

## BOOK REVIEWS

*A Guide to EU Renewable Energy Policy: Comparing Europeanization and Domestic Policy Change in EU Member States*, edited by Israel Solorio and Helge Jörgens (Edward Elgar, 2017). 360 pages, ISBN 9781783471553.

This edited volume provides an exhaustive review of EU renewables energy policy over the past 40 years. In Chapter 1, the lead authors present the theoretical framework underlying the case studies. They categorize three types of policy interactions, termed “Europeanization:” bottom-up (from countries to EU), top-down (from EU to countries), and horizontal (country to country).

Chapter 2 presents a very informative history of EU renewable energy sources (RES) policy, starting from its beginnings in the late 1970s. The start consisted in “soft steps,” for example, the coordination of indicative energy objectives across member countries. The first significant effort towards harmonization of RES policy took place in the context of the Renewable Energy Directive (RED) in 2009, which was a cornerstone of EU energy policy. The process underlying the RED was an effort to define a post-Kyoto strategy for climate change, in which the EU took the lead, given the passivity of the United States on this issue. The RED established the now-famous “20-20-20” rules (by 2020, a 20 percent reduction of greenhouse gas emissions relative to 1990, a 20 percent increase in energy efficiency relative to projections in 2007, and a 20 percent share of renewables in total energy supply). These targets are binding. The burden is shared across individual member countries based on GDP per capita and early investments in RES. The RED also included a 10 percent target for RES in the transportation sector, which could be achieved in different ways (e.g., biofuels or electric cars). Currently, the EU overall and the majority of countries are on track towards achieving these goals.

In the wake of the failed Copenhagen Accord in December of 2009 and the economic and financial crises, support for renewable energy policy has decreased. The road to define 2030 targets was marked by disputes about the level of harmonization and the cost-effectiveness of different ways to combat climate change. The faction advocating for a more “technology-neutral” policy and more flexibility for member countries ended up with a majority. The result was an ambitious greenhouse gas reduction target for 2030 of 40 percent relative to 1990, combined with not particularly stringent targets of 27 percent for both energy efficiency and overall share of RES. The authors seem to disagree with this decision and to prefer more harmonized rules, including more ambitious goals for renewables than those embedded in the 2030 agenda. However, since they also argue that the main force underlying EU renewables policy has always been climate change, it is not clear (at least to me) why renewables support should be a goal per se rather than a means to an end.

Chapters 3-12 contain a collection of case studies about RES policy in ten EU countries, applying the framework of the three levels of Europeanization discussed in Chapter 1. The case studies start with Germany, which instituted a system of feed-in tariffs in the 1990s. This was in opposition to the wishes of the EU, which considered feed-in tariffs a form of distortive state aid. By the time the EU enacted the RED in 2009, feed-in tariffs were an established “fact on the ground.” As a consequence, the RED left to member countries’ discretion choices about how to support RES, rather than enforcing tradable certificates as originally envisioned. Germany thus engaged in successful “foot-dragging” by delaying harmonized EU rules that likely would have established an EU-wide system of green transferable certificates. It also engaged in horizontal Europeanization by promoting its system of feed-in tariffs as a model for other countries. However, over time the EU reinforced its commitment to harmonization and in 2014 ruled that after an introductory period, feed-in tariffs would no longer be accepted and that tradable certificates would eventually have to take their place. Germany responded by significantly restricting the use of feed-in tariffs, which is

an example of top-down Europeanization. In the context of renewables support for transportation (RES-T), Germany engaged in a similar strategy of foot-dragging by preventing EU-wide rules that would have limited the possibility of tax exemptions for biofuels. The chapter concludes that in recent years, Germany no longer acts as a leader in European renewable policy, but has instead become a follower.

The Netherlands (chapter 4) was a leader in RES policy during the 1990s, often setting the pace for Europe. After the change in government from the political left to the right, the Netherlands became more passive in the development of RES policy in Europe and engaged in strategic foot-dragging to protect the interests of its (mainly coal- and gas-based) electricity sector. The Netherlands successfully lobbied for waste incineration to be included in the definition of renewables, thus lowering its burden share in the 20-20-20 effort. In the realm of RES-T, the Netherlands largely acted as a follower.

Denmark, discussed in chapter 5, has consistently been a frontrunner in RES for electricity (RES-E), especially in terms of wind power and has engaged both in bottom-up and horizontal Europeanization. The chapter argues that Denmark's position is partly due to ideology, but importantly also due to industrial interests as Denmark has become one of the world's top producer of wind turbines. Its electricity sector is set to become completely renewable by the year 2035. In contrast, Denmark has been rather passive in the arena of RES-T due to widespread skepticism towards first-generation biofuels (which, unlike second-generation fuels, are based on crops).

