

European Yearbook of International Economic Law

Rafael Leal-Arcas

■ *Special Issue:*
Solutions for Sustainability

How the International Trade, Energy and
Climate Change Regimes Can Help

European Yearbook of International Economic Law

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Rafael Leal-Arcas

Solutions for Sustainability

How the International Trade, Energy and
Climate Change Regimes Can Help

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*To Alessandra, Eduardo, and Juan, for
teaching me so much about life.*

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Many concepts addressed in Chaps. 2, 4, and 9 are a further development of R. Leal-Arcas, “Sustainability, Common Concern and Public Goods,” *The George Washington International Law Review*, Vol. 49, Issue 4, pp. 801–877, 2017. Several sections from Chap. 3 are a further development of R. Leal-Arcas and A. Morelli, “The Resilience of the Paris Agreement: Negotiating and Implementing the Climate Regime,” *Georgetown Environmental Law Review*, Vol. 31.1, pp. 1–63, 2018. Several ideas in Chap. 6 are a development from R. Leal-Arcas, “New Frontiers of International Economic Law: The Quest for Sustainable Development,” *University of Pennsylvania Journal of International Law*, Vol. 40, Issue 1, pp. 83–132, 2018. Many ideas in Chaps. 7 and 8 were drawn from R. Leal-Arcas et al., “Smart Grids in the European Union: Assessing Energy Security, Regulation & Social and Ethical Considerations,” *Columbia Journal of European Law*, Vol. 24.2, pp. 311–410, 2018. Parts of Chap. 8 were drawn from the ideas developed in R. Leal-Arcas et al., “Energy Decentralization in the European Union,” *Queen Mary University of London, School of Law Legal Studies Research Paper No. 307/2019*, pp. 1–55.

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Chapter 1

Introduction



Sustainability is a necessity for the twenty-first century that has an inter-generational dimension.¹ Given the urgency² of the issue, scientists have proposed concepts such as “planetary boundaries” to define a “safe operating space for humanity”³ to continue to thrive for years to come.⁴ The concept of planetary boundaries is based on scientific research that indicates that, since the Industrial Revolution at the end of the eighteenth century and beginning of the nineteenth century, human activity has gradually become the main driver of global environmental degradation.⁵

A related concept—sustainable development—was coined by the Brundtland Commission⁶ in a report titled *Our Common Future*.⁷ The concept has three main pillars. First, sustainable development recognizes that part of the environmental challenge is poverty.⁸ For example, certain communities need to cut down trees

¹In the case of climate change and energy, the indicators of sustainability are greenhouse gas emissions, primary energy consumption, and the share of renewable energy in gross final energy consumption. For further details on sustainability in the context of economic performance and social progress, see J. Stiglitz, A. Sen and J.-P. Fitoussi, “Report by the Commission on the Measurement of Economic Performance and Social Progress,” (2008) available at <https://ec.europa.eu/eurostat/documents/118025/118123/Fitoussi+Commission+report>.

²Jake Sullivan, US national security advisor to US Vice President Biden, once famously said: “Between fatalism and complacency lies urgency.” See <https://twitter.com/JesseJenkins/status/1062448890543267841>.

³Rockström et al. (2009), p. 33.

⁴*Planetary Boundaries Research*, Stockholm Resilience Centre, <http://www.stockholmresilience.org/research/planetary-boundaries.html> [<https://perma.cc/HME9-TBNR>].

⁵Rockström et al. (2009), p. 33.

⁶Formally known as the World Commission on Environment and Development, the Brundtland Commission was created to persuade countries to aim at sustainable development. World Comm’n on Env’t & Dev., *Our Common Future*, Annex 2, U.N. Doc. A/42/427 (1987), available at <http://www.un-documents.net/our-common-future.pdf> [<https://perma.cc/KPK5-CH3Y>].

⁷*Id.* at 1.

⁸*Id.* at Overview, ¶ 8.

down for their fuel needs. Second, an integrated approach to sustainable development is important.⁹ One of the objectives of the Brundtland Commission was to raise awareness that the various areas (now goals) of sustainable development cannot be addressed in clinical isolation.¹⁰ Rather, sustainable development efforts must integrate economic, environmental, and social considerations. And third, intergenerational ethics apply to sustainable development.¹¹ Traditionally, however, a short-term approach to issues has been rewarded, as opposed to a long-term approach.

In 2005, one scholar predicted humanity's top ten problems for the next 50 years¹² as follows: (1) energy, (2) water, (3) food, (4) the environment, (5) poverty, (6) terrorism and war, (7) disease, (8) education, (9) democracy, and (10) population.¹³ This prediction was based on the fact that in 2004 the world population was 6.5 billion, and in 2050 it is expected to be 10 billion.¹⁴ However, new predictions place the world's population at 11 billion by 2050.¹⁵

This book explores links and synergies among three of the above challenges: energy,¹⁶ the environment, and poverty (specifically the role of international trade in addressing poverty). It examines international regimes that deal with the three issues, explores possible solutions through multilateralism, and analyzes the potential impact of citizens and prosumers.¹⁷ In this sense, decarbonizing the global economy and achieving energy that is affordable, secure, and clean—in other words, “sustainable energy”¹⁸—are pressing issues.

⁹*Id.* pt. 1, chp. 1, ¶ 42.

¹⁰*Id.* pt. 1, chp. 2, ¶ 10.

¹¹*Id.* pt. 1, chp. 2, ¶ 76. For millennials, values are important. For instance, if they recycle at home, they also want to own or work for firms that recycle.

