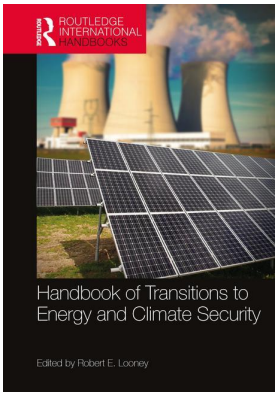

Handbook of Transitions to Energy and Climate Security

Robert E. Looney

Energy and climate transitions in Mexico

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Energy and climate transitions in Mexico

The emergence of a "política ambiental de estado"

Duncan Wood

Mexico is one of the world's most important emerging economies, a major oil producer and a country that has bet heavily on industrialization and manufacturing exports for its development strategy. It is a country with a growing population, a relatively young demographic profile, and a rapidly expanding middle class with the normal aspirations. Mexico is also the world's tenth largest emitter of greenhouse gas (GHG) emissions so it is surprising to many that Mexico stands out as an important example of a country that has chosen to exercise a leadership role in the global conversation over climate action, and in recent years has begun to enact meaningful changes in national legislation aimed at reducing the country's GHG emissions, at the same time as it has been successful in building a viable renewable energy industry.

This chapter provides an overview of Mexico's emergence as such a leader, and analyzes its approach to climate action. I propose that, while Mexico has defied those skeptics who argued that an oil-producing state could not be taken seriously as a climate change leader, achieving its ambitious GHG reduction targets will require an enormous commitment of time, resources and political capital over a long period of time and across several administrations, something that has traditionally proved difficult in Mexico. Nonetheless, the recent energy reform process in Mexico provides us with hope that there will be significant reductions in the short term thanks to the modernization of the energy sector, in particular electricity generation, as well as a new Energy Transition legislative package that was passed by the Mexican Congress in December 2015.

The strongly centralized nature of Mexican energy and natural resources policy-making plays a significant role in this story. The existence of two publicly-run energy monopolies in Mexico, Pemex (the national oil company or NOC) and the Comision Federal de Electricidad (CFE, the national electricity utility), and the capacity of the federal government to engage in national energy planning and infrastructure projects has greatly helped the effort to reduce emissions in recent years. This may seem ironic to some, as both Pemex and CFE have hardly been viewed as exemplary climate citizens in the past. However, the energy reform process in Mexico that began in 2013 is proving to be transformative not only in terms of the structure of the energy

sector, but also in the incentives to both reduce emissions and improve economic competitiveness. Mexico therefore serves as an important example of a positive sum game between economic development and climate action.

Explaining Mexico's approach to climate change

For many years, Mexico did not occupy a central role in the global conversation on climate change. Although the Mexican government signed the UNFCCC in 1992, and was a signatory to the Kyoto Protocol in 1998 as a non-Annex 1 country, early government approaches focused on greenhouse gas inventories and energy and emissions intensity arguments. Projections made by the Mexican government in the early 2000s showed that the priority was clearly on economic growth and improving the energy efficiency of that growth, rather than in reducing overall emissions.

It is easy to understand why Mexico put only minimal emphasis on reducing emissions in these early years. First, Mexico's economy and government budget have depended heavily on hydrocarbons since the middle of the twentieth century and Mexicans view themselves as an "oil nation." In fact until 2004, when Pemex reached record high production of 3.4 million barrels per day, revenue from oil production was seen to be an increasingly important element in national economic growth, employment and wealth creation. The truth is, of course, that oil production has become a far less important element in the Mexican economy since the 1990s, with the rise of a manufacturing export sector that has become the envy of the world, and now dwarfs oil as a percentage of national GDP. Nonetheless, Mexico's attitudes to climate change were consistent with those of an oil-producing state until the mid-2000s.

Pulver has argued that, prior to 2006, Mexican approaches to climate change were shaped by three factors.[1] First, the government adopted a "stop-and-go" attitude to climate policy, responding largely to the international and bilateral agenda with the United States, but failing to maintain consistency throughout successive administrations. Second, PEMEX successfully opposed a more aggressive stance on emissions reductions, and third, civil society failed to generate any policy momentum in this field.

