing Goals and Targets under the 19 Focus Areas Being Considered by the Open Working Group*, March-April 2014, https://sustainabledevelopment.un.org/owg10.html.
[14] IEA et al., n. 6, 3, 93.

While neither the text nor the indicators of target 7.2 specify the types of renewable energy it covers, official reports track at least six categories: "solar photovoltaic", "wind", "traditional biomass", "modern bioenergy", "hydropower", and "other renewables" (which include "solar thermal", "geothermal", and "tidal" power).[15] The extent to which "modern" forms of renewables, such as solar power, should be preferred over "older" forms such as hydroelectricity, is not addressed by SDG 7, although the technical potential of solar and wind to exceed energy demand has long been known.[16] Energy efficiency also lacks a definition, but "primary energy intensity" (that is, the energy used per GDP) is tracked in official reports.[17] Overall, SDG 7 focuses on the selective goals of the energy transition: energy access, decarbonization, and efficiency. Other, wider policy and commercial goals, which, in practice, have been the overriding catalyst for the energy transition – namely, cost of energy and energy security – are not clearly captured in SDG 7's targets or indicators. These goals, however, are implicit in the reference to "affordable" and "reliable" energy for all and are the practical reasons why the global transition is able to accelerate.[18]

In terms of implementation, SDG 7 progress has been patchy and is not on track for full realization by 2030. Over the last decade,

- global electrification increased from 83 percent to 90 percent (leaving over 750 million people without electricity);[19]
- lack of access to clean cooking remained constant at around 3 billion people;[20]
- global renewables in power consumption only increased by 1 percent – from 16.3 percent to 17.3 percent; renewable energy use in heating and transport grew minimally;[21]
- energy efficiency improved by only 2.1 percent, requiring a hefty 3 percent average increase to meet the 2030 target;[22] and
- international public finance flows doubled to US $21.4 billion, but less than 12 percent of those funds went to vulnerable countries.[23]

Based on those trends, hundreds of millions of people will still be without electricity in 2040,[24] and global decarbonization rates will need to "triple to reach the 2°C target and quintuple to reach the 1.5°C target" in article 2(1)(a) of the 2015 Paris Agreement so as to supply 75–85 percent of electricity by 2050.[25]

[15] *Id.*, 72.
[16] See Ottmar Edenhofer et al. (eds.), *Renewable Energy Sources and Climate Change Mitigation: Special Report of the Intergovernmental Panel on Climate Change* (CUP, 2012) 3, 10, 12, 206–7.
[17] IEA et al., n. 6, 95.
[18] See generally REN21, *Renewables 2020: Global Status Report*, 2020.
[19] IEA et al., n. 6, 4, 15.
[20] *Id.*, 1, 4.
[21] *Id.*, 1, 8. See also REN21, n. 18.
[22] IEA et al., n. 6, 93.
[23] *Id.*, 2, 3, 120.
[24] See Independent Group of Scientists appointed by the UNSG, *Global Sustainable Development Report 2019: The Future Is Now – Science for Achieving Sustainable Development* (United Nations, 2019), xxvii.
[25] *Id.*, 76; see also United Nations Environment Programme (UNEP), *Emissions Gap Report 2019*, 2019.

Patchy implementation of SDG 7 has wider implications. Targets 7.1, 7.2, and 7.3 are indeed a means to advance numerous socially desirable ends articulated in other SDGs. For instance, increased use and adoption of renewable energy and energy efficiency technologies, particularly in developing countries, can contribute to:

- reducing poverty by providing off-grid access to clean electricity (SDG 1);
- powering schools and medical facilities to improve education, health, and well-being (SDGs 3 and 4);
- electrifying households to empower women to pursue other activities (SDG 5);
- creating jobs and industrial growth from installation and maintenance (SDGs 8 and 9);
- avoiding fossil fuel power generation that contributes to global warming (SDG 13); and
- avoiding mining and use of finite natural resources (SDGs 12 and 15).[26]

Yet neither SDG 7 nor the SDGs as a whole provide any guidance on how these objectives are to be prioritized and integrated.

Impediments to progressing SDG 7 and the energy transition more broadly include a number of structural, technological, and market factors: lobbying efforts to maintain the status quo, insufficient electrical storage capability, unproven scalable negative emissions technologies, lack of reliable alternatives to fossil fuel for transport, over-reliance on biomass, and skewed economic incentives from fossil fuel subsidies.[27] Resolving these issues will largely depend on domestic action, coordinated through international diplomacy, but international law can also play a role, as discussed in the next section.

3. Positioning SDG 7 in International Law

As a general matter, international law defines the broad rules of the game within which the energy transition envisioned in SDG 7 may unfold. The relevant aspects of international law involve an interplay of binding treaty law, non-binding "soft" law, foundational principles of international law, and, crucially, international actors and institutions. In the following subsections, we first review the nature of the legal "patchwork" relevant to sustainable energy and then analyze the relevance of five domains of international law – human rights law, climate change law, trade law, investment law, and intellectual property law – for SDG 7.

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[26] Christian Kroll, Anne Warchold & Prajal Pradhan, "Sustainable Development Goals: Are We Successful in Turing Trade-offs into Synergies?" (2019) 5 *Palgrave Communications* 1; Kaime & Glicksman, n. 8, 1423–40; IEA, *World Energy Outlook Special Report: Energy Access Outlook 2017*, 2017.

[27] UNSG, n. 24, 78; see also Anna-Alexandra Marhold, "Subsidy Regulation in WTO Law: Some Implications for Fossil Fuels and Renewable Energy", Tilburg Law School Legal Studies Research Paper Series no. 20/2016, 2016.

3.1 The "International Law of Energy"

Competence to regulate energy and natural resources under international or domestic law is largely derived from territorial jurisdiction. As a foundational tenet of international law, states possess entitlements over both the "conventional" sources of energy (that is, fossil, hydro, and nuclear fuels) and "new" sources of energy (that is, solar, wind, geothermal) subject to their sovereignty or sovereign powers, and they are at liberty to determine how those resources are exploited, managed, and used, unless constrained by international law.[28] The broad range of potentially applicable "constraints" serve multiple purposes, operate at different stages of the energy cycle, and hold varying degrees of influence depending on their legal source and geographic scope of application. In general, the influence of international law on energy activities (from exploration and exploitation to storage, transport, consumption, waste management, and decommissioning) increases in relation to the degree of "internationalization" of those activities. Factors relevant to ascertaining the role, scope, and function of potential constraints include:

(i) resource location and practical need to cooperate with other states (exclusive, shared, onshore, offshore, common area resources);[29]
(ii) risk of significant harm arising from energy activities (transit of hazardous waste, ship design standards, civil liability for collisions and disasters);
(iii) conservation, protection, and management requirements associated with energy activities (access, emissions reductions, biodiversity, habitat, landscapes and species protection, and so on);
(iv) cross-border transportation, financing, and commerce associated with energy activities (navigation and shipping rights, trade obligations and standards, intellectual property rights, in-bound investment protections); and
(v) mandates of international organizations and bodies relevant to energy activities.[30]

When these factors are applied to conventional and new sources of energy, both commonalities and marked differences in regulatory approach are revealed.