¹²See generally Prashant V. Kamat, *Energy Challenge and Nanotechnology*, Presentation, 1, <http://www3.nd.edu/~pkamat/pdf/energy.pdf> (referencing humanity's top ten problems for the next 50 years, as identified by Richard Smalley of Rice University) [<https://perma.cc/3SSK-NV5E>].

¹³*Id.*

¹⁴*Id.*

¹⁵See Boris Johnson, U.K. Sec'y of State for Foreign and Commonwealth Aff., Speech at Chatham House: Global Britain: UK Foreign Policy in the Era of Brexit, 8 (Dec. 2, 2016), <https://www.chathamhouse.org/event/global-britain-uk-foreign-policy-era-brexite> [<https://perma.cc/HH5K-XSVB>].

¹⁶According to Meghan O'Sullivan, there are ways to see energy: (1) as a driver of domestic development; (2) a shaper of grand strategy; and (3) a determinant of international affairs. Lecture at Harvard University, 3 October 2018.

¹⁷It is interesting to see the conceptual evolution of this phenomenon of energy actors over time: Initially, one referred to an energy user, then consumer, then customer, and now prosumer. For an analysis of prosumers, see Leal-Arcas et al. (2017), pp. 139–172.

¹⁸A terminological clarification needs to be made: technically speaking, no energy is sustainable because it disappears as it is consumed; however, for the purposes of this book, we are using the terms ‘sustainable energy’ and ‘energy for sustainable development’ interchangeably, bearing in mind that the ultimate goal is energy for sustainable development.

Sustainable energy is crucial in a world where 1.2 billion people still have no access to electricity, which is a serious inequality issue.¹⁹ A solution for sustainable energy is better governance of energy trade.²⁰ Energy security, or access to energy at an affordable price, is one of the main problems humanity faces.²¹ Without access to energy, people and countries cannot develop their potential.²² Today's environmental challenges are driving a shift from fossil fuels towards clean and renewable energy,²³ i.e., energy from sustainable sources, as opposed to conventional sources such as oil, natural gas,²⁴ or coal.²⁵ As the price of oil goes up, there will be a greater incentive for countries to invest in renewables to eventually obtain a cheaper, cleaner and more secure supply of energy. This transition away from fossil fuels will, however, come at a cost.²⁶ Others argue that the goal of sustainable energy should be "to curb global warming, not to achieve 100% renewable energy."²⁷

Two energy developments are happening that explain geopolitical shifts in energy security: (1) a revolution in unconventional energy²⁸ and (2) a shift to a more environmentally sustainable global energy mix.²⁹ As a result, we are experiencing a paradigm shift from perceived energy scarcity to energy abundance.

¹⁹See *Energy Access Database*, Int'l Energy Agency, <https://www.iea.org/energyaccess/database/>.

²⁰That said, today, the energy that crosses borders is mostly fossil fuel. See generally Leal-Arcas et al. (2016).

²¹Leal-Arcas (2016).

²²In the view of the European Commission, there are three main goals in the clean energy transition: putting energy efficiency first, achieving global leadership in renewable energies, and providing a fair deal for consumers. See <https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition>.

²³See for instance the growing pressure Cambridge University faced in October 2017 to abandon its investments in fossil fuels because they are incompatible with the Paris Climate Agreement. See A. Mooney, "Pressure grows on £6.3bn Cambridge University fund to drop fossil fuels," *Financial Times*, 8 October 2017.

²⁴Nevertheless, one should acknowledge that the abundance of natural gas is transforming the natural-gas market. Prior to 2000, almost all natural gas was either consumed where it was produced or was traded to other countries via pipelines. Growth in supplies and in liquefied natural gas (LNG) is driving growth in gas trade in the world. An increasing number of countries has been importing LNG since 2000, resulting in more fluid, more integrated markets. See lecture by Megan O'Sullivan at Harvard University, 3 October 2018.

²⁵Massai (2011).

²⁶*100% Renewable Energy: At What Cost?*, *The Economist*, July 15, 2017, at 58–59. This global concern about environmental challenges is such that there is a United Nations process that could lead to negotiations for an international environmental treaty. See International Centre for Trade and Sustainable Development, "Efforts get underway to consider potential Global Environment Treaty negotiations," *Bridges*, Vol. 22, No. 29, 13 September 2018.

²⁷*Renewable-Energy Targets: A Green Red Herring*, *The Economist*, July 15, 2017, at 10.

²⁸For further details, see Leal-Arcas (2018a), pp. 129–142.

²⁹See for instance M. O'Sullivan et al., (eds.) "The Geopolitics of Renewable Energy," Harvard Kennedy School Faculty Research Working Paper Series, Working Paper 17-027, June 2017, available at <https://www.hks.harvard.edu/publications/geopolitics-renewable-energy>. There are several mechanisms where renewables could shape geopolitics: critical materials supply chains,

Therefore, we can expect that the energy transition will have major geopolitical consequences.³⁰ Equally, it is very likely that, in future, there will be less energy trade in commodities due to a more environmentally sustainable global energy mix. Instead, it is very probable that we will see more renewable energy trade via electricity thanks to technology.