Chapter 6 argues that the UK managed to shape EU RES policy like no other country. Because its domestic energy policy has always been centered on fossil fuels from the North Sea, the UK has never been a supporter of RES. To avoid adaptation costs, the UK has successfully engaged in bottom-up lobbying of EU RES policy by "debilitating EU policies." Despite this foot-dragging attitude, the UK has acted as a policy pacemaker in terms of RES support schemes. One example is its own system of transferable green certificates, which it has successfully "uploaded" to EU policy. In the realm of biofuels promotion, the UK has engaged mostly in horizontal Europeanization by instituting tax exemptions and consumption standards. Overall, the authors of the chapter do not take a kind view of the UK's legacy for RES promotion and blame it for the relatively lax RES targets in the 2030 goals.

Europeanization in the Italian context (chapter 7) mainly occurred in a top-down sense, as national RES policy was shaped by EU legislation. However, the national policies implemented the EU goals only imperfectly, due to a disagreement among various interest groups and frictions in the political process. Italy was also influenced horizontally by policies enacted in Germany, Spain, and France. Despite the inefficient implementation of RES policy, however, Italy is on track to fulfill its national targets by 2020.

Unlike Italy, Spain served as a frontrunner and pacesetter in EU-wide negotiations about RES-E. Chapter 8 focuses on this "circular" way of Europeanization that was key to the Spanish context. Europeanization changed the relevant market structures for renewables (e.g., by liberalizing the electricity market). As a consequence, Spain emerged as one of the champions of renewables generation in Europe and the world. But Europeanization also led to domestic resistance, especially in the context of RES-T. Similar to Germany, but due to domestic rather than EU pressure, the feed-in tariff approach has been abandoned in favor of more flexible instruments.

The dominance of nuclear power resulted in France (chapter 9) acting as a fence-sitter and foot-dragger towards top-down support of RES-E. Over time, France was horizontally influenced by German support for feed-in tariffs, which were eventually adopted for solar, but not wind electricity in France. Due to the traditional focus on agricultural policy, France has been a frontrunner and policy-shaper in the context of biofuels. The French case is a clear example that national policy interests and the political culture are key to the qualitative effects of Europeanization.

Poland (Chapter 10) is known for its opposition to climate change legislation. Its strategy of foot-dragging is described as ineffective with regards to the overall policy direction and the 2020

goals, but quite effective in the context of the 2030 goals (i.e., the lack of stringency for RES-E standards). Poland readily adopted EU policy that supported first-generation biofuels as it viewed this to be beneficial for its agricultural industry, but switched to ineffective foot-dragging when the EU changed its support towards second-generation biofuels. Poland was influenced horizontally in that it adopted tradable quotas; however, it largely resisted the implementation of feed-in tariffs due to the nationalized nature of its power system.

Despite their reputation of being environmental laggards, Romania (Chapter 11) and Bulgaria (Chapter 12), were affected significantly by top-down and horizontal Europeanization and both instituted strong support policies for RES-E (and, in the case of Bulgaria, also for RES-T). This led to a rapid expansion of wind and solar electricity, to the point where both countries had exceeded their 2020 targets by the year 2014. More recently, RES-E support has slowed down due to the financial crisis, but also because the speed of EU renewables policy has decreased in terms of explicit RES-E goals.

Chapter 13 concludes that the financial crisis had a strong impact on support for renewable energy, and that the EU “risks paying the costs of being a pioneer of RES-E deployment without gaining the benefits of becoming a leader” and makes the case that the EU should once again take up the leadership role to combat climate change.

The narrowest audience for this book are readers specifically interested in EU renewables policy. It highlights the most important development is support for RES and its consequences in Europe, and it provides an outlook for future opportunities and challenges in this area. Due to the careful theory-based discussion of how policy propagates within and across different levels of government, this book also makes a more general contribution to dynamic policymaking in a federation, especially in settings where the top level of government has limited political power.

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***The Political Economy of Clean Energy Transitions***, edited by Douglas Arent, Channing Arndt, Mackay Miller, Finn Tarp, and Owen Zinaman (Oxford Scholarship Online available free at <https://www.wider.unu.edu/publication/political-economy-clean-energy-transitions-0>, 2017), 631 pages, ISBN: 9780198802242.

