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Nicholas S. Bryner*

PEOPLE OF THE SUN: LEVERAGING ELECTRICITY REFORM TO PROMOTE RENEWABLE ENERGY AND CLIMATE CHANGE MITIGATION IN MEXICO

ABSTRACT

Human activities that impact the Earth's climate are driven, in large part, by energy consumption. Advancements in technology, infrastructure, and industry have been made possible by the use of fossil fuels. In recent decades, recognition of climate change and its causes has increased, coinciding with other, sector-wide transitions in energy generation and use. The interconnected nature of climate and energy issues calls for legal and regulatory frameworks that are better able to integrate these two concerns—effective broad-scale policy on climate must engage with the complex system for regulating energy, and forward-thinking changes in energy policy must address climate externalities on present and future generations.

This article examines Mexico's experience in its efforts to bridge these two policy areas. Since 2012, Mexico has pursued two parallel tracks in policy developments: the enactment of comprehensive legislation on climate change, and constitutional changes related to energy—specifically, the generation of electricity. In 2013, Mexico amended its Constitution to allow for competition in electricity generation, and legislation enacted in 2014 and 2015 have called for rapid restructuring of the country's electricity sector and the creation of a new wholesale energy market. At the same time, Mexico's General Climate Change Act of 2012 establishes ambitious goals for greenhouse gas reduction, including a transition to greater use of "clean energy." The constitutional reform provides a significant opportunity—if appropriately leveraged—for Mexico to make policy changes that will enable the country to play a leadership role in integrating climate mitigation and energy regulation.

INTRODUCTION

In December 2013, Mexico amended several energy-related articles of its national constitution, introducing sweeping reform into the petroleum and electricity

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sectors.¹ These constitutional amendments, designed to reduce inefficiencies in state-run institutions and boost economic growth, represent a significant but controversial change to the country's long-standing practices, and open up the country to investment in areas previously controlled by state-run monopolies. Oil, in particular, has been a symbol of national pride in the country since the sector was nationalized in 1938, and recent petroleum reforms continue to be a politically-sensitive topic.² However, one of the other critical aspects of the national energy reform project is a restructuring of the electricity sector.

In August 2014, the Mexican Congress passed legislation implementing the constitutional changes to the electricity system: the Electric Industry Act (*Ley de la Industria Eléctrica*).³ The Act has been packaged within the Mexican Government's reform as an effort designed to reduce electricity prices, incentivize low-cost generation sources, and promote investment in electricity transmission. Most importantly, it breaks up the vertically-integrated, state-run Federal Electricity Commission (*Comisión Federal de Electricidad*, or CFE), exposing it to competition in the electricity generation sector. The Electric Industry Act reorganizes the regulatory agencies that oversee the Mexican electric industry, creates a national wholesale electricity market, and allows for private investment in state-owned electricity transmission and distribution.⁴

These changes take place in the context of Mexico's actions to promote renewable and/or "clean" sources of energy in the country as a policy response to climate change. In 2012, Mexico's Congress passed the comprehensive General Climate Change Act, including a target of 35% electricity generation from "clean energy" sources by 2024.⁵ The Electric Industry Act, in turn, introduces obligations related to clean energy—very broadly defined—and outlines the creation of a system of clean energy certificates.⁶ In late 2015, an additional statute, the Energy Transition Act, further elaborated this system and incorporated the clean energy targets as a mandatory element of regulatory action.⁷ Thus, the Electrical Industry Act builds on a series of legislation addressing climate change.

What will this broad package of electricity reform in Mexico mean for climate change policy in the country? This article examines Mexico's constitutional reform and new electricity legislation in the context of broader global changes in electricity systems. These shifts include technological changes, such as the advent of smart grid infrastructure; efforts to promote access to electricity; environmental concerns, particularly with regard to climate change; and other disruptive challenges

1. See, e.g., *Mexico: Constitutional Amendment on Energy*, GLOBAL LEGAL MONITOR, LIBR. OF CONGRESS (Feb. 12, 2014), http://www.loc.gov/lawweb/servlet/lloc_news?disp3_l205403863_text.

2. See, e.g., MICHAEL REID, FORGOTTEN CONTINENT: THE BATTLE FOR LATIN AMERICA'S SOUL 74 (2007).

3. *Ley de la Industria Eléctrica* [Electric Industry Act], Diario Oficial de la Federación [DO], 08 de noviembre, 2014. Translations from this Act and from other Mexican sources throughout the paper are the author's, unless otherwise indicated.

4. *Id.*

5. *Ley General de Cambio Climático* [LGCC] [General Climate Change Law], art. 3, DO, 06 de junio, 2012 (Env'tl. Law Inst. trans.).

6. *Electric Industry Act*, tit. I, ch. I, art. 3 (definition of "clean energy"); tit. IV, ch. III, arts. 121–29 (obligations relating to clean energy).

7. *Ley de la Transición Energética* [LTE] [Energy Transition Act], DO, 24 de diciembre, 2015.

to traditional models of electricity service. The restructuring of Mexico's electricity sector has the potential to both reshape the country's role in the region's electricity markets and define Mexico's commitment to climate change mitigation policies—domestic and international.

This article further explores how this new legal framework may impact the possibilities for expanding renewable and other low-emission electricity generation, especially from distributed, decentralized energy resources. Regulation of these reforms at the agency level is still being debated and formed, and the implementation of new electricity markets has just begun in January 2016.

Part I of this article traces the development of Mexico's electricity law and policies prior to the constitutional reform of 2013. Part II introduces the General Climate Change Act of 2012 as the result of a separate movement to define Mexico's national strategy for addressing climate change and set the tone for the country's position in international negotiations on the issue. Part III discusses and analyzes the constitutional reform of 2013, the Electric Industry Act of 2014, and subsequent legislation and implementation of new regulations, including potential synergies for linking electricity reform to climate policy goals. The article concludes with recommendations for a path forward: as Mexico begins to implement these changes, two major challenges will be figuring out how to incorporate lessons learned from other models of electricity regulation and ensuring that the steps taken with these new policies put Mexico on a path toward meeting its climate change goals and commitments.

I. DEVELOPMENT OF MEXICO'S ELECTRICITY LAW AND POLICY: FROM 1917 TO 2014

a. Constitution of 1917

Mexico's current political system dates back to the Constitution of 1917, established during the tumultuous period of the Mexican Revolution.⁸ In 1938, President Lázaro Cárdenas ordered the nationalization of the country's petroleum resources and expropriation of foreign oil developers' assets in Mexico.⁹ Seven-plus decades of federal control over sub-soil minerals and oil have shaped the energy sector as a whole in Mexico, in ways that are still seen today, mainly in the major state-owned enterprise *Petróleos Mexicanos* (Pemex).

The political system in Mexico and its development is not wholly separate from this energy-centered history. From 1929 to 2000, Mexico was governed by a single party with the somewhat oxymoronic name of Institutional Revolutionary Party (PRI). After two successive presidents from the center-right PAN (National Action Party), the country in 2012 again elected a president from the PRI, Enrique Peña Nieto.¹⁰ While facing serious security crises related to the drug trade, organized

8. CONSTITUCIÓN POLÍTICA DE LOS ESTADOS UNIDOS MEXICANOS [C.P.], DO, 5 de febrero de 1917 (Mex.).

9. REID, *supra* note 2, at 74.

10. See, e.g., Randal C. Archibold & Karla Zabudovsky, *New President of Mexico Vows to Focus on Economy*, N.Y. TIMES (Dec. 1, 2012), http://www.nytimes.com/2012/12/02/world/americas/enrique-pena-nieto-takes-office-as-mexicos-president.html?_r=0.

