

Power to the People: From Top-Down to Bottom-Up Approaches

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Introduction: A Paradigm Shift in the Governance of Sustainable Development

This paper proposes a novel approach to sustainable development focusing on the potential role of citizens in international trade, climate change mitigation, and sustainable energy. This approach offers a new pathway to sustainability and a mechanism to help to ensure that trade policy reinforces, rather than undermines, the global commitment to climate change action.¹ In doing so, it offers a paradigm shift in sustainable development governance, moving from the 20th century top-down approach to climate change action (e.g., the Kyoto Protocol), energy (e.g., inter-governmental energy agreements), and international trade (e.g., inter-governmental trade agreements), to a bottom-up strategy.

The Paris Agreement on climate change embodies a mega-trend of the 21st century: bottom-up leadership, typified by the involvement of citizens, non-governmental organizations, mayors, governors, businesses, universities, and faith-based organizations.² In energy governance, we observe a similar push for *energy democratization* as control over energy security shifts and new energy actors emerge, namely *prosumers* (citizens who both consume and produce energy) and renewable energy cooperatives.³ This approach could help to expedite the changes in global energy patterns required to mitigate climate change and enhance international trade.

From Top-Down to Bottom-Up Governance

Multilateralism is at a pivotal juncture. The United States signaled its intention to withdraw from the Paris Agreement and President Trump questions the validity of the United States' contribution to the broader international regime, including the United Nations system. The World Trade Organization (WTO) seems out of step with economic and geopolitical shifts. Multilateral negotiations under its auspices have lagged and its dispute settlement system seems stagnant.⁴ Indeed, the days when multilateral trade liberalization was an appealing policy priority appear to be in the rearview mirror.

More recently, focus has shifted to mega-regional trade agreements, such as the Trans-Pacific Partnership, or its latest iteration, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, and the Trans-Atlantic Trade and Investment Partnership. These plurilateral agreements offer a possible path forward in international trade and a forum for reconciling tensions between trade goals and environmental aspirations, especially the “sustainability imperative” of the 2015 United Nations Sustainable Development Goals and the decarbonization goals of the 2015 Paris Agreement on climate change.⁵

What has not changed, however, is people's awareness that negotiations among nation-states have a profound impact on public well-being. For example, in 1999, during the WTO Ministerial Conference in Seattle, large crowds angrily demonstrated on the streets—asking trade technocrats to be transparent and share the outcomes of multilateral trade negotiations happening behind closed doors. More recently, large demonstrations have been occurring on the streets of the United States, United Kingdom, Germany, and Austria.⁶ Apprehensive that the outcome of such plurilateral negotiations may negatively affect their daily life due to the “openness to investment from other members, the protection of patents, and environmental safeguards,”

citizens increasingly seek to participate in the trade policy conversations and have their interests considered in international trade negotiations.⁷

Further, recent examples of citizens' discontent in the European Union governance reveal the apathy among voters towards supranational parliamentary elections. Indeed, participation in these elections has been declining since 1979. In contrast, there is an increased interest in national and sub-national parliamentary politics, as exemplified by the Brexit vote and the Catalanian independence movement—both of which are closer to the citizens than metanational, supranational, or international entities.

These situations challenge the hegemonic stability theory, which posits that the international system will be most stable when a single state serves as the dominant power in the world.⁸ In the search for alternatives to distant trade decision-making, policy makers should take care not to overlook what citizens think, since state-centricity seems to be making people unhappy and dissatisfied. Indeed, there seems to be a fundamental lack of trust in large-scale governance structures.

As one of the mega-trends of the 21st century, the bottom-up implementation of climate change plans draws from the Paris Agreement, which has become the locomotive of climate change action.⁹ It entails a shift from a higher-level to decentralized debate and decision-making as consumers and citizens participate in action and implementation, in contrast to the top-down approach under which choices are made by presidents and prime ministers.¹⁰ This scaled-down approach offers a more democratic decision-making framework in that power remains with the citizens.¹¹ Under a bottom-up approach, multilateral governance is transformed. It must become softer, relying on informal tools of governance, rather than treaties.

Citizens' Empowerment

Citizens' empowerment has emerged as a relatively new concept in global governance.

