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Earth, Wind, and Sun: Will Renewable Energy Prevail in Mexico?

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This report explores some of the central issues related to Mexico's renewable energy policy, emphasizing its uncertain future. It first traces the initial steps to introduce renewable energy sources in Mexico, a country where fossil fuels have been the main source of power generation for decades. Second, it examines climate change legislation and policy during the administration of President Felipe Calderón (2006–2012), which enacted Mexico's first ever Law on the Development of Renewable Energies and the Financing of the Energy Transition.[1]

Third, the report addresses the substantial development of renewable energy projects in Mexico as a result of the Enrique Peña Nieto administration's energy reforms of 2013–2014, when opportunities were significantly expanded for such investments through legislative changes involving long-term power auctions and the issuance of Clean Energy Certificates (CELs).[2] Finally, the report examines President Andrés Manuel López Obrador's return to fossil fuel-based power generation and the steps his administration have taken to reverse the incentives for developing privately financed renewable energy projects.

BACKGROUND ON RENEWABLE PROJECTS IN MEXICO

Renewable source power generation in Mexico has taken a circuitous route. The first renewable power generation projects—primarily windfarms—were built in the early years of the 21st century on the Isthmus of Tehuantepec in the state of Oaxaca, where abundant wind and sun offer exceptional potential to generate energy.[3] The early turbine parks were built under the 1992 regulations contained in the Law of the Public Service Electric Utility (Ley del Servicio Público de Electricidad), which still barred private investment in the power industry, but allowed some investment in wind power generation. Thus, the 1992 law allowed private investors to participate as power generators, but with important restrictions. The most important of these limitations was that it allowed private investment in power generation 1) for "self-use" but not for sale[4] except, exclusively, to the public utility (CFE); 2) for use in cogeneration ventures, that is, joint projects between private investors and the public utility (CFE); and 3) for use in small-scale power generation projects for the importation and exportation of electric power. Given these restrictions, renewable source power generation projects were developed primarily for self-use and, to a lesser extent, for the consumption of CFE.[5] This was the status quo until President Felipe Calderón Hinojosa took office at the end of 2006.

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EARLY 21ST CENTURY CHALLENGES

Although there were no changes to the legislation early in the administration of President Felipe Calderón (2006–12), the Mexican government did try to be more consistent about its implementation by observing the spirit of the 1992 legal framework and policy, and by tying it to climate change and renewable energy.

Mexico became an increasingly active participant in international forums that promoted mitigation and adaptation in climate change policies. This shift was solidified in 2010 when Mexico hosted the COP16, the United Nations Conference for Climate Change.

Thus, the most evident change was to provide renewable energy companies with a greater degree of certainty for their investments. And from then on, Mexico became an increasingly active participant in international forums that promoted mitigation and adaptation in climate change policies. This shift was solidified in 2010 when Mexico hosted the COP16,[6] the United Nations Conference for Climate Change. Following the COP16, Mexico in fact committed to a clean energy resource target of 35% for its own power generation by the year 2024.[7] Nonetheless, there appeared to be an important discrepancy between the country's international commitments and domestic policy—the latter of which was shackled in many ways by the existing legislation's own limitations.

Indeed, while Mexico had hosted a major climate change conference[8] and made important political commitments toward climate change mitigation, the country's public utility (CFE) exhibited enormous organizational resistance toward using renewable energy as a power source as a result of decades of making obligatory purchases of Pemex's fuels.[9] If Mexico's national oil company had a surplus of the highly polluting fuel oil in its inventory, CFE was obligated by the energy sector's authorities and sometimes even by Mexico's president to acquire it for power generation. Thus, one of the key obstacles to the development of renewable energy sources has been the dominant position of CFE as the country's power utility.[10] Except for Peña Nieto's government (2012–2018), Mexico's modern presidential administrations forced CFE to generate power with Pemex´s inputs, primarily fuel oils, regardless of their environmental and economic costs. When and if Pemex had a surplus of fuel oil, a hydrocarbon well-known to be highly polluting, CFE was Pemex´s captive customer.