This is not to say that there was no interest in climate change in Mexico, and there was considerable attention dedicated to the issue among the Mexican scientific community in the 1990s. Of particular importance was the international recognition received by Mario Molina after his 1995 Nobel Prize given for his discovery of the hole in the ozone layer. Molina went on to create an eponymous center for the study of energy and the environment with a heavy focus on climate change.

However, it was only after 2006 that the Mexican government began to adopt a more coherent approach. A number of factors conspired to drive a change in opinion and policy. First, there was rising environmental awareness and activism due to the high air pollution levels in Mexico City, which experienced persistent critical air quality advisories in the 1990s and 2000s. Although civil society is not as active as in other countries, it has played an important role as diverse environmental groups and universities have worked alongside the scientific community and a more left-leaning government of Mexico City after 1997, to raise public awareness about environmental degradation in general, and about the harmful effects of emissions in particular. Mexico's political and social opening to the world has also helped this cause, with much greater interaction between Mexican and foreign environmental NGOs. Having achieved important advances during the last 20 years in terms of the reduction of automobile emissions, of the ozone at sea level and suspended particles in the air, all levels of government have searched for other ways to improve the local and national environment which has

attracted not only international attention and praise, but has also generated confidence that Mexico could be a leader in environmental questions.

The second factor was the growing awareness that Mexico's geography makes it especially susceptible to the harmful effects of climate change. With significant parts of national territory located below the Tropic of Cancer, situated beside the hurricane factory that is the Gulf of Mexico, possessing enormously long coastlines of both Pacific and Atlantic sides of the country, and with major populations in rural areas depending on near-subsistence agriculture and living in poorly constructed housing, Mexico is more vulnerable than most countries to the effects of violent weather. In fact, the Mexican government estimates that violent weather events related to climate change have cost almost 340 billion pesos in the early years of the 21st century alone.[2]

Third, Mexico's commitment to the global climate change regime solidified over time. A signatory to the original UNFCCC as a non-Annex 1 country, Mexico's position as one of the few developing states that are also members of the OECD helped to drive a realization of the importance of shared responsibility between Annex 1 and non-Annex 1 states to reduce emissions. This socialization process is reflected in the growing size of Mexican delegations to COP meetings as well as in the increasing number of written submissions to international negotiations.[3]

The fourth factor, however, is more idiosyncratic. The election of Felipe Calderón to the Mexican presidency in 2006 heralded a major shift in national climate change approaches. His predecessor, Vicente Fox, had done little to consolidate a coherent national climate change policy but Calderón, despite being from the same party (the National Action Party or PAN), adopted an aggressive approach, both domestically and internationally on the issue. As President, Calderón cited his father's firm belief in the importance of sustainability as one of the major influences in his own political thinking.[4] The theatrical release of former U.S. Vice President Al Gore's movie, "An Inconvenient Truth" is also reckoned to have motivated him. This personal attachment to the issue drove him to try to make Mexico a climate change leader, not just in Latin America but among developing countries. This was not just a passing fancy, either: since leaving office Calderón has chaired the Global Commission on the Economy and Climate, an organization that argues against the notion that fixing the climate and emissions rules are bad for the economy, calling the choice between climate action and economic prosperity a "false dilemma."[5]

Climate change and Mexican public opinion

Mexican public opinion has reflected this shift in awareness and policy. Between 2007 and 2010, the Mexican public increased its recognition of climate change as a serious threat by 10%, from already relatively high levels (see Table 11.1). What is perhaps extraordinary about this is that most Mexicans admit that they have a very elementary understanding of the issue. A Parametria poll in 2014 revealed that 76% of Mexicans accept that they know little about climate change and another 16% say they know nothing about it.[6]

However, it is not clear that awareness of climate change or scientific knowledge of the issue makes a big difference in concern for climate. A recent poll by Pew has shown that the link between education and support for climate action is less than solid. A survey of U.S. public opinion demonstrated that political affiliation and age are much better determinants. In fact, education and scientific knowledge seem to have little relation to environmental attitudes in general in the U.S.[7]