One way to enhance energy security could be through greater energy efficiency, which may prove more effective than the deployment of renewable energy when it comes to reducing greenhouse gas (GHG) emissions.³¹ Higher energy efficiency means that less fossil fuel must be burned to get the world economy going. Trade provides another way to enhance energy security: north-eastern Germany is not very industrialized and therefore does not consume much energy, which is needed in south Germany and other more industrialized parts of the country. Here is where trading energy can help enhance energy security. This book explores solutions through better governance of energy trade.³²

Objectives of the Book

This book challenges the view that trade's only impact on the environment is negative.³³ On the contrary, this research takes the unconventional view that the trading system goes beyond benefiting the economy and society in that it can also contribute to environmental protection, with a specific focus on decarbonization. In this sense, this book proposes a paradigm shift in how we approach trade and develops a new theory based on the triple benefit of trade. This book incorporates the current trend of bottom-up, rather than top-down, solutions to today's global challenges. In my analysis of trade's potential for environmental protection, this book:

- Investigates how trade agreements may be more effective legal instruments than environmental agreements for environmental-protection purposes—a possibility that is both counter-intuitive and surprising;
- Identifies opportunities to promote sustainable energy and environmental protection in future trade agreements; and
- Explores the role of prosumers as new actors on the energy market towards the achievement of energy transition via energy *decentralization*, *democratization*, *digitalization*, *de-regulation*, and *decarbonization*. This approach shifts the

technology and finance, new resource curse, electric grids, reduced oil and gas demand, avoided climate change, and sustainable access to energy. Ibid.

³⁰Ibid.

³¹*Renewable-Energy Targets: A Green Red Herring*, The Economist, July 15, 2017, at 10. As an example of energy inefficiency, think for instance of air-conditioning in public buses in the US, where, at times, the air-conditioning cannot be turned off, or even down, even when it is unnecessarily cold inside the bus.

³²Leal-Arcas et al. (2016), p. 40.

³³See for instance Lilliston, B. "The climate cost of free trade: How the TPP and trade deals undermine the Paris climate agreement," *Institute for Agriculture and Trade Policy*, 2016.

current paradigm from a top-down to a bottom-up perspective in the governance of sustainability.

1.1 State of the Art

Existing literature has taken a comparative approach,³⁴ but focuses only on some aspects of the problem.³⁵ Some have carried out their comparative analyses on the trade aspects of energy³⁶; others on the external dimension of EU energy law and policy³⁷ or the internal dimension of EU energy policy³⁸; others on the interrelationships between trade,³⁹ investment,⁴⁰ transit⁴¹ and/or environmental agendas⁴² vis-à-vis energy⁴³; and others, while having carried out thorough cross-

³⁴Marin Quemada et al. (2011); Cottier and Delimatsis (2011); Leal-Arcas and Filis (2013), pp. 1–58, Oxford University Press; Sovacool (2011a), pp. 3832–3844.

³⁵There are any number of books on the different aspects of globalization. There are many books on the challenges facing the global economy and those facing the global environment. There are only a few books that attempt to address the complex interrelationships between the global economy and the global environment. There are no books that do so in the context of making and re-making international economic and environmental law, and of linking international economic and environmental institutions in the broader context of sustainability. See, for instance, the following books: Hufbauer and Suominen (2010), Victor (2011) and Sachs (2015). These books devote only a few pages to international economic and environmental rules and to the possible clashes between them. None of them addresses the need to erase the lines dividing global economic and environmental governance. None of them offers specific proposals for a future global framework for providing such governance from the bottom up. Moreover, none of these books views these issues through the prism of international and EU law and policy.

³⁶Selivanova (2011); UN Conference on Trade and Development (2000); Farah and Cima (2015); Ostry (2010); Sakmar (2008), p. 96.

³⁷Dupont and Oberthuer (2015), Goldthau and Sitter (2015) and Talus (2013).

³⁸Baumann (2010). The rationale for energy policy is mainly pollution externalities from fossil fuel combustion and in the production of energy, energy security, imperfect competition, government finance, and redistribution of wealth.

³⁹Shih (2009), p. 433.

⁴⁰Ghosh (2011); World Energy Council, “World Energy Perspectives – Non-Tariff Measures: Next Steps For Catalysing The Low-Carbon Economy,” 2016, available at https://www.worldenergy.org/wp-content/uploads/2016/08/Full-report_Non-tariff-measures_next-steps-for-catalysing-the-low-carbon-economy..pdf.

⁴¹Yafimava (2011), Pogoretsky (2017) and Azaria (2015).

⁴²Esty (1994); Van de Graaf (2013a), p. 14; Guruswamy (1991), p. 209; Brown Weiss (2016), pp. 367–369; Wettestad (2009), pp. 393–408; Yamarik and Ghosh (2006), p. 15; Leal-Arcas (2014), pp. 11–54; Barrett S, ‘Climate Change and International Trade: Lessons on their Linkage from International Environmental Agreements’ (Geneva, 2010), available at https://www.wto.org/english/res_e/reser_e/climate_jun10_e/background_paper6_e.pdf.

⁴³Pauwelyn (2010).

policy comparative examinations,⁴⁴ do not explore the systemic implications of their subject matter for energy security *per se*.⁴⁵ Moreover, there is literature on the implications of global⁴⁶ and regional⁴⁷ systems on energy security,⁴⁸ specific to certain structures—e.g., the EU⁴⁹ and the North American Free Trade Agreement—and to limited memberships.⁵⁰ Other research looks at the relationship of regional or sectoral systems for global energy governance,⁵¹ but does not focus comprehensively on sustainable energy.

1.2 Originality and Ground-Breaking Nature of the Book

This book is unique in that there is no similar comparative study that takes a comprehensive approach over how the trading system can help mitigate climate change and enhance sustainable energy. The book is also unique in that it brings together a top-down and bottom-up approach to the governance of sustainability. Furthermore, it is one of the first monographs that analyze two of the most relevant global regulatory trends in recent international trade agreements, namely climate change and sustainable energy.