The scientific community is convinced that climate change is real and increasingly serious. The economics community is convinced that this externality is a market failure and bemoans government failures to adequately address this thorny issue with efficient policy. This impressive volume on the political economy of climate aims to show that scientific understanding, enabling technologies, and a toolbox of efficient policy ideas will not be enough to achieve policy goals set by the scientific community. They will need to be coupled with an understanding of political economy issues. Human conflicts, tradeoffs, and lags abound in climate change and climate policy. They include conflicting stakeholder goals; conflicting effects across winners and losers; conflicting understanding of climate science and solutions; tradeoffs between the environment and economic development; tradeoffs between efficiency and equity; reconciling who will ride free, who will pay, and whose yard will house the new technology. Meanwhile, all of these challenges must be coordinated internationally, regionally, nationally and locally.

This massive volume is organized as follows. In the introductory chapter, the editors set the stage by noting that the first 20 Conferences of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) accomplished little. However, the 2015 COP21 in Paris signaled a shift in strategy from a “top down” to a “bottom up” approach. Instead of assigning emissions targets across players, the new approach is for countries to make offers for emission reduction

called Intended Nationally Determined Contributions (INDCs). The sum of the currently more than 160 published offers yields the global emission targets. Each country chooses how to achieve their own targets. These targets coupled with impressive improvements in renewable energy technology, a deeper appreciation for the perils of climate change in the developing world, and issues and local externalities in developing large fossil fuel systems in rural areas make the editors more hopeful that we have entered a second and more productive stage in climate policy.

Because large scale energy infrastructure lasts a long time and CO<sub>2</sub> in the atmosphere lasts even longer, the timing of the transition to a carbon free energy system is critical. In chapter 2, one of my favorites in the book, Sovacool considers past energy transitions and cites arguments in favor of long, drawn-out transitions taking many decades and some transitions that are much shorter affairs. He argues that both may be the case with speed depending on the inertia in the system and when the transition is measured. Such transitions typically transpire as a complex series of steps with some steps more or less significant and some taking shorter or longer times. Additionally the transitions may be path dependent and involve lock-in. He winds up the chapter on an optimistic note with 10 case studies of transitions taking less than two and a half decades.

To learn from others' successes and failures, the book then presents 27 detailed case studies divided across 7 sections: climate policy, institutions and governance, actors and interests, incumbency, sector reform, social inclusion, and regional dynamics.

*Climate Policy* has three papers on classic problems in climate policy. In chapter 3, Jenkins and Karplus consider political constraints that have hampered governments from pricing carbon, including incurring immediate costs for future benefits of uncertain size, a divergence between private and public costs, and large stakeholders with high costs from carbon pricing policies putting up strong opposition. The authors build a partial equilibrium model that combines a CO<sub>2</sub> price with some distribution of revenues that might yield policies closer to efficient than the current plethora of command and control policies or carbon prices far below the level needed for climate control. They simulated two cases for four political economy constraints, finding that subsidizing renewables can improve welfare in the carbon price and energy price constraint cases, while direct lump sum transfers under limits to losses for producer or consumer surpluses can yield efficient mitigation.

In chapter 4, Bueb, Hanania, and Le Clézio look at carbon pricing and solutions to carbon leakage. With leakage, carbon policies are weakened as industries in countries with a carbon price may lose business or businesses may even move to countries with lower carbon prices and more lax environmental regulation. An obvious but complicated solution to this problem is a border carbon adjustment (BCA) that equalizes product prices across countries so all represent the same embedded carbon price. Their discussion includes types of leakage, the most common BCAs under a carbon tax and under tradeable permits, issues in evaluating carbon content, potential challenges under international law, along with their pros and cons and a need to use the funds to support more sustainable production.

In Chapter 5, Gawel, Strunz, and Lehmann use a Public Choice framework to assess the successful German energy transition, considering what policies were chosen and why. In this framework, policies arise out stakeholder interests and require rent management across stakeholders. Policy starts with the choice of instruments followed by ongoing adaptations to improve policy outcomes. The authors outline a variety of potential policy instruments, some of their characteristics, their rent management potential, and their application in Germany. Renewable electricity generation support in the form of feed in tariffs (FITs) was chosen as less likely to be opposed by entrenched fossil utilities than carbon pricing. It provided investment security for renewable producers with the popular perception that cost is largely passed on to ratepayers. They outline incremental policy changes as renewables have become a larger share of the market. They indicate problems and resistance to reduced support from the renewable producers and resistance from legacy producers to pay for the cost of renewable intermittency.

*Institutions and Governance* has six papers. In chapter 6, Četković, Buzogány, and Schreurs compare the development of more mature onshore wind technology with newer offshore wind

technologies across three different types of capitalist economies— simple liberal market economies (UK), simple coordinative market economies (Denmark, Sweden, Netherlands), and compound coordinative market economies (Germany). They characterize these types of economies and detail the development of onshore and offshore wind in these five countries. They hypothesize and find that the coordinative market economies were more successful in promoting onshore wind energy than the liberal market economy. Germany's coordinated and more decentralized political system and Denmark with more decentralized energy market were more successful than the others. Germany and Denmark also have successfully promoted offshore wind but more recently offshore wind has picked up in the UK and Netherlands.