A stronger link appears to exist between levels of emissions per capita and concern over climate. Another Pew poll highlights the fact that the Mexican public has a much higher level of

Table 11.1 Threat from global warming in Latin America (% who view global warming as serious threat)

Country	*2007–2008*	*2010*	*Change (pct. pts)*
Ecuador	69%	85%	16
Venezuela	62%	80%	18
Brazil	76%	78%	2
Chile	69%	75%	6
Colombia	65%	75%	10
Peru	58%	75%	17
Mexico	**63%**	**75%**	**10**
Argentina	71%	70%	−1
Costa Rica	72%	69%	−3
Uruguay	68%	68%	0
Panama	61%	66%	5
Bolivia	51%	63%	12
Guatemala	51%	61%	10
El Salvador	51%	61%	10
Paraguay	54%	61%	7
Honduras	57%	51%	−6
Dominican Republic	46%	51%	5
Haiti	35%	18%	−17

Source: Gallup, "Fewer Americans, Europeans View Global Warming as a Threat," http://www.gallup.com/poll/147203/Fewer-Americans-Europeans-View-Global-Warming-Threat.aspx, April 20, 2011.

concern over climate change than its counterparts in either the U.S. or in Canada; whereas Canadians and Americans show a relatively low level of concern over the issue, Mexico is in the same peer group as other low per capita emitters such as Argentina, Chile, India and Vietnam.[8]

Mexico and renewable energy

The renewable energy story of Mexico is particularly encouraging. The country is blessed with considerable renewable energy potential, due to impressive wind, solar and geothermal resources. Since the mid-2000s, Mexico has engaged in an ongoing process of modernizing its energy sector, focusing on trying to raise energy production and increase efficiency. At the same time, and especially since 2005, national energy policy and private sector initiatives have driven the rise of renewable energy sources in Mexico. A number of factors combined to encourage investment in the renewables field. First, the problems of the oil and gas sector should be recognized. After the national oil company, Pemex, saw peak oil production in 2004 at 3.4 million barrels per day, production dropped precipitously over the next decade, reaching only 2.2 million barrels per day by 2016.[9] As a result, replacing the use of fuel oil for electricity generation with alternative sources became attractive to policy makers as hydrocarbons not used internally would become available for exporting. However the true potential of this approach would not be seen until the PRI administration of Enrique Peña Nieto after 2012.

In 2008, the Mexican Congress passed a new Law for the Better Use of Renewable Energy and the Financing of the Energy Transition (LAERFTE in Spanish). Significantly, the law required that the energy ministry, SENER, create new rules and offer new incentives for the

renewable energy industry in Mexico. Therefore, in addition to establishing a clearer legal framework for renewable energy, the law established a modest fund of US$220 million a year for three years to fund projects related to renewable energy. Simultaneously, a National Energy Strategy put forward by the Secretary of Energy and the Works and Investment Program of the Electricity Sector (POISE) proposed by the national electricity utility, CFE set a goal to generate 35% of electricity from non-fossil sources by 2024.

Although the government and CFE have been key drivers of renewable energy in Mexico, foreign actors have also played an important role in promoting renewable energy. A number of foreign governments have engaged with Mexico on the issue, including the United Kingdom and Germany, and investors from those same countries along with Spain have been active in developing and operating wind power plants in the Mexican southwest. However, it is fair to say that the United States has been the most closely involved in Mexico. In the 1990s, the U.S. government financed solar power projects in Mexico through the United States Agency for International Development (USAID). Later, USAID promoted the use of wind energy in Oaxaca by sponsoring a survey of the wind power resources in the state in 2002.[10] This initiative laid the foundation for the development of the energy program in the region of La Ventosa and was exhaustively used to attract investors to the project.[11] In 2008 and 2009, USAID also played a role in developing public education programs centered on the financing for renewable energy projects and underlined the lessons that should be learned from the regulatory frameworks used in the United States of America for renewable energy.[12]