First, operations and activities associated with the conventional sources of energy, such as oil and gas, tend to have a high degree of internationalization and are thus susceptible to multiple domains of regulation across the energy cycle under international law, industry practice, and national standardization.[31] Although the international rules related to the exploitation of straddling deposits are not fully settled,[32] a significant proportion of fossil fuels are extracted offshore, and transported and traded internationally, thereby implicating a swathe of binding and non-binding international laws relevant to subpoints (i)–(v), mentioned earlier.

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[28] Redgwell, n. 2, 29.
[29] See Catherine Redgwell, "The Practice of Shared Responsibility in Relation to Energy", in André Nollkaemper & Ilias Plakokefalos (eds.), *The Practice of Shared Responsibility in International Law* (CUP, 2017), 1071.
[30] For other conceptualizations, see Catherine Redgwell & Lavanya Rajamani, "Energy Underground: What's Law Got to Do with It?", in Donald Zillman et al. (eds.), *The Law of Energy Underground* (OUP, 2014), 101.
[31] Peter Cameron & Michael Stanley, *Oil, Gas and Mining: A Sourcebook for Understanding the Extractives Industries* (World Bank, 2017).
[32] See Viñuales, n. 1, chap. 4.

Second, in contrast, the generation and consumption of newer sources of energy, such as solar and wind power, tend to be highly localized within states' onshore and offshore territory[33] and produce few significant transboundary effects.[34] Fewer international laws are thus implicated, and they tend to relate to aspects of subpoints (iii)–(v), principally in conjunction with siting, habitat preservation, investment protection, and financial and technical assistance to other states for similar activities. Instead, states have pragmatically agreed to adopt global policy goals to guide their actions (for example, SDG 7) and have preserved their competence over how these goals are reached within the parameters set by international law. SDG 7 follows the trend of using non-binding instruments as a new form of regulation for energy (and other matters).[35] An indication of its relevance is provided by the fact that, as of 2019, over 170 states had adopted renewable energy targets or policies.[36]

Third, most international law relevant to subpoint (iii) applies to domestic activities irrespective of the source of energy but can have particular normative force in encouraging sustainable energy generation.[37] For instance, most of the five hundred or more multilateral environmental agreements in which states have voluntarily entered,[38] including the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 2015 Paris Agreement as well as the core rules and principles of international environmental law,[39] do not specifically address energy activities, but they do set legal parameters to guide and evaluate the action of states and other actors.[40] The following subsection considers selected aspects of the international legal order related to subpoints (iii)–(iv) that support or hinder the realization of SDG 7.

3.2 Access to Energy: International Human Rights Law

The goal of enhanced access to energy as encapsulated in target 7.1 and the related goal of energy security are expressions of diplomatic and political agreement. Thus, target 7.1 suffers from a disconnect between policy aspirations and their specific translation into international legal rules. In practical terms, global development goals, including poverty reduction and the improvement of physical and mental health, cannot be achieved without access to modern energy services, reliable electricity, and clean fuels.[41] Yet these goals are not expressly underwritten by an independent, substantive human "right to energy", "right to clean energy", or "right to access" any form of energy (clean, affordable, and reliable or otherwise) in

[33] Offshore wind projects shared between states would likely be subject to an agreement, such as the North Sea Countries Offshore Grid Initiative.
[34] Redgwell, n. 2, 36.
[35] Riccardo Pavoni & Dario Piselli, "The Sustainable Development Goals and International Environmental Law: Normative Value and Challenges for Implementation" (2016) 13(26) *Veredas Do Direito* 24.
[36] REN21, n. 18, 35.
[37] See Redgwell & Rajamani, n. 30, chap. 5.
[38] See Ivar Baste et al. (eds.), "Global Responses", *Global Environment Outlook 6: Environment for the Future We Want* (UNEP, 2012), 457, 464.
[39] See generally Leslie-Anne Duvic-Paoli & Jorge E. Viñuales, "Prevention of Significant Environmental Harm", in Jorge E. Viñuales (ed.), *The UN Friendly Relations Declaration at 50: An Assessment of the Fundamental Principles of International Law* (CUP, 2020).
[40] Raphael Heffron et al., "A Treatise for Energy Law" (2018) 11 *Journal of World Energy Law and Business* 34; Catherine Redgwell, "International Regulation of Energy Activities", in Martha Roggenkamp et al. (eds.), *Energy Law in Europe*, 3rd ed. (OUP, 2016), 2.195–2.223.
[41] Kaime & Glicksman, n. 8, 1423–24.

international human rights law or treaties. Therefore, creative approaches have been advanced by human rights bodies and courts in an attempt to integrate and manifest contemporary goals and aspirations through the existing international legal infrastructure.

First, the SDGs and 2030 Agenda for Sustainable Development incorporate, by reference, the major pillars of the human rights law framework to support the realization of the SDGs.[42] The SDGs express that they are "grounded" in the 1948 Universal Declaration of Human Rights and "international human rights treaties", the core of which include the 1966 International Covenant on Civil and Political Rights, the 1966 International Covenant on Economic, Social and Cultural Rights, and the 1989 Convention on the Rights of the Child.[43] As a corollary, rights and obligations related to the SDGs cannot be interpreted as detracting from, but only as advancing, these and other instruments.

