A DEEP DIVE

ALIGNING MEXICO'S ENERGY TRAJECTORY WITH THE GRID: LINKS BETWEEN RENEWABLES, ENERGY SECURITY, AND SOVEREIGNTY

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Expert recommendations

The following pathways would enable an energy transition that delivers energy security, sovereignty, and climate outcomes for Mexico:

- Make clean-power target for 2030 binding (legally enforceable).
- Prioritize renewable generation: renewables need to crowd out natural gas in dispatch and planning to meet the *energy security* and *sovereignty* objective.
- Under the new legal framework, ensure a regulated and monitored private sector participation to scale up renewables; currently, regulatory uncertainty discourages clean-energy financing.
- Invest generously in the grid, which needs to scale in parallel with generation and move toward modular, recyclable technologies that utilize renewable-energy flows.

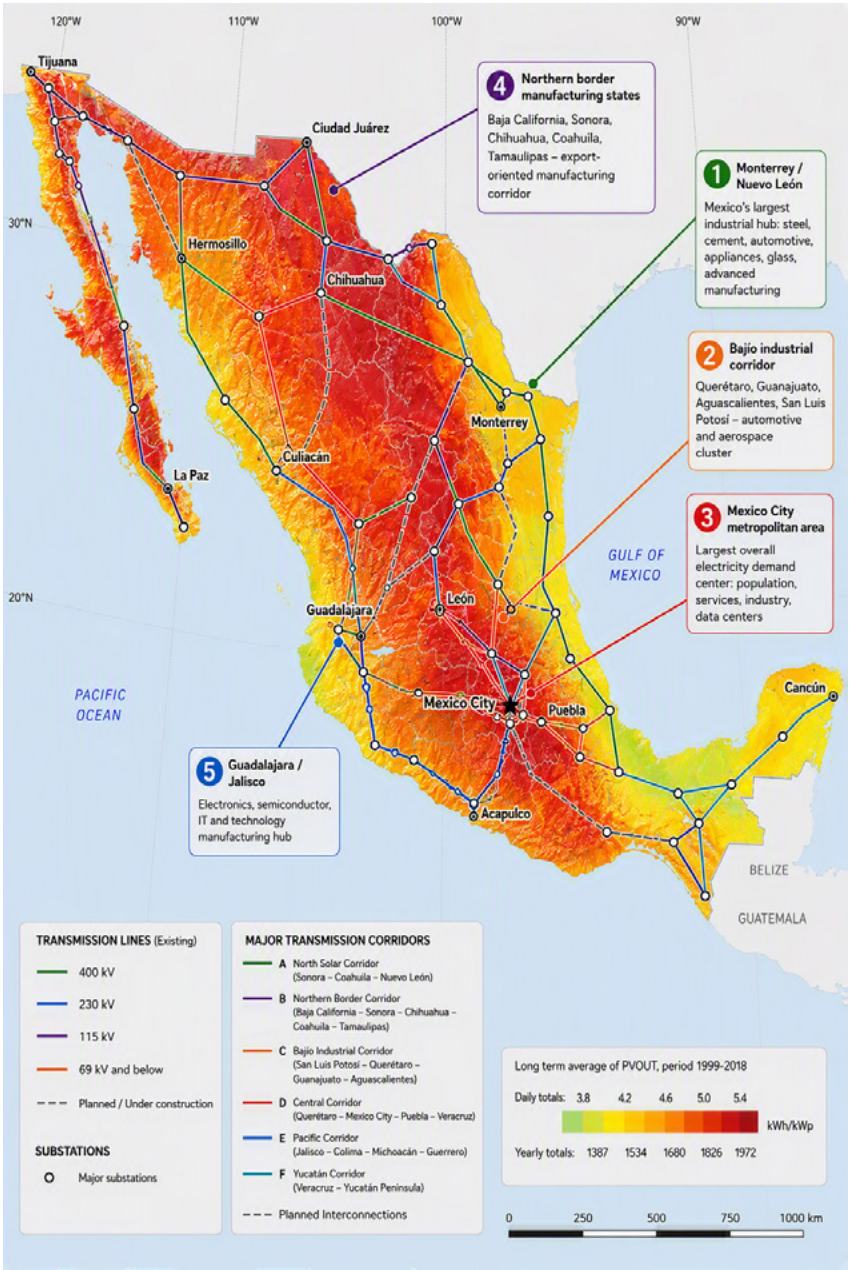
Methodology

The Implementation Gap Analysis (IGA) developed by the Climate Policy Lab (CPL)[1] has been applied in the first phase of IGA research to assess and rank sources of climate-related policy *implementation gaps*[2] in Mexico.[3] This policy brief presents findings from the second phase of research; it maps previously identified gaps ranked as most significant (as well as additional gaps identified by experts) to recently adopted *initiatives*[4] in the energy sector. Mixed methods research (policy review drawing on International Energy Agency and CPL policy databases)[5] was followed by qualitative research (semi-structured in-depth expert interviews), then triangulated with the results of the first research phase. The goal of the interviews was to capture expert views regarding the most critical implementation gaps impacting climate outcomes and decarbonization of the electricity sector (and the energy sector overall).

Country Context

In the broader context of Mexico's energy strategy, the current energy policy framework is expected to deliver the following outcomes: energy sovereignty and security, hydrocarbon self-sufficiency, electricity sector overhaul, and a diversified electricity matrix – in keeping with environmental and climate commitments. In November 2025, Mexico submitted a third Nationally Determined Contribution (NDC 3.0)[6] under the Paris Agreement, pledging an emissions cap of 364–404 $MtCO_2e$ by 2035 (unconditional) and net-zero emissions by 2050. These goals are premised on emission reductions in electricity generation by around 20%, and a major scale-up of renewable energy, energy efficiency improvements, transportation electrification, and gas flaring and methane leaks reduction.

Figure 1. Photovoltaic power potential, transmission corridors and key industrial demand centers (Mexico)



Source: Photovoltaic power potential (PVOUT) derived from Global Solar Atlas (World Bank Group, ESMAP, and Solargis). Industrial demand centers and transmission corridor overlay developed by the author based on major electricity demand centers and representative transmission pathways.