Empowering citizens provides a human element to governance that prompts societal change and is increasingly seen as necessary to deliver good governance.¹² In the same spirit, the use of behavioral economics in public policy has risen on the agenda. In energy policy, for example, “it has become clear that efforts to steer people towards “better”—that is, more energy efficient—choices and behaviors are much needed.”¹³ As suggested by Lucia Reisch, evidence shows that the right incentives spur behavioral change.¹⁴ This trend is certainly the case in Nordic countries, where the so-called Nordic model has failed in top-down policies (e.g., the creation of common defense policy and a single currency), but is very successful in the design of bottom-up approaches to policies with the right incentives and market integration.¹⁵

Reducing energy demand may not be realistic given our lifestyle in the West—a trend that is increasingly replicated in the rest of the world. What we may, instead, need is a smart policy design to reduce energy demand—such as an escalating carbon charge—coupled with technological and institutional improvements on the supply side.¹⁶ Creating a more efficient and sustainable energy system will allow us to cut costs, decrease greenhouse gas emissions, and reduce energy imports and dependency.

Moreover, there is evidence that young people want to consume in a sustainable manner—a positive change that has the potential to make the future brighter.¹⁷ Greater use of social media (e.g., Twitter, Facebook, YouTube) could be a highly effective platform to educate the youth, raise awareness on the links between trade and climate change, and involve them in parliamentary elections. More broadly, to effectively place citizens at the center of governance

transformation, policy makers should create greater access to information and opportunities for participation.

Climate Change Action

Global issues, such as climate change, poverty, or terrorism are too big for nation-states, but are—somewhat counterintuitively—more suitable for cities to tackle.¹⁸ Most human activities today occur in cities. Cities are where the majority of the world population lives and 80 percent of global economic activity takes place. Cities produce 50 percent of global waste and emit 60 to 80 percent of greenhouse gases.¹⁹ The pragmatic approach of city mayors arguably offers better governance on these matters than that of high-level policy makers because mayors are seen as more accountable, and therefore people tend to trust them more than politicians at the national level.

Given that cities (and their citizens) are the main polluters as well as the main implementers of legislation, they can, and should, take climate change action.²⁰ In a bottom-up approach to governance, citizens can ask cities, states/provinces, or even entire nations for reform via referenda. Consequently, national governments remain essential, albeit no longer the only key actors, given the rise of (informal) bottom-up approaches to governance. Indeed, cities around the world are demonstrating innovative strategies for advancing solutions to climate change.²¹ Specifically, city-level climate change action that includes much greater citizen participation is particularly promising.²²

Likewise, businesses are taking on a leadership role in climate change mitigation.²³ Citizen participation can further improve human wellbeing and facilitate the management of climate change and environmental issues through exerting public pressure on companies.²⁴ In

this regard, bringing together environmental non-governmental organizations and businesses for greater and closer cooperation is a promising way forward. A surprising case in point is a well-organized social movement in the United States pushing for the implementation of the Paris Agreement, which emerged soon after President Trump announced his intention to withdraw from the Agreement. A coalition of people from highly diverse backgrounds—including representatives of cities, states, and businesses—gathered together outside the main conference building of the 2017 United Nations Framework Convention on Climate Change negotiations to demand more climate change action under the heading *We Are Still In and America's Pledge*.²⁵

Energy Transition

Since the energy sector and the economy are intertwined, the future of the energy transition and the future of countries' economies will inevitably go hand in hand. The main drivers of the clean energy transition must be: innovation; energy decentralization; increased access to information and communication; energy democratization via a multi-level governance system; citizens' empowerment in a customer-centered system that enables them to exploit electric grid opportunities; new business models for utilities; stronger and smarter grids; better and smarter regulation aimed at reducing or eliminating technical barriers; and electrification facilitating the deployment of renewable energy.²⁶

To develop a more efficient and sustainable energy system, citizens need to be empowered in terms of access to, and provision of, energy.²⁷ What citizens want is security of supply, lower bills, protection of the environment, and a smart grid. Gordon Walker identified four types of community-owned means of renewable energy production in the United Kingdom: 1) cooperatives, 2) community charities, 3) development trusts, and 4) renewable energy projects

with shares owned by a local community organization.²⁸ In addition, a number of cooperative models have been emerging for wind turbine companies in several European Union countries (namely Austria, Germany, Denmark, The Netherlands). These examples illustrate innovative models of citizens' participation and community involvement in energy production.²⁹ Local renewable energy communities are thus at the grassroots of the movement to change the current energy security system.