In Chapter 7, Dasgupta, Cian, and Verdolini conduct regression analysis on an unbalanced panel of 20 countries from 1995-2010. They aim to capture the effects of political economy factors on four different innovation variables measured as a share of value added: industrial energy R&D, power R&D, power patents, and environmental patents. Their independent variables are chosen to represent stringency of environmental policy, government institutional quality, political orientation of the government, energy intensive industries relative to the rest of the economy, along with energy prices, trade openness, and fixed effects variables. They test a variety of hypothesis. Some of their findings include policy stringency tends to increase patents but the effects are not so clear on R&D, good governance tends to increase patents and R&D intensity in the power sector, left leaning governments tend to be associated with higher patents, and more energy intensive industries may be associated with more R&D but less environmental patents.

In Chapter 8, Yuliani considers the effectiveness of Indonesian feed in tariffs. After defining FIT policy, outlining some global successes and barriers to FITs, she outlines Indonesian FIT policy, analyzes the success of Indonesia's FIT policy and makes some recommendations. Quantitative data showed a failure to meet the targets set for renewable energy. Qualitative interview data suggested that although the prices and structure of the program seemed adequate, there were difficulties in permitting relating to corruption, complexity of permit requirements, lack of clarity and consistency across multiple government agencies, and difficulties in land acquisition from local communities.

In Chapter 9, Kere develops a theoretical model of biofuel production as a function of variables related to price, market size of demanders, quality of governance, substitute energy sources, macro policies, and land productivity. He applied his model using a fixed effect Tobit model on an unbalanced panel dataset of 112 countries for 2000 to 2012 to predict total biofuel, ethanol, and biodiesel production for all countries, for developed countries, and for developing countries. He also estimated a random effects probit models to predict whether a country has made the decision to produce these fuels or not. In one set of Tobit models on means, he includes origin of their legal system, British, German, Scandinavian, French, or socialist law. Results are mixed, and no statistical testing is done to see if the results varied across the developed and developing countries or across fuels. However, statistical analysis suggested some differences and tendencies. For example, better governance made it more likely a developed country would produce biofuels, but better governance tended to increase the amount of biofuel produced in developing countries. Other results relate to the effect of the production of other renewables, financial maturity, trade openness, market size, and agricultural productivity.

In chapter 10, Sonnenschein focuses on the need to measure the success of government research, development, and demonstration (RD&D) policies to support low carbon technologies. He identifies 27 success indicators used in Nordic countries and divides them into six categories: administrative capacity, environmental effectiveness, technical progress effectiveness, commercial effectiveness, additionality (how does the RD&D add to carbon reduction over business as usual), and other. He then chooses six indicators that are numerical and applicable at the national and program level: RD&D spending, CO<sub>2</sub> emissions, patents, commercial indicators (turnover, exports, and jobs), return on investment (ROI), and the ratio of public to private RD&D. These indicators were ranked by acceptance of stakeholders, ease of monitoring (measurable and available), and robust-

ness against manipulation. He winds up discussing some of the biases that can be created when using indicators for program evaluation.

In chapter 11, Agu and Ogbeide-Osaretin consider Nigeria's outlined policies to promote clean energy but question whether Nigeria has the political will, given its high dependence on oil, or the institutional capacity to implement the policies. From Nigerian government policy and spending, they conclude that institutions set up to promote renewable energy likely failed because of lack of funds and recommend streamlining agencies for better use of funds. They also note that with the heavy reliance on oil exports the government did not take a transition to renewables very seriously. With low oil prices and the threat of a global transition away from oil to renewables, that may change. To facilitate the change, the authors recommend capital investments in clean energy be made at, not only the federal, but also encouraged at the state level, while tax regimes need to be adopted to compensate for falling oil revenues.

*Actors and Interests* has four papers considering how stakeholders and their interests influence the play-out of policies. In Chapter 12, Isoaho, Goritz, and Schulz have a fascinating comparison of clean energy transitions in China and India. They frame their discussion with three political economy forces: leaders are interested in staying in power, the distribution of power within and without governing coalitions, and the institutional structure between national and sub-national governments. Similarities between the countries include a high dependence on fossil fuels, strong reductions in poverty, and commitments towards increasingly competitive modern renewable technologies, yet their transitions have varied. In China a 2005 policy shift to promote non-fossil electricity (hydro, nuclear, solar, and wind) has continued, and they are on track to meet their 2020 targets. Societal pressure to reduce pollution has been strongly supportive of this move, and a re-centralization of government energy management since 2000 has enhanced implementation ability. India has supported solar power since 2008 and wind from even earlier. However, in India there is little social protest against air pollution with economic growth and electricity access given higher social priority. Although implementation is typically at the state/provincial level in both India and China, Indian states have more authority to make policy with a few states much more successful in promoting renewables than others.