Second, despite the absence of a specific provision in those instruments expressly recognizing a right to energy, human rights bodies have elaborated on the primary rights in order to address, with various degrees of specificity, the link between energy and human rights, including in connection with a right to an environment of a certain quality.[44] Some observers have argued that certain human rights (for example, the rights to life, property, private and family life, housing, standard of living, health) either imply in law,[45] or, at minimum, necessitate in fact, access to energy. This claim is supported by reference to the interpretive practice of some human rights bodies. As early as 1991, the Committee on Economic, Social and Cultural Rights (CESCR) stated that the concept of "adequate housing" implicates access to energy for cooking, heating and lighting[46] and that contracting states should ensure that personal or household financial costs (such as energy costs) are not so high as to inhibit the attainment of other basic rights.[47] By 2017, the CECSR had gone much further, specifically recommending that Australia take "immediate measures aimed at reversing the current trend of increasing absolute emissions of greenhouse gases and pursue alternative and renewable energy production".[48]

In recent years, international human rights treaty bodies have linked the promotion of, and access to, renewable energy with climate change mitigation and adaptation as a means to

[42] See discussion in *id*., 1434–43.
[43] SDGs Declaration, para. 10.
[44] *Social and Economic Rights Action Center/Center for Economic and Social Rights v Nigeria*, Decision Regarding Communication 155/96, Case no. ACHPR/COMM/A044/1, 27 May 2002; *Government of the Republic of South Africa and Others v Grootboom and Others*, 4 October 2000, (2000) 11 BCLR 1169.
[45] See Adrian Bradbrook & Judith Gardam, "Placing Access to Energy Services within a Human Rights Framework" (2006) 28 *Human Rights Quarterly* 389, 405; Adrian Bradbrook, Judith Gardam & Monique Cormier, "A Human Dimension to the Energy Debate: Access to Modern Energy Services" (2008) 26(4) *Journal of Energy and Natural Resources Law* 526; Stephen Tully, "The Contribution of Human Rights to Universal Energy Access" (2006) 4 *Northwestern Journal of International Human Rights* 518.
[46] Committee on Economic, Social and Cultural Rights (CESCR), *General Comment no. 4: The Right to Adequate Housing*, UN Doc. E/1992/23, 1992, para. 8(b).
[47] *Id*., para. 8(C). A similar statement is found in the 1979 Convention on the Elimination of All Forms of Discrimination against Women, which expressly requires that, in the context of rural development, women have the right to "enjoy adequate living conditions, particularly in relation to housing, sanitation, electricity and water supply" (art. 14(2)(h)).
[48] CESCR, *Concluding Observations on the Fifth Periodic Report of Australia*, UN Doc. E/C.12/AUS/CO/5, 11 July 2017, para. 12.

protect and fulfil primary rights to life, health, and a clean environment.[49] In 2019, the Human Rights Committee observed that "[e]nvironmental degradation, climate change and unsustainable development constitute some of the most pressing and serious threats to the ability of present and future generations to enjoy the right to life, and in particular life with dignity", requiring states to take measures to address those issues caused by "public and private actors".[50] The CESCR has issued a similar statement, adding that states should "dedicate the maximum available resources" to mitigate and adapt to climate change, including by "accelerating the shift to renewable sources of energy" and "improving the insulation of buildings".[51] The Committee on the Rights of the Child (CRC) has further endorsed phasing out fossil fuels globally to protect children's right to health[52] and expressly encouraged Japan and Australia to accelerate their transition to renewable energy.[53] The Committee on the Elimination of Discrimination against Women (CEDAW) has made similar statements to Nigeria and Guyana in the context of development, empowerment, and equality through investment in clean energy jobs and infrastructure, noting the link to SDG 7.[54]

The growing body of precedent culminated in September 2019 in a landmark joint statement on human rights and climate change by the CESCR, CEDAW, CRC, the Committee on the Protection of the Rights of All Migrant Workers and Members of their Families, and the Committee on the Rights of Persons with Disabilities. The statement expressly links human rights, clean energy, and climate change, particularly in the context of the most vulnerable people and places:

> [I]n order for States to comply with their human rights obligations, and to realize the objectives of the Paris Agreement, they must adopt and implement policies aimed at reducing emissions … [including] phasing out fossils fuels, promoting renewable energy and addressing emission from the land sector … and ensure that public and private investments are consistent with a pathway towards low carbon emissions and climate resilient development.[55]

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[49] For a discussion of potential human rights obligations and aspirations within the global climate change regime, see Jorge E. Viñuales, "The Paris Agreement on Climate Change: Less Is More" (2017) 59 *German Yearbook of International Law* 11; Daniel Klein et al. (eds.), *The Paris Agreement on Climate Change: Analysis and Commentary* (OUP, 2017); see also an earlier statement by the Human Rights Council, *Human Rights and Climate Change*, Resolution 7/23, UN Doc. A/HRC/7/23, 28 March 2008.
[50] Human Rights Committee, *General Comment no. 36 on Article 6 and the Right to Life*, Doc. CCPR/C/GC/36, 3 September 2019, para. 62. The implications of this statement have been explored in multiple decisions. See, e.g., International Covenant on Civil and Political Rights Committee, *Concluding Observations on the Initial Report of Cabo Verde*, Doc. CCPR/C/CPV/CO/1/Add.1, 3 December 2019, para. 18.
[51] CESCR, *Statement on Climate Change and the International Covenant on Economic, Social and Cultural Rights*, Doc. E/C.12/2018/1, 31 October 2018, para. 9.
[52] Committee on the Rights of the Child (CRC), *Concluding Observations on the Combined Fifth and Sixth Periodic Reports of Spain*, Doc. CRC/C/ESP/CO/5-6, 5 March 2018, para. 36.
[53] CRC, *Concluding Observations on the Combined Fourth and Fifth Periodic Reports of Japan*, Doc. CRC/C/JPN/CO/4-5, 5 March 2019, para. 37(e); CRC, *Concluding Observations on the Combined Fifth and Sixth Periodic Reports of Australia*, Doc. CRC/C/AUS/CO/5-6, 1 November 2019, para. 41(b).
[54] Committee on the Elimination of Discrimination against Women (CEDAW), *Concluding Observations on the Combined Seventh and Eighth Periodic Reports of Nigeria*, 14 July 2017, para. 40(b); CEDAW, *Concluding Observations on the Combined Seventh and Eighth Periodic Reports of Guyana*, 12 July 2019, para. 42.
[55] *Joint Statement on "Human Rights and Climate Change"*, 16 September 2019, paras. 11–12, www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=24998.