To make energy access cheaper and more secure, we must reduce or eliminate legal and technical barriers to energy technology so that smart grids—electrical grids with distributed generation including “prosumer” power production—can take off in different jurisdictions.³⁰ Likewise, the legal environment has to facilitate the development of the technology and create, for example, a single smart grid in supranational structures like that of the European Union.³¹ The implementation of the energy transition will inevitably vary from country to country, based on access to technological and economic conditions.³² For instance, in the case of the European Union, it will require solar and wind energy integration. Greater flexibility will also be necessary for cross-border energy trade and for local and regional smart grids.

By presenting a variety of local engagement opportunities, these developments will help change citizens' roles from passive consumers to “active” energy managers, as well as electricity producers or “prosumers.”³³ Since an increasing number of prosumers are entering the energy market, the identified changes will lead to the creation of scalable micro grids for prosumers and utility companies, new policies and regulatory frameworks for smart grids, and overall, a better grid management. Including citizens in the much needed energy transition will help us move away from energy poverty towards energy democratization (a situation where regions and

consumers gradually become more self-sufficient in their access to energy), energy citizenship, decentralized energy, and sustainable energy enhancement.³⁴

It is now clear that as the world reduces its oil dependence, the winners will be those producing and exporting green technology, whereas the losers will be those continuing to depend on fossil fuels. Two ingredients may help move forward the energy transition: international collaboration and energy decentralization. International trade will certainly play a major role in the transfer of technology as one of the key fields where potential international collaboration can occur. Private actor-led initiatives will also be critical. One example is the *Breakthrough Energy Coalition*, an undertaking by visionary billionaires, global corporations, and financial institutions working to provide reliable, affordable, and carbon-free energy.³⁵ Another initiative called *Mission Innovation* brings together a group of 22 countries and the European Union with the goal of reinvigorating and accelerating clean energy innovation throughout the world to make clean energy affordable for all.³⁶ The emergence of microgrids or minigrids dealing with locally produced wind and solar energy, as well as electric vehicle batteries, will not only improve access to energy, but will also play a significant role in decentralizing economies and energy systems.

International Trade

The international trading system will continue to be relevant in the coming years to climate change action and decarbonization efforts as most countries will remain predominantly dependent on energy imports for decades to come. One of the key challenges of the trade regime will be to provide the means for various actors to cooperate in clean energy deployment and climate change action. The thrust of sustainable development is integration and issue linkages to

increase cooperation on global common concerns—all of which can be strengthened by enhancing the participation of diverse stakeholders in regional and global institutions.³⁷ A key ingredient to improving trade in energy is better and more efficient connection between nations as harmonized markets yield greater economic incentives. Trading, however, is not possible without trust. Trust is based on incentives. Enabling citizens and other small non-state actors to become participants in the global trade regime creates the necessary framework that encourages trust in this system.

In the case of international trade, therefore, one could imagine citizens' empowerment as the involvement of civil society in committees on trade and the environment and their full participation during the negotiation process of future trade agreements. Regarding the process of trade agreement negotiations, however, there are technical barriers to bringing participation to the grassroots level. Potential areas in which these barriers can be minimized include transparency, non-governmental organization involvement, implementation of trade agreements, information asymmetry, and due process.

With the rise of e-commerce, one could think of the increasing participation of micro, small, and medium enterprises via apps on their smartphones. The role of citizens and small enterprises in international trade governance is an example of a bottom-up approach to sustainable development governance that would shift the current paradigm and open up the structure of global governance. A World Trade Organization Secretariat report³⁸ explains how the current trade governance system can support the participation of these enterprises in the international trading system:

1. Helping them to meet sustainability standards and conform with other international regulations to take advantage of the opportunities resulting from global supply chains;

2. Ensuring that micro, small, and medium enterprises can trade their goods and services in a timely and competitive manner, which will result in greater consumer confidence; and
3. Making sure that trade finance is available. Doing so will contribute to gender equality, increase economic growth, foster innovation, and increase participation in international trade.