The link between international trade law and renewable energy law has been largely neglected by the existing literature. Previous studies have examined specific micro-aspects of the field, e.g., the effect of trade liberalization⁵² on energy transit. However, there has been no overarching, cross-disciplinary study that examines the implications of international governance regimes for renewable energy and trade and EU/trans-national energy security. Due to the lack of similar studies, despite the growing research area of sustainable energy, academic literature is limited to the fields of economics and international relations.

⁴⁴Barton et al. (2004); McElroy (2009); Goldemberg (2012); Van de Graaf (2013b); Florini and Sovacool (2011), p. 57; Smith and Htoo (2008), p. 217.

⁴⁵Leal-Arcas et al. (2014), Johnston and Block (2012) and Sovacool (2011b).

⁴⁶Birol (2012), p. 184; Sovacool and Florini (2012); Cherp et al. (2011), p. 75; Dubash and Florini (2011), p. 6.

⁴⁷See, e.g., Marketos (2008), Pirani (2009), Andrews-Speed (2012), Tunsjø (2013), Bedeski and Swanström (2012), Fingar (2016), Patnaik (2016), Malashenko (2013), Cooley (2012), Kavalski (2010) and Jonson (2006).

⁴⁸Maniruzzaman (2002), p. 1061; Kalicki and Goldwin (2013); Goldthau and Sitter (2015). See also the contributions in Barton et al. (2004).

⁴⁹Glachant et al. (2012a, b).

⁵⁰de Jong, S. and Wouters, J. "Institutional Actors in International Energy Law," Leuven Center for Global Governance Studies, Working Paper No. 115, July 2013.

⁵¹Barton et al. (2004); Gunningham (2012), p. 119; Kuzemko (2012); Leal-Arcas (2009).

⁵²Hancher et al. (2015), Bjørnebye (2010), Grubb et al. (2008), Roggenkamp et al. (2016), Isser (2015), Talus (2013) and Finger and Künneke (2011).

However, there is an omission of legal analysis in the academic market regarding the topic of this book. In fact, this is the first study to analyze the governance of renewable energy and trade comprehensively, from the perspective of law, political economy and international relations. Looking at renewable energy and trade solely from the perspective of law would not suffice to understand its complexity. Going beyond the law will help us rethink the law. It will then allow us to create an ambitious framework for sustainability.

The book breaks new ground in international relations, international and EU law by assisting in the gradual constitutionalization of international and EU renewable energy trade law in its wider economic context.⁵³ Its in-depth concentration on EU sustainable energy, and how it can be enhanced by changing the relationships through trade actors, is where this book is innovative and ground-breaking. Taking such a detailed look at the potential of the international trading system to go beyond economic incentives and incorporate the social and environmental aspects of development as well is why this book goes beyond the state of the art, with benefits for a broad spectrum of researchers.

This book answers a very large research question in its entirety and seeks to establish a new interdisciplinary field of study at the juncture of two different but related sectors (i.e., trade and climate change/renewable energy).

1.2.1 Trade As a Vehicle for Climate Action and Sustainable Energy

The first new concept that this book offers is how the trading system can be utilized as a vehicle for climate action and sustainable energy (i.e., energy that is affordable, secure, and clean). The book argues that the trading system can be part of the solution, not the problem, to environmental protection. How can international trade and climate change mitigation work together harmoniously without impeding each other in the context of an emerging decentralized energy system?

The book demonstrates that we are not capitalizing on the international trading system to achieve two crucial twenty-first century goals: sustainable energy and climate change mitigation. The book undertakes a broad analysis of links between the trade, energy, and climate regimes, and examines both bottom-up and top-down approaches in using trade law to tackle climate change and sustainable energy. In other words, it looks at the flagging multilateral trading system and identifies how the international trading system can be used effectively towards environmental protection.

⁵³Cottier and Hertig (2003), pp. 261–328; Cottier (2011), pp. 495–532.

Very little research has been conducted on the impact of preferential trade agreements (PTAs)⁵⁴ in addressing climate change mitigation/environmental protection and energy security.⁵⁵ Moreover, the book argues that we can use trade law as a vehicle not only for climate action and sustainable energy, but for many of the other Sustainable Development Goals (SDGs).⁵⁶ In other words, trade can serve as an enabler for achievement of the SDGs, which are bottom-up activities, given that it embraces environmental, economic, and social dimensions.⁵⁷ This is in line with the commitments of many countries to sustainable energy. However, currently, the governance of trade and renewable energy is fragmented, with many institutions and legal instruments.

There is insufficient research on how the trade and renewable energy regimes can cooperate. No one has conducted the kind of research required to understand trade's role in sustainability issues. New agreements are starting to include sustainable development chapters,⁵⁸ and various think tanks and institutes are starting to discuss this issue.⁵⁹ But there is no thorough empirical and theoretical study of what impact such sustainable development chapters are having so far, how they can improve, how the two regimes operate and can align better, and how to capitalize on trade to really push forward the renewable energy agenda.⁶⁰

⁵⁴Regional trade agreements (RTAs) and preferential trade agreements (PTAs) are used interchangeably throughout this book.

⁵⁵Leal-Arcas and Wilmarth (2015), pp. 92–123; Falkner and Jaspers (2012); Reuveny (2010); Eerola (2006), pp. 333–350, November; Vranes (2009); Carraro and Egenhofer (2007).