crime, and violence within Mexico, President Peña Nieto campaigned on the promise of a “new direction.”¹¹ During the first half of his six-year term, the President’s popularity and credibility suffered amid corruption allegations and other scandals.¹² However, President Peña Nieto’s administration has devoted significant effort toward broad, government-wide reform programs, including the major push for energy-sector reform that culminated in the 2013 constitutional amendments relating to the petroleum and electricity industries.¹³

b. Traditional Electricity Sector Regulation in Mexico

The basic model for the electricity sector in Mexico, prior to the recent reforms beginning in 2013, was based on a regulated federal monopoly—with limited exceptions—on the generation, transmission, and distribution of electricity throughout the country. Article 27 of the Mexican Constitution (prior to the 2013 amendment) committed electricity to the federal government’s regulatory authority; only the federal government could “generate, transmit, transform, distribute and supply electric energy that is to be used for the public service.”¹⁴ The Public Service of Electric Energy Act of 1975 (*Ley del Servicio Público de Energía Eléctrica*) echoed this constitutional grant of authority, placing all responsibility for meeting the public’s electricity needs in a vertically-integrated state entity, the Federal Electricity Commission (*Comisión Federal de Electricidad*, or CFE).¹⁵ The CFE carried with it, as part of the regulatory compact, a general duty to serve all customers that met basic requirements.¹⁶

In 1992, as part of a broader drive for economic modernization, Mexico agreed to join the North America Free Trade Agreement (NAFTA) with the United States and Canada.¹⁷ As part of NAFTA, Mexico opened up some possibilities for private investment in electricity in the country, but with strict limitations consistent with the constitutional provisions in place at the time. Some commentators have suggested that Mexico maintained its energy sector monopolies (particularly in the case of oil) to counter the United States’ unwillingness to allow more liberalized labor migration from Mexico under NAFTA.¹⁸

11. See, e.g., *One Year After Enrique Peña Nieto’s Election*, WASHINGTON OFF. ON LATIN AMERICA (Jul. 2, 2013), http://www.wola.org/commentary/one_year_after_enrique_pena_nieto_s_election.

12. See, e.g., Carrie Kahn, *Allegations of Corruption Dog Mexico’s First Lady Angélica Rivera*, NPR (Aug. 3, 2015), <http://www.npr.org/sections/parallels/2015/08/03/428171924/allegations-of-corruption-dog-mexicos-first-lady-ang-lica-rivera>.

13. See Diana Villers Negroponte, *Mexican Energy Reform: Opportunities for Historic Change*, BROOKINGS INST. (Dec. 23, 2013), <http://www.brookings.edu/research/opinions/2013/12/23-mexican-energy-reform-opportunities-historic-change-negroponte>.

14. See C.P., art. 27, para. 6 (version no longer in force, published June 6, 2011, available at <http://pdba.georgetown.edu/Constitutions/Mexico/vigente.html>).

15. *Ley del Servicio Público de Energía Eléctrica* [LSPEE] [Public Service of Electric Energy Act], DO, 22 de diciembre, 1975, *abrogated by* Electric Industry Act, DO, 08 de noviembre, 2014.

16. *Id.* art. 25.

17. North American Free Trade Agreement (NAFTA) annex 602.3, proviso.

18. See REID, *supra* note 2, at 296.

As noted above, the Constitution allowed only the State to generate, transmit, and distribute electricity as a “public service.”¹⁹ Under NAFTA, however, the Mexican Government interpreted this constitutional provision as allowing private investment in electricity generation that would be developed exclusively for export (though prohibiting electricity generation for consumers in Mexico).²⁰ Based on this interpretation, Mexico’s Congress amended the Public Service of Electric Energy Act to allow independent electricity generation for exportation, despite the general state monopoly on generation held by the CFE, by excluding it from the statutory definition of “public service.”²¹ While this was intended to allow for both imports and exports across the border (the Public Service of Electrical Energy Act’s amendments also allowed electricity imports for the importer’s own on-site use), the practical effect was that Mexico continued to be a net exporter of electricity to the United States, as European, U.S.-based, and other foreign companies utilized resources in Mexico to reach the U.S. market.²² In 2009, for example, Mexico exported a net amount of over 400,000 MWh to the United States.²³ Overall, however, NAFTA may not have substantially altered the bilateral electricity trade, which already existed between CFE and regional interconnections on the U.S. side of the border in California and Texas.²⁴

Given that transmission and distribution were managed exclusively by CFE, there was still no “market” for electricity in Mexico prior to 2013. However, private participation in generation had opened up under several exceptions, including generation for self-consumption, co-generation, and other limited opportunities for independent generators, mostly on a small scale.²⁵ According to the Instituto de Investigaciones Eléctricas, independent generation accounted for about 23% of installed capacity in 2014.²⁶ Thus, although the basic regulatory structure had not changed, there was significant movement for alternatives to centralized state-run electricity generation.

II. GENERAL CLIMATE CHANGE ACT OF 2012

Amid Mexico’s recent shifts in energy law and policy were efforts to build a legal regime for addressing climate change. In 2010, Mexico hosted the 16th

19. LSPEE, DO, 22 de diciembre, 1975, *abrogated by* Electric Industry Act, DO, 08 de noviembre, 2014.

20. See NAFTA, *supra* 17, annex 602.3, proviso 5; see also José Juan González, *Law and Regulation Governing Electricity Networks in Mexico in the Context of Regional Integrations with North and Central America*, in MARTHA M. ROGGENKAMP ET AL., EDS., *ENERGY NETWORKS AND THE LAW: INNOVATION SOLUTIONS IN CHANGING MARKETS* 41–60 (2012).

21. LSPEE, art. 3, DO, 22 de diciembre, 1975, *abrogated by* Electric Industry Act, DO, 08 de noviembre, 2014.

22. See González, *supra* note 20.

23. *Id.* at 50.

24. *Id.* at 51–52 (describing interconnection with WECC in California and ERCOT in Texas).

25. LSPEE, art. 36, DO, 22 de diciembre, 1975, *abrogated by* Electric Industry Act, DO, 08 de noviembre, 2014.

26. Adrián Inda Ruíz, *Impact of Reforms on the Smart Grid Model of Mexico*, NEWSL. (IEEE Smart Grid), Oct. 2014, <http://smartgrid.ieee.org/october-2014/1162-impact-of-reforms-on-the-smart-grid-model-of-mexico>.

Conference of the Parties (COP) of the UN Framework Convention on Climate Change (UNFCCC)²⁷ for its first meeting since the 2009 Copenhagen COP, a low point in international negotiations.²⁸ Mexico has styled itself as a leader in the subsequent round of climate negotiations, which culminated in the Paris Agreement in December 2015.

In this context, in June 2012, Mexico's Congress passed the General Climate Change Act (*Ley General de Cambio Climático*),²⁹ with the purpose of providing a comprehensive policy outlining the responsibilities of the federal, state, and municipal governments in Mexico.³⁰ The introductory provisions of the General Climate Change Act incorporate language from and tie the country's climate policy to the goals in the UNFCCC—to regulate greenhouse gas emissions so as “to achieve stabilization of their concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”³¹ The Act also calls for reducing the vulnerability of Mexico's people to the effects of climate change and for promoting education, research, and technology transfer and development for both climate change mitigation and adaptation.³²

Building on other laws and regulations that Mexico has developed in the past decade to incentivize renewable energy, renewable energy is a key component of the General Climate Change Act.³³ Some of its most notable provisions are aspirational, listing principles and goals—such as the 35% target of electricity

27. UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, REPORT OF THE CONFERENCE OF THE PARTIES ON ITS SIXTEENTH SESSION, HELD IN CANCUN FROM 29 NOVEMBER TO 10 DECEMBER 2010 (2011), http://unfccc.int/meetings/cancun_nov_2010/session/6254/php/view/decisions.php.

28. Prior to the Copenhagen COP, the UNFCCC developed the “Bali Road Map” in 2007, which envisioned the creation of a new negotiating process on climate change by 2009, to address plans for action following the end of the Kyoto Protocol's first commitment period in 2012. See UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, REPORT OF THE CONFERENCE OF THE PARTIES ON ITS THIRTEENTH SESSION, HELD IN BALI FROM 3 DECEMBER TO 15 DECEMBER 2007 (2008), http://unfccc.int/key_documents/bali_road_map/items/6447.php. The Copenhagen COP in 2009 did not resolve the issues sought in the Bali Road Map; the parties ultimately decided to only “take note” of the 2009 outcome document, the Copenhagen Accord, a recognition that it had failed to meet the international community's expectations. See UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, REPORT OF THE CONFERENCE OF THE PARTIES ON ITS FIFTEENTH SESSION, HELD IN COPENHAGEN FROM 7 DECEMBER TO 19 DECEMBER 2009, Decision 2/CP. 15 Copenhagen Accord (2010), <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf>.