At the regional level, the European Union seems to be one of the most committed regions in the world to climate change mitigation. The European Union's Partnership Instrument promises to be pivotal when dealing with cooperation on issues of common concern.³⁹ Its "overall objective is to... promote [European Union] interest by supporting the external dimension of [European Union] internal policies (e.g., competitiveness, research and innovation, migration) and by addressing major global challenges (e.g., energy security, climate change and environment)."⁴⁰ The Partnership Instrument aims at increasing trade, investment, and business opportunities between the European Union and countries that "play an increasingly prominent role in global affairs, international economy and trade, multilateral fora and global governance, and in addressing challenges of global concern."⁴¹

Moreover, in 2017, the European Union Commission announced the creation of a new advisory group on trade agreements.⁴² The group's mission is to increase transparency and inclusiveness in European Union trade policy—an initiative that highlights the Commission's serious commitment to this cause.⁴³ Including the perspective of a wide group of stakeholders (consumer groups, trade unions, and other non-governmental organizations) will certainly help to shape future European Union trade by promoting a greater understanding of interlinkages and placing emphasis on sustainability concerns in trade policy making.⁴⁴

Finally, the incorporation of environmental provisions in the so-called mega-regional trade agreements—for example, Chapter 20 of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, Chapter 24 of the Comprehensive Economic and Trade Agreement, and the “trade and sustainable development” chapter in the Trans-Atlantic Trade and Investment Partnership negotiations—holds much potential.⁴⁵ Regional trade agreements between emerging economies, especially those that are members of the Organization for Economic Cooperation and Development, are also joining this “green race.”⁴⁶ Relative to those negotiated before the Paris Agreement, recent European Union Free Trade Agreements, such as those with Singapore, Vietnam, and Japan, contain stronger and more detailed provisions on the links between trade and climate change and have “trade and sustainable development” chapters.⁴⁷ Given the current crisis in the multilateral trading system, it is worth exploring the potential of incorporating chapters that address climate change mitigation and promote renewable energy within regional free trade agreements or preferential trade agreements. With their vast network of such agreements, we can thus expect major trade actors to take the lead in transforming international trade into a supporter or enabler of climate change action and a clean energy transition.

Conclusion

The traditional discourse on the linkages among trade, environment, and more recently, climate change, has focused on the actions of and interactions among states and international institutions. In contrast, this paper puts forth a new view that better outcomes can be achieved through a more bottom-up process with more focus on decentralized clean energy and pathways to deep

decarbonization. Citizens' participation thus emerges as critical to climate change mitigation, energy security, international trade, and sustainable development efforts.

No solution to these big challenges can succeed without social mobilization and cooperation among governments, companies, and research institutions. When politicians fall short, business leaders may have a role to play in helping to decarbonize the economy at large. While politicians are susceptible to short-termism (for obvious electoral reasons) and may be too risk-averse, entrepreneurs must step up with longer-term visions and commitments to a changed future. Entrepreneurs—think, for instance, of Elon Musk's companies SpaceX and Tesla—who influence the changing automobile industry and emerging "mobility" industry. Technology seems to be the critical resource for transformation.⁴⁸ To that, one should add the optimism of Steven Pinker that things will only get better in the future because people generally think reasonably and logically and that the geopolitics of clean energy may make the world more peaceful and stable.⁴⁹

The much-needed clean energy transition offers an opportunity to protect the planet, create jobs, and promote economic growth. While the transition is presently happening at a slow pace, it is promising that the energy mix is increasingly dominated by low carbon energy sources and is getting cheaper. Promoting the use of renewable energy is one of the most pressing concerns for climate change and long-term sustainability at a global level, whereby the goal is 100 percent energy use from wind, solar, and hydropower sources. Apart from the power sector, heating, cooling, and transport are the other key sectors where fossil fuels need to be gradually replaced with renewables.

Given the fundamental links between the energy sector and the economy, the future of the energy transition and the trajectory of countries' economies, as well as international trade,

will inevitably go hand in hand. One can think of five D's when analyzing what is shaping the economy and the energy transition:

- Democratization;
- Digitalization;
- Decarbonization;
- Decentralization; and
- Deregulation.