While the statement does not expressly recognize independent energy rights, it emphasizes the role of emissions reductions and renewable energy to respect, protect, and fulfil a broad array of internationally protected human rights. Improving access to and use of clean, affordable energy as per target 7.1 is one practical approach to advance protected rights.[56]

Third, similar developments are unfolding in regional contexts. An implied human right to energy may exist to help secure the “best attainable physical and mental health” standards protected by the 1981 African Charter on Human and Peoples’ Rights and the 1988 Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights. Two recent decisions from the Inter-American Court of Human Rights affirm that approach. One ordered that states party to the 1969 American Convention on Human Rights provide access to electricity to vulnerable people so as to fulfil primary human rights protected by the convention.[57] The other, in the form of an advisory opinion, stated that adequate protection of the environment is essential for human well-being as well as for the enjoyment of multiple human rights – in particular, the rights to life, personal integrity, health, and a healthy environment.[58] Those rights can be advanced through energy access and clean technology.

3.3 Decarbonizing Energy: The International Law of Climate Change

Measures relating to sustainable energy, such as those in target 7.2 (and target 7.3), are not central, textual features of the international climate change regime, despite patterns in energy generation and consumption being central elements to both the cause of anthropogenic climate change and the solution to realizing the regime’s core objectives: to stabilize greenhouse gas emissions so as to avert catastrophic consequences of climate change,59 to achieve mandated emissions reductions for member states,[60] and to limit global temperature increases to well below two degrees Celsius and towards 1.5 degrees Celsius.[61]

The text of the UNFCCC does not expressly refer to renewable energy, and energy efficiency is noted only in the preamble as a measure to reduce growing energy consumption.[62] The 1997 Kyoto Protocol, which created market mechanisms to incentivize emissions reduction

[56] Consultations continue on proposals for a new international human right to a “safe, clean, healthy and sustainable environment”, as articulated in the *Framework Principles on Human Rights and the Environment*, UN Doc. A/HRC/37/59, April 2018, which, in practice, would implicate newer sources of renewables, such as sun and wind, and energy efficiency technologies. While few jurisdictions have created enforceable rights to access energy, over 155 states have recognized the right to a healthy environment through treaties, constitutions, legislation, and judicial determination. *Report of the Special Rapporteur on Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment*, Doc. A/HRC/40/55, 8 January 2019, para. 16.
[57] IACtHR, *Case of the Río Negro Massacres v Guatemala*, Judgment (Preliminary Objection, Merits, Reparations, and Costs), 4 September 2012, para. 284. <please confirm case citation>
[58] IACtHR, *State Obligations in Relation to the Environment in Relation in the Context of the Protection and Guarantee of the Rights to Life and to Personal Integrity: Interpretation and Scope of Articles 1(1) and 2 of the American Convention on Human Rights*, Advisory Opinion OC-23/17, November 2017, paras. 47–69.
[59] United Nations Framework Convention on Climate Change (UNFCCC), art. 2.
[60] Kyoto Protocol, Annex B.
[61] Paris Agreement, art. 2(a).
[62] UNFCCC, preamble, para. 22.

from renewables and energy efficiency projects,[63] refers to renewable energy as one among several other policy choices that states may adopt domestically, at their discretion, when implementing measures to reduce emissions.[64] The decision adopting the Paris Agreement implicitly supports targets 7.1 and 7.2 by acknowledging "the need to promote universal access to sustainable energy in developing countries, in particular in Africa, through the enhanced deployment of renewable energy".[65] However, the primary texts do not contain further express references to renewable energy.

As a system of law and governance that aspires to reduce global emissions, the climate change regime largely devolves to its member states the responsibility for, and approach to, decarbonization. But such discretion is not unfettered. It has to be exercised within legal parameters, not the least the good faith discharge of member states obligations. Member states are required to adopt nationally determined contributions (NDCs) that meaningfully address climate change mitigation and adaptation and to implement domestic laws and policies to achieve these goals. Sustainable energy laws, policies, and projects will be central to the attainment of NDCs and the decarbonization objectives. But, to date, member states are not on track to meet their international obligations to avert the worst effects of climate change.[66]

The Paris Agreement, however, does provide strong signals to debt and capital markets that "financial flows" (that is, private investment and public finance) should be directed towards "low greenhouse gas emissions and climate-resilient development", thereby directing future funds into sustainable energy projects relevant to SDG 7 and especially targets 7.a and 7.b.[67] It also provides for the creation of a global emissions trading regime, through the Sustainable Development Mechanism,[68] akin to a combined version of the Clean Development Mechanism (Article 12) and Joint Implementation (Article 6) of the Kyoto Protocol, which is anticipated to incentivize investments in sustainable energy projects and technologies.

Even though the climate change regime relies on target 7.2 (and target 7.3) to achieve its aims, it does not directly advance SDG 7 through mandated technology or policy choices. Its legal and practical relevance is indirect – first, by creating frameworks that seek to incentivize and encourage public and private activities that are consistent with SDG 7 and, second, by obliging member states to cooperate, share, and transfer low-carbon energy technologies and knowledge to developing country member states as well as to provide financial support.[69] The second objective has been underwritten by the creation of new international technology and

[63] The Kyoto Protocol has generated over US $300 billion in climate and sustainable development investments and reduced global greenhouse gas emissions by almost 2 billion tonnes. UNFCCC, *Achievements of the Clean Development Mechanism 2001–2018*, 2019, 2–3.
[64] Kyoto Protocol, art. 2(1)(a) provides a non-exhaustive list of eight non-binding policy options, including "enhancement of energy efficiency in relevant sectors of the national economy" and "promotion, development and increased use of, new and renewable forms of energy".
[65] *Adoption of the Paris Agreement*, Draft Decision -/CP.21, Doc. FCCC/CP/2015/L.P/Rev.1, 12 December 2015, preamble, para. 14.
[66] UNEP, n. 25, xx; Intergovernmental Panel on Climate Change, *Special Report on the Impacts of Global Warming of 1.5 degrees Celsius*, 2018; *Chile Madrid Time for Action*, Decision 1/CP.25, December 2019, paras. 6, 8.
[67] Paris Agreement, art. 2(1)(c).
[68] *Id.*, art. 6.
[69] UNFCCC, arts. 4(1)(c), 4(1)(g), 4(1)(i), 4(3)–(5), 6(b), 11(1); Kyoto Protocol, arts. 10(c)–(e), 11(2).

finance mechanisms that indirectly advance SDG 7, which, in practice, have produced mixed results.[70]

3.4 Reducing Energy Intensity: International Trade Law

The 2030 Agenda for Sustainable Development considers international trade to be the "engine for inclusive economic growth and poverty alleviation".71 The realization of this goal will involve trade in energy goods and services, including energy efficiency technologies related to target 7.3. The development, creation, and use of these goods and services are typically regulated by domestic law, often with reference to international standards.[72] But the movement of these goods and services across national borders is regulated by international law[73] – namely, by bilateral, regional, and global trade rules, disciplines, and obligations, including those contained in the 1947/1994 General Agreement on Tariffs and Trade (GATT), the 1994 General Agreement on Trade in Services, the 1994 Agreement on Subsidies and Countervailing Measures, the 1994 Trade-Related Investment Measures, and the 1994 Agreement on Technical Barriers to Trade.[74]

The World Trade Organization's (WTO) rules exemplify the difficulty of integrating national and international priorities and economic, social, and environmental objectives: no sector, including energy, is differentiated under trade law. The structure and content of the trade rules also brings to bear the inherent differences in the interests of producers, importers, and exporters of sustainable energy technologies. On the one hand, the trade rules seek to promote a level playing field in international trade relations (through common tariff and non-tariff barriers) in relation to energy goods and services. On the other hand, those rules seek to balance states' prerogative to provide fiscal support policies (that is, feed-in tariffs), subsidies, and incentives (including energy efficiency rebates and domestic content requirements) to grow local sustainable energy industries.[75]

One mechanism by which the trade rules seek to minimize such priority conflicts, as well as conflicts between trade and other international (environmental) obligations, is through the

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[70] See subsection 3.5.

[71] United Nations General Assembly (UNGA), *Transforming Our World: The 2030 Agenda for Sustainable Development*, Doc. A/RES/70/1, 25 September 2015, para. 68; see also Matthias Helble & Ben Shepherd (eds.), *Win-Win: How International Trade Can Help Meet the Sustainable Development Goals* (Asia Development Bank Institute, 2017).

[72] Domestic producers may adhere to the standards for certain products from the International Organization for Standardization or the International Electrotechnical Commission. A number of voluntary international initiatives created by the Group of Seven or Group of Twenty, noted in subsection 4.2, focus on accelerating policy cooperation for particular domestic energy efficiency products and technologies.

[73] See generally Stuart Bruce, "Climate Change Mitigation through Energy Efficiency Laws: From International Obligations to Domestic Regulation" (2013) 31(3) *Journal of Energy and Natural Resources Law* 313.

[74] The Agreement on Technical Barriers to Trade (TBT) and its committee encourage progressive harmonization of technical product regulations and standards, including those related to energy efficiency, to avoid discriminatory treatment and trade inefficiencies. The TBT last considered energy efficiency in 2016 during an experience sharing exercise. Moderators to the TBT Committee, *Thematic Session on Regulatory Cooperation between Members: Energy Efficiency* (WTO Committee on Technical Barriers to Trade, 2016); see also Martijn Wilder & Leslie Parker, "International Law, the Renewable Energy Sector and the Development of a Green Economy", in Kevin R. Gray, Richard Tarasofsky & Cinnamon Carlane (eds.), *The Oxford Handbook of International Climate Change Law* (OUP, 2016).

[75] Ilaria Espa & Gracia Marin Durán, "Renewable Energy Subsidies and WTO Law: Time to Rethink the Case for Reform beyond Canada – Renewable Energy/FIT Program" (2018) 21 *Journal of International Economic Law* (*JIEL*) 621.

provision of derogations and exceptions that justify non-compliance with trade obligations.[76] For example, under articles III(8)(a), XX and XXI of the GATT, the derogations and exceptions most relevant to energy activities include public procurement and bona fide measures taken for national security purposes, for the protection of human, animal, or plant life or health, or for the conservation of exhaustible natural resources.[77] Yet, in practice, these provisions have failed to shield the renewable energy promotion schemes of Canada and India.[78]

Diplomatic efforts since 2001 to "green" the WTO regime have all but failed. The mandate of the 2001 Doha Development Agenda to strengthen legislative and executive coordination between WTO and multilateral environmental rules and secretariats, and to eliminate tariffs and non-tariff barriers on environmental goods and services,79 has not been fulfilled. More promise was held for the plurilateral 2014 Environmental Goods Agreement (EGA), which sought to reduce or eliminate tariff and non-tariff barriers on a range of environmentally beneficial goods and services that could advance SDG 7, including those related to clean energy.80 EGA negotiations frayed in 2016 and were largely held among developed Western nations, without participation from South America, Africa, the Middle East, and most of Asia,81 raising doubts about the legitimacy of any purported level playing field in trade and environment. Greater traction has been made in a similar Asia-Pacific Economic Cooperation process, potentially highlighting the amenability of regional collaborations over global approaches.[82]

To sidestep the impasse in trade negotiations, numerous alternatives have been proposed to reconcile trade and non-trade interests, including carbon border adjustment taxes, carbon clubs, climate waivers, sustainable energy trade agreements, reforms to fossil fuel subsidies, and the creation of sustainable energy subsidies.[83] These proposals could offer pragmatic approaches to increase the global harmonization of regulations and standards related to energy efficiency, which would provide the dual benefits of non-discrimination among trade relations and greater deployment of technologies that benefit SDG 7 and other SDGs.

Modern bilateral and regional free trade agreements have also demonstrated greater, albeit incremental, success in accommodating energy efficiency and climate change priorities. For example, the text of the "Environment" chapter of the 2018 Comprehensive and Progressive Agreement for Trans-Pacific Partnership expressly acknowledges that "transition to a low emissions economy requires collective action" based on domestic circumstances and

[76] World Trade Organization (WTO), *The Environment: A Specific Concern*, www.wto.org/english/thewto_e/whatis_e/tif_e/bey2_e.htm.
[77] General Agreement on Tariffs and Trade, arts. XXI, XX(b), XX(g); TBT, art. 2.2. Similar exceptions exist in other trade rules.
[78] WTO, *India – Certain Measures Relating to Solar Cells and Solar Modules*, Appellate Body Report, WTO Doc. WT/DS456/AB/R, 14 October 2016; WTO, *Canada – Certain Measures Affecting the Renewable Energy Generation Sector*, Appellate Body Report, WTO Docs. WT/DS412/AB/R, WT/DS426/AB/R, 24 May 2013.