Thus, the generation of wind and solar power took place within the constraints of the 1992 legal framework and in the context of a CFE–Pemex relationship whereby CFE had no choice but to use Pemex's fuel oil surplus. Consequently, the incentive to invest in renewable power generation was low. As already mentioned, such projects were developed mainly under the legal framework of Article 36k Sections I–IV, of the 1992 Law of the Public Service of Electricity and, given the structure of incentives, most private parties found it useful to generate power with renewable sources mainly for their own use and for other limited purposes and users. They were essentially barred from going beyond by law[11] because they could not provide power to third parties.

FORCING CHANGE, WITHIN LIMITS

Until the energy reform proposed by President Calderón in 2008, there was no specific legislation for renewable energy projects. Even so, the 2008 legislation only acknowledged the reality on the ground: an increasing interest in power generation using solar- and wind-driven sources[12] and the growing commitments of the Mexican government to reduce greenhouse gas emissions.[13] Thus, the changes in the law in 2008 merely provided a framework for such projects and room to fulfill the country's international commitments through proper legislation and financial incentives.[14]

It is noteworthy that the specific purpose of the Calderón administration's reform of 2008 was to enhance oil and gas production, but once the bill was presented to congress, the Mexican Green Party (Partido Verde Mexicano, or PVM), in the course of the legislative discussion, argued that a hydrocarbon-based reform served no purpose for building a sustainable future for Mexico. It proposed that the scope of that legislation be expanded to include renewable sources of energy. Thus, a few weeks later, the PVM in coalition with Calderón's own political party, the Partido Acción Nacional (or PAN), consolidated these proposals into a single bill.[15] Importantly for the purposes of this report is that the 2008 bill allowed private companies to develop renewable energy projects within a legal framework that ensured greater incentives and a higher degree of investment certainty. At the same time, it provided a critical route for the implementation of an energy transition in accordance with Mexico's international commitments to address climate change.

Thus, the Law on the Development of Renewable Energies and the Financing of the Energy Transition enacted in 2008 was a joint initiative of the PVM and PAN, and although it was not the kind of deep reform the country needed, it was a step forward. This law would be replaced by Peña Nieto's energy reform in 2013–2014—more on that below.

Interestingly, Calderón took the liberalization as far as he could within the limits allowed by the political environment. For example, he not only enacted the first law specific to renewable energy projects and set the country's energy transition on course, but he also instructed the Ministry of Energy to issue a strategic document on the issue. That document, "The National Energy Strategy," was put together by the executive branch and had to be approved by Mexico's senate, which did its part. "The National Energy Strategy" contained the guidelines for energy policy for the following 15 years and was the first document to include renewable energy projects as part of Mexico's development plans.[16] Thus, it was during the Calderón administration that a "National Strategy for Climate Change" was finally issued. This document specifically identified renewable energy sources as one of the solutions for the country's energy future and its international commitments.[17]

WIND AND SUN DURING PEÑA NIETO'S ENERGY REFORM

While the Calderón government created a legal and more financially sound environment for renewable source power generation, the Peña Nieto administration (2012–2018) found the political conditions ripe to move this issue further ahead than anyone had managed to do in over half a century. It succeeded in opening power generation to market competition. Under the 2013–2014 hydrocarbon and electricity reforms, no longer would CFE be the sole provider of power to large-scale consumers.[18, 19] Thus, companies dedicated to power generation through renewable sources could now produce not only for self-use and for the national utility (CFE), but also for larger power consumers, such as the service and industrial sectors. Residential service remained in the hands of CFE, however, primarily to protect the utility from price volatility derived from markets.[20]

When compared to Mexico's opening of the oil and gas industry, changes in the power sector were more intricate and restrictive. This is because electricity markets have greater technical and economic complexities.[21] Simply put, it is hard to design a market for something that is not per se a tangible commodity but consists instead of electrons that go everywhere and end up in the hands of many final users in the form of light or machine power. Unlike the pricing of oil, natural gas, or gasoline—for example—the calculation of the price of electricity involves models that can be beyond the grasp not only of laypeople, but even of competent energy economists. Complex mathematical formulae are involved in the pricing of electricity, and there are always substantial discussions when designing methodologies to produce it, distribute it, price it, and regulate it.[22] The new law, with all its complexity, imposed a steep learning curve in which regulatory authorities, producers, distributors, and the entire industry were engaged in deep analysis and dialogue.[23]