29. LGCC, DO, 06 de junio, 2012, últimas reformas, 13 de mayo, 2015 (Mex.). Subsequent references to the General Climate Change Act are to an English translation published in ENVIRONMENTAL LAW INSTITUTE, WHAT ARE THE NEXT STEPS? LEGAL PERSPECTIVES ON MEXICO'S GENERAL LAW ON CLIMATE CHANGE, 23–67 (2012), <http://www.eli.org/sites/default/files/docs/what-are-the-next-steps.pdf>.

30. LGCC, arts. 1–2, DO, 06 de junio, 2012, últimas reformas, 13 de mayo, 2015. While the General Climate Change Act deals with national policies for both mitigation of and adaptation to climate change, the focus here is on the sections on mitigation and how electricity reform in Mexico may affect these goals and policies.

31. LGCC, art. 2, DO, 06 de junio, 2012, últimas reformas, 13 de mayo, 2015.

32. LGCC, art. 2, DO, 06 de junio, 2012, últimas reformas, 13 de mayo, 2015.

33. See, e.g., Ley Para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética [Act for Renewable Energy Use and Financing the Energy Transition], DO, 28 de noviembre, 2008, últimas reformas, 06 de julio, 2013.

generation from “clean energy” mentioned above³⁴—and setting procedures for developing national strategies and plans. However, the Act is important in creating the institutional framework within the government for addressing these issues and may carry political weight in integrating climate change actions across different agencies and ministries. The goals in the General Climate Change Act create a context in which the climate benefits of electricity and energy sector reforms and other legislation can be evaluated.

a. Clean Energy Goal

The transitory articles of the General Climate Change Act provide bottom-line quantitative goals, charting a path forward for ministries and agencies with regulatory and planning authority and for future legislation in the area. The Act sets a goal for Mexico of 30% GHG emissions reductions by 2020 below business-as-usual (BAU), and 50% by 2050 from a baseline year of 2000.³⁵ However, the legislation specifically refers to this as an “indicative objective or aspirational goal,” limiting its effectiveness to spur specific policies through the rest of the Act.³⁶ Further, this target is explicitly based on an expectation of international mechanisms for financial and technological support from developed countries—consistent with the principles in the UN Framework Convention.³⁷

To meet this goal, the General Climate Change Act calls for the Ministry of Finance and Public Credit to work with the Ministry of Energy and the Energy Regulatory Commission (CRE) to establish an “incentive-based system” to promote “profitable electricity generation through renewable energy, such as wind, sun, and small hydroelectric plants.”³⁸ The Ministry of Energy is then given the charge, along with the CFE and CRE, to “promote that electricity generation from clean energy sources reach at least 35% by 2024.”³⁹

b. Interaction with and Effect on Electricity Sector Law and Policy

In addressing climate change, the General Climate Change Act assigns specific areas of authority to the national government, including the following areas directly or indirectly related to the electricity sector: conservation, management, and sustainable use of natural resources; energy; national development planning; regional and urban development; and other areas as described in relevant laws.⁴⁰ In addition, it lists several key principles for forming national climate change policy,

34. See LGCC, DO, 06 de junio, 2012, últimas reformas, 13 de mayo, 2015.

35. LGCC, trans. art. 3, DO, 06 de junio, 2012.

36. *Id.*

37. *Id.*; see also United Nations Framework Convention on Climate Change, art. 4.3, June 13, 1992 [hereinafter UNFCCC] (on the commitments of Annex II countries—a subset of developed countries—to provide financial resources and transfer of technologies to support climate mitigation efforts).

38. LGCC, trans. art. 3, DO, 06 de junio, 2012. This goal is (at least partially) manifest in the Clean Energy Certificates program established by electricity reform legislation, described *infra* Part III, Section C.

39. LGCC, trans. art. 3, DO, 06 de junio, 2012.

40. *Id.* at art. 7, cl. VI.

several of which could be tied to the management of or changes to the electricity sector, including, among others:

- Sustainability in the exploitation or use of ecosystems and of their natural elements.
- Adoption of production and consumption patterns by the public, social, and private sectors to transition to a low carbon emissions economy.
- Comprehensiveness and cross-sectoralism to ensure implementation of the national climate change policy, focusing on coordination and cooperation among different levels of government and among social and private sectors.
- The use of economic instruments for mitigation, adaptation, and risk/vulnerability in the face of climate change provides incentives for the protection, preservation, and restoration of the environment; the sustainable use of natural resources; and the generation of economic benefits for those implementing them.⁴¹

The General Climate Change Act's call for cross-sectoral approaches, changes in production and consumption patterns, and market-based approaches for climate change mitigation suggests a mandate and path forward for integrating climate considerations into energy policy, especially regarding electricity generation and use. Article 32 of the Act describes "areas of opportunity" for creating national mitigation policies, "prioritizing the sectors with greatest potential for reduction." It calls for an "[a]nalysis of the electricity generation sector" and other sectors in making determinations about what mitigation actions will be most efficient and effective, "including the costs of social and environmental externalities, as well as the costs of emissions in the electric power generation target sources."⁴²

More explicitly, Article 33 lists as objectives of climate mitigation policies the promotion of "the generation of electricity through the use of renewable energy," as well as the promotion of "energy efficiency practices" and "development and use of renewable energy sources."⁴³ Article 34 calls for federal, state, and local government agencies to take "emissions reduction[s] in the generation and use of energy" into account in designing and developing such policies.⁴⁴ Together, these provisions of the General Climate Change Act call for integration of electricity sector policies in furthering plans and strategies for climate change mitigation.

Mexico's Environment Ministry (*Secretaría de Medio Ambiente y Recursos Naturales*, or SEMARNAT) built on this emphasis on electricity generation in climate mitigation in 2013 by issuing its National Climate Change Strategy.⁴⁵ The National Climate Change Strategy lists, as the first of five "strategic axes," a strategy for "accelerating the energy transition toward clean energy sources."⁴⁶ In particular, the strategy includes action points related to energy law, such as strengthening regulatory institutions and economic incentives for clean and more efficient energy

41. *Id.* at art. 26, cls. I, V, VI, IX.

42. *Id.* at art. 32.

43. *Id.* at art. 33, cls. III–IV.

44. *Id.* at art. 34.

45. Estrategia Nacional de Cambio Climático [National Climate Change Strategy], DO, 30 de mayo, 2013.

46. *Id.* at 7.4, M1.

technologies; increasing the penetration of renewable energy through use of smart grid and distributed generation technologies; and encouraging both private and public generators to pursue renewable sources.⁴⁷

c. National Strategies and Planning

The General Climate Change Act creates and reorganizes several entities within the federal government to design and implement policies on climate change. These include an Inter-Ministerial Commission on Climate Change, led by the President through the Ministry of the Environment, with participation of other executive agencies, including the Ministry of Energy.⁴⁸ This Inter-Ministerial Commission is designed to coordinate agency actions and the national government's planning process, including national strategies, proposals for regulation, and recommendations for national positions on climate change issues at the international level.⁴⁹

In addition to these structural changes, in order to assist in planning, designing, and carrying out actions, the General Climate Change Act creates an inventory and registry process for tracking emissions and sets up a fund for channeling investments in climate change mitigation and adaptation.⁵⁰ It also allows for the establishment of "economic instruments" to facilitate compliance climate policy (including both financial instruments and market-based systems), though does not itself create these instruments.⁵¹

d. Mexico's Continued Role and Commitments in International Negotiations

As noted above, the UNFCCC COP hosted in Cancún, Mexico in 2010 was the first in the aftermath of the Copenhagen Accord, and the first in a new round of international climate negotiations that would eventually point toward a longer-term agreement in 2015.⁵² As a part of this process, countries agreed to submit to the UNFCCC their Intended Nationally Determined Contributions (INDCs) in the lead-up to the December 2015 Conference of the Parties in Paris. The INDCs would be used as a "bottom-up" basis for climate change mitigation action beginning in 2020.⁵³

47. *Id.*

48. LGCC, art. 45, DO, 06 de junio, 2012.

49. *See id.* at art. 47.