[79] WTO, *Doha WTO Ministerial 2001: Ministerial Declaration*, Doc. WT/MIN(01)/Dec/1, 14 November 2001, paras. 6, 31(iii).
[80] WTO, *Environmental Goods Agreement*, www.wto.org/english/tratop_e/envir_e/ega_e.htm.
[81] WTO, *Map of EGA Participants*, www.wto.org/english/tratop_e/envir_e/ega_map_e.htm.
[82] See Asia-Pacific Economic Cooperation, *2012 Leaders Declaration: Annex C – List of Environmental Goods*, www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC.aspx.
[83] WTO, *Mainstreaming Trade to Attain the Sustainable Development Goals*, 2018; James Bacchus, *Triggering the Trade Transition: The G20's Role in Reconciling Rules for Trade and Climate Change*, white paper (International Centre for Trade and Sustainable Development, 2018); Richard Barron & Justine Garrett, *Trade and Environment Interactions: Governance Issues* (Organisation for Economic Cooperation and Development [OECD], 2017).

capabilities and encourages the parties to cooperate in relation to "energy efficiency", "low emissions technologies", and "renewable energy sources", including through capacity building.84 Similarly, the "Climate Change" section of the "Trade and Sustainable Development" part of the 2019 EU-Vietnam Free Trade Agreement commits the parties to "consult and share information and experiences of priority or of mutual interest", including in relation to "the promotion of energy efficiency, low-emission technology and renewable energy".[85] While such developments are welcome, they principally foster cooperation rather than ambitious action, which has led to calls from the World Economic Forum, among other bodies, for a comprehensive Low-Carbon Trade Agreement to directly and purposefully accelerate global decarbonization.[86]

3.5 Cooperation and Infrastructure Development: International Investment Law and Intellectual Property Law

To achieve SDG 7 by 2030, annual global investments amounting to US $680 billion in renewable energy, US $625 billion in energy efficiency, and US $45 billion in energy access will be required.[87] Overall, annual investments of US $5–7 trillion will be required to realize all of the SDGs, with over half of those amounts being directed to developing countries.[88] Yet, between 2010 and 2017, finance flows into developing countries in support of renewable energy and clean energy projects only doubled to a relatively modest US $21.4 billion, with less than 12 percent of that amount directed to least developed countries. Half of those amounts funded "older" renewable energy technologies – namely, hydropower – while 19 percent funded solar power and 7 percent funded wind power.[89] These figures reveal that less than 1.6 percent of the needed annual investment in sustainable energy infrastructure and technologies is being directed to those most in need of that investment – developing countries. They also highlight the disparity between word (the abundant international treaty and political commitments for development finance, technology transfer, and cooperation)[90] and deed that would materially advance targets 7.a and 7.b. Multiple drivers fuel this disconnect. Two substantial obstacles ingrained in international law include the friction between international investment (and trade) law and the energy transition and the reluctance of states and private actors to cooperate beyond the strictures of international intellectual property rights and protections (IPRs).

Regarding the first obstacle, a persistent criticism among states and scholars relates to the tendency of international investment agreements (IIAs)[91] to asymmetrically focus on economic

[84] Art. 20.15.
[85] Art. 13.6(2)(c).
[86] Richard Samans, *It's Time to Bring Together Global Trade and Climate Action and Let Them Help Each Other*, www.weforum.org/agenda/2019/09/climate-low-carbon-trade-agreements/ (World Economic Forum, 2019).
[87] IEA et al., n. 6, 120.
[88] Jorge E. Viñuales, *International Investment Agreements and Sustainable Development: Safeguarding Policy Space and Mobilising Investment for a Green Economy* (UNEP, 2018), 1; United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2014: Investing in the SDGs*, 2014, xi; see also OECD, *Investing in Climate, Investing in Growth* (OECD Publishing, 2017), 28 (executive summary).
[89] UNSG, *Progress towards the Sustainable Development Goals*, Doc. E/2020/57, 28 April 2020, para. 72.
[90] See, e.g., *Addis Ababa Action Agenda of the Third International Conference on Financing for Development*, UNGA Res. 69/313, UN Doc. A/RES/69/313, 17 August 2015, para. 49.
[91] Consisting of bilateral and multilateral investment treaties and investment chapters in free trade agreements.

goals and investor rights over public concerns and issues (such as social development and environmental protection). These concerns are typically more evident in the almost three thousand or more "older generation" IIAs, which tend to be short and contain broad, general language.[92] That design is intended to provide certainty and rule-of-law-like benefits,93 including protections against excessive and arbitrary governmental interference. But it is also linked to many challenges, ranging from extreme claims for protection and compensation to discouraging states from adopting or changing regulations that facilitate the clean energy transition in line with SDG 7.[94]

Numerous bilateral and multilateral projects have been undertaken to reform and modernize the IIA network so as to encourage greater allocation of capital into clean technology projects while also clarifying the scope of states' conduct in making decisions in law or practice that impact those investments without incurring responsibility95 thus benefiting targets 7.a and 7.b. "Next generation" IIAs and new free trade agreements have a propensity to increasingly seek to "rebalance" obligations and imperatives and to place environmental considerations within a tribunal's frame of reference.[96] For example, the preambular text of the 2009 Free Trade and Economic Partnership between Japan and the Swiss Confederation commits to "protect the environment, to promote the optimal use of natural resources in accordance with the objective of sustainable development and to adequately address the challenges of climate change".[97] Similarly, the preamble to the revised Dutch model IIA expressly commits to "sustainable development" and to international trade and investment to advance that goal, without compromising the Netherlands's right to regulate through measures that advance "public health, safety, environment, public morals, labor rights, animal welfare, social or consumer protection or prudential financial" objectives.[98] It will be for tribunals in subsequent disputes to assess the content of each of these goals and to balance the various interests, rights, and obligations, but, on their face, these goals hold potential to encourage greater levels of investment in clean energy infrastructure projects.

With respect to the reluctance of states and private actors to cooperate beyond the strictures of their IPRs, one enduring challenge to international cooperation and technology transfer to developing states has been the risk of private entities creating undesirable market competition.[99] Since its inception, the global climate change regime has had difficulty in