In chapter 13, Davidson, Kahrl, and Karplus focus on wind power development in China. They draw on global examples to develop a political economy framework for wind development with its variability, unforecastability, and the potential mismatch between generation location and load centers. Political structure (how centralized the government is and how it chooses to regulate), economic structure relating to markets and price formation, and interests of stakeholders influence how wind power will evolve. The authors divide functions for wind power development into capacity planning, price formation, dispatch and balance, and the promotion of renewables. The Chinese national government has a role in all functions; other stakeholders with more limited roles are local governments, private wind generators, thermal generators, and the grid companies. The authors provide an enlightening discussion of how Chinese central policy has played out to deliver the highest capacity of wind power in the world with the highest percent of wind power curtailment. Included in their discussions are the Chinese planning and approval process, support mechanisms and controls, cost recovery, balancing and dispatch, and unintended side effects.

In chapter 14, Rennkamp and Bhuyan outline political conditions and justifications often associated with nuclear programs (secrecy, national security, technocratic tendencies, government intervention, centralized energy systems, and strong political authority over both the opposition and civil society) and apply them to the nuclear program in South Africa. They outline the evolution of South Africa's nuclear power industry, which started production in the 1980s. With the end of apartheid, the new government opposed nuclear power but gradually came around as a pro-nuclear coalition lobbied for its expansion. In 2011 the government renewed plans to build six new nuclear plants (9.6 GW), about a 25% increase over current capacity. These plans fomented strong public debate. From media and policy documents, along with interviews, the authors identified 55 organi-

zations, 24 arguments for and against, and various coalitions. The most controversial issue was cost, followed by safety and job creation. The authors suggest that nuclear relies on support of pro-nuclear coalitions and the political conditions they set forth at the outset. Although smaller, these coalitions had higher stakes with stronger government support. It is not clear if these results still hold. Since publication, the South African 2018 integrated resource plan to 2030 does not include any additional nuclear capacity <http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/south-africa.aspx>.

In chapter 15, Heshmati and Abolhosseini note the European Union's desire to simultaneously diversify its energy supplies away from Russian natural gas and nuclear. They consider alternative sources of natural gas (e.g. Iran) and their political implications. The authors argue that green energy can help both security and climate issues. They review the interplay between natural gas and renewables, compare recent costs of renewable power to other sources, look at recent changes in global wind and solar power generation by major world region, present security indices relating to fuel mix and import share over time for major European countries through 2014, and conclude with some general policy prescriptions: reduce dependence on Russian natural gas, help develop infrastructure and better political relations with alternate suppliers, and continue to push for more renewables, more energy efficiency, and more power interconnection to deal with renewable intermittency.

*Incumbency* has three papers on the tension between entrenched high carbon sources and new low carbon entrants. In chapter 16, Astoria considers how the legal and institutional framework are designed in favor of fossil incumbents over new green entrants in Wisconsin. His motivation is a rate case in which WE Energies requested and was granted regulatory approval for increased electricity tariffs that threatened the viability of household-generated distributed solar power. The new tariffs generally raised fixed charges for distributed power producers and lowered rates and flexibility for reselling power back to the grid. An ensuing court case by renewable energy advocates achieved partial reversal of the rate increases. The author argues that this case is more than just "monopolistic rent seeking" by the incumbent utility, but rather is symptomatic of the infrastructure inconsistencies between fossil and renewable generation as well as the laws, legal institutions and markets designed for fossil fuel electricity generation. Some of his arguments relating to energy return on investment (EROI), use value, exchange value, and embodied energy are not so likely to appeal to economists. Other arguments including economies of scale for fossil fuel generations, PV systems requiring property rights against shading, and PV production is intermittent better fit economist's world view. In conclusion, the author argues for the reconfiguration of the legal and market system but does not have much to say about what that configuration should look like.

In chapter 17, Eid, Hakvoort, and de Jong focus on the political economy of smart grids. They mention the history of the smart grid concept starting in 1981 and define a typical smart grid as allowing bilateral communication between producers and consumers requiring smart meters, distributed energy sources, batteries or other storage, real time demand management and control, and increasingly, it looks like electric vehicles will be part of the equation. Actors within the grid include public utilities, distribution companies, retailers, aggregators, and customers. They indicate how the smart grid concept is playing out in

- three market scenarios—the USA (a vertically integrated utility in some cases with wholesale competition), the EU (with full retail competition), and China (as a single buyer with multiple producers),
- two price regulation schemes—cost of capital service (or rate of return regulation) used in the USA and China and incentive (or price cap regulation) used in Europe, under
- three smart grid policy approaches and motivations: USA (bottom up to increase reliability and recover investment), EU (hybrid top down or bottom up varying by country for affordability and sustainability of renewables targets) and China (top down to satisfy and sustain power to keep up with demand).