By 2014, Mexico had made impressive progress on renewable energy. 22% of all electricity generated came from non-fossil fuels, with hydro-electric power by far the biggest component. Of the total of 16,295 MW of total renewable installed capacity in 2014, Mexico had 11,632 MW of hydro capacity, accounting for 18% of total installed generation capacity. Hydroelectricity supplied about 15% of Mexico's electricity generation in 2014.[13] In addition to large hydro-electric plants, located predominantly in the south of the country, the CFE and private firms are also focusing efforts on completing a number of smaller projects (<30MW). It is expected that these projects will bring another 289 MW of hydroelectric power to the system by 2016.[14]

However, non-hydro renewable power in Mexico offers an equally, if not more, encouraging story than traditional hydro. Prior to the energy reform in 2013, Mexico was the world's fifth largest producer of geothermal power, with almost 1,000 MW of installed capacity, and the passing of the geothermal law and the Round 1 auction of geothermal fields to private bidders offers the prospect of significant additions to that total.

Of critical importance, however, in the renewable energy story in Mexico has been the role of the private sector.[15] The decision by some of Mexico's leading businesses, including cement giant Cemex, mining conglomerate Grupo Bal, Walmart de Mexico S.A., and Coca Cola bottlers FEMSA to reduce their carbon footprint by engaging in self-supply contracts with private renewable energy providers allowed for the rapid expansion of wind power in Mexico up to more than 2,000 MW of installed capacity by the end of 2012.[16] This was helped greatly over the past decade by the high price of electricity for Mexican industrial consumers. Both the states of Oaxaca and Baja California have been centers of wind energy investments, and Energy Secretary Pedro Joaquin Coldwell announced in 2015 that the government hopes to bring in $14 billion in investment in wind energy by 2018 to boost total installed capacity from 2,000 MW to 12,000 MW.[17] Although this seems ambitious, between 2010 and 2013 Mexican wind power saw an almost seven-fold increase in installed capacity. To make it possible, however, there will need to be concomitant investments in transmission capacity to get the electrons to market. Mexico's opening of its electricity will be a crucial component in facilitating such investment.

Although solar power is still largely undeveloped as a resource in Mexico, recent years have seen growing interest and a number of significant projects. Until recently, the main attraction for solar investments was in rooftop PV installations for residential applications. Due to the sliding tariff used by CFE, large consumers of electricity who would normally have to pay the high domestic consumption (or DAC) rate, found that they could achieve major savings on their electricity bills by installing solar panels, thereby gaining access to the lower tariff reserved for smaller consumers. However, since 2012 there has been renewed attention to large-scale solar generation, especially in the north of the country. Mexico has an extraordinary solar resource, with a national insolation average of around 5 kilowatt hours per square meter per day (5kWh/m^2/day). In northern states such as Sonora, Chihuahua and Durango, the solar resource is of extremely high quality, with around 6kWh/m^2/day. It is expected that, with increasing attention to solar, and with lower costs due to mass production of solar panels and improved technologies, solar power will experience a boom in Mexico in the near future.

Energy policy and climate under the Calderón administration: modernization and mainstreaming

Throughout the Calderón administration, the President repeatedly referenced the need for both national actions and international collaboration to address the issue. At home, the PAN government was able to secure legislation in the Congress to help develop renewable energy, and sought to limit the emissions from electricity generation, and improve energy efficiency. Much of this was foretold by the publication of Mexico's 2007 National Strategy on Climate Change (ENCC), which laid out the executive branch's perspective on climate action and provided insights into future legislative priorities. Although traditionally a hydrocarbons-heavy energy producer, the early years of the 21st century saw Mexico begin to focus its attention on alternative energy sources.

Pulver has provided an excellent overview of Mexico's climate change policy up until 2012 and shows that the Calderón administration enacted a number of legislative initiatives that highlighted the president's commitment to climate action. The administration made an impressive early commitment to increasing the share of renewable energy in the electricity generation mix, as well as reducing overall emissions. However, the culmination of these efforts came in the last year of the Calderón government, with the Congressional passage of a General Law on Climate Change (GLCC), which made the following ambitious commitments:

- The government would create an inter-ministerial commission on climate change.
- A new climate fund would be created to help mitigation efforts.
- An emissions market would be created.
- The government would establish emissions measurement, reporting and verification requirements.
- The government would reduce and then reverse the trend of deforestation.
- The government would increase the percentage of renewable energy in the electricity generation mix to 35%.
- The government would reduce fossil fuel subsidies.