Moving forward, several key challenges to the energy transition are likely to emerge, including:

- Multi-level and multi-party cooperation: The current complexity of the governance system would need further cooperation among various parties involved in the energy transition process at all levels, whether it is the European Union, states, regulators, distributors, stakeholders, or transmission system operators;⁵⁰
- Digitalization: Cybersecurity in energy will inevitably have cascading effects in other sectors such as finance and transport;⁵¹
- Investment and innovation: Previously centralized energy systems are increasingly moving toward decentralized structures—smart technologies, data-centricity, and the electrification of transport are all expected to become key features of these emerging systems. This transition will happen with innovation and appropriate investment to manage data and empower prosumers and renewable energy cooperatives;
- Fairness and universal access: No person and no country should be left behind. In other words, the energy transition must be designed in a fair manner; and
- A global level playing field: For instance, the objectives of the Paris Agreement on climate change would need to be in line with the objectives of future legislation on clean

energy. In the same vein, the objectives of the Paris Agreement must be aligned with those of future trade and investment legislation, as well as of the international trade and investment regimes.⁵²

Just as the remarkable improvement in quality of life after World War II was largely due to the expansion of world trade, one can use the international trading system—whether bilaterally, regionally, plurilaterally, multilaterally, or in any other form—to help mitigate climate change and enhance sustainable energy. If multilateralism is currently in crisis, plurilateralism and decentralized government can be an effective, alternative platform to promote the links between trade and climate change action by ensuring that major greenhouse gas emitters conclude agreements between major economies that liberalize green goods and services.

Another item worth exploring is how a General Agreement on Trade in Energy might be structured to promote sustainable energy worldwide. Examining how a Sustainable Energy Trade Agreement, as suggested by the International Centre for Trade and Sustainable Development, might help to reconcile trade and climate change policies might also pay dividends.⁵³ Such a plurilateral agreement would cover the liberalization of trade in climate change friendly goods and services under Annex 4 of the WTO Agreement and would include a critical mass of major economies and greenhouse gas emitters, either in the context of the WTO or outside of it. All forms of energy should be subject to the same rules—and energy should become part of the WTO agenda. But fundamentally, the opportunity for progress on climate change and trade liberalization centers on a shift from top-down modes of engagement to bottom-up strategies. National governments may be floundering, but mayors, governors/premiers, and corporate leaders are not—nor is the public at large. Let's give them a chance to lead.

Notes

¹ Rafael Leal-Arcas, “Sustainability, common concern and public goods,” *The George Washington International Law Review* 49, no. 4 (2017): 816-822.

² Walter Leal Filho and Rafael Leal-Arcas, eds., *University Initiatives in Climate Change Mitigation and Adaptation* (Springer, 2018). It is remarkable to see the transformation of climate change agreements in terms of governance structure in such a short period of time: in less than 20 years, the 1997 Kyoto Protocol as an example of a top-down approach to climate change mitigation, and the 2015 Paris Climate Change Agreement as an example of a bottom-up approach to climate change mitigation. For an analysis of the Paris Climate Change Agreement, see Daniel Bodansky, “The Paris Climate Change Agreement: A new hope?” *American Journal of International Law* 110, no. 2 (2016): 288-319; Bryan H. Druzin, “A Plan to strengthen the Paris Climate Agreement,” *Fordham Law Review Res Gestae* 84 (2016): 18-23.

³ It is interesting to see the conceptual evolution of this phenomenon over time. Initially, one referred to an energy user, then consumer, then customer, and now prosumer. For an analysis of prosumers, see Rafael Leal-Arcas, Feja Lesniewska, and Filippos Proedrou, “Prosumers: New Actors in EU Energy Security,” *Netherlands Yearbook of International Law* 48 (2017): 139-172.

⁴ US Trade Representative Robert Lighthizer has repeatedly made the point that the WTO needs to be reformed and that US trade policy has gone in the wrong direction since the creation of the WTO. See Shawn Donnan, “We need to talk about the Lighthizer Doctrine,” *Financial Times*, February 12, 2018, <https://www.ft.com/content/7335e48c-0fe7-11e8-8cb6-b9ccc4c4dbbb?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8#myft:notification:daily-email:content>.