⁵⁶Resolution adopted by the General Assembly on 25 September 2015, *Transforming our world: the 2030 Agenda for Sustainable Development*, A/RES/70/1, available at http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E. For further details on the SDGs, see Cutter, A. et al., “Sustainable Development Goals and Integration: Achieving a better balance between the economic, social and environmental dimensions,” Stakeholder Forum, available at <http://www.stakeholderforum.org/fileadmin/files/Balancing%20the%20dimensions%20in%20the%20SDGs%20FINAL.pdf>; Sachs (2016), available at <http://worldhappiness.report/ed/2016/>.

⁵⁷There is also literature on how environmental agreements can help achieve the sustainable development goals. See Balakrishna Pisupati, UNEP/DEL/C, ‘*Role of Multilateral Environmental Agreements (MEAs) in achieving Sustainable Development Goals (SDGs)*’, (UNEP Division for Environmental Laws and Conventions 2016) 8.

⁵⁸Charnovitz (2008), pp. 249–251; Falkner and Jaspers (2012), p. 245. Also, environmental issues are starting to play a more prominent role in the WTO dispute settlement system. See for example, United States — Standards for Reformulated and Conventional Gasoline (29 April 1996) WT/DS2/AB/R; United States — Import Prohibition of Certain Shrimp and Shrimp Products (12 October 1998) WT/DS58/AB/R; European Communities — Measures Affecting Asbestos and Products Containing Asbestos (12 March 2001) WT/DS135/AB/R.

⁵⁹Branford (2014); Mattoo, Aaditya and Subramanian, Arvind (04 May 2013) “Four changes to trade rules to facilitate climate change action,” VOX CEPR’s Policy Portal; Mavroidis and de Melo (2015), pp. 225–236.

⁶⁰This situation raises the question whether climate change demands a normative shift in how we think about the trade regime. For analyses, see Daly (1995), p. 313; Lilliston (2016); Kanemoto et al. (2014), pp. 52–59; Gordon, Kate and Lewis, Matthew, “It’s Time to Close the ‘Carbon Loophole’,” *Wall Street Journal* (13 November 2017), available at <https://blogs.wsj.com/experts/2017/11/13/its-time-to-close-the-carbon-loophole/>.

1.2.2 *Governance from the Bottom Up*

A second concept that this book offers is citizens' empowerment, which is an emerging concept in global governance. Empowering citizens has implications for societal change as it provides a human element to governance.⁶¹ More direct participation by citizens is increasingly necessary to reach good governance.

New opportunities are coming up for ensuring energy security. The energy sector is undergoing a large-scale low-carbon transition. What is under-emphasized in this transition is that it involves a major paradigm shift from a supply-driven to a demand-side energy policy. Driven by a mix of geopolitical, economic, climate, and technological considerations, the energy sector is moving towards a new architecture, the principal pillars of which are progressive electrification, a cleaner energy mix, renewable indigenous energy production, increased energy efficiency, and the development of new markets to produce, transmit, and, crucially, manage energy.⁶²

The shift in paradigm can be explained as follows: a top-down guidance to sustainable development will come from inter-governmental decisions (i.e., high level of abstraction), whereas a bottom-up approach means that action/implementation will happen from consumers'/citizens' participation (i.e., low level of abstraction). National governments are essential, but are no longer the only key actors, given the rise of (informal) bottom-up approaches to governance. This raises the question whether cities can make effective change if national governments do not deliver. At what point should businesses have to step up if politicians fall short? Cities around the world are demonstrating innovative strategies for advancing solutions to climate change.⁶³ Via this bottom-up approach to governance, citizens can ask states for reform via referenda.

1.3 Interdisciplinary and Inter-Sectoral Aspects of the Book

The book is interdisciplinary and inter-sectoral, bringing together an analysis of international trade and sustainable energy from the perspective of law, international political economy, and international relations. It takes the novel approach of bringing together law, international political economy, and international relations to explain sustainability as an academic discipline. The book applies methods of legal analysis, namely a comprehensive analysis of treaties, case law and academic

⁶¹Leal-Arcas (2018b), pp. 1–37.

⁶²For an overview of the current legal and policy situation in EU energy, see Leal-Arcas and Wouters (2017).

⁶³SUSTANIA, "Explore 100 City Solutions for a Greener and Fairer Future"; C40 Cities. *Powering Climate Action: Cities as Global Changemakers*. 2015. https://issuu.com/c40cities/docs/powering_climate_action_full_report.

writings from scholars as well as literature from other social science disciplines, such as international relations and international political economy, to help explore the challenges addressed.⁶⁴

The international political economy of sustainable energy is integrated into this book to identify barriers and success factors that will explain why some countries have been more successful than others when it comes to renewables.⁶⁵ The importance of a geopolitical analysis of renewables as part of the national and international energy supply is a relatively new phenomenon.⁶⁶

Legal scholars have used international relations theories and quantitative and qualitative methods from political science, whereas political scientists have tried to understand the causes and consequences of the legalization of international relations. Political Science/International Relations has provided most of the theoretical content and methodological guidance of international legal/political science scholarship, whereas international legal scholarship has contributed with institutional design and processes, as well as dispute settlement mechanisms. This interdisciplinary approach to challenges is in keeping with the direction that legal education has taken in recent decades. To examine the relationship between trade law and sustainable energy from the sole perspective of a legal analysis would result in incomplete insights of little worth to outsiders to the discipline of law. Scholars of international relations and international law have increasingly been involved in approaches that are more problem-driven and less theory-driven, and more receptive to the fact that the realities of international law and international politics may be related to power-politics considerations associated with realism or functional concerns related to institutionalism.⁶⁷

1.4 Structure of the Book

This book is divided into two Parts. After this introduction, Part 1 (Chaps. 2–5) offers a top-down approach to the main themes of economic governance and sustainability (namely trade, energy, and climate change). Such an approach was typical of the twentieth century and remains necessary to provide guidance.