Perhaps the single most important component of the GLCC was the creation of the inter-ministerial commission on climate change. This body allows for a mainstreaming of climate policies across government ministries and policies, driving greater coordination and cross-fertilization of ideas.

Throughout the Calderón administration, international financing for Mexico's climate action strategy remained a priority. Whether it was through the Green Climate Fund (GCF), through Clean Development Mechanism (CDM) financing for methane avoidance, renewable energy or energy efficiency projects, or through foreign investment in renewable energy projects, international money has been behind much of the progress. It is important to note that Mexico became a major beneficiary of the CDM, with the second largest number of CDM projects in Latin America after Brazil, and fourth in the world (with 127 CDM-financed projects by 2013).

Alongside renewable energy (see above for details), the Calderón administration took the lead in emphasizing energy efficiency as a strategy that was justified both in terms of its climate effects and its economic benefits. In 2009 the Mexican government launched a national energy efficiency plan, coinciding with the transformation of the National Council on Energy Savings (CONAE) to the National Council on the Efficient Use of Energy (CONUEE). This plan, named National Program for the Sustainable Use of Energy (PRONASE) developed in conjunction with the consulting firm McKinsey, evaluated different opportunities for energy efficiency gains in Mexico and identified seven strategic areas where the government could make significant progress: lighting, domestic appliances, transport, green buildings, cogeneration, industrial motors and water pumping.

The PRONASE plan evaluated each of these opportunities on a cost-benefit calculation and identified lighting as the most cost-effective way to launch a national energy efficiency program. The program focused on the transition from incandescent light bulbs to more efficient, fluorescent bulbs. Beginning with government buildings, and then encouraging homeowners to switch over by offering subsidies for the purchase of the new bulbs, the Mexican government, working closely with CFE, was able to secure rapid progress. In a two-year period, the program exchanged 45.8 million light bulbs (and gave away almost 23 million light bulbs), achieving energy savings equivalent to taking nearly 600,000 cars off Mexican roads for a year.

The second phase of the PRONASE focused on appliances and offered subsidies for consumers who replace older, less efficient domestic appliances such as fridges and washing machines with newer models. By emphasizing the economic benefits of doing so, and by offering financial incentives, the government was able to convince a large number of consumers to make the switch, with nearly 2 million appliances being replaced under the program by the end of the administration. The Mexican government also collaborated with U.S. authorities to develop a national efficiency certification standard, known as FIDE, and to harmonize the standard with the United States' Energy Star standard.

Also of major significance was the decision by the Calderón administration to end the practice of subsidizing gasoline prices in Mexico. Though widely reviled by the public, the monthly "*gasolinazos*" of raising fuel prices by reducing the fuel subsidy succeeded in focusing attention on fuel conservation and the energy efficiency of automobiles. This practice was continued under the Peña Nieto administration until the gasoline subsidy had finally been eliminated in anticipating of the opening of the downstream market in 2016.

The Peña Nieto administration and energy reform: discovering a "green lining"

The major achievement of the Peña Nieto administration to date has been the successful execution of a transformative energy reform that opens oil, gas and electricity sectors to private and foreign participation. The heavy media focus on oil production in this reform has meant that many observers have neglected the climate change policies of the government since 2012. Indeed most analysts displayed considerable skepticism about Peña Nieto's commitment to

climate action in the early months of the government,[18] but the administration seized on the progress made by its predecessor and developed policy ownership on the issue. Despite a main focus in energy policy on rejuvenating the hydrocarbons industry, in the first three years of the PRI government we have seen an impressive commitment to building on existing laws and strategies, and continuing to make major international commitments on GHG emissions reduction.

The energy reform itself, a Constitutional reform approved by the Mexican Congress in December 2013, with secondary (implementing) legislation following in August 2014, represented a paradigm shift for Mexico's energy sector. From a closed, state-dominated, monopolistic paradigm, Mexico's energy sector has rapidly been transformed into an open, market-oriented system. This is allowing for greater efficiencies, for experimentation with new technologies and processes, and access to capital.