Basically, the reform of the electricity industry in 2013–2014 took the following characteristics: First, CFE lost its monopoly in generating power for registered large-scale users. This dramatic change was clear in the then-new Electric Industry Law.[24] Second, if a manufacturer wished to purchase power in the open market, it had to be registered as a "qualified" user, in accordance with the aforementioned law, which stipulated that it had to consume at least 2 Megawatts/hour.[25] Finally, once registered as a "qualified user," that consumer could purchase power from any company or from the national utility CFE. This was a significant step toward liberalizing a market once controlled entirely by CFE. Of course, consumers that to failed to register as "qualified" users could not buy power in the market but were obliged to purchase it from CFE, presumably to avoid market uncertainty.[26]

Another structural change was the creation of an independent transmission grid operator.[27] The National Center for

Energy Control (Centro Nacional de Control de Energía, or CENACE) had existed since the CFE's creation in 1967,[28] but was entirely dedicated to meeting CFE's transmission needs.[29] This meant that the smaller, more limited private projects—such as the early windfarms that emerged after the 1992 change in the law—were in a precarious situation as far as power transmission was concerned. Their generated power had nowhere to go if CFE was using all of the physical transmission capacity and none was available to them. It was clear that for CENACE, the national utility (CFE) was its number one priority. Interestingly, even among these small producers there were claims that, when physical transmission capacity was made available, CENACE favored some independent power producers over others.[30] These allegations were not merely rumors, and the complaints became the basis for the redesign of CENACE under the 2013–2014 energy reform. If a market was to be efficient, CENACE had to become an independent entity, completely delinked from CFE, to avoid favoring the national utility or some producers over others in the use of transmission capacity. If allowed to operate as before, CFE, presumably one more competitor in the power generation market, could erect significant entry barriers for newcomers to the industry. Thus, CENACE became the transmission grid operator and, by law, was barred from engaging in discriminatory practices among power generators.

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"Long-term power auctions"[31] became the most visible way to measure CENACE'S impartiality. These auctions, conducted by CENACE, provided a competitive process by which generators could offer power to CFE at the lowest rate.[32] During the Peña administration there were three of these auctions, with over 40 long-term contracts (25 to 30 years) awarded. Interestingly, one important result was that most awardees offered power generated by renewable sources to the national utility (CFE). Even more unexpected were the prices offered during the auctions—they were quite competitive.[33] Solar generators offered some of the lowest rates to CFE in the world, along with generators from Peru, Chile, Abu Dhabi and Saudi Arabia, which offered similarly low prices.[34] The Peña Nieto government rapidly made an enthusiastic announcement about the success of the auctions in terms of the prices and the number of contracts. Renewable energy companies joined the praise about the competitive process, which resulted in extraordinary savings for CFE.[35] This was relevant because CFE had historically argued that renewables could never compete in price with natural gas power generation. For Mexico, it meant a significant step toward the energy transition.

In 2015, the Peña Nieto administration pushed energy reform in the direction of renewable source power generation even further, enacting a specialized law for the country's energy transition.[36] This law favored the use of clean energy, with even more significant incentives for its generation. One of the most important features of the law was the creation of a Certificate of Clean Energy (CEL in Spanish), by which clean projects were to be financed as follows: under the law, users consuming power generated by fossil fuels had to purchase CELs from accredited clean generation projects. For example, a windfarm project certified by authorities as a clean energy source would be awarded a number of CELs, which it could sell in the market to consumers using energy from more polluting sources, such as diesel, coal, fuel oil, etc. Simply put, industrialists were not barred from using energy generated by more polluting sources but were obligated by law to offset their environmental impact by financing cleaner projects through the purchase of their allocated CELs.[37] This change was met with resistance by industrial groups[38] and even CFE, the biggest consumer of power generated by fossil fuels. Nevertheless, the Energy Transition Law was passed in 2015. Surprisingly, again, the first company to purchase CELs was CFE.[39]