[92] UNCTAD, *UNCTAD's Reform Package for the International Investment Regime* (UNCTAD, 2017); Kathryn Gordon, Joachim Pohl & Marie Bouchard, *Investment Treaty Law, Sustainable Development and Responsible Business Conduct: A Fact Finding Survey* (OECD, 2014); Kathryn Gordon & Joachim Pohl, *Environmental Concerns in International Investment Agreements: A Survey* (OECD, 2011). See generally Jorge E. Viñuales, *Foreign Investment and the Environment in International Law* (CUP, 2012).
[93] August Reinisch, "The Rule of Law in International Investment Arbitration", in Photini Pazartzis et al. (eds.), *Reconceptualising the Rule of Law in Global Governance, Resources, Investment and Trade* (Hart, 2016), chap. 20.
[94] See generally Mavluda Sattorova, *The Impact of Investment Treaty Law on Host States: Enabling Good Governance?* (Hart, 2018); Michael Waibel et al. (eds.), *The Backlash against Investment Arbitration* (Wolters Kluwer, 2010).
[95] See Pierre-Marie Dupuy & Jorge E. Viñuales, *Harnessing Foreign Investment to Promote Environmental Protection: Incentives and Safeguards* (OUP, 2013).
[96] See Catherine Titi, *The Evolution of Substantive Investment Protections in Recent Trade and Investment Treaties*, RTA Exchange Think Piece (International Centre for Trade and Sustainable Development/Inter-American Development Bank, 2018); Manjiao Chi, *Integrating Sustainable Development Goals in International Investment Law* (Routledge, 2018).
[97] Preamble.
[98] 2018 Draft Dutch Model International Investment Agreement, preamble.
[99] See, e.g., Anthi Koskina et al., "Trade in Clean Energy Technologies: Sliding from Protection to Protectionism Through Obligations for Technology Transfer in Climate Change Law, or Vice Versa?" (2020) 13(2) *Journal of World Energy Law and Business* 114.

realizing the obligations of its developed country member states to provide both technology and financial assistance to developing country member states.[100] Pointedly, the 2009 understanding reached in Copenhagen to provide a minimum of US $100 billion annually for projects in developing countries by 2020 has not been achieved once and has now been extended to 2025 to realize that goal.[101]

This inertia is due in part to concerns by developed states and their companies over IPRs and sharing patented technology with developing states without reward or incentive. SDG 7 does not create any additional concrete, tangible reasons to improve on that front. Moreover, when agreeing on the means of implementation for the 2030 Agenda for Sustainable Development, states supported the “transfer of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed”.[102] There is a real risk that such an approach to transfers may not be consistent with international trade and IPR obligations,[103] including those under the 1994 Agreement on Subsidies and Countervailing Measures and the 1994 Agreement on Anti-Dumping, adding further complexity to the relationship between the SDGs and international law.[104]

4. Positioning SDG 7 in the International Institutional Context Relevant for Its Implementation

In contrast to states’ resistance to adopting binding sustainable energy obligations under international law, states have demonstrated a willingness for international actors to exert considerable influence on the development and deployment of resources towards the low-carbon transition. But the resulting influence over SDG 7 through international organizations is not the result of a planned, coordinated, and deliberate intergovernmental or private process. Instead, organizations are advancing SDG 7 based on their particular (and overlapping) mandates regarding energy (for example, global/regional; broad/narrow; single/multiple issue), membership rules, legal powers, degrees of formality,[105] thematic approach (for example, environment, development, industrialization, capital markets), and technical expertise (for example, advocacy, data analysis, capacity building, technical assistance, political risk funding, adjudication). As a result, the international context that is relevant for the implementation of SDG 7 is much like the relevant international legal framework: a growing patchwork of bodies with various mandates and interests that directly or indirectly influence, shape, and implement SDG 7[106] – the legitimacy and effectiveness of

[100] UNFCCC, arts. 4(1)(c), 4(1)(g), 4(1)(i), 4(3)–(5), 6(b), 11(1); Kyoto Protocol, arts. 10(c)–(e), 11(2).
[101] See also chapter 13 in this volume.
[102] UNGA, n. 72, para. 41. Note that the UNGA also indicates that trade should be in accordance with its established rules and obligations. *Id.*, para. 68; see also SDG 17, Partnerships for the Goals, target 10.
[103] See Matthew Rimmer, “The Road to Paris: Intellectual Property, Human Rights, and Climate Justice”, in Matthew Rimmer (ed.), *Intellectual Property and Clean Energy: The Paris Agreement and Climate Justice* (Springer, 2018), 1.
[104] See Henok Birhanu Asmelash, “Energy Subsidies and WTO Dispute Settlement: Why Only Renewable Energy Subsidies Are Challenged” (2015) 18(2) *JIEL* 261.
[105] Stuart Bruce, “Global Energy Governance and International Institutions”, in Walter Leal Filho et al. (eds.), *Encyclopedia of the UN Sustainable Development Goals: Affordable and Clean Energy* (Springer, 2019), 6.
[106] See *id*., 6–13; Stuart Bruce, “The Sustainable Energy Transition through International and EU Law”, in Stephen Minas & Vassilis Ntousas (eds.), *EU Climate Diplomacy: Politics, Technology and Networks* (Edward Elgar, 2018), 74–76.

which has been doubted.[107] The patchwork includes many international institutions and political forums, private actors, and civil society.

4.1 International Institutions and Political Forums

Beyond state organs, the broad array of international institutions and platforms that impact the implementation of SDG 7 include over forty UN agencies and programmes; general and specific political forums and conferences; international organizations; and international financial institutions (IFIs).[108] Each body's degree of influence and particular role in relation to SDG 7 is determined by its competence and mandate. At one end of the spectrum, the role of formal international organizations, such as the International Renewable Energy Agency (IRENA), is prescribed by their express and implied powers and subsequent practice. Established in 2011, IRENA's mandate is to "promote the widespread and increased adoption and the sustainable use of all forms of renewable energy".[109] As a "centre of excellence", it is to provide an essential role in enabling the transfer of renewable energy knowledge and technology, capacity building and concessional finance and in coalescing states, organizations, and private actors around renewable energy use and deployment.[110] By agreement among its founding states, its mandate does not extend to establishing global standards or targets related to renewable energy. But with membership now at 161 states,[111] IRENA holds considerable legitimacy as an influencer in international law related to target 7.2.