While it is true that the administration has been most concerned with attracting investment into the oil and gas sector in Mexico, a concomitant focus on both climate change and renewable energy has established strong political credentials for the government in international negotiations. What's more, the administration has succeeded in offering both environmental and business benefits from the reform process thus far.

The first suggestion that the President would not neglect the renewable energy sector came in the announcement of the energy reform package in the fall of 2013. Alongside a major shakeup of the hydrocarbons and electricity sectors, the President announced a new geothermal energy law that offers concessions to private firms to develop the country's significant geothermal resources. Although there have been suggestions that the intention here was to offer business opportunities to political allies anxious to get involved in the sector, the new law has already attracted interest from national and foreign investors.[19]

The most important contribution towards enabling emissions reductions in Mexico, however, came with the government's commitment to build new gas pipeline infrastructure to reduce natural gas shortages and to lower the cost of electricity generation. In the final years of the Calderón administration, natural gas consumers in Mexico were hit by severe shortages of gas as Pemex both cut production of the fuel due to low prices, and increased gas consumption at its refineries to save costs versus its traditional fuel source, fuel oil. The shortages hit the manufacturing sector hard in 2012, with firms forced to shut down production several times due to commodity shortages. Companies were therefore obliged to turn to more expensive options, such as liquefied natural gas (LNG) or liquefied petroleum gas (LPG) to make up for the shortfall. These problems, combined with the issue of already higher electricity prices in Mexico for industrial consumers (compared to the United States) were cited by both government and private sector as major obstacles for national economic competitiveness.

In response the government moved ahead with existing plans, drawn up under the Calderón administration, to build new gas pipelines across the U.S.-Mexico border to bring in more plentiful, cheaper gas from American producers. The most important of these pipelines, the Los Ramones project, is predicted to bring in sufficient new gas to Mexico to satisfy national demand until 2018. Other pipelines, such as the Waha-San Elizario (to connect with the planned San Isidro-Samalayuca gas conduit in the northern border state of Chihuahua), are important in satisfying demand in different geographic regions of the country.[20]

The new fuel source has made possible an accelerated transition in generating capacity in Mexico as the CFE has modernized its plants, dramatically reducing the use of much higher polluting fuel oil. Furthermore, it has enabled CFE to lower its generating costs, in turn allowing them to lower electricity costs to their customers.

The other aspect of the energy reform that will greatly aid the long-term reduction of emissions from the electricity sector is the freeing of the electricity market itself, to allow private

investment in all aspects of generation. The new investments in generation capacity that are likely to come into Mexico in the next few years will almost all focus on either natural gas or renewables as their fuel source. This offers Mexico the opportunity to increase its energy supply without significantly raising its emissions levels and, in the long term, to reduce emissions below current levels.

In addition to the modernization of the energy sector, the Mexican government made a major statement of climate action when the Congress approved the creation of a carbon tax in 2014. The tax, which was substantially reduced through negotiations in the legislature, sets an approximate average price for carbon at $US3.5/tCO$_2$e. Natural gas was exempted from the tax, and a sliding scale was used, with coal and oil coke the most heavily penalized. The Mexican government estimates that the tax will raise around US$1 billion per year for the Fnance Ministry.

Despite considerable progress on multiple fronts, there is a notable weakness in the Peña Nieto government's approach to climate action thus far. The administration announced that the national energy efficiency program (PRONASE) would be widened beyond the five strategic areas identified during the Calderón administration, but it has yet to establish a plan for implementation or even for general principles. The PRONASE website has instead focused on criticizing the previous administration's approach, accusing it of being too limited. However, energy efficiency is an emerging issue in trilateral talks with the United States and Canada through the North American Energy and Natural Resources Ministers' meeting, and the North American Climate Change and Energy Working Group, where discussions have taken place about harmonizing energy efficiency standards.