Chapter 2 analyzes the conceptual links between sustainability, common concern and public goods. It also examines incentives for regional and global cooperation on decarbonizing the economy.

The purpose of Chap. 3 is to explain new horizons and perspectives in international economic law in the context of sustainable development. Chapter 3 explores

⁶⁴Dunoff and Pollack (2013) and Frodeman et al. (2010).

⁶⁵Moe and Midford (2014).

⁶⁶USAID, (2014) Encouraging Renewable Energy Development: A Handbook for International Energy Regulators.

⁶⁷Katzenstein and Okawara (2001), pp. 153–185; Katzenstein and Sil (2008), pp. 109–130.

the potential of the trading system in helping mitigate climate change and enhancing sustainable energy. The argument is that trade agreements have tremendous potential to help mitigate climate change, which is currently under-explored. Chapter 3 first explains how trade agreements may be a legal instrument to mitigate climate change and enhance sustainable energy. It then provides an analysis of the challenges of mitigating climate change and enhancing sustainable energy. The last section examines the synergistic links between the trading and climate regimes.

Chapter 3 offers a research agenda in international economic law with proposals on how to reach sustainable development. By doing so, it makes the unconventional claim that the trading system can make a great contribution to decarbonisation. Chapter 3 offers a paradigm shift in thinking about international trade. Traditionally, trade has been understood as a stumbling block to sustainable energy. I argue that trade is a building block and that the international community should capitalize on the proliferation of regional trade agreements (RTAs)/bilateral trade agreements to enhance energy security via renewable energy and achieve clean energy. Both can be achieved with the inclusion of strong chapters on trade in goods and services related to sustainable development and renewable energy in RTAs.

Chapter 4 proposes the novel idea of using mega-regional trade agreements (RTAs) to mitigate climate change and enhance sustainable energy. It proposes the argument that only a few major greenhouse gas emitters and just three mega-RTAs can make a great contribution towards climate change mitigation and the enhancement of sustainable energy. Chapter 4 offers forum options that best deal with them with the aim to help mitigate climate change and enhance sustainable energy.

Chapter 5 contributes to the debate on energy security by highlighting various aspects of the energy sector, specifically electricity and gas, which are relevant to the discussion on regional integration and their convergence with sustainable development. Development is not possible without energy and sustainable development is not possible without sustainable energy. Chapter 5 discusses energy sustainability through the trading system and proposes regional trade agreements as means to further enhance peace and the energy security agenda of the region. It makes the case that, to achieve security of energy supply, two main factors are important: diversification to minimize risk and regional cooperation. It suggests that all the regions of the world should reduce or eliminate the technical barriers to energy trade.

Part 2 (Chaps. 6–9) looks at economic governance from the bottom up, a new feature of the twenty-first century for the implementation of projects and for action to happen. Part 2 explores in theoretical and practical terms how this new system of governance and sustainability can be achieved.

Chapter 6 examines the mega-trends of the twenty-first century in the context of sustainability. By doing so, it brings forward the novel idea of how greater participation of citizens can be very promising in helping achieve the Sustainable Development Goals. More specifically, it brings forward the novel approach that the role of citizens in international trade, climate change mitigation, and sustainable energy is crucial to reach sustainability.

Chapter 6 also critically analyzes the new challenges and opportunities that prosumers, as new energy actors, bring to achieving energy security goals.

Following trends in the EU towards new levels of cooperation in energy governance, decentralization, and the emergence of a ‘gig’ economy, the energy sector is currently undergoing a large-scale transition. One of its core aspects is the progressive top-down diffusion of potential, competences, and leverage across the energy value chain from States and corporate actors towards prosumers.

The novelty of Chap. 6 is that it aims to explain the paradigm shift in the governance of sustainable development: the twentieth century was characterized by a top-down approach to the governance of climate action, energy, and international trade; the twenty-first century, however, offers a bottom-up approach, marking one of the mega-trends of the twenty-first century. Chapter 6 then investigates how the international trading system can be governed from the bottom up so that there is an open, more inclusive trading system in political, legal, and economic terms.

Chapter 7 focuses on how smart grids can contribute to a broader economic transformation. It considers the economic transition occurring globally towards collaborative economics and how the EU aims to incorporate new market exchange models into smart grids energy systems. It considers the potential social and environmental benefits in addition to the challenges that lie ahead in realizing policy goals about the future. Chapter 7 explores the social and ethical dimension of smart grids in the context of the collaborative economy. Chapter 7 also explores how the EU is working towards fostering more flexible, open, transparent, and dynamic policies within the energy sector. To achieve a low-carbon sustainable society that is fair and equitable for all, the new model also has to reduce the use of resources and to use them efficiently. Finally, Chap. 7 then analyzes the role of prosumers in energy security.

The purpose of Chap. 8 is to offer the practical applications of decentralized energy in the EU. It provides an analysis of smart grids in the EU as a way forward to reach sustainable energy. It represents a significant milestone in the upscaling of the various aspects of smart grid technology across the EU. Chapter 8 examines progress on energy decentralization in various EU jurisdictions. It focuses on specific outcomes of decentralization, including deployment of smart grids and smart meters, promoting demand response, the promotion of electric vehicles and greater interconnection with neighboring countries. It also examines any existing barriers. Chapter 8 also provides an analysis of smart grids in the context of the circular economy and digital technology, including cybersecurity and data-management issues.