While it cannot be said that Mexico had decisively become a country with a solidly greener energy policy, by the end of the Peña Nieto administration the country has taken unprecedented steps in that direction. Energy generation was a long way from those early windfarms in the

state of Oaxaca. Peña Nieto's energy reform opened a great window of opportunity to use Mexico's most abundant renewable resources: wind and solar energy. This turn was in fact met with much interest in countries like Spain, Italy, and particularly Germany, which engaged this opportunity to develop photovoltaic power.[40]

THE LAND OF THE SETTING SUN: RENEWABLE ENERGY IN THE LÓPEZ OBRADOR ADMINISTRATION

President Andrés Manuel López Obrador (2018–2024) is a strong proponent of conventional forms of energy—oil and gas in particular.[41] In a strategic document titled "National Project,"[42] published in November 2017, after his election and days before he took office, his focus was on the hydrocarbon industry as the key to Mexico's development. Whenever he addresses energy issues, oil and gas is featured prominently. Electric power seems to be secondary to the goal of fueling the Mexican economy with hydrocarbons. Even the CFE, which had begun to accept renewables as a viable source of energy, has reversed course. The clean energy path of the Calderón and the Peña Nieto administrations has been abandoned. This begs the question: Where is Mexico going now on this important issue?

First, CFE's chief executive officer under the López Obrador administration, Manuel Bartlett Díaz, has insisted on overhauling many of the older and more polluting power generation facilities owned by the utility.[43] To Bartlett, it makes no economic sense to abandon CFE's existing assets, even if they contribute to greenhouse gas emissions. Consequently, the government canceled all electricity auctions and announced that Mexico's power generation was to be carried out at state-owned facilities. Worse, CFE proceeded to purchase several tons of coal for power generation.[44] This was controversial because of the lack of transparency in the purchase. The transaction was announced by Coahuila's Senator Armando Guadiana, a mining entrepreneur but also a member of the president's party and chairman of the Energy Commission in the lower chamber of Mexico's congress.[45] Moreover, not only was CFE buying a highly polluting source of energy, but there was also a severe conflict of interest in the participation of Guadiana. Finally, following two months of public accusations of corruption, it was made official that CFE had awarded 12 contracts to Glencore International AG, for the acquisition of nearly 5 tons to fuel the Plutarco Elías Calles plant in Petalcalco, Guerrero.[46]

Second, the return of older, more polluting power plants is not the only indicator that this administration is not committed to cleaner energy. Changes in CEL policy have created significant uncertainty regarding the possibility of financing renewable source power plants. As already mentioned, CELs were created so that consumers of fossil-fuel generated energy could contribute to the viability of renewable source power plants by purchasing their "right to pollute." The point of CELs was the creation of a market by which the incentives to use hydrocarbons were lowered, while the incentives to go for renewables were increased. This changed when Mexico's Regulatory Energy Commission (CRE), under presidential pressure,[47] approved guidelines to enable CFE's older hydroelectric and nuclear plants to become CEL title holders. These plants had been explicitly excluded during the Peña Nieto administration to attract new investors on renewables. Today, with CFE's older power plants in the CEL market, the supply of these titles will exceed their demand and thus their price is bound to drop significantly. This will make it very difficult to finance the newest renewable projects by means of a CEL market.[48]

Finally, another sign of this administration's aversion to renewable energy is the declaration of CFE's director, Manuel Bartlett, that CENACE's low transmission rates for renewable energy is ruinous to the Mexican state.[49] He would prefer to return to a framework whereby CENACE privileges the public utility CFE. Under previous administrations, such transmission rates were kept low by the CRE as an incentive to renewable developers.[50]

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These subsidies were thought to be necessary because wind and sun power plants are generally far away from the grid and require this subsidy to remain viable, making transmission costs of sun and wind higher than those of coal, gas, or any other hydrocarbon.[51] An increase in transmission rates could render them uncompetitive.