The role of "subsequent practice" in shaping the mandate of formal international organizations in relation to SDG 7 is particularly evident in relation to IFIs. At the time of writing, many multilateral development banks have reoriented their structure, operations, and lending policies to align with the Paris Agreement and SDG 7's objectives and expressly reduced funding for fossil fuel-based projects,[112] despite those topics not appearing in their founding articles of association. For instance, in October 2019, the International Monetary Fund announced that it will include climate risk in its country assessments, which will ultimately influence investment flows towards low-carbon projects. Many other IFIs are redoubling their attention to the low-carbon transition as a response to COVID-19. While IFIs typically assist with de-risking private investments in developing states, bodies such as the Global Environment Facility and Green Climate Fund leverage blended public-private finance to fund in-country projects that help realize the Paris Agreement and SDG 7. Overall, the 2030 Agenda for Sustainable Development considers this category of actors as central to the implementation of the SDGs.[113]

At the other end of the spectrum, informal platforms, such as the SEforALL initiative or the Group of Seven (G7)/Group of Eight (G8)/Group of Twenty (G20) meetings, have greater

[107] Achim Steiner et al., "International Institutional Arrangements in Support of Renewable Energy", in Dirk Assmann, Ulrich Laumanns & Dieter Uh (eds.), *Renewable Energy: A Global Review of Technologies, Policies, and Markets* (Earthscan, 2016).
[108] Vanora Bennett, *EBRD Puts Decarbonisation at Centre of New Energy Sector Strategy* (European Bank for Reconstruction and Development, December 2018).
[109] 2009 Statute of the International Renewable Energy Agency, art. 3.
[110] *Id*., art. 4.
[111] International Renewable Energy Agency, *IRENA Membership*, www.irena.org/irenamembership.
[112] See, e.g., World Bank, *The 2030 Sustainable Development Agenda and the World Bank Group: Closing the SDGs Finance Gap*, 2019.
[113] UNGA, n. 72, para. 44.

latitude to consider interlinking global issues such as climate change, energy security, and economic development away from centralized bureaucracies.114 These platforms have launched numerous international programmes to accelerate decarbonization and reduce energy intensity, such as the Energy Efficiency Action Plan and Climate and Energy Action Plan for Growth.[115] Since 2009, the Clean Energy ministerial political platform has enabled energy ministers and energy diplomats to share best practices and promote sustainable energy programmes and policies in more detail than the G7/G8/G20 processes. While the potential norm-shaping influence of these multilateral platforms is high, discussions related to climate change are subject to the vagaries of the political process, potentially diluting their effectiveness at materially addressing SDG 7.[116] New state collaborations to accelerate clean energy innovation, such as Mission Innovation, may provide more practical avenues to advance SDG 7-related goals.

4.2 Private Actors and Civil Society

The high level of visibility and awareness of sustainable energy access and uptake is largely due to a handful of factors. One factor is civil society's decades-long advocacy for the development of international sustainable energy policy, the dissemination of technical information, the monitoring of impact, and the promotion of clean energy projects in emerging economies (for example, the World Resources Institute, the World Wide Fund for Nature, the International Union for Conservation of Nature, the International Institute for Sustainable Development, the International Institute for Environment and Development, the Renewable Energy and Energy Efficiency Partnership, the Renewable Energy Policy Network for the 21st Century, and the International Partnership for Energy Efficiency Cooperation). In general, the actions of many actors in this category have been considered credible and legitimate given their motivations and UN-observer status and have helped to keep sustainable energy on the international political agenda.

Another factor is the burgeoning enthusiasm from national and transnational private actors for political and legal certainty related to decarbonization incentives and trajectories (We Mean Business Coalition, RE100%, ClimateAction100+, Institutional Investors Group on Climate Change, and so on). With the global direction of travel in relation to emissions management set by the Paris Agreement, and climate change, degradation of the natural environment, environmental catastrophes, and risks to ecosystem collapse among the top ten corporate concerns globally,[117] private actors are increasingly seeking options to reduce regulatory and asset-stranding risk exposure in their investments, operations, and projects. Investments that advance targets 7.2 and 7.3, in particular – including enhanced energy efficiency in buildings, appliances, and industrial activities and greater deployment of large-scale and off-grid, distributed renewable energy generation and energy storage – fit that bill. While these private

[114] See generally John Kirton & Brittaney Warren, "G20 Climate Change Governance: Performance, Prospects, Proposals" (conference paper presented to the pre-G20 Summit, Soka University, Japan, 10 December 2018).
[115] Bruce, n. 106, 10.
[116] See generally Ann Florini and Benjamin Savocool, "Who Governs Energy: The Challenges Facing Global Energy Governance" (2009) 37(12) *Energy Policy* 5239.
[117] World Economic Forum, *The Global Risks Report*, 2020, 2–3, Figures 1, 2. See Eduardo Brondizio et al., *Global Assessment Report on Biodiversity and Ecosystem Services* (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019); see also Partha Dasgupta, *The Economics of Biodiversity* (Her Majesty's Treasury, 2021).

actors are (usually) independent from states, the intention of state-related initiatives such as the Financial Stability Board's Task Force on Climate-Related Financial Disclosures and the Network of Central Banks and Supervisors for Greening the Financial System is to create circumstances that leverage the incredible financial and organizational power of those private actors to advance and implement SDG 7 and the Paris Agreement.[118]

5. Conclusion

The progressive attainment of SDG 7 holds considerable promise for humankind and for reducing despoliation of the natural world. With three global, "top-down" targets having been set in SDG 7 – universal access to energy and significant increases in renewable energy and energy efficiency – the intended, and agreed, direction of travel is clear. But the speed of travel towards the attainment of these goals, which is largely determined by "bottom-up" national action (with international support), while increasing, is insufficient. States are widely off track to achieve the targets of SDG 7 (and SDG 13). To decarbonize the global economy within the time frames established by scientific evidence, greater coordination and collaboration between states, private actors, and civil society will be needed and quickly.

The extent to which international law may assist in that endeavour varies – it can both support and hinder progress. While energy is central to the advancement of most, if not all, of the SDGs, the transition to a low-carbon or "sustainable" energy matrix is not clearly reflected in international law. By incidence of its historical structure, role, and function, no identifiable "international energy law" has emerged in public international law. Instead, the entire corpus of public international law needs to be examined through the lens of "energy", and the transition to low-carbon energy, in order to assess its relevance and utility to advance SDG 7.

The implementation of SDG 7 through the various bodies of international law thus results in an evolving and complex system, including, but not limited to, human rights law, climate change law, trade law, investment law, and intellectual property law. There is an urgent need to improve the integration of non-economic objectives in the major disciplines of international economic law. Doing so will help to promote and remove barriers to innovation, commerce, and financial flows for clean energy projects and the electrification and decarbonization of all aspects of modern life. Such developments would improve the prospects of realizing SDG 7.

[118] See generally Joyeeta Gupta, Arthur Rempel & Hebe Verrest, "Access and Allocation: The Role of Large Shareholders and Investors in Leaving Fossil Fuels Underground" (2020) 20 *International Environmental Agreements: Politics, Law and Economics* 303; Mark Carney, *A New Horizon* (Bank of England, 21 March 2019); Mariana Mazzucato & Gregor Semieniuk, "Financing Renewable Energy: Who Is Financing What and Why It Matters" (2018) 127 *Technological Forecasting and Social Change* 8.

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