50. *See id.* at arts. 74–90.

51. *See id.* at arts. 91–95. The electricity reform legislation described *infra* in Part III reflects, at least for the electricity sector, an effort to utilize market-based economic instruments, through the Clean Energy Certificates program.

52. *See* UNFCCC, *Report of the Conference of the Parties on its sixteenth session*, U.N. Doc. FCCC/CP/2010/7 (Mar. 15, 2011), http://unfccc.int/meetings/cancun_nov_2010/session/6254/php/view/reports.php. The following year, at the 17th COP, the "Durban Platform for Enhanced Action" was created, with the goal of adopting "another legal instrument or an agreed outcome with legal force" no later than 2015. *See* UNFCCC, *Report of the Conference of the Parties on its seventeenth session*, U.N. Doc. FCCC/CP/2011/9/Add.1, Decision 1/CP.17 (Mar. 15, 2012), <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=2>.

53. *Intended Nationally Determined Contributions (INDCs)*, UNFCCC, http://unfccc.int/focus/indc_portal/items/8766.php (last visited Jan. 31, 2016).

In March 2015, Mexico became one of the first countries to submit its INDC.⁵⁴ The bottom line of Mexico's INDC is an "unconditional" commitment to reduce GHG emissions by 25% from business-as-usual (BAU) levels by the year 2030. Mexico's BAU baseline for calculating emissions targets presumes a growth pathway that would occur in the absence of the 2012 General Climate Change Act.⁵⁵ The use of a BAU baseline—higher than current levels—creates an easier target, as a BAU projection allows Mexico's absolute level of emissions to rise for the next decade until a peak in 2026. For this reason, Mexico's commitment to reduce GHG emissions by 25% from BAU may seem like a backtracking of commitments from the 2012 legislation.

However, Mexico's INDC is significant in that it commits the country to both "unconditional" and "conditional" reductions.⁵⁶ In other words, Mexico agrees to take on some obligation—the 25% reduction from BAU—regardless of international action, and is willing to extend that commitment based on supplementary international action. "[S]ubject to a global agreement addressing important topics including international carbon price, carbon border adjustments, technical cooperation, access to low-cost financial resources and technology transfer," the reductions could be as much as 40% below BAU by 2030.⁵⁷ Thus, Mexico could achieve notable reductions through the conditional obligations in its INDC.

The key to Mexico's climate policy, looking forward, is that the country views this commitment as a first step in addressing climate change: the INDC states that it is "consistent with Mexico's pathway to reduce 50% of emissions by the year 2050, with respect to the year 2000, as mandated by the [General Climate Change Act]."⁵⁸ By referencing the General Climate Change Act, the country signaled that it has internalized the legislative commitment, and will build on it to address climate change through an integrated patchwork of legislation, constitutional reforms, and international commitments.

III. CONSTITUTIONAL REFORM, THE 2014 ELECTRIC INDUSTRY ACT, AND THE 2015 ENERGY TRANSITION ACT

a. Constitutional Amendments

Mexico's constitutional reforms on energy took effect on December 20, 2013, having been approved by a two-thirds majority in the Senate and House of

54. GOV'T OF MEX., INTENDED NATIONALLY DETERMINED CONTRIBUTION, (2015), <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Mexico/1/MEXICO%20INDC%2003.30.2015.pdf>.

55. *Id.* at 3.

56. *Id.* at 2.

57. *Id.* at 2.

58. *Id.* Mexico's General Climate Change Act listed the "aspirational" goals of 30% GHG reductions (from the baseline level) by 2020, and 50% GHG reductions from 2000 levels by 2050. Similar to the conditional goals in the INDC, the statute makes the 2020 and 2050 targets subject to the establishment of international mechanisms for financial and technological assistance. *See* LGCC, art. 2, DO, 06 de junio, 2012.

Representatives, as well as the legislatures in a majority of states.⁵⁹ The reform amended several provisions of Articles 25, 27, and 28 of Mexico's Constitution.⁶⁰ These changes included major shifts in the electricity sector, as well as for petroleum and other hydrocarbons in the country. Overall, the Mexican Government described the objective of the energy reform program to "modernize and strengthen, *without privatizing*, Pemex [the state oil company] and the Federal Electricity Commission,"⁶¹ reflecting the political and cultural importance of the state-run enterprises.

The key change for restructuring the electricity sector was Article 27, Paragraph 6. Prior to 2013, Paragraph 6 had reserved to the federal government the exclusive authority to "generate, transmit, transform, distribute and supply electric energy that is to be used for the public service."⁶² As noted earlier, the Mexican government had interpreted the "public service" portion of this paragraph to mean that the Constitution did not prohibit private investment in generation of electricity that would be used solely for export.⁶³

The new amendments shifted the paradigm. Though the federal government maintains "exclusive authority" over electricity planning, transmission, and distribution, it no longer maintains sole control over electricity generation. In other words, the Constitution no longer prohibits private investment in electricity generation and supply to serve the general public:

. . . The Nation [Federal Government] has exclusive authority over the planning and control of the national electric system, as well as the public service of transmission and distribution of electric energy; for these activities, the Government shall not grant concessions, but may form contracts with private persons under terms as established by law. Such law shall describe how private persons may participate in other activities in the electricity industry.⁶⁴

These changes open the door to legislation redesigning the system and breaking up the vertically-integrated, state-owned model of the CFE.

59. CP, art. 135, DO, 2 de mayo, 1917 (describing the amendment process); CP, *as amended*, Decreto por el que se reforman y adicionan diversas disposiciones de la Constitución Política de los Estados Unidos Mexicanos, en Materia de Energía, DO, 20 de diciembre de 2013, http://www.diputados.gob.mx/LeyesBiblio/ref/dof/CPEUM_ref_212_20dic13.pdf [hereinafter *2013 Constitutional Amendments on Energy*].

60. *2013 Constitutional Amendments on Energy*, *supra* note 59, at 2–3 (amending art. 25, paras. 4, 6, and 8; art. 27, para. 6; and art. 28, paras. 4 and 6; and adding new a new seventh paragraph to art. 27 and a new eighth paragraph to art. 28).

61. GOBIERNO DE LA REPÚBLICA, REFORMA ENERGÉTICA 3 (2014), http://reformas.gob.mx/wp-content/uploads/2014/04/Explicacion_ampliada_de_la_Reforma_Energetica1.pdf.

62. CP, art. 27, para. 6, DO, 2 de mayo, 1917 (outdated version published June 6, 2011), DO, 10 de junio, 2011, *available at* <http://pdba.georgetown.edu/Constitutions/Mexico/vigente.html>.

63. *See supra* notes 17–22 and accompanying text.

