

2016 Top Markets Report **Environmental Technologies** Country Case Study

Mexico

Unprecedented investment in environmental infrastructure has catapulted Mexico to the number two rank in the Environmental Technologies Top Market Study. U.S. environmental technologies exporters benefit from close commercial ties with Mexico, but lagging Mexican technical capacity in the environmental sector could moderate the implementation of sophisticated projects and attendant opportunities for U.S. business.

Overall Rank	2	Air Pollution Control	2
Water	7	Waste & Recycling	13

The overall Mexican environmental technologies market, including goods and services, is valued at USD 14.7 billion (2016).¹ Mexico ranks second overall on the 2016 Top Markets Study (TMS), with a composite environmental technologies score of 37.1. Mexico's air pollution monitoring and control market is the most prominent environmental technology segment and ranks Mexico second globally, with a score of 26.2. Mexico's water sector ranks seventh overall, with a

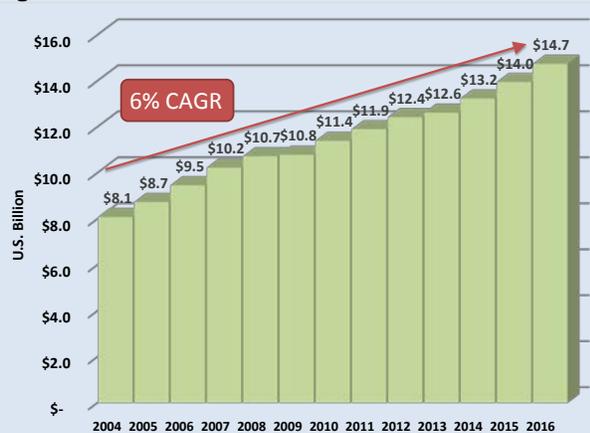
score of 9.5. For waste and recycling, Mexico ranked 13th, with a score of 1.4 (see Appendix 1 for global rankings).

State of the Environmental Regime

Mexico's environmental legal standards are improving thanks to recent legislative efforts, but compliance remains a challenge. This change is reflected through the Environmental Business Journal (EBJ)-OECD's Environmental Stringency Survey, which ranks environmental regimes on a scale from 1 to 7 (with 1 being lax and 7 being among the most stringent). Mexico scored a 4.0 in 2012 on the EBJ-OECD Survey, a 0.7 point improvement from its 2005 score. Mexico's ranking on the World Economic Forum's 2011 Index for Regulatory Stringency of 45th globally, with a score of 3.99 (on a similar scale to that of EBJ-OECD), echoes this result, indicating that Mexico's legal framework is above the median and improving. Mexico's ranking in the same survey for enforcement, however, lags at 57th globally, with a score of just 3.42, highlighting the need for improved compliance measures.

Mexico's environmental regime is based upon two fundamental pieces of legislation: the General Law of

Figure 1: Mexico Environmental Market



Equilibrium and Environmental Protection (LGEEPA) and the General Law for Prevention and Integral Management of Wastes (LGPGR). In 2012, President Calderon signed the first General Climate Change Law in Mexico. The Law accelerates implementation of programs for air pollution monitoring and control in particular. Mexico further emphasized its commitment to reduce greenhouse gas emissions in its Nationally Determined Contribution (NDC) under the COP 21 Paris Agreement in December 2015. The NDC calls for reducing GHG emissions by 22 percent and black carbon by 51 percent from business-as-usual levels by 2030.

The Mexican Ministry of Environment and Natural Resources (SEMARNAT) governs and implements environmental regulation and is also responsible for issuing environmental tenders for air pollution monitoring, soil remediation, waste management and projects that fall under the recently promulgated national Climate Change Strategy.

Water tenders are the purview of the National Water Commission (CONAGUA). CONAGUA manages water resources at a federal level and is the only entity authorized to delegate or grant concessions for water use. Municipal governments provide water services to communities through decentralized municipal water utilities known as “*organismos operadores*”.

While these water utilities are tasked by law with developing water service infrastructure, due to subsidized and inadequate water rates, commercial inefficiencies and a lack of technical capacity in many cases, however, CONAGUA has been the de facto developer and financier of water infrastructure projects throughout the country.

Market Barriers

Over the past 20 years, the North American Free Trade Agreement (NAFTA) has removed many barriers to trade with Mexico. The following barriers, however, do persist for environmental technologies companies attempting to export to or work in Mexico:

- 1. Local partnership is encouraged in public tenders.**

While not a formal requirement, local partnership in public tenders is strongly encouraged in Mexico. U.S. companies hoping to develop consortia relationships with

Mexican companies should seek assistance through the U.S. Commercial Service to identify appropriate and credible partners for engineering, procurement and construction (EPC) contracts.

- 2. Value added taxes diminish competitive pricing of U.S. environmental technologies.**

While U.S. companies enjoy duty free privileges under NAFTA, a Value Added Tax (VAT) of 16 percent, while imposed on domestic and foreign goods alike, further erodes the price competitiveness of higher quality, and thus more expensive, U.S. environmental technologies.

- 3. Finding a credible distributor with national reach can be difficult.**

The benefits due to acceptance of U.S. products, as well as low tariffs afforded by the NAFTA, are often counter-balanced by difficulties arising from Mexico’s size and diversity, which can be under-estimated by U.S. exporters. It can be difficult to find a single distributor or agent to cover this vast market, and assistance with locating the appropriate distributor for a given product segment is often required. Mexican companies are extremely price conscious, seek financing options, tend to push for exclusive agreements, and value outstanding service and flexibility.

- 4. The presumption of conformity is not extended for international standards in Mexico.**

Companies exporting to Mexico will need to meet Mexican standards and demonstrate conformity. The cost of accreditation for a single product in Mexico through *Entidad Mexicana de Acreditación* is approximately USD 4,875. Mexico hosts a national NSF International office, which can help ease the accreditation and conformity assessment process. Mexico does not explicitly extend the presumption of conformity, however, and therefore, it is recommended that U.S. companies work with NSF Mexico or another relevant testing and certification organization to determine a cost-effective path toward meeting Mexican standards and certification requirements.

Market Opportunities

In 2015, the Mexican government allocated USD 100 million to SEMARNAT to support federal, state and municipal environmental projects throughout the country. U.S. firms can access the most current lists of funded projects on SEMARNAT's website.²

Air Pollution Control

Air Quality Monitoring

The ambient air quality of many Mexican large metropolitan areