



2016 Top Markets Report **Civil Nuclear** Country Case Study

Mexico

Market Type: Existing and Expanding

Mexico maintains two operational GE-designed BWR reactors at Laguna Verde. The Mexican government is interested in constructing new nuclear reactors as well as an expansion of the Laguna Verde plant. If these plans move forward, U.S. civil nuclear companies will be in a strong export position due to Mexico’s close proximity and long-standing ties with Mexico’s nuclear industry. American companies also remain uniquely primed to supply goods and services for the existing Laguna Verde reactors.

New Builds

10

Existing Reactors

12

Decommissioning

N/A

Overall Rank

8

U.S. Ambassador to Mexico: Roberta Jacobson
Minister Counselor for Commercial Affairs: Brian Brisson

natural gas and new natural gas pipelines. These CFE fossil fuel projects and low natural gas prices could delay Mexico’s nuclear energy plans.

Mexico currently has two operational GE-designed Boiling Water Reactors (BWR) at Laguna Verde. The two plants supply about 4 percent of the nation’s electricity. For several years, the Government of Mexico (GOM) has considered building new nuclear power plants (NPPs), beginning with additional units at Laguna Verde. Mexico has also considered utilizing small modular reactors (SMRs) for power generation and seawater desalination.

Between 2007 and 2013, the Federal Electricity Commission (CFE), the state-owned electricity company that owns the Laguna Verde plant, contracted with Spain’s Iberdrola Engineering and France’s Alstom to replace components and uprate both reactors, resulting in a 20 percent increase in net power capacity. Operating licenses for Laguna Verde Units 1 and 2 expire June 2020 and April 2025, respectively; CFE is expected to request license extensions, but no formal application has been filed to date.

In mid-2015, Mexico’s Development Program of the National Electric System listed plans for new capacity via two NPPs, with commercial operation slated for 2026 and 2027. Despite being a net energy exporter, Mexico wants to develop nuclear energy to reduce its carbon emissions and its dependence on hydrocarbons. Low gas prices have buoyed this reliance, and Mexico’s Federal Electricity Commission (CFE) has invested in new gas-fired plants, retrofitting of coal-fired plants for

Mexico’s Energy Transition Law (passed in December 2015), the last major remaining legislative piece of the comprehensive energy reform, codifies the framework for Mexico’s transition to a cleaner energy matrix, including nuclear energy, with interim targets and formalization of a clean energy certificate program. The reform also transforms CFE into a “state productive

enterprise" that will sell electricity to the national grid, which could accelerate Laguna Verde expansion plans.

Planned Nuclear Energy Projects

Additional Laguna Verde Reactors

Owner: Mexico's Federal Electricity Commission (CFE)

Reactor Type: BWR

Capacity: 1,000 MWe (2 units)

Value of Project: \$11 billion (estimated)

Construction Period: TBD

Operation (tentative): 2026 and 2027

Comment: An international tender could be released soon. Competitors for the project include the United States, Russia, France, Japan and Korea.

Commercial Opportunities

Services (front-and back-end): Possibilities for feasibility studies and infrastructure development for Laguna Verde expansion.

Licensing Support: Limited opportunities.

Design, Construction, and Operation: Opportunities once new reactors are under consideration.

Components: Potential with new reactor builds.

Fuel Management: Limited opportunities.

Waste Management: Potential services for future disposal site.

Challenges and Barriers to Exports

Mexico's potential expansion of the Laguna Verde NPP presents a great opportunity for U.S. industry. Beyond this project, however, the overall prospect for U.S. civil nuclear exports remains limited. Mexico cut back on its nuclear development plans in response to the Fukushima accident, and it has now tentatively committed to building only two additional reactors. Details on Mexico's nuclear energy policy will be needed before a more robust assessment for U.S. exports can be made.

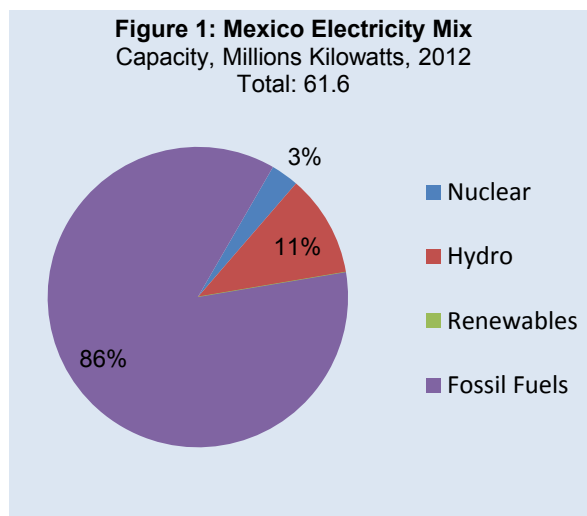
Financing will be a key challenge, as it is for most countries seeking to build new NPPs. Mexico's strong relationship to U.S. industry through the Laguna Verde plant and its good U.S. Ex-Im Bank rating should help with overcoming this challenge.