64. CP, art. 27, para. 6, DO, 2 de mayo, 1917 (Mex.), as amended by *2013 Constitutional Amendments on Energy*, *supra* note 59.

b. An Overview of the Electric Industry Act of August 2014

On August 5, 2014, as part of a package of legislation designed to implement the December 2013 constitutional amendments, the Mexican Congress approved the final version of the Electric Industry Act (*Ley de la Industria Eléctrica*).⁶⁵ The Act lists competing objectives such as guaranteeing “continuous, efficient, and secure” operation of the electricity sector for the benefit of the public, while also fulfilling obligations related to clean energy and pollution reduction.⁶⁶

This section examines the Electric Industry Act’s structure and evaluates prospects for achieving these goals. In many ways, the Act seeks to leapfrog several decades of developments in electricity restructuring in the United States, United Kingdom, and other developed countries’ models by moving directly from a state-controlled monopoly system to a wholesale market that utilizes modern technology and methods for promoting competition among generation and demand-side resources. In the United States, for example, the Public Utility Regulatory Policies Act (PURPA) of 1978 laid the groundwork for wholesale market restructuring by requiring utilities to purchase electricity from qualifying independent generators (generally smaller, more efficient plants, such as small hydroelectric facilities or cogeneration)—giving them access to the transmission grid that such generators would not have had.⁶⁷ However, it took two decades of additional statutory and regulatory change before those independent generators gained guaranteed access to electricity markets on equal footing, via Order 888 of the U.S. Federal Energy Regulatory Commission (FERC). Order 888 required “functional unbundling” of transmission services and provided for an open-access transmission tariff at non-discriminatory rates in the U.S. interstate transmission market.⁶⁸ Unlike the U.S. case, Mexico’s Electric Industry Act moves straight to imposing an obligation of open access to the national transmission market and distribution markets on “not unduly discriminatory terms.”⁶⁹

1. New Agencies and Actors: Decentralizing Policy and Regulatory Functions

Although Mexico’s government is a federal system, with overlapping authority between state and national governments, all aspects of the electricity sector are under federal jurisdiction, a point reaffirmed in the Electric Industry Act.⁷⁰ This model of centralized regulatory control at the federal level greatly simplifies sectoral changes, as it obviates disputes regarding jurisdiction among different levels of government. This is in contrast to the United States, where jurisdiction over wholesale and retail electricity sales are split between the federal government and

65. The Act was published in Mexico’s Official Journal on August 11, 2014. See Electric Industry Act, DO, 11 de agosto, 2014.

66. Electric Industry Act, art. 1, DO, 11 de agosto, 2014.

67. Public Utility Regulatory Policies Act of 1978 § 210, 16 U.S.C. § 824a-3 (2005).

68. See FED. ENERGY RESOURCE COMMISSION, ORDER NO. 888, PROMOTING WHOLESALE COMPETITION THROUGH OPEN ACCESS NON-DISCRIMINATORY TRANSMISSION SERVICES BY PUBLIC UTILITIES; RECOVERY OF STRANDED COSTS BY PUBLIC UTILITIES AND TRANSMITTING UTILITIES (1997).

69. Electric Industry Act, art. 4, DO, 11 de agosto, 2014.

70. *Id.* at art. 7.

the states respectively, with jurisdictional boundaries a frequent subject of ongoing litigation.⁷¹

The 2014 Electric Industry Act describes roles for several different government agencies and entities in implementing reform and in managing the new, restructured electricity system. Some of the key agencies are the Federal Electricity Commission (*Comisión Federal de Electricidad* or CFE), the Energy Regulatory Commission (*Comisión Reguladora de Energía* or CRE), the Ministry of Energy (*Secretaría de Energía* or SENER), and the National Energy Control Center (*Centro Nacional de Control de Energía*, or CENACE). Though these four entities already existed prior to the reform, the new law rearranges their relationships and functions.

Prior to the reform, CFE owned and operated the vast majority of the country's generation capacity, as well as the entire transmission grid and distribution system, as a vertically-integrated entity.⁷² Under the new Electric Industry Act, CENACE is spun off from CFE as a separate, independent agency with the responsibility for managing the operation of the national electric grid, dispatch of generating capacity, and running a new wholesale electricity market.⁷³ In March 2015, CENACE's Administrative Council published a new Organic Statute laying out this new structure and set of functions for the agency.⁷⁴

The Electric Industry Act clarifies the roles for the other major agencies. The Ministry of Energy, SENER, for its part, sets the country's energy policy, and also has overlapping authority with the CRE in overseeing unbundling, Clean Energy Certificates (CECs), and the promotion of financing mechanisms for distributed renewable generation.⁷⁵ CRE assumes the primary regulatory role, with responsibilities ranging from issuing permits to generators; establishing terms for unbundling and legal separation of entities operating in different components of the electricity sector; granting CECs; promulgating rules related to verifying CECs; issuing regulations on transmission and distribution tariffs; and regulating the operation of retail electricity suppliers.⁷⁶ Put simply, the Ministry of Energy sets policy, the CRE acts as a regulator function, and CENACE serves as the grid and wholesale market manager.⁷⁷

Notably, under the previous system, regulated tariffs for all classes of end users were set by the Ministry of Finance (*Secretaría de Hacienda y Crédito*

71. See Federal Power Act § 201, 16 U.S.C. § 824 (2012). The Supreme Court's January 2016 decision on FERC regulation of "demand response" in interstate wholesale electricity markets is a recent example. *FERC v. Elec. Power Supply Ass'n*, No. 14-840, slip op. at 1 (U.S. Jan. 25, 2016) (noting that the division of authority in the Federal Power Act between national and state responsibilities "generates a steady flow of jurisdictional disputes"). Earlier controversies even pre-date the Federal Power Act, e.g., *Public Util. Comm'n of R.I. v. Attleboro Steam & Elec. Co.*, 273 U.S. 83 (1927) (holding that states could not regulate interstate sales of electricity).

72. See, e.g., González, *supra* note 20, at 41–60.

73. See Electric Industry Act, arts. 107–08, DO, 11 de agosto, 2014.

74. Estatuto Orgánico del Centro Nacional de Control de Energía [Organic Statute of the National Energy Control Center], DO, 09 de marzo, 2015, <http://www.cenace.gob.mx/Paginas/Publicas/MarcoRegulatorio/Estatutos.aspx>.

75. *Id.* at art. 11.

76. *Id.* at art. 12 (listing fifty-three responsibilities of the CRE under the statute).

77. See MAYER BROWN LLP, ANALYSIS OF MEXICO'S NEW ELECTRIC INDUSTRY LAW, LEGAL UPDATE (2014).

Público), rather than the CRE. Some observers suggest the previous system resulted in rates “more responsive to political considerations than economic realities.”⁷⁸ Under the new Electric Industry Act, CRE has authority to issue regulations on transmission and distribution tariffs, as well as the operation of retail electricity suppliers and tariffs for other services not included in the wholesale market.⁷⁹

The Electric Industry Act’s transitory provisions describe the transformation process for CFE. The Commission’s basic governance structure from the 1975 Public Service of Electric Energy Act will remain intact until a new Administrative Council takes its place under the new organic statute for CFE.⁸⁰ Together with the Electric Industry Act, the new statute reorganizing CFE, the Federal Commission of Energy Law (*Ley de la Comisión Federal de Electricidad*), was enacted in August 2014.⁸¹ Existing permits and contracts for and with private parties for cogeneration, small and independent generation, and on-site use are grandfathered in, where applicable.⁸² However, the Electric Industry Act requires that CFE’s generation, transmission, distribution, and marketing functions be subject to “strict legal separation”—including separation of accounting, operations, functions, and other legal matters.⁸³

This process is ongoing: on January 11, 2016, SENER promulgated the specific terms of legal separation for CFE affiliates and subsidiaries, with several scheduled implementation points at which these entities may no longer share resources in carrying out specific activities.⁸⁴ Generation and distribution are subject to horizontal separation as well, with the intent to promote greater efficiency and market competition in the sector, though transmission remains under centralized control.⁸⁵ Under the January 2016 terms of separation, for example, electricity generating CFE subsidiaries that participate in the wholesale electricity market are prohibited from coordinating or sharing information.⁸⁶ Thus, CFE is gradually transforming from a heavily centralized, vertically-integrated entity into a group of compartmentalized state-owned affiliates responsible for strictly delineated functions.

78. *Id.* at 1; see LSPEE, arts. 30–31, DO, 22 de diciembre, 1975, *abrogated by* Electric Industry Act, DO, 11 de agosto, 2014 (“The sale of electricity shall be governed by such tariffs as approved by the Ministry of Finance.”).

79. See Electric Industry Act, arts. 12, 138, DO, 11 de agosto, 2014.

80. *Id.* at trans. art. 2.