⁵ After the United States decided to withdraw from the Trans-Pacific Partnership, which never entered into force, it was agreed in January 2018 that negotiations would start on a new trade agreement called the Comprehensive and Progressive Agreement for Trans-Pacific Partnership. To see the newly agreed text, see “Comprehensive and Progressive Agreement for Trans-Pacific Partnership,” legally verified text released February 21, 2018, <https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-concluded-but-not-in-force/cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership-text/#chapters>. Crucial side letters were not yet available as of February 2018; The following is evidence that plurilateralism, as opposed to multilateralism, seems to be the way forward in international trade negotiations: In December 2017, during the WTO Ministerial Conference in Buenos Aires, some, but not all, WTO Members (an example of plurilateralism) issued joint statements that were signed by subgroups of WTO Members. The aim of these plurilateral statements was to deal with specific topics, including informal work programs for Micro, Small and Medium Enterprises (WT/MIN(17)/58/Rev.1), investment facilitation (WT/MIN(17)/59), electronic commerce (WT/MIN(17)/60), fossil fuel subsidies (WT/MIN(17)/54), as well as on services domestic regulation (WT/MIN(17)/61) within the WTO Working Party on Domestic Regulation. For an analysis of plurilateral governance in climate change, see Rafael Leal-Arcas, “Alternative Architecture for Climate Change – Major Economies,” *European Journal of Legal Studies* 4, no. 1 (2011): 48-50.

⁶ Anecdotal, it is interesting to note that more people signed an anti-TTIP campaign in the United Kingdom—which is known as a free-trade country—than in France—which is known as a protectionist nation. See *The Economist*, “The politics of trade deals: Not so global Britain,” *The Economist*, February 10, 2018, 27-28.

⁷ The Economist, “Banyan: Trading places,” *The Economist*, January 27, 2018, 47.

⁸ Joshua S. Goldstein, *International Relations* (New York: Pearson-Longman, 2005), 107.

⁹ Daniel Esty of Yale Law School has developed 10 mega-trends of the 21st century, one of which is a bottom-up approach to climate action; Rafael Leal-Arcas, “A Bottom-Up Approach for Climate Change: The Trade Experience,” *Asian Journal of Law and Economics* 2, no. 4 (2011): 1-54. Leal-Arcas, “A Bottom-Up Approach.”

¹⁰ Leal-Arcas, “A Bottom-Up Approach,” 25-29.

¹¹ For analyses of democracy, see Patrick Deneen, *Why Liberalism Failed?* (New Haven: Yale University Press, 2018); David Frum, *Trumpocracy: The corruption of the American Republic* (New York: HarperCollins, 2018); Steven Levitsky and Daniel Ziblatt, *How Democracies Die: What history tells us about our future* (New York: Crown Publishing, 2018).

¹² Rafael Leal-Arcas, “Empowering citizens for common concerns: Sustainable energy, trade and climate change,” *GSTF Journal of Law and Social Sciences* 6, no.1 (January 2018): 1-37.

¹³ Lucia Reisch, “Nudging Europe’s Energy Transformation,” *The Globalist*, August 20, 2012. <https://www.theglobalist.com/nudging-europes-energy-transformation/>.

¹⁴ Reisch, “Nudging Europe’s Energy Transformation.”

¹⁵ Hans-Arild Bredeesen, Terje Nilsen, and Elizabeth S. Lingjærde, *Power to the People: The first 20 years of Nordic power-market integration* (Oslo: Nord Pool Spot, 2013).

¹⁶ Daniel C. Esty and Michael E. Porter, “Pain at the Pump? We Need More,” *The New York Times*, April 27, 2011.

¹⁷ Nielsen, “Green generation: Millennials say sustainability is a shopping priority,” May 11, 2011, <https://www.nielsen.com/uk/en/insights/news/2015/green-generation-millennials-say-sustainability-is-a-shopping-priority.html>.

¹⁸ The Globe & Mail, “Mayors Get Things Done. Should They Run the World?” March 11, 2014, <https://www.theglobeandmail.com/opinion/ideas-lab/should-mayors-lead-the-world/article17275044/>.