Since 2024, Mexico has enacted far-reaching constitutional and legal reforms in the energy sector that strengthen state control over the oil, gas, and electricity industries. The main pillars of the energy sector – Federal Electricity Commission (CFE) and PEMEX, now classified as state public enterprises – are guaranteed a majority share of the market. With priority power dispatch over private companies, CFE has to supply at least 54% of the country's electricity.[7] Moreover, PEMEX enjoys preferential rights in upstream, mid- and downstream hydrocarbon activities, from oil & gas exploration and production to petroleum refining, natural gas processing, fuel distribution, fuel imports/exports, and petrochemical production (Hydrocarbon Law, 2025).[8] With oil production capped at 1.8 million barrels/day for the Mexican market, PEMEX's mandate is to serve the Mexican market first. Electricity transmission and distribution are exclusive state monopolies.

Mexico's industry competitiveness, uncertainties resulting from continuous negotiations over the United States–Mexico–Canada Agreement and fluctuating oil and gas trade flows have resulted in efforts to securitize of Mexico's energy economy. As articulated in the 2025–2030 National Development Plan (PND, 2025),[9] the role of the state will be to ensure energy security, sovereignty and affordability, but also to invest in clean energy in keeping with climate commitments. A total of 51 strategic projects are expected to generate an additional 22,000+ MW, reduce dependence on imports, and achieve equitable energy access. The plans include boosting oil and gas self-sufficiency, setting the

target for clean energy to 38% by 2030 (from 25% today), and modernizing the grid and refineries.

Interview Findings

The main concerns raised by the interviewees concerned key uncertainties relating to the future of Mexico's clean energy transition given the dominant position of PEMEX and CFE. Promoting strategic clean energy projects and upgrading electricity infrastructure, while fostering technological innovation to reduce environmental impacts and dependence on fossil fuels also implies promoting the integration of clean and renewable energy at all stages of the value chain and ensuring competitive renewable energy supply *(Interviewees 1–6).*

Given the market dominance of the state companies, all interviewees except one expressed concern that the energy market is not open to accommodate competition, which – according to the interviewees – has implications for outcomes of all initiatives surveyed in this policy brief.[4] Additionally, lack of competition and bank participation increases risk and project costs; the current strategic projects (20-year power purchase agreements) are much more expensive and less cost efficient than in the previous competitive environment (3-year power purchase agreements of 2015) *(Interviewee 3).*

> "The current risk is that the close relations between industrial strategy and CFE and Pemex will translate into more combined cycle gas and refining capacity while transmission – the real constraint to renewables – will remain under-funded." – Miriam Grunstein, Baker Institute, Nonresident Scholar