Mexico and the international climate regime 2006–2015

At the international level, Mexico has gradually emerged as a leader among developing nations. Although it was a hesitant participant in the early years of the UNFCCC, focusing on the need for industrialized states to commit to GHG emissions reductions, Mexico acquired a role as a developing country leader under Calderón. In fact, President Calderón began to develop Mexico's credentials as a climate action leader as early as 2007. At the Bali COP 13, the administration unilaterally offered to reduce emissions by 50% over 2002 levels by 2050. This offer received favorable international reactions, although at least one climate NGO expressed some skepticism over the government's ability to implement and follow through on such a commitment.[21]

The Bali summit was important in another way, however, as President Calderón dedicated himself to the COP process. Bitterly disappointed by the failure of the Copenhagen COP 15, Calderón made a commitment to ensure that the process would get back on track during the COP16 meeting in Cancun, and worked closely with the British government to develop a strategy for achieving consensus in 2010.[22] Despite major tensions between the leading negotiating parties, Mexican foreign minister Patricia Espinosa employed her decades of experience in international diplomacy and pulled off a final agreement at the summit to ensure that the talks would continue on track in later years.[23] By extending the period for talks to replace the Kyoto Protocol, it is no exaggeration to state that the Mexican government's deft handling of negotiations paved the way for the eventual agreement of a post-Kyoto scenario at the Paris COP21 talks in December 2015.

Another major achievement of Calderón in the international climate regime was the creation of a GCF during COP16. The GCF was envisioned by Calderón to be a source of financing from all nations for all nations. A key element of its design was to make accessing climate

financing easier and more transparent. But the most important element of the GCF initiative was the notion that both industrialized and developing countries would share the burden of financing climate transition, an idea that had never before been agreed upon in international talks. Since Cancun, this idea has been substantially modified but the GCF highlighted Calderón's leadership in the field and his government's ability to generate consensus.

The administration of Enrique Peña Nieto, to the surprise of many observers, has continued to put Mexico at the center of the global climate regime as a leading developing country. In anticipation of the 2015 Paris COP21 meeting, Mexico became the first developing nation to publish its Intended Nationally Determined Contribution (INDC) in April 2015, following on from the United States submission in March of the same year. This reflected a growing realization that the United States and Mexico need to adopt compatible approaches to climate action, given the highly integrated nature of their economies.

In the lead in to the Paris talks, Mexico under Peña Nieto again adopted a leadership role. On March 28, 2015, Mexico became the first developing country to deliver its INDC to the UNFCCC, in anticipation of the Paris COP21 meeting later that year. Mexico committed to unconditionally reduce its emissions of GHGs by 25% below baseline emissions by 2030 (Table 11.2), in line with existing national legislation, and by 50% by 2050. The Peña Nieto administration also embraced the possibility of a 40% reduction by 2030, if certain international conditions are met (mostly commitments by other states and the availability of financing).

This impressive commitment is based on a number of elements. What is most intriguing about Mexico's INDC is that it focuses heavily on black carbon, a component found most commonly in soot from diesel, coal, fuel oil and biomass. When one examines the main sources of black carbon GHG emissions in Mexico, it is clear that transportation and industrial activity are the major culprits, and it remains to be seen how the Peña Nieto government plans to bring about such a dramatic reduction (see Table 11.3). However, the shift from fuel oil to natural gas in electricity generation will greatly facilitate reductions in GHG emissions and a continued focus on energy efficiency and renewables must be part of the equation.

In addition to these mitigation commitments, a large part of Mexico's INDC focused on climate change adaptation efforts. The three main lanes of the Peña Nieto government's approach to adaptation lie in improving resilience in vulnerable communities, strengthening ecosystems and achieving a 0% deforestation rate by 2030, and putting in place specifically-designed strategic infrastructure and productive systems.

Despite the grand ambitions of Mexico's commitment to the Paris COP21 talks, the plans have been criticized by a number of analysts. While some have applauded the Mexican government for including an "economy-wide emissions reduction goal and the specification of an unconditional *and* a conditional reduction,"[24] criticisms have focused on the lack of detail in the implementation of the plans, as well as what has been perceived as a less aggressive renewable energy target (5% of total generated by 2018) than the one first put forward by the government (8.2% by 2018). By extension, concerns have emerged that Mexico will be able to reach its medium-term target of 24% of generation from renewables by 2024.