In chapter 18, Asmelash considers progress in reducing fossil fuel subsidies and explores ways to encourage more reduction and preservation of recent successes. He discusses the definition of an energy subsidy, barriers to removal, and intergovernmental nonbinding calls for removals. He calls for multilateral binding agreements and outlines factors needed for a successful multilateral program including agreement on subsidy definition, transparency, buy-in from developing and oil-exporting nations, agreeing on commitments and timelines, and effective enforcement institutions and procedures. He discusses an international institution home for the agreement, which would need: a secretariat, broad international membership, and a forum for negotiations. After an interesting comparison of two final candidates, he concludes in favor of the WTO over the UNFCCC.

*Sector Reform* has four rather varied case studies relating to energy. In chapter 19, Baker looks at the South African renewable independent power producers, whose generation must feed into the cash-strapped incumbent state-owned utility, Eskom, along with the ins and outs of previous electricity policy since apartheid. She begins with a discussion of the mineral-energy complex that controlled the country throughout apartheid and Eskom's role in it. She followed with Eskom's current supply crisis and what led up to it as well as tracing how South African electricity policy has evolved and become more transparent since apartheid. In 2011, South Africa's first integrated resource plan and its renewable program from independent power producers were initiated. From government documents, media articles, and interviews with participants from the electricity, coal, renewable energy sector in 2010 and 2015, she is able to trace out the resulting policy changes and issues, conflicts, turf battles, and successes of these programs.

In chapter 20, Ogunleye considers the 2005 Nigerian power sector reform that strives to unbundle and privatize the state-owned electricity monopoly and develop an effective regulatory framework. He outlines and assesses the reform and the modest progress so far and notes many remaining challenges. Government failures in the reform process include corruption, political interference, and the failure to reform government bureaucracy, leaving coordination and communication problems with overlapping and conflicting authority. Other key problems are lack of agreement on tariffs; an inadequate grid; inadequate funding resulting from collection losses and balance sheet problems of the power sector and funding banks; and a lack of infrastructure to deliver flared gas and large natural gas reserves to the power sector. His recommendations include developing an effective natural gas policy—perhaps with a public-private partnership, developing capable human capital all along the supply chain, investigate ways to improve power sector efficiency, develop cost-based tariffs, provide for adequate funding channels, leverage foreign funding sources, resolve problems of local insurgency and discontent, increase investment in renewable energy, and develop institutions to sustain and extend Nigerian power system reforms.

In chapter 21, Valenzuela and Studer consider Mexico's electricity and climate reforms. Although not in Annex I under the Kyoto Protocol, Mexico made voluntary GHG reduction commitments, was the first such country to pass a climate law, and the first developing country to make INDC commitments under COP21. The authors outline the big shift towards natural gas and policy reforms relating to the sector and their relationship to the above Mexican climate commitments. The Mexican power sector began some liberalization in the early 1990s allowing independent power producers and industry self-supply. Reforms in 2008 set renewable targets and motivated independent renewable power producers. However, 2012 reform targets were not met and a Climate Change Law was passed, which included planning instruments, mandatory emission reporting, gradual subsidy reform, local government obligatory mitigation plans, reconfirmation of previous mitigation targets, introduction of a small carbon tax with the potential for carbon emission trading. The Electricity Act of 2014 furthered the prospect for renewables by creating an independent system operator, a wholesale market, government regulatory oversight, requiring unbundling of the state electricity monopoly, and initiating clean energy mandates with tradeable certificates and clean energy auctions. The authors still question Mexico's commitment to clean energy with recent power sector reductions in GHGs largely the result of the switch to natural gas, while the share of renewables fell significantly



from 1990 to 2013. Further, they suggest Mexican climate policy is more strongly associated with cheap power and development than climate change. Moving forward, they urge that the preference for natural gas be revisited with low gas prices offset by clean energy obligations and higher carbon taxes across the economy.