GAP 1: INDUSTRY LOBBY/RESISTANCE

While different industry groups maintain ties to and share interests with the government, only some actors in the energy industry will seek to expand their own economic power *(Interviewee 2).* The dissolution of an autonomous regulator, Energy Regulatory Commission (CRE), and National Hydrocarbons Commission (CNH), in combination with the powerful fossil fuel lobby,[10] pose a risk of collusion and unchecked influence over the energy transition including its pace *(Interviewees 2–6).* Additionally, "state fossil fuel buildout and hydrocarbon rescue systematically trade climate outcomes for short-term fiscal and political gains" *(Interviewee 2).*

GAP 2: INCENTIVE MISALIGNMENT

All interviewees expressed the view that current incentives are either misaligned, insufficient, or non-existent to attract the size and scale of investment needed to achieve timely climate-compatible energy transition as wished for in announced strategies and subsequent policy initiatives.[4] First, to improve grid reliability and capacity and resolve transmission bottlenecks, massive investment in the grid is required (in transmission, distribution and system flexibility), but it is unclear how much funding will be allocated for the upgrade. Second, no disincentives are in place to change status quo and induce change in hydrocarbon industry behavior (e.g., reduce emissions, invest in clean technology and decarbonize its operations) *(Interviewees 2–6).* Third, guardrails are missing to prevent climate and environmental targets from being sidelined and/or compromised (e.g., "polluter pays" principles such as a carbon tax or effective enforcement are largely absent) *(Interviewees 1, 3, 4, 5, 6).*

Additional gaps

POLICY DESIGN

The policy design, when backed by binding investment, will determine whether the energy transition will be aligned with both industrial expansion fueling over 3% annual growth in energy demand (some estimates refer to a 13.4% increase in electricity demand), and Mexico's clean energy and climate commitments. Low levels of transmission and grid investment will result in stagnation and system constraints. On the contrary, high levels of investment will enable high renewable penetration. But even with slower renewable growth, significant grid investment is needed to relieve bottlenecks and maintain reliability *(Interviewees 3, 4, 6).*

As confirmed by all interviewees, *stakeholder coordination* and their *competing interests* will inevitably affect the implementation progress of climate-compatible energy policies. However, *policy design* could moderate power asymmetries among stakeholders *(Interviewees 1–6)* and limit the extent to which they influence energy policy decision-making and exert control over climate mandates *(Interviewee 2).*

TECHNOLOGY

In Mexico's resource context, *technology readiness, maturity,* and *cost-effectiveness* involving solar, wind and storage are not perceived as significant constraints affecting the implementation progress in electricity matrix decarbonization. On the other hand, stalled investment in transmission, distribution and grid modernization, and system flexibility – alongside generation – have been noted as key pre-conditions for progress *(Interviewees 1–6;* see also Climate Transparency's assessment[11]). The future grid needs to integrate the latest technological advances including the new concept of base load power – instead of providing more inflexible supply at any price, it should deliver dependable capacity when required. If some generation capacity remains underused, renewable resources have no fuel costs and operating expenses are low. These cost savings need to be considered when making initial investment decisions in the *transmission* (long-distance, high-voltage lines), *distribution & grid modernization* (smart grid rollout, monitoring, demand management, local networks, digitalization), *system flexibility* (grid-side upgrades beyond storage: substations, reactive power, dynamic line rating, forecasting, etc.), and *generation* (solar, wind, storage).

PUBLIC AND PRIVATE INVESTMENT

Investing in grid and transmission is a pre-requisite to unlocking renewable generation and achieving full-scale energy transition aligned with industrial expansion *(Interviewees 1–6).* A carbon tax and removal of fossil fuel subsidies make renewables the least costly option for grid decarbonization, and can gradually phase out currently untaxed natural gas *(Interviewees 4 and 5).* With a balanced buildout, grid expansion should scale with renewables, enabling steady growth without major congestion ($50+ billion grid investment unlocks $100 billion in generation) (Table 1). To meet the investment targets (starting at $100 billion for the total system upgrade), creating conditions to attract private investment should become a priority *(Interviewees 1–6).*

In the high investment / high renewable penetration, a 210 billion USD total system investment would enable 200–300 TWh/ year of additional renewable generation, while transmission, smart-grid, and storage investments would mainly help integrate that capacity, reduce curtailment and losses, and improve overall system utilization. Mexico currently generates 350–370 TWh of electricity per year, of which about 75% comes from non-renewable sources. Adding 200–300 TWh/year of clean electricity would mean the electricity matrix would become mostly renewable and domestically sourced, in line with the energy security and energy sovereignty policy goals. Moreover, clean electricity would be delivered to high-energy demand industrial and manufacturing hubs such as the Bajío industrial corridor, Mexico City metropolitan area, northern regions and Guadalajara – all in need of decarbonization. Simultaneously with the clean grid transformation, pollution levels, air quality and health outcomes of workers would substantially improve.