CONCLUSION

Clearly, Mexico's relationship with renewable source power generation has taken a circuitous route. The long-term prospects for renewable energy, which were beginning to improve, have precipitously faded under current Mexican energy policy, which is increasingly at odds with the goals of clean energy. The López Obrador administration's reversal is unfortunate, as the world is moving toward significant milestones in the transition toward cleaner energy sources. It is also unfortunate because Mexico was late to act on this issue; it was not until the turn of the second millennium that Mexican authorities saw beyond hydrocarbons as a reliable source of power, and its legislative and regulatory changes had incorporated many of the important lessons learned in other countries.

The López Obrador administration has reversed not only gains from the 2013–2014 energy reforms, but also the limited gains from the 2008 energy reforms. In addition, the administration's actions end hopes that Mexico can contribute to stemming the worst effects of climate change. In effect, Mexico approved the energy transition law that allowed it to comply with its international commitments to lower greenhouse gases by 22%,[52] but now the country is reverting to petroleum as the center of its energy mix. That is not progress.

Finally, Mexico has also returned to state monopolies to organize the energy sector, rejecting the notion of an open market. This means that private investment in power generation will dry up, be it for conventional or renewable sources. This is a bad decision on at least two levels: Mexico's economy requires direct foreign investment and its hydrocarbon production is in steep decline.

But sunshine and wind in Mexico are plentiful and they will be there when López Obrador is out of office. They will eventually become the viable route for the country's power needs. But that, for now, will have to wait.

ENDNOTES

1. The original legislation, in Spanish, is titled "Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética." This act of Mexico's congress was published in the Federal Official Gazette (Diario Oficial de la Federación) on November 28, 2008. See the full text at http://www.diputados.gob.mx/LeyesBiblio/abro/laerfte/LAERFTE_abro.pdf.

2. The National Center for Energy Control (CENACE) describes the auctions (*subastas*, in Spanish) as follows: A mechanism by which power generators may enter into contracts by means of a competitive process to satisfy the needs of power, electricity, and clean energy certificates (CELs). The text can be found at https://www.cenace.gob.mx/Paginas/Publicas/MercadoOperacion/Subastas.aspx.

3. Interestingly, the first wind power project was developed as an experimental facility by Mexico's public utility (CFE) in Oaxaca 1994. This project, which was not expanded on a massive scale by CFE itself, was nonetheless replicated by private investors who became aware of Mexico's significant wind power potential. See "La Energía Eólica en México. Una perspectiva Sobre el Valor de la Tierra," Secretaría de Gobernación, Comisión para el Diálogo con los Pueblos Indígenas en México. Undated document available at https://www.gob.mx/cms/uploads/attachment/file/31621/eolico.pdf.

4. The self-use modality was limited to those who financed the plant for their own power consumption. This, pursuant to Article 36, Section I, of the now voided Ley del Servicio Público de la Energía Eléctrica. Text available at http://www.diputados.gob.mx/LeyesBiblio/abro/lspee/LSPEE_abro.pdf.

5. Víctor Florencio Ramírez Cabrera, "Renovables y ¿subsidios? Intermitencia y transmisión, otros dos mitos," Nexos, July 25, 2019. Text available at https://www.nexos.com.mx/?p=43528.

6. This refers to the United Nations Climate Change Conference held in Cancún, Mexico, during November and December of 2010. The agreements of the parties to reduce greenhouse emissions can be found at www.unfccc.int/process-and-meetings/conferences/past-conferences/cancun-climate-change-conference-november-2010/cancun-climate-change-conference-november-2010-0.

7. Ibid.

8. According to the director of the National Center for Energy Control (CENACE), a key regulatory agency, at this point, it is unlikely that Mexico will reach its target as it lacks the financial resources to do so. Diana Nava. 2019. "México no llegará a su meta de energías limpias para 2024: Titular del CENACE," *El Financiero*, April 20, 2019, https://www.elfinanciero.com.mx/economia/mexico-no-llegara-a-su-meta-de-energias-limpias-para-2024-titular-de-la-cenace.