¹⁹ See “World’s Population Increasingly Urban with More than Half Living in Urban Areas,” *U.N. Department of Economic & Social Affairs*, July 10, 2014, <http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html>; By 2050, 70% of the world’s population is expected to live in cities. See Mark Wilson, “By 2050, 70% of the World’s Population Will Be Urban. Is That a Good Thing?” *Co.Design*, March 12, 2012, <https://www.fastcodesign.com/1669244/by-2050-70-of-the-worlds-population-will-be-urban-is-that-a-good-thing>; United Nations Environment Programme, “Resource efficiency as key issue in the new urban agenda: Advancing sustainable consumption and production in cities,” accessed November 1, 2018; Richard Dobbs, Sven Smit, Jaana Remes, James Manyika, Charles Roxburgh, and Alejandra Restrepo, *Urban World: Mapping The Economic Power Of Cities* (McKinsey Global Institute, March 2011), https://www.mckinsey.com/~media/McKinsey/Featured%20Insights/Urbanization/Urban%20world/MGI_urban_world_mapping_economic_power_of_cities_full_report.ashx; UNEP-DTIE Sustainable Consumption and Production Branch, *Cities And Buildings: UNEP Initiatives and Projects*. Paris: United Nations Environment Programme, undated, http://www.oas.org/en/sedi/dsd/Biodiversity/Sustainable_Cities/Sustainable_Communities/Events/SC%20Course%20Trinidad%202014/ModuleVI/2.%20Cities%20and%20Buildings%20%E2%80%93%20UNEP%20DTIE%20Initiatives%20and%20projects_hd.pdf, 5.

²⁰ R20, “Regions of Climate Action,” date accessed November 1, 2018. <http://regions20.org/>.

²¹ SUSTANIA, “Explore 100 City Solutions for a Greener and Fairer Future,” accessed November 1, 2018; C40 Cities, *Powering Climate Action: Cities as Global Changemakers*, 2015, https://issuu.com/c40cities/docs/powering_climate_action_full_report.

²² Jochen Monstad, “Urban Governance and the Transition of Energy Systems: Institutional Change and Shifting Energy and Climate Policies in Berlin,” *International Journal of Urban and Regional Research* 31, no. 2 (2007): 326-343; See subnational climate change partnerships and initiatives including C40 Cities, “The Power of C40 Cities,” accessed 31 March, 2019, <https://www.c40.org/cities>; ICLEI, “ICLEI-Local Governments for Sustainability,” accessed March 31, 2019, <https://www.iclei.org>; and Global Covenant of Mayors, “Global Covenant of Mayors for Climate & Energy: Who We Are,” accessed March 31, 2019, <https://www.globalcovenantofmayors.org/about/>.

²³ See SUSTANIA, “Sub-Saharan Africa’s First Light-Rail Train,” accessed November 1, 2018, <https://solutions.sphaera.world/solutions/energy-efficient-transportation-for-cities100/building-blocks/sub-saharan-africa-s-first-light-rail-train>.

²⁴ See The Consumer Goods Forum, “Our Initiatives,” accessed November 1, 2018, <https://www.theconsumergoodsforum.com/>.

²⁵ Oliver Milman and Jonathan Watts, “One nation, two tribes: opposing visions of US climate role on show in Bonn,” *The Guardian*, November 9, 2017, <https://www.theguardian.com/environment/2017/nov/09/bonn-climate-change-talks-us-two-tribes>.

²⁶ By energy democratization, we mean a situation where regions and consumers gradually become more self-sufficient in their access to energy; Leal-Arcas, “Empowering citizens for common concerns: Sustainable energy, trade and climate change”; Rafael Leal-Arcas, Feja

Lesniewska, and Filippou Proedrou, “Smart grids in the European Union: Assessing energy security, regulation & social and ethical considerations,” *Columbia Journal of European Law* 24, no. 2 (2018).

²⁷ See, e.g., Malcolm Gladwell, *The Tipping Point: How Little Things Can Make a Big Difference* (Boston: Back Bay Books, 2002).

²⁸ Gordon Walker, “What are the barriers and incentives for community-owned means of energy production and use?” *Energy Policy* 36 (2008): 4401-4405.