While the trend of energy decentralization creates ample potential for facilitating and improving the EU’s security of supply as well as fulfilling its climate change targets, several caveats exist. These caveats are not confined within energy security prerogatives; they also extend to the critical management of digital security, which the digitalization of energy services brings to the fore. Private and public finance should be effectively attracted and directed to infrastructure schemes that will enable a transition from the traditional centralized power network to the decentralized nexus of smart grids. Technology will play a crucial role in facilitating the role of prosumers in the new market in-the-making.

Finally, Chap. 9 explores sustainability in the context of innovation, research, and technology. Chapter 9 concludes with the expression that there is a knowledge gap on the links between four major global concerns: trade, energy, climate change, and sustainability. With the threat of climate change looming and energy increasingly important to all aspects of human and economic development, learning more about these links is extremely timely.

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Part I
From the Top Down

Chapter 2

Cooperation on Issues of Common Concern and Public Goods



2.1 Introduction¹

The changing global landscape of the twenty-first century saw the emergence of new challenges which threaten the economic prosperity of states, the well-being of nations, and the human rights of individuals. This chapter takes the view that some of those challenges, which have affected the European Union and its citizens profoundly, can be resolved through an effective and unified system of energy governance.² Accordingly, this chapter demonstrates that successful decarbonization through regional and global collective action will both boost the economy and help resolve significant human rights issues and concerns that continue to plague the European Union, such as the current refugee crisis.

¹Many concepts addressed in this chapter are a further development of Leal-Arcas (2017), pp. 801–877.

²For instance, according to one study, by removing regulatory barriers to participating in the production of renewable energy, over 180 million Europeans (so-called “energy citizens”) could produce their own renewable electricity by 2050. See Bettina Kampman *et al.*, *The Potential of Energy Citizens in the European Union* 5, 18, 20 (2016). This approach suggests that a bottom-up approach to renewable energy generation is desirable. See *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, at 2 (stating that the European Commission’s vision is “an Energy Union with citizens at its core, where citizens take ownership of the energy transition”). The Author subscribes to this idea.

In February 2015, the European Commission launched the Framework Strategy for a European Energy Union,³ a project that envisages a resilient “Energy Union”⁴ with a forward-looking climate change policy. To achieve greater energy security, sustainability, and competitiveness, the European Commission aims to strengthen and promote solidarity and trust, the full integration of the European market, energy efficiency that will contribute to moderation of demand, the effective decarbonization of the economy, and the promotion of research, innovation, and competitiveness.⁵

Decarbonization⁶ is one of the pillars of the European Energy Union because it is a way to achieve both *energy security*⁷ and *climate change mitigation*.⁸ The latest data indicate that in 2014 the European Union imported 53% of its energy, which makes it the largest energy importer in the world.⁹ In addition, six E.U. member states still depend entirely on a single supplier for their gas imports, which makes them vulnerable to supply shocks.¹⁰ The disputes between Ukraine and Russia in 2006, 2009, and 2014 had consequences for the E.U. economy and its citizens’ quality of life.¹¹ Sudden disruptions of energy supply could cripple the European Union and have devastating consequences.

The decarbonization of the economy through the use of renewable energy sources¹² can lead to greater energy security, as the European Union can decrease

³*Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, at 1–4, COM (2015) 80 final (Feb. 25, 2015), http://eur-lex.europa.eu/resource.html?uri=cellar:1bd46c90-bdd4-11e4-bbe1-01aa75ed71a1.0001.03/DOC_1&format=PDF [hereinafter Energy Union Communication] [<https://perma.cc/GXR9-CPB2>].

⁴*Id.* The European Energy Union is an ambitious project aiming at secure, affordable, and climate-friendly energy in the European Union. See European Comm’n, *Energy Union and Climate*, http://ec.europa.eu/priorities/energy-union-and-climate_en [<https://perma.cc/AT7P-2ECH>]; see also Leal-Arcas (2016) (analyzing the goals of the project) [hereinafter *European Energy Union*].

⁵See Energy Union Communication, at 4.

⁶Decarbonization refers to the increased use of low-carbon energy sources, such as renewables and nuclear, as well as the act of capping greenhouse gas (GHG) emissions. For the purposes of this chapter, decarbonization refers to the transition to a low-carbon economy through the use of renewable energy sources, unless stated otherwise. See *European Energy Union*, at 93–132.

⁷The International Energy Agency defines energy security as “the uninterrupted availability of energy sources at an affordable price.” See *Energy Security*, Int’l Energy Agency, <https://www.iea.org/topics/energysecurity/> [<https://perma.cc/JLR6-E4HQ>]; see also Leal-Arcas et al. (2016) (analyzing energy security in the context of international trade).

⁸*European Energy Union*, at 107; see generally Leal-Arcas (2013).

⁹See Energy Union Communication.

¹⁰*Id.* Imports are a sign of economic weakness.

¹¹See Leal-Arcas et al. (2016), p. 1.

¹²These could be tidal, wind, solar (which is one of the big hopes for the future, but it does not work at night), hydro, wave, biomass, to name a few. There are more than 10 countries with near 100% of electricity supplied by renewable energy mostly from hydro. These countries are Albania, Angola, Bhutan, Burundi, Costa Rica, the Democratic Republic of Congo, Lesotho, Mozambique, Nepal,

its reliance on external energy suppliers. This approach will make the bloc less vulnerable to unexpected disruptions of energy supplies. Decarbonization through renewables could also significantly reduce greenhouse gas emissions and contribute to climate change mitigation. The Paris Agreement on Climate Change (Paris Agreement),¹³ negotiated in December 2015, sets a goal of keeping global average temperatures below 2 °C above preindustrial levels, as well as pursuing efforts to limit the temperature increase to 1.5 °C above preindustrial levels,¹⁴ “recognizing that this would significantly reduce the risks and impacts of climate change,”¹⁵ which are all local, due to the weather.