In chapter 22, Bucaram, Fernández, and Grijalva consider a failed Ecuadorian policy to sell shares called YGCs for a moratorium on developing oil reserves in an Amazonian National Park. One YGC = 1 barrel of oil left in the ground. They begin by explaining the properties of the program initiated in 2007, which was terminated in 2013 after raising less than 10% of the targeted revenue. They quote arguments explaining its failure and use Monte Carlo simulation to argue that Ecuador's original discounted value of the oil reserves using a \$32/bbl price was likely too low, making it likely Ecuador would abandon the agreement when the oil became more valuable. With additional Monte Carlo simulation, the authors valued the YGCs using the value of Certificates of Emission Reductions (CERs) under the clean development mechanism, and found YGC values much lower than the asking price in the initial agreement—again suggesting the program was likely to fail. They also develop a theoretical model for Ecuador to sell property rights to a coalition of buyers that consider harm from oil consumption and want to keep oil in the ground. From their static analysis, they find the optima tied to oil prices and argue that rather than sell promises of non-extraction, they sell property rights to the oil. Then coalition buyers could choose to produce the oil or not depending on the net benefits and harm caused by additional consumption of oil. Such contracts would make clear the property rights and could likely be enforced within existing international law. Lease price would need to be negotiated and could be tied to futures prices, making them more transparent than the failed program.

*Social Inclusion* has three case studies relating to the effect of clean energy programs on the weakest members of society. In chapter 23, Ezeanya and Kennedy consider two intriguing Rwandan policies. One gives pregnant cows to destitute families (Girinka) and a complementary program promotes conversion of cow dung to biogas (2008-2009 Government Biomass Energy Strategy (BES)). They discuss the economic situation, biomass household energy use, deforestation and reforestation, the foreign aid supported BES, and the Girinka program. Because some Girinka households have migrated to using dung for biogas and others have not, the goal of their research was to determine why. From interviews with Girinka households, biogas users acknowledged the benefits of biogas including reduced fuel cost, better health, cleaner cooking environment, reduced cooking and wood gathering effort, some reforestation, and use for lighting. The most important reason for non-adoption was inability to afford the installation cost. While free installation for some may have promoted others to wait in hopes of free installation. Delays in installation, faulty installations, breakdowns, and dangerous leaks were encountered for other households from lack of technicians and spare parts or inability to pay for repairs. Reduction in donor support has slowed the program. Program problems included dangers of open dung pits, dry-season shortages of water for cleaning and for moistening dung, and the daily ration and small stoves not matching some families' cooking needs and preferences. Co-operative projects for enough dung to make a biogas plant viable can have issues with a fair division of biogas that is respected by all members. The authors' recommendations include planning for the withdrawal of donor support, considering public private partnerships for installation and maintenance, providing stronger coordinating across poverty reduction programs, and decentralizing the program down to grass roots level with sub-national government buy-in at the beginning of the program.

In chapter 24, McCormick considers Brazilian programs to increase renewables (large dams, small dams, and biomass) in the Amazon. She outlines some thought-provoking interactions between climate change and these energy developments. If deforestation, Brazil's largest contribution to climate change to date, causes drought, it could affect future programs to promote biomass as well as reduce hydropower production. Both hydro and biomass projects can exacerbate deforestation, and all the implications of these projects are not usually considered when the projects are

planned. With information from media sources, a literature search, and private interviews in the Amazon region, McCormick outlines some of the consequences of other large dam projects and the potential consequences across Brazil (e.g. displacing indigenous people, reducing migrating fish populations, poorer health and living conditions). She outlines some of the conflicts and stakeholder positions that arose out of two large proposed projects in the Amazon Basin. The political economy of these large projects is driven by international interests (lenders, governments, private business, and environment groups), Brazilian national and local governments, the Brazilian private sector (lenders and business), and local communities. The chapter leaves the reader with an appreciation of the complexity of renewable energy programs in the Amazon and the need for energy planning to more carefully consider the long-term effects on the climate as well living conditions of local communities.

In Chapter 25, Kruger, Tait, and de Groot compare a more successful program in Indonesia promoting LPG to a stalled program in South Africa, where electrification was more successful. Similarities in the two countries include: middle income, relatively good infrastructure and industrialization, strong mineral sectors, new democracies, regional hegemony, and goals to provide energy to the poor. Despite these similarities, the authors argue programs to transition poor households to LPG have had dissimilar effects because of political economy: different interests and incentives across different groups, differing formal and informal institutions, and differing cultural values. Indonesia desired to remove kerosene subsidies for low income users to reduce government budget drain. The program started the conversion in 2007 with Pertamina (the national oil company) distributing LPG conversion kits to subsidized kerosene users, and had largely succeeded in the transition by 2013. The alignment of stakeholder interests contributed to the success, as consumers got a better fuel and the lower subsidy cost improved the government budget.