81. Ley de la Comisión Federal de Electricidad [Federal Electricity Commission Act], DO, 11 de agosto, 2014.

82. Electric Industry Act, arts. 12, 138, trans. art. 2, DO, 11 de agosto, 2014.

83. *Id.* at trans. art. 4.

84. Términos para la Estricta Separación Legal de la Comisión Federal de Electricidad [Terms for Strict Legal Separation of the Electricity Commission], trans. art. 4, DO, 11 de enero, 2016 (for example, CFE subsidiaries are permitted to share personnel, systems, and physical space while participating in the wholesale electricity market only for the first six months of operation, after which activities such as bidding into actions must be undertaken independently).

85. Electric Industry Act, trans art. 4, DO, 11 de agosto, 2014. SENER announced in January 2016 that at least four generation subsidiary firms would be formed. See Global Transmission Report, Mexican CFE to be restructured, (2016), <http://www.globaltransmission.info/archive.php?id=24837>.

86. Términos para la Estricta Separación Legal de la Comisión Federal de Electricidad [Terms for Strict Legal Separation of the Federal Electricity Commission], ch. 2.2, DO, 11 de enero, 2016.

2. The Wholesale Electricity Market and Expanded Opportunities for Generation

As mentioned above, the August 2014 Act called for the establishment of a wholesale electricity market to be overseen by the National Energy Control Center, or CENACE.⁸⁷ Electricity generators (including state-owned generation under CFE), electricity marketers, and qualified large users may participate in the wholesale market, which is being tested and implemented in phases and includes markets for electricity sales, ancillary services, capacity, Clean Energy Certificates, and other products as determined by regulations.⁸⁸ Generators may bid into auctions in the wholesale market, and generators, marketers, and large end users may also negotiate longer-term contractual agreements (power purchase agreements, or PPAs).⁸⁹ Each participant must register with CENACE under a standard contract; separate bilateral contracts between producers and users/marketers must also be filed with that agency.⁹⁰ In addition to the wholesale market, CENACE also manages the dispatch of generation resources and demand-side resources (referred to as “controllable demand” in the statute).⁹¹

One of the key tasks fulfilled in preparation for bringing the wholesale market online was the establishment of the “Market Rules” provided for in the Electric Industry Act. The CRE is tasked with setting the “foundations” for the design and operation of the market, including auctions, while CENACE has responsibility for the “operating procedures,” or directives, criteria, guidelines, and procedures for the market in line with the principles CRE sets out.⁹²

In September 2015, the Ministry of Energy released the Market Rules (*Bases del Mercado*) for the wholesale market,⁹³ and a schedule was established for beginning operations of the market. In January 2016, the Ministry authorized CENACE to begin operating portions of the short-term market: for the nationwide interconnection (excluding Baja California and Baja California Sur), the day-ahead market opened on January 28, followed by the real-time market on January 29.⁹⁴ The

87. Electric Industry Act, arts. 94–96.

88. *Id.* at arts. 94, 96.

89. *Id.* at arts. 97, 106.

90. *Id.* at arts. 97–98.

91. *Id.* at art. 101.

92. *Id.*

93. Reglas del Mercado [Market Rules], DO, 08 de septiembre, 2015, <http://www.cenace.gob.mx/Paginas/Publicas/MarcoRegulatorio/ReglasMercado.aspx>.

94. Resolución que autoriza el inicio de operaciones del Mercado de Energía de Corto Plazo en los Sistemas Interconectados Baja California, Nacional y Baja California Sur, actualiza el calendario que deberá observar el Centro Nacional de Control de Energía para el inicio de pruebas y operaciones del Mercado de Energía de Corto Plazo y establece disposiciones transitorias para su entrada en vigor [Resolution authorizing the start of operations for the Short Term Energy Market in the Baja California, National, and Baja California Sur Interconnects, updating the CENACE calendar for tests and operation of the Short Term Energy Market, and establishing transitional arrangements for its implementation], DO, 28 de enero, 2016, http://dof.gob.mx/nota_detalle.php?codigo=5423787&fecha=28/01/2016. For news accounts of the market’s opening, see Karol García, *Mercado Eléctrico Pasa a Una Nueva Fase Histórica*, EL ECONOMISTA (Jan. 27, 2016), <http://economista.com.mx/industrias/2016/01/27/mercado-electrico-pasa-nueva-fase-historica>; Naureen Malik, *Power Sells at Almost \$20 in Mexico Market, Close to Texas Price*, BLOOMBERG BUSINESS (Jan. 27, 2016), <http://www.bloomberg.com/news/articles/2016-01-27/mexico-starts-power-market-in-step-to-loosening-state-s-hold>.

first auction for the long-term capacity market has been set for the end of March 2016,⁹⁵ which, according to CENACE, has attracted interest from some 200 parties.⁹⁶

In the generation market set up by the new Act, the state-owned CFE continues to operate in electricity generation, but now as a competitor of independently-owned sources (and with other CFE generation subsidiaries).⁹⁷ Any source with a capacity over 0.5 MW must obtain a permit from the CRE to operate.⁹⁸ Sources exempt from permitting may operate, but can only sell generated electricity via a permitted supplier or use the electricity as isolated supply.⁹⁹

c. Clean Energy in the Electric Industry Act and the Energy Transition Act

The electricity reforms in Mexico present a major opportunity to establish the policies needed for the country to meet its statutory clean energy mandate and GHG emissions targets. Mexico's Congress took ambitious steps toward resolving these issues with the enactment of the Energy Transition Act (*Ley de Transición Energética*) in December 2015,¹⁰⁰ which unites the General Climate Change Act's commitment to climate mitigation through changes in the electricity sector with the broader energy reform package. The signature feature introduced in the Electric Industry Act and refined in the Energy Transition Act—which will have a long-term impact on diversifying energy sources and promoting decentralized, distributed resources—is the creation of a system of Clean Energy Certificates (CECs)—negotiable credits that represent the tradable “clean” attributes of energy produced from a defined category of sources.¹⁰¹

The CECs are a market-based mechanism—analogueous to renewable energy credits in many U.S. states—for incentivizing the generation of clean energy and ensuring that minimum proportions of qualifying “clean” energy are incorporated each year into the national electricity supply. Under the Electric Industry Act, the Ministry of Energy is given responsibility to define parties' obligations with regard to CECs.¹⁰² Each year, in the first quarter of the year, the Ministry will be required to set the level of CECs that must be obtained for the following three years; once the level is set for a future year, the statute mandates that the requirement not be reduced.¹⁰³ CENACE's market rules allow for bilateral sales of CECs (from a clean energy generator to another generator), and wholesale market participants can

95. See Platts, McGraw Hill Financial, *Mexico to Hold First-Ever Power Auction in March: CENACE* (Nov. 20, 2015), <http://www.platts.com/latest-news/electric-power/houston/mexico-to-hold-first-ever-power-auction-in-march-21508307>.

96. Karina Suárez, *Prevén 60 Ofertas en Subasta Eléctrica*, REFORMA.COM (Jan. 19, 2016), <http://www.reforma.com/aplicacioneslibre/preacceso/articulo/default.aspx?id=744648&v=2&po=4&urlredirect=http://www.reforma.com/aplicaciones/articulo/default.aspx?id=744648&v=2&po=4>.

97. See MAYER BROWN, *supra* note 77, at 1–2.

98. Electric Industry Act, art. 17, DO, 11 de agosto, 2014.

99. *Id.* at art. 21. “Isolated supply” in this case means that which is used on site, as well as electricity directed specifically for export, without being connected to the national grid. See *id.* at art. 22.

100. Ley de Transición Energética [Energy Transition Act], DO, 24 de diciembre, 2015, http://www.dof.gob.mx/nota_detalle.php?codigo=5421295&fecha=24/12/2015.

101. Electric Industry Act, arts. 121–29, DO, 11 de agosto, 2014.

102. *Id.* at art. 121.