²⁹ Thomas, Bauwens, Boris Gotchev, and Lars Holstenkamp, “What drives the development of community energy in Europe? The case of wind power cooperatives,” *Energy Research & Social Science* 13 (2016): 136–147.

³⁰ According to Stanford University researchers, “utilities around the world can rely on multiple methods to stabilize their electricity grids in a shift to 100% wind, solar, and hydroelectricity.” See Taylor Kubota, “Jacobson study shows multiple paths to grid stability in 100% renewable future,” *The Energy Mix*, February 14, 2018, <http://theenergymix.com/2018/02/14/jacobson-study-shows-multiple-paths-to-grid-stability-in-100-renewable-future/>.

³¹ For an initiative in this direction towards energy cooperation between the North Seas countries, see Benelux, “The North Seas Countries’ Offshore Grid Initiative,” accessed November 2, 2018, <http://www.benelux.int/nl/kerntemas/holder/energie/nscogi-2012-report/>. Similar thinking is taking place for the creation of a single, shared 5G wireless network. See “Telecoms: Next-generation thinking,” *The Economist*, February 10, 2018, 11-12.

³² Think for instance of the polymer problem, where having proper waste-management systems makes a difference to solve it. See “Plastic Pollution: Too much of a good thing,” *The Economist*, March 3, 2018, 50-52.

³³ Leal-Arcas, Lesniewska, and Proedrou, “Prosumers,” 21.

³⁴ Craig Morris and Arne Jungjohann, *Energy Democracy: Germany’s ENERGIEWENDE to Renewables*, Imprint: Palgrave Macmillan, Cham, 2016; Patrick Devine-Wright, “Energy citizenship: Psychological aspects of evolution in sustainable energy technologies,” in *Governing technology for sustainability*, ed. Joseph Murphy (Earthscan, 2007), 57-88; Kristina Orehounig, Ralph Evins, and Viktor Dorer, “Integration of decentralized energy systems in neighbourhoods using the energy hub approach,” *Applied Energy* 154 (2015): 277-289; Noshin Omar, *Future and Emerging Technologies: Workshop on Future Battery Technologies for Energy Storage* (Luxembourg: European Union, 2018).

³⁵ See Breakthrough Energy, “Reliable, Affordable Energy for the World,” accessed November 2, 2018, <http://www.breakthroughenergycoalition.com/en/index.html>.

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⁴⁶Axel Berger, Clara Brandi, Dominique Bruhn, and Manjiao Chi, “Towards “Greening” Trade? Tracking Environmental Provisions in the Preferential Trade Agreements of Emerging Countries,” Discussion Paper 2/2017, *Deutsches Institute fuer Entwicklungspolitik* (Bonn: DIE, 2017.)

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⁴⁸ Daniel C. Esty, “Red Lights to Green Lights: Toward an Innovation-Oriented Sustainability Strategy,” in *Better Planet: 40 Big Ideas or a Sustainable Future*, ed. Daniel C. Esty (New Haven: Yale University Press, 2019), 93-103.

⁴⁹ Steven Pinker, *Enlightenment Now: The case for reason, science, humanism, and progress* (New York: Viking, 2018).

⁵⁰ A lot of these transmission system operators are naturally regional, not national.

⁵¹ An example is the potential risk of cyber-attacks associated with autonomous vehicles. “Reinventing wheels,” Special Report, *The Economist*, March 3, 2018, 6.

⁵² For the specific case of energy trade, see Rafael Leal-Arcas, Nelson Akondo, and Juan Alemany Rios, “Energy trade in the MENA Region: Looking beyond the Pan-Arab electricity market,” *Journal of World Energy Law and Business* 10, no. 6 (2017): 520-549; Rafael Leal-Arcas, “Energy Transit in the Caucasus: A Legal Analysis,” *Caucasus International* 6, no. 2 (2016): 53-74; Rafael Leal-Arcas, “How Governing International Trade in Energy Can Enhance EU Energy Security,” *Renewable Energy Law and Policy Review* 6, no. 3 (2015): 202-219; Rafael Leal-Arcas, Costantino Grasso, and Juan Alemany Rios, “Multilateral, Regional and Bilateral Energy Trade Governance,” *Renewable Energy Law and Policy Review* 6, no. 1 (2015): 38-87.

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