9. Eduardo Aguilar, "Es la energía eólica un mal negocio para CFE?" *El CEO*, November 29, 2019, https://elceo.com/negocios/es-la-generacion-eolica-un-mal-negocio-para-cfe/.

10. Miriam Grunstein Dickter, "Monopolios de estado y política del cambio climático en México: ¿Bastiones de cambio o barreras estratégicas?" *Estudios y Perspectivas* No. 55 (September) – Sede Subregional de la CEPAL en México, Comisión Económica para América Latina y el Caribe (CEPAL) de las Naciones Unidas. Text found at https://repositorio.cepal.org/handle/11362/371342014.

11. Article 3, sections I to V, of the Ley del Servicio Público de la Energía Eléctrica set forth such activities that are not considered to be the provision of a public service. See http://www.diputados.gob.mx/LeyesBiblio/abro/lspee/LSPEE_abro.pdf.

12. Roberto Gutiérrez, "Reformas estructurales de México en el sexenio de Felipe Calderón: la energética," Economía *UNAM* 11, no. 32 (May–August 2014): 32–58.

13. Ibid.

14. Ibid.

15. Ámbito Jurídico "Régimen en México para las Energías Renovables," January 1, 2010, https://ambitojuridico.com.br/cadernos/direito-ambiental/regimen-en-mexico-para-las-energias-renovables/.

16. Carlos Navarro, "President Calderón Releases Comprehensive Energy Plan for 2012–2016," The University of New Mexico Repository, March 7, 2012. Text available at https://digitalrepository.unm.edu/cgi/viewcontent.cgi?article=1090&context=la_energy_notien.

17. Secretaría del Medio Ambiente y Recursos Naturales, "Estrategia Nacional de Cambio Climático. Visión 10 20 40," 2013, Gobierno de la República.

18. Article 3, Sections 28 and 45, of the Electric Industry Law, which allows various energy sector actors, such as power generators and certain qualified users, to participate in the electricity market. Text available at http://www.diputados.gob.mx/LeyesBiblio/ref/lielec.htm.

19. Ibid.

20. These are called Basic Users pursuant to Article 3, Section 19, of the above cited Electric Industry Law.

21. These complexities are explained in Alejandro Limón Portillo's "La reorganización de la industria eléctrica en México," *Centro de Investigación Económica y Presupuestaria AC*, December 5, 2017. Text available at https://ciep.mx/la-reorganizacion-de-la-industria-electrica-en-mexico/.

22. Some examples of the complexity of these methodologies and formulae may be found in the document titled "Resolución Por La Que La Comisión Reguladora de Energía Expide las Disposiciones Administrativas de Carácter General Sobre La Determinación de Tarifas para las Actividades Reguladas en Materia de Servicios Conexos No Incluidos en el Mercado Eléctrico Mayorista de Potencia y Reservas Reactivas." Text available at http://187.191.71.192/portales/resumen/38904.

23. The very extensive comments to the document mentioned above may be found in the website of the Comisión Nacional de Mejora Regulatoria [National Agency for Regulatory Improvement], which has an online consultation phase before the enactment of any binding rules. Text available at http://187.191.71.192/portales/resumen/38904.

24. See the above cited Article 3 of the Electric Industry Law.

25. Ibid.

26. Article 3 of the Electric Industry Law.

27. In the document issued by the Banco Mexicano de Comercio Exterior (Bancomext), the impartiality of CENACE as a regulatory agency is explained by its restructuring, with a mission to avoid discriminatory service and guarantee open access. See Bancomext's "Modelos de Negocio para la Generación de Electricidad con Energías Renovables En México (November 2018): 8. Text available at https://www.bancomext.com/wp-content/uploads/2018/12/Modelos_de_negocio_ER_Bancomext_GIZ.pdf.

28. Ibid., 8–9.

29. Ibid., 10.

30. Ibid., 10–12.

31. Long term auctions are established in article 135 of the Electric Industry Law and, pursuant to the same CENACE may require power to be tendered in a competitive manner to ensure nation-wide electricity coverage.