103. *Id.* at art. 124.

include CECs in long-term contracts, subject to registration with the CRE.¹⁰⁴ CENACE will also operate a spot market for CEC on an annual basis or in line with the Ministry's defined clean energy compliance period.¹⁰⁵ Thus, an entity that does not generate a sufficient proportion of its electricity from qualifying clean sources can purchase credits from other firms with clean generation.

The CEC program sets up the possibility for linking the electricity reform effort to two related goals: first, mitigation of greenhouse gas emissions and other pollution resulting from fossil-fuel energy generation; and second, diversification of energy supply and promotion of decentralized, distributed generation. The potential for the CEC program to achieve these goals, however, raises several key challenges, including the contentious question of defining "clean" energy, as well as technical questions about how to integrate new sources of energy into the electrical grid with greater levels of market penetration.

1. Clean Energy Certificates: Linking Electricity Reform to Climate Goals

The function of a market in renewable or clean energy credits is generally to provide economic flexibility in meeting a defined target or mandate for a specific level or percentage of energy generation from "clean" or renewable sources.¹⁰⁶ Such credits are associated with a defined quantity of power generated—typically, one CEC would correspond to one megawatt-hour (MWh). In analogous systems in the United States,¹⁰⁷ the state requires a definitive number of credits to lead toward meeting a percentage dictated by state legislation or policy in a particular compliance year. The Electric Industry Act itself, however, did not set such a numeric target for the future to guide the Ministry of Energy, leaving only the General Climate Change Act's call to "promote" a level of 35% "clean" energy by 2024.¹⁰⁸ However, the 2015 Electric Transition Act takes up this target and explicitly makes it binding.¹⁰⁹ The Act requires the Ministry of Energy to set the target at 25% generation from clean energy sources in 2018, with an increase to 30% in 2021 and 35% in 2024.¹¹⁰ These percentages are ambitious in comparison to most state-level programs in the United States and other international commitments.¹¹¹

104. Acuerdo por el que la Secretaría de Energía emite las Bases del Mercado Eléctrico [Agreement under which the Secretary of Energy issues the Rules for the Electricity Market], Base 12.1.3, DO, 08 de septiembre, 2015, http://www.dof.gob.mx/nota_detalle.php?codigo=5407715&fecha=08/09/2015.

105. *Id.* at Base 12.1.2.

106. See, e.g., U.S. DEP'T OF ENERGY, *Green Power Markets: Renewable Energy Certificates*, <http://apps3.eere.energy.gov/greenpower/markets/certificates.shtml> (last accessed May 20, 2016).

107. As of 2013, twenty-nine states had some form of mandate, often referred to as Renewable Portfolio Standards. See EMILY HAMMOND ET AL., *ENERGY, ECONOMICS, & THE ENVIRONMENT*, 625–726 (4th ed. 2015). See also KLASS ET AL., *ENERGY LAW AND POLICY* 484–99 (2014), for an in-depth discussion on how state RPSs work and their legal and policy design challenges.

108. See *supra* Part II.c.1.

109. LTE, trans. art. 3, DO, 24 de diciembre, 2015, http://dof.gob.mx/nota_detalle.php?codigo=5421295&fecha=24/12.

110. *Id.*

111. For information comparing the twenty-nine different U.S. state renewable portfolio standards, see NAT'L CONF. OF STATE LEGISLATURES, *State Renewable Portfolio Standards and Goals*, <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

2. Definition of Clean Energy

In order to evaluate whether the potential impact of Clean Energy Certificates on Mexico's state climate change policies, it is important to carefully examine how "clean energy" is defined. The Electric Industry Act defines the term very broadly, including the major renewable sources—wind, all forms of solar energy, and geothermal—but also many additional categories: hydroelectric power, nuclear power, fossil-fuel energy equipped with carbon capture and geological or biological carbon sequestration; certain categories of efficient cogeneration; and other low-carbon technologies as recognized by international standards.¹¹² In other words, the categories of applicable energy sources encompass everything that can be considered "low carbon"—as opposed to other potential measurements of "cleanliness."

In practical terms, the broad delineation of "clean" energy sources has significance for how the CEC program and mandate will work. According to the U.S. Energy Information Administration, Mexico's electricity in 2014 included 15% generation from hydroelectricity and 3% from non-hydro renewables (mostly geothermal), as well as generation from a single 1400 MW nuclear plant (accounting for roughly 4% of the country's electricity generation).¹¹³ At this stage, the presence of non-hydro renewables in the electricity grid is low, although wind power is growing quickly, particularly in the states of Baja California and Oaxaca.¹¹⁴ Most of the rest of the electricity comes from fossil fuel sources; in previous decades, oil/petroleum products accounted for the majority (due to the country's large oil production industry), though natural gas and coal use have been increasing in proportion.¹¹⁵ By this initial measure, Mexico already had at least 22% generation (the total of hydro, non-hydro renewables, and nuclear), in addition to any cogeneration or other sources that would be counted, within the statute's definition of "clean energy."

The first announced CEC targets for 2018, set in March 2015, seem to apply only to new plants beginning generation after 2014 or new increased "clean" capacity at previously existing plants.¹¹⁶ If conventional utility-scale electricity in the forms of hydro and nuclear power count under the clean energy scheme, though, it is not clear that the program, at least in the early stages, would do much to incentivize a diversified portfolio of energy or effectively promote non-hydro renewables at either the utility or distributed scale. Under the Ministry of Energy's regulations pursuant

112. Electric Industry Act, art. 3, cl. 22, DO, 11 de agosto, 2014.

113. U.S. ENERGY INFO. ADMIN., *Mexico* 11–12 (Sept. 21, 2015), http://www.eia.gov/beta/international/analysis_includes/countries_long/Mexico/mexico.pdf (the proportion for non-hydro renewables is based on data from 2013).

114. *See id.* The development of wind power in portions of Mexico is also controversial among local groups, who have raised issues about the lack of meaningful consultation processes with communities in the area where major renewable projects are planned and under construction. *See, e.g.,* Emilio Godoy, *Native Communities in Mexico Demand to be Consulted on Wind Farms*, INTER PRESS SERV. NEWS AGENCY (June 3, 2015), <http://www.ipsnews.net/2015/06/native-communities-in-mexico-demand-to-be-consulted-on-wind-farms/>.

115. *See* U.S. ENERGY INFO. ADMIN., *supra* note 113.

116. This 2018 target was set at five percent. *See* AVISO por el que se da a conocer el requisito para la adquisición de Certificados de Energías Limpias en 2018 [Notice of requirement for the acquisition of Clean Energy Certificates in 2018], DO, 31 de marzo, 2015.

to the Act, no apparent distinction is made for Clean Energy Certificates based on the particular source or technology used.¹¹⁷ This is unlike many programs in the United States, which offer premium credits for solar, for example, to incentivize it in particular over other technologies.¹¹⁸ If, under Mexico's program, wind and solar energy would still be competing with large hydroelectric or nuclear power projects for the same market incentives, then the use of CECs may not be able to appropriately compensate existing non-fossil fuel sources while also promoting the environmental co-benefits of employing new renewable generation.

3. Technical Challenges for the Grid: Distributed Generation

Articles 68 through 70 of the Electric Industry Act specifically address the role of distributed generation resources in Mexico.¹¹⁹ Distributed sources operate as exempt from the permit requirements of the Act and are defined as power from a source that is "interconnected in a distribution circuit with a high concentration of load centers."¹²⁰ The Act guarantees open, non-discriminatory access for distributed generation into the distribution grid and other networks where electricity may be sold.¹²¹

While the pre-reform electricity system had operated with a state-run monopoly over most generation sources, the Electric Industry Act is not as drastic a change as it may seem on the surface. Mexico had already taken several policy steps toward facilitating distributed renewable generation.¹²² CRE issued a resolution in 2007 to promote the use of distributed solar energy via net metering.¹²³ The resolution was a response to the country's 2007–2012 development plan, which called for a strategy of diversification of energy sources and the use of renewable sources, and was based on the CRE's legal authority to create model contracts and agreements for activities regulated by the agency.¹²⁴

The 2007 development plan was initially limited to solar generators with no more than 10 kW capacity for residential users, and 30 kW for other small scale generators, to be connected to the grid at a maximum voltage of 1 kV.¹²⁵ The model contract gives generators the responsibility to pay for construction and installation, as well as the difference between the cost of conventional meters and the equipment and meters necessary to allow for net metering.¹²⁶ The contract offers a significant

117. Reglamento de la Ley de la Industria Eléctrica, ch. 12, art. 83–84 (Oct. 31, 2014).

118. See KLASS et al., *supra* note 107, at 77–78.

119. Electric Industry Act, arts. 68–70, DO, 11 de agosto, 2014.

120. *Id.* at art. 3, XXIII.