INSTITUTIONAL GAPS

Implementing guardrails that support the coherence of the energy and climate policy framework implies enacting reforms that address specific institutional gaps; to name a few – reliable data collection and sharing, market compliance and accountability, carbon tax enforcement, and regulator autonomy and oversight *(Interviewees 1–6).* These reforms would fulfill functions previously performed by autonomous, independent bodies such as the Federal Economic Competition Commission (COFECE), CRE, CNH or their equivalents *(Interviewees 3, 4, 6).* Simultaneously, these guardrails will act as levers the government can use to push for the

Table 1. A combined system investment (grid and generation): Low versus high levels of investment

	Low investment / low renewable penetration (in billions USD)	High investment / high renewable penetration (in billions USD)
Transmission	$5–10 (maintenance, not expansion)	$30–60 (expansion of long-distance, high-voltage lines); solar (North) and wind (Oaxaca) will reach demand centers in central Mexico
Distribution (smart grid rollout, monitoring, demand management)	$4–8 (minimal upgrades, grid patching)	$10–20 (smart grid rollout, monitoring, demand management, digitalization)
System flexibility	$1–3 (slow progress)	$10–15 (advanced grid technologies and grid-side upgrades beyond storage: substations, reactive power, dynamic line rating, forecasting)
Generation	$10–20 (allocated to specific projects)	$80–120 (solar, wind, storage)
Total investment	$20–35	$130–210
Projected outcomes	Insufficient investment will result in system constraints, stagnation and blackouts; Grid congestion will likely worsen, potentially impacting existing renewable projects.	Grid transforms from a bottleneck to an enabler, while supporting over 50% of renewable penetration; $50 grid investment unlocks $100 in generation (transmission needs to lead generation rather than vice versa).

stated outcomes of the adopted policies. Last but not least, two interviewees consider tackling *corruption* and the *informal economy* (including fuel theft) essential for the economic success of the 2025–2030 National Development Plan and the 2026 Energy Sovereignty Strategy *(Interviewees 4 and 5).*

ENERGY SECURITY AND SOVEREIGNTY (PND)

Specific questions were raised with respect to the implementation of the National Development Plan 2025–2030 (PND) and achieving energy security and sovereignty. According to the experts, these will be difficult to reach given the fact that 50% of Mexico's solar value chain is China-dependent *(Interviewee 5)* and 75% of its electricity mix (natural gas) comes from the United States *(Interviewees 1–6).* At the same time, ***energy security*** and ***sovereignty*** as strategic policy goals should not translate into an endorsement of the fossil fuel state monopoly crowding out renewable energy markets that can compete on cost basis *(Interviewee 6).* On the contrary, competitive energy market re-opening, with private investment regulated, monitored, and sanctioned, would facilitate rather than hinder the implementation of the stated policies[3] *(Interviewees 2–6).*

Recommendations

The administration's priorities are currently shaping investment conditions through 2030. Recent policies and reforms have disincentivized competition and broad participation in energy markets – the electricity reform favors the CFE, while the Hydrocarbon Law strengthens the market position of PEMEX. To offset the imbalance, (i) introduce supportive mechanisms for clean power deployment, (ii) integrate carbon pricing reform, and (iii) ensure private-renewables participation under the new legal framework.

Relatedly, the amount that will be allocated to the modernization of the entire electricity system including transmission, distribution, system flexibility, and generation, will determine the pace and scale of renewable penetration, particularly because the optimal solar and wind resources are located far from demand centers. Over the past decade, renewables including solar, wind, and utility-scale batteries became the lowest cost sources of new electricity, with solar decreasing by 70–90%. Annual global investment in wind, solar, and storage amounted to $807 billion (IRENA and CPI, 2025),[12] resulting in a fast pace of deployment, continued technological advancement, and evolving global supply chains. Given Mexico's lithium reserves and solar abundance, the country's domestic resources make it an ideal candidate for grid modernization to accommodate a fast uptake of renewables with advanced storage technology, integrating the latest design concept of baseload power. Solar, wind, hydro, storage, demand response, and grid management can be configured to provide such reliability, while being deployed incrementally, at a fast pace, and with less financial risk. High-level investment in high-renewable grid penetration would (i) advance the energy security and sovereignty policy goals, (ii) help decarbonize main industry hubs, and (iii) improve environmental and health outcomes.