The result was quite different in S. Africa, where a highly successfully electrification program increased electricity access to 80% in 2012 but the LPG program languished for a variety of reasons. LPG is expensive with supply constrained by the market power of the multinational oil companies, while both kerosene and electricity are subsidized. The strong interest of Eskom in South Africa have made electrification the key household energy policy supported by a household cultural bias for electricity as the modern fuel that had been denied to many under apartheid. In both cases, alignment of interests and strong state actors played a key role in the successful programs – Pertamina in Indonesia promoting LPG, and Eskom in S. Africa promoting electrification.

*Regional Dynamics* has three case studies. In chapter 26, Pham Do and Dinar provide a thought provoking discussion on conflicting regional goals over the Mekong River. Uses of the river vary over the riparian countries Cambodia (fishing), Laos (hydropower), Myanmar (potential hydropower exports), Thailand (hydro power and irrigation), Vietnam (agricultural support), and the Yunnan province of China (hydro power and trade route). They outline regional organizations to allow cooperation over managing the river and build a two-player (China and the Lower Mekong Delta countries), two-stage game theory model linking decisions on water use to trade. Their model suggests that such linked decisions will allow greater benefits.

In chapter 27, Puppim de Oliveira and Andrade compare climate policy in two Brazilian states with a focus on aligning international Clean Development Mechanism (CDM) projects with national and sub-national policy. The two states chosen for their study—Rio Grande do Sul and Bahia—both were among the Brazilian states attracting the largest number of CDM projects. From their study of two hydro project implemented under CDM, they concluded that these projects did not do much to promote climate policies or technical capabilities at the local level and made some suggestions to improve their performance.

In chapter 28, Lepesant considered two sub-regional renewable programs within the EU—Brandenburg, Germany's wind program and Aquitaine, France's promotion of forest biomass. He frames his analysis looking at community acceptance in a Federal system at the project level in

Brandenburg, which may be influenced by distributional justice (who wins and who loses) and procedural justice (inclusion of all stakeholders in the process). He looks at market acceptance (adoption and diffusion) of the technology in Aquitaine in a unified state. From his study using secondary data and personal interviews in 2015, he notes increasing consumer opposition in Brandenburg as the cost of power has increased to fund feed-in tariffs and costs entailed in dealing with intermittency. Additional incumbent opposition arose from increased marginalization of lignite. In Aquitaine, pushback came from traditional forest industries concerned whether there will be enough forest biomass, which is exacerbated by forest land taxation policy that does not support active forest management.

The editors conclude the volume by looking forward again suggesting we are entering a second stage in global climate policy. They are more hopeful that stage 2 with a bottom-up approach and more experimenting across countries to meet voluntary INDCs will lead to more successes. However, the INDCs are not enough to reach any reasonable climate targets. They cite four research frontiers to tip us into a more sustainable stage 3. The first is continued technical improvement in clean energy production and distribution supported by enabling policy, regulatory framework, and business model. Second, research to develop pathways at the international, regional, national, and local level that support the climate as well as growth and development. Third, continue to work on how to best create informed climate citizens. Fourth, continue to exploit and develop the best analytical tools and data to inform policy makers on the linkages of energy production/use and land use on climate, economies, health, education, and food production.

I enjoyed this comprehensive volume, although it takes a while to get through it all. I learned from all chapters but my favorites were 2, 12, 13, 14, 17, 22, 23, 24, 25, 26, and 28. Given the difficulties of finding proxy variables for political economy concepts, I was more comfortable and convinced by non-econometric methodologies. Although many of the chapters are primarily verbal, the audience that will benefit most from the volume are those that are familiar with intermediate-level microeconomics and electricity market structures with a strong interest in renewable energy and climate policy. A more general audience, as well as policymakers in other areas, should find the political economy challenges quite provocative. As the price is right—it is freely downloadable—many will want to download it as a reference. The index should be helpful in finding and excerpting information of interest. I expect I will be able to use some of the institutional and policy detail in my energy economics classes. I appreciated the table of abbreviations.

The level and variety of detailed comparison informs the readers on the types of reforms and policies that can be applied, and the political economy issues that can plague even the most ambitious and well-designed programs. The volume reminds economists that markets and efficiency are not the only things to consider when moving into a renewable energy world. Conflicts abound across sectors, energy types, regions, levels of government, and stakeholders. Who wins and loses and whether reforms succeed or fail is heavily dependent on who is holding the cards and how they are playing them. After poring over this volume, it seems that there have been more failures than successes amongst the many examples. I hope the editors are correct in asserting that we are entering a second, more productive, stage in climate policy. Although now more cognizant of the political economy challenges facing climate policy, I remain convinced by William Nordhaus that a carbon tax should be a core part of climate policy. Let us all challenge politicians and policy makers to provide the leadership to overcome the political economy roadblocks to carbon taxation as well as other policies to provide affordable, clean, and secure energy for all.

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