121. *Id.* at art. 68; see also Chadbourne & Parke LLP, *Special Update: A New Power Market in Mexico* at 5 (Sept. 2014), available at http://www.chadbourne.com/files/Publication/cfbf25f4-52c1-4a46-8675-5298e9836121/Presentation/PublicationAttachment/fba22689-74b6-4d28-b623-02318254c978/New_Power_Market_Mexico_0914.pdf.

122. See Ley Para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética, 28 de noviembre, 2008 [Act for Renewable Energy Use and Financing the Energy Transition].

123. RESOLUCION por la que se aprueba el modelo de Contrato de Interconexión para Fuente de Energía Solar en Pequeña Escala, RES/176/2007, DO, 07 de julio, 2007 [Resolution approving the Model Interconnection Contract for a Small-scale Solar Energy Source].

124. *Id.* at 1–2.

125. *Id.* at Annex I.

126. *Id.* at Annex I, cl. 6.

benefit by allowing the generator to carry over credits whenever it supplies more electricity than it receives from the grid, for up to 12 months.¹²⁷ These pre-2013 steps can hopefully lay the groundwork for further efforts to facilitate distributed renewable generation, as a way of meeting clean energy targets.

It remains to be seen how the Clean Energy Certificate program will mesh with these previously existing incentives. However, given the broad definition of “clean energy,” there is the potential that distributed generation may be lost in the broader array of sources included in a potential CRE mandate.

Market observers have touted the potential appeal of private investment from U.S. solar companies to grow the residential solar sector in Mexico as well.¹²⁸ However, short-term forecasts for solar installations in Mexico in 2016 (especially at the utility scale) have been revised down, citing concerns and confusion about “dealing with a completely new set of rules for selling solar electricity into [the] energy market.”¹²⁹ If new efficiencies in the wholesale market reduce prices for retail residential and commercial customers, distributed solar generation may temporarily be less attractive. However, these same observers expect that, with new possibilities for financing and for participation in the new markets, rapid growth in the medium to long term will more than make up for slowdown during the transition.¹³⁰

The regulatory framework in place will need to be paired with technical effort to ensure that the electrical grid can effectively and efficiently incorporate these sources as they come online (in addition to managing the broader shifts that electricity reform will facilitate from coal and oil toward combustion of cheaper natural gas). In this regard, Mexico can learn from what countries (Europe, in particular) are experiencing as they reach a higher degree of market penetration from intermittent renewables.¹³¹

CONCLUSIONS

The Electric Industry Act represented only the first step in the process of implementing Mexico’s constitutional reforms. The roadmap laid out in the Act’s transitory provisions¹³² is just beginning to be fulfilled as the wholesale electricity market comes online in January 2016 and the market moves toward incorporation of Clean Energy Certificates in 2018. However, the transition has only begun, and some critical aspects remain to be defined. Effective implementation of these reforms depends on Mexico’s ability to tailor the regulatory framework toward two separate, but potentially complementary, goals: first, improving public service through

127. *Id.* at Annex I, cl. 9.

128. See Adam James, *Here’s Why SolarCity Will Move into Mexico*, GREENTECH MEDIA (Aug. 21, 2014), <http://www.greentechmedia.com/articles/read/Heres-Why-SolarCity-Will-Move-into-Mexico>.

129. Stephen Lacey, *An Illustrated Guide to Mexico’s Solar Market: Short-Term Pain May Bring Long-Term Gains*, GREENTECH MEDIA (Jan. 27, 2016), <http://www.greentechmedia.com/articles/read/an-illustrated-guide-to-mexicos-solar-market>.

130. *See id.*

131. *See, e.g.*, EUROPEAN COMM’N DIRECTORATE-GENERAL FOR ENERGY, DG ENER WORKING PAPER: THE FUTURE ROLE AND CHALLENGES OF ENERGY STORAGE 21 (2012), https://ec.europa.eu/energy/sites/ener/files/energy_storage.pdf.

132. *See* Ley de la Industria Eléctrica Transitorios [Transitory Articles], DO, 11-08-2014.

competition, lower prices, and greater efficiency; and second, promoting a transition to cleaner energy.¹³³

One of the major selling points for the reform was to create a more efficient system that will lead to lower prices and allow the state-run CFE to shut down less-efficient generation. Distinguished from some other countries' reform efforts, Mexico is not directly privatizing the electricity industry; it is not—as it did with the telecommunications sector, for example—selling state-owned assets.¹³⁴ However, Mexico is opening up the “productive state enterprises” to competition with the intent of reducing overall costs. If private companies can actually generate electricity at lower costs, it remains to be seen whether the remaining state-owned generation—CFE will still own (through subsidiaries and affiliates) two-thirds or more of total capacity, none of which is being privatized¹³⁵—can continue to exist without significant subsidies. In addition, lower prices overall may not necessarily mean lower prices for each type of Mexican customer. Residential customers in Mexico have historically paid less, due to significant subsidies relative to other classes of electricity users.¹³⁶ Thus, as one commentator notes, introducing competition may have the potential to reduce those higher tariffs, and doing so without (what would be unpopular) residential tariff increases may be difficult.¹³⁷

On the regulatory side, Mexico appears to be taking significant steps toward putting a regulatory framework in place to handle the transition. Concepts of wholesale markets are not new, but integrating demand-side resources will require sophisticated management of the electricity grid. Mexico can draw on other examples in the region, particularly the larger countries in South America, with experience restructuring electricity sectors. However, for distributed generation, Mexico's resources are still on a limited scale in comparison with Europe or the United States. Nonetheless, if regulations can effectively incentivize renewable generation—perhaps through specialized categories of CECs or other methods of distinguishing renewables from the other statutorily defined “clean” energy categories—distributed resources have the potential to grow substantially. As they do so, the country will need to address some of the issues currently facing utilities in developed markets, including the so-called “death spiral” of decreased utility revenues (and potential reliability concerns) from policies that generously compensate distributed sources via net metering, feed-in tariffs, or other mechanisms.¹³⁸

133. *See id.* at art. 1.

134. *See* Sylvia Gaylord, *Mexico's Electricity Sector Reform in Perspective*, POWER (Dec. 8, 2014), <http://www.powermag.com/mexicos-electricity-sector-reform-in-perspective/?printmode=1> (comparing Mexico's reform to Chile and other countries in Latin America).

135. *See* Chadbourne & Parke LLP, *supra* note 121.

136. *See, e.g.*, Kristin Komives et al., *Residential Electricity Subsidies in Mexico: Exploring Options for Reform and for Enhancing the Impact on the Poor* (World Bank, Working Paper No. 160, 2009).

137. *See* Gaylord, *supra* note 134.

138. *See generally* Peter Kind, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, EDISON ELECTRIC INST. (Jan. 2013), <http://www.eei.org/ourissues/finance/documents/disruptivechallenges.pdf>; David Malkin, *Results-Based Regulation: A Modern Approach to Modernize the Grid*, GE DIGITAL ENERGY, <http://files.publicaffairs.geblogs.com/files/2014/08/Results-Based-Regulation.pdf> (last visited Dec. 17, 2014).

As Mexico completes its transition toward a restructured electricity market, it should continue to examine whether the system can appropriately incentivize investment in renewable generation that will move the country toward its environmental and climate goals. As Mexico identifies further regulatory and technical barriers, the country will ideally be able to build on these steps to construct a successful, modern electricity system that is more effective and grows closer to environmental sustainability.