Nuclear Infrastructure

Research Reactor: Mexico operates three research reactors. The National Nuclear Research Institute (NNRI) operates a 1 MWe Triga Mk III that has been operational since 1968; the University Autonoma de Zacatecas has had a subcritical Chicago Modelo 900 assembly used for training since 1969; there is a Chicago Modelo 2000 at the Instituto Politécnico Nacional (National Polytechnic Institute).

Fuel: Mexico's Secretariat of Energy (SOE) delegates to the Mineral Resources Board the responsibility for uranium mining and prospecting policy. Two-thousand tons of uranium reserves have been identified in Mexico but have been too expensive to exploit at current prices.

Waste Management: The SOE is responsible for used fuel storage and disposal. A collection, treatment and storage center for LLW has operated at Maquixco since 1972.



U.S. Government Collaboration

123 Agreement: Mexico does not have a 123 Agreement with the United States, although discussions are underway regarding a future 123 Agreement. A project supply agreement between Mexico, the United States and the IAEA enables U.S. cooperation and trade with Mexico relating to the Laguna Verde NPP. The existing PSA will not apply to the potential Laguna Verde expansion.

Regulatory Cooperation: Extensive cooperation with the U.S. NRC, including a bilateral arrangement for the exchange of technical information and cooperation in

nuclear safety and research (renewed in 2012); a memorandum of cooperation (MOC) between the CNSNS and the NRC for import and export of certain radioactive sources (2012); CNSNS participation in the Code Applications and Maintenance Program (CAMP) and the Cooperative Severe Accident Research Program (CSARP) since 2009.

U.S.-Mexico High Level Economic Dialogue (HLED): Established in 2013, the HLED is chaired by the U.S. Departments of Commerce and State the Mexican Ministry of Finance, with the goal of promoting bilateral economic competitiveness. Energy is one of the six HLED priority areas.

U.S.-Mexico Energy Business Council: In February 2016, the U.S. Department of Commerce announced the establishment of the U.S.-Mexico Energy Business Council. The Council will bring together representatives of the U.S. and Mexican energy industries to discuss ways to strengthen commercial ties between energy industries in the two countries and communicate actionable, non-binding recommendations to the U.S. and Mexican governments.

Figure 2: Additional Agreements	
Non-Proliferation Treaty	✓
IAEA Comprehensive Safeguards Agreement & Additional Protocol	✓
Joint Convention on Safety of Spent Fuel Management	
Convention on Nuclear Safety	✓
Convention on Early Notification of a Nuclear Accident	✓
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	✓
Paris Convention on Third Party Liability in the Field of Nuclear Energy	
Vienna Convention on Civil Liability for Nuclear Damage	✓
Joint Protocol Relating to the Application of the Vienna Convention and Paris Convention	✓
Convention on Supplementary Compensation for Nuclear Damage	
Organization Membership	
IAEA	✓
Nuclear Suppliers Group	✓
OECD/NEA	✓
IFNEC	✓
GenIV International Forum (GIF)	

International Engagement

The U.S. and Mexico have had a bilateral science and technology agreement since 1972. Nuclear energy engagement is primarily with the IAEA.

Resources

For more information on the commercial opportunities in Mexico, contact: Francisco Ceron (Senior Trade Specialist, francisco.ceron@trade.gov); John Howell (Principal Commercial Officer in Monterrey, john.howell@trade.gov); Jonathan Chesebro (ITA Civil Nuclear Team, jonathan.chesebro@trade.gov)

For more information on the civil nuclear industry in Mexico, contact: SOE website (www.sener.gob.mx); CFE website (www.cfe.gob.mx); CNSNS (www.cnsns.gob.mx)

Sources

CIA Factbook, United Nations, World Nuclear Association, Asian Development Bank, and Commerce Department contacts at the U.S. Embassy in Mexico City.