However, shortly after Mexico made its Paris commitments, the national Congress passed a new Energy Transition Law (Ley de Transición Energética or LTE). The law contains ambitious targets for renewable energy use in Mexico, setting a goal of 25% of electricity generation from clean sources by 2018, 30% by 2021, 35% by 2024, 45% by 2036, and 60% by 2050. In addition, the Mexican Congress refused to bow to pressure from the national steel producers' association, CANACERO, to include natural gas as a "clean" energy source, meaning that the steel industry will be forced to seek alternative forms of energy for its production processes. Overall, the LTE provides the potential to reduce Mexico's emissions by between 95 and 115

Table 11.2 Mexico's greenhouse gas emissions by sector ($MtCO_2e$), 2013 and 2030

Emission category	*GHG emissions 2013*	*GHG emissions goal 2030*
Transport	174	218
Electricity generation	127	139
Residential and commercial	26	23
Oil and gas	80	118
Industry	115	157
Agriculture and livestock	80	86
Waste	31	35
LULUCF*	32	0
Total emissions	665	776
LULUCF absorption	−173	−14
Total	492	762

Source: Government of Mexico, "Intended Nationally Determined Contribution: Mexico", April 2015, http://iecc.inecc.gob.mx/indc.php.

*Land Use, Land Use Change and Forestry.

Table 11.3 Mexico's black carbon emissions ('000 tons), 2013 and 2030

Emission category	*Black carbon emissions*	*Black carbon emissions goal 2030*
Transport	47	10
Electricity generation	8	2
Residential and commercial	19	6
Oil and gas	2	3
Industry	35	41
Agriculture and livestock	9	10
Waste	<1	<1
LULUCF	4	4
Total emissions	125	75
LULUCF absorption	0	0
Total	125	125

Source: Government of Mexico, "Intended Nationally Determined Contribution: Mexico," April 2015, http://iecc.inecc.gob.mx/indc.php.

$MtCO_2e$ by 2030, aproximately 50% of the proposed reductions under the INDC. The law also lays out details of Clean Energy Certificates (CELs), modeled on the California system, that will help to incentivize renewable energy, setting a target of a minimum of 5% CEL use by power producers by 2018.

Conclusion

Since 2006, Mexico has emerged as a climate action protagonist among developing countries. Initially this leadership was due to the personal beliefs of PAN President Felipe Calderón, but it quickly became institutionalized in Mexican government policy as the government developed a

succession of plans and strategies. These activities culminated in the GLCC of 2012, a crucial milestone in Mexican climate action, as it became the legal framework inherited by the new PRI-ista government of President Enrique Peña Nieto. Of central importance in this institutionalization process is the creation of an inter-ministerial commission on climate change, which is promoting the mainstreaming of climate change across government agencies.

Mexico's commitment to climate change mitigation has been hailed in international forums, especially in the form of its leadership of UNFCCC talks. This climate leadership by Mexico is seen as important not only in building coalitions (seen most clearly at the Cancun talks), but in strengthening the argument that all countries, not only the Annex 1 states, should contribute to the global climate action agenda.

Of much greater significance, however, is the fact that Mexico has followed up on its international commitments with a coherent and cross-cutting domestic climate agenda, composed of aggressive promotion of renewable energy, a modernization of electricity infrastructure and a switch to natural gas as the primary fuel source, and a package of laws that promote a lower emissions economic model. The passing of a carbon tax law, alongside the creation of Clean Energy Certificates, and the continuation of a commitment to energy efficiency strategies, should facilitate the achievement of emissions stabilization by the end of the 2020s and then steep reductions into the 2030s and beyond. This is particularly impressive given Mexico's relatively youthful demographic profile and a rising middle class that has expectations of a higher standard of living.

Mexico's climate action profile can therefore be seen as an example for other major developing economies. It has embraced both industrialization and sustainable development, and sees conformity with international norms as a crucial component in making this a sustainable proposition and the international climate agenda remains central to pushing Mexico to follow through on its commitments.

Notes

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