Addressing the above noted sources of implementation gaps requires institutional reforms that focus on market compliance, accountability, autonomous oversight and enforcement (including combatting informality and corruption), resource mobilization across scales, multi-stakeholder coordination, and power-asymmetry moderation. Beyond regulation and enforcement, access to public data systems and digital infrastructure, as well as collection and sharing of reliable data (including between state operators and utility companies) will improve transparency and enable timely policy adjustments. Importantly, for energy policy implementation to succeed and achieve the articulated policy outcomes, it must be supported not only by robust finance and grid overhaul, but also coordinated governance across federal-regional-state-local levels capable of aligning planning with execution.[3, 13]

Endnotes

1. The IGA framework includes four broad categories of policy implementations, broken into additional subcategories: (1) Governance and Institutional Capacity, (2) Political Economy and Interests, (3) Financial Constraints, and (4) Technical and Legal Constraints. In the case of Mexico, *Industry Lobby/Resistance* and *Incentive Misalignment* were identified as having the greatest impact on climate-related policy outcomes. Closely ranked as slightly less important were *Competing Interests, Policy Design, Stakeholder Coordination, Public Investment,* and *Technology.*

2. CPL definition of implementation gap is a discrepancy between intended and actual outcomes after policy adoption.

3. Nora Hampl and Daniel Alegre, Achieving Mexico's *Climate Ambition Despite Institutional Weakness* (Policy Brief, Climate Policy Lab, The Fletcher School at Tufts University, November 2025), https://bpb-us-e1.wpmucdn.com/sites.tufts.edu/dist/d/8478/files/2025/11/CPL_IGA_PolicyBrief_Mexico.pdf

4. *Initiatives* in this policy brief refer to strategies, policies, programs, legislative acts, regulatory and planning instruments, etc. and include (i) The 2025-2030 National Development Plan, (ii) Electricity Sector Reform and regulatory oversight, (iii) The 2026 Energy Sovereignty Strategy, and (iv) climate-related actions (reducing methane leaks and gas flaring).

5. Climate Policy Lab, *National Climate Policy Inventories* (2026), https://www.climatepolicylab.org/national-climate-policy-inventories

6. Government of Mexico, *Nationally Determined Contribution (NDC 3.0),* submitted November 17, 2025, https://unfccc.int/documents/654344

7. International Trade Administration, "Mexico's Energy Sector Reform," April 10, 2025, https://www.trade.gov/market-intelligence/mexico-energy-sector-reform

8. International Trade Administration, “Mexico Energy Hydrocarbon Sector,” March 10, 2026, https://www.trade.gov/market-intelligence/mexico-energy-hydrocarbons-sector

9. Government of Mexico, *The National Development Plan 2025-2030 (PND),* April 15, 2025, https://www.gob.mx/cfcrl/documentos/plan-nacional-de-desarrollo-2025-2030-396052?state=published

10. In oil and gas, the CARSO group, for example, proposes policy measures that will benefit the same while seeking to restrict competition; in the power sector, some companies have a preferential status in acquiring substantial deals and contracts.

11. Climate Transparency, “Assessment of Financial Instruments for Mexico’s Energy Transition: Cases of FOTEASE and FIDE” (2025), https://www.climate-transparency.org/wp-content/uploads/2025/04/Assessment-of-financial-instruments-for-Mexicos-energy-transition_-cases-of-FOTEASE-and-FIDE.pdf

12. International Renewable Energy Agency (IRENA) and Climate Policy Initiative (CPI), *Global Landscape of Energy Transition Finance,* (Abu Dhabi, 2025). https://www.irena.org/Publications/2025/Nov/Global-landscape-of-energy-transition-finance-2025

13. Grantham Research Institute on Climate Change and the Environment and London School of Economics, “Strengthening Mexico’s Climate Law: Policy Lessons from Subnational and International Experience,” (2025), https://www.lse.ac.uk/granthaminstitute/publication/strengthening-mexicos-climate-law-policy-lessons-from-subnational-and-international-experience

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