After its negotiation, it was said that the Paris Agreement was a success,¹⁶ but real success will come once it is implemented and greenhouse gas emissions are reduced. The ultimate fate of the Agreement rests on developed countries and large emerging economies. The Agreement is a hybrid between a top-down centralized approach (which serves as oversight, guidance, and coordination) and a bottom-up approach

Paraguay, Tajikistan, and Zambia. One down-side of large hydro plants is that they are very invasive because they displace large numbers of people. Some sources of renewable energy work well at small-scale and local level. Equally, bio-wastes—created by human beings—can be a major source of energy. Cities produce a lot of bio-wastes, such as food wastes and sewage wastes. It is a form of sustainable biomass, with no extra land-use implications. A way to rectify food waste is via consumer behaviour through education and awareness. Incidentally, food waste has a major impact on the environment because it produces GHG emissions. If it were a country, it would be the third largest emitter of GHGs. See Climate Action Tracker, “Reducing food waste and changing diet could drastically reduce agricultural emissions,” 23 January 2018, available at <https://climateactiontracker.org/press/reducing-food-waste-and-changing-diet-could-drastically-reduce-agricultural-emissions/>.

¹³The Paris Agreement on Climate Change is one of four major legal instruments used to mitigate climate change. The other three are the UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Copenhagen Accord. The UNFCCC distinguishes itself because its objective (Article 2) is *qualitative*, not quantitative (namely it does not provide any guidance about temperature reduction in numerical terms). Another feature that makes the UNFCCC a prominent legal document of climate change mitigation is the principle of common but differentiated responsibilities (Article 3.1). The Kyoto Protocol imposes legally binding obligations to reduce greenhouse gas emissions to specific countries (so-called Annex I countries). Unlike the Kyoto Protocol, the Copenhagen Accord is not legally binding, which means that it is a political agreement to mitigate climate change. Moreover, unlike the UNFCCC, the Copenhagen Accord provides a *quantitative* objective, namely ‘to hold the increase in global temperature below 2 °C’ (paragraph 2). The Paris Agreement on Climate Change is more flexible than the UNFCCC in that it does not create categories of countries, but instead offers nationally determined contributions to mitigate change.

¹⁴Despite common belief to the contrary, more people die because of cold weather than hot weather. See Norberg (2016), p. 120. For instance, almost twice as many U.S. citizens died between 1979 and 2006 from excess cold than from excess heat. See Goklany (2009), p. 106.

¹⁵See Paris Agreement, art. 2(1), Apr. 22, 2016, <https://treaties.un.org/doc/Publication/UNTS/No%20Volume/54113/Part/I-54113-0800000280458f37.pdf> [https://perma.cc/UC9R-FS99].

¹⁶See Michael Levi, *Two Cheers for the Paris Agreement on Climate Change*, Council on Foreign Relations: Energy, Security, & Climate (Dec. 12, 2015), <http://blogs.cfr.org/sivaram/2015/12/12/two-cheers-for-the-paris-agreement-on-climate-change/> [https://perma.cc/R6JM-9T6R].

(via the nationally determined contributions to the global response to climate change).

Fulfilment of the European Commission's ambitious plan for a resilient Energy Union requires a degree of unity and dedication, as well as enhanced cooperation among member states, both regionally and globally. However, the European Union currently faces serious challenges to its security, sustainability, stability, and ultimately its *legitimacy*. In the wake of raging war on the outskirts of Europe's borders,¹⁷ an unprecedented refugee crisis,¹⁸ an economic debt crisis,¹⁹ and the recent challenges associated with the United Kingdom's decision to leave the European Union,²⁰ the European Union faces serious integration challenges that threaten not only its legitimacy, but also its very future. This raises two vital questions. First, why would E.U. member states cooperate regionally and globally towards the decarbonization of the economy when they already face serious integration challenges? More importantly, why would E.U. member states concede to speaking with one voice on energy matters when that voice is already fragmented?

This chapter demonstrates that despite the notable integration challenges currently looming over the European Union, E.U. member states have numerous economic, legal, and political incentives to cooperate both regionally and globally. Issues such as climate change and energy supply are matters of common concern that require collaboration at the global level. Climate change mitigation is a global public good, which requires collective action by states and concerted efforts at the regional and global level.²¹ This chapter contends that energy security that is achieved through the use of renewable energy sources is a global public good, the type that requires and enables collective action at the global level.

After this introduction, the chapter explores the notion of public goods and matters of common concern in the broader context of international economic law and governance. The chapter then examines possible incentives for regional and global cooperation to decarbonize the economy.

¹⁷Jim Yardley, *Has Europe Reached the Breaking Point?*, N.Y. Times (Dec. 15, 2015), <https://www.nytimes.com/2015/12/20/magazine/has-europe-reached-the-breaking-point.html> [<https://perma.cc/78TJ-FVEF>].

¹⁸*Id.*

¹⁹*Id.*

²⁰See generally Rafael Leal-Arcas, *Three Thoughts on Brexit*, Queen Mary School of Law Legal Studies Research Paper No. 249/2016 (2016) (describing future trade relations between the United Kingdom and the European Union as well as the impact on the United Kingdom alone).

²¹See D. King *et al.*, "Climate Change: A risk assessment," available at <http://www.csap.cam.ac.uk/media/uploads/files/1/climate-change%2D%2Da-risk-assessment-v9-spreads.pdf>.