32. Claudia Andalón. "México impone récord con energía solar más barata del planeta a 1,77 ¢ / kWh" in *Nación Eléctrica*, November 21, 2017, in https://nacionelectrica.com/mexico-impone-record-energia-solar-mas-barata-del-planeta-177-%C2%A2-kwh/

33. Ibid.

34. Karol García "Energía Renovable. Más barata que la convencional." *El Economista*. April, 23, 2018, in https://www.eleconomista.com.mx/empresas/Energia-renovable-mas-barata-que-la-convencional-20180424-0022.html

35. Centro Nacional de Energía. Prensa "Anuncian SENER y CENACE resultados preliminares de la Tercera Subasta de Largo Plazo," in https://www.gob.mx/cenace/prensa/anuncian-sener-y-cenace-resultados-preliminares-de-la-tercera-subasta-de-largo-plazo-141668

36. Ley de Transición Energética, published in the *Official Federal Gazette* in December 24, 2015, in http://www.diputados.gob.mx/LeyesBiblio/pdf/LTE.pdf

37. Pursuant to Article 123 of the Electric Industry Law, energy users that consume energy from sources other than renewables are obligated to purchase CELs.

38. There were at least 16 constitutional challenges filed against this law, as Mexican industrialists demanded that they be allowed to choose their energy sources freely. Alfredo Méndez. 2016. "Se amparan contra ley de transición energética" (February 11). Text found at https://www.jornada.com.mx/2016/02/11/economia/027n2eco.

39. Diana Gante "Pagó CFE 2 mil mdp por CELs en 2018. 2019." Reforma (November 25). Text found at https://www.reforma.com/aplicacioneslibre/preacceso/articulo/default.aspx?__rval=1&urlredirect=https://www.reforma.com/pago-cfe-2-mil-mdp-por-cels-en-2018/ar1821580?referer=--7d616165662f3a3a6262623b727a7a7279703b767a783a--.

40. The German government was active in promoting sustainable energy, particularly solar, as it has in recent years within its own borders. The joint actions of the Mexico–Germany alliance can be consulted in the German–Mexican Energy Partnership website at https://www.energypartnership.mx/home/.

41. Edgar Sigler. 2018. "AMLO se baja de la ola de las energías verdes y apuesta por lo más contaminante." Expansión (December 20). Text found at https://expansion.mx/empresas/2018/12/20/amlo-se-baja-energias-verdes-y-apuesta-por-mas-contaminante.

42. The National Project, which includes an energy chapter, from pages 166 to 187, concentrates mostly on fossil fuels, as commodities, but also as energy sources. Text found at http://morenabc.org/wp-content/uploads/2017/11/Plan-de-Nacion-de-Morena.pdf.

43. Iliana Chávez, "Bartlett delinea Programa Nacional de Electricidad" Energía Hoy, December 8, 2018, https://energiahoy.com/2018/12/08/bartlett-delinea-programa-nacional-de-electricidad/.

44. Griselda Farías, "Defiende CFE su licitación para comprar carbón." Infonor. Diario Digital, April 6, 2019, https://www.infonor.com.mx/index.php/carbonifera/9/71680-defiende-cfe-su-licitaci%C3%B3n-para-comprar-carb%C3%B3n.

45. Redacción, "Acusan posible conflicto de interés en compra de carbón de CFE a Senador de Morena." 24 Horas, March 20, 2019, https://www.24-horas.mx/2019/03/20/acusan-posible-conflicto-de-interes-en-compra-de-carbon-de-cfe-a-senador-de-morena/.

46. Efraín Mariano, "CFE importa 71,500 toneladas de carbón para la Termoeléctrica Plutarco Elías Calles," Energy and Commerce, May 7, 2019, https://energyandcommerce.com.mx/cfe-importa-71500-toneladas-de-carbon-para-la-termoelectrica-plutarco-elias-calles/.

47. Redacción, Energía a Debate "Modifican lineamientos de Certificados de Energías Limpias," Energía Debate October 18, 2019, https://www.energiaadebate.com/energia-limpia/modifican-lineamientos-de-certificados-de-energia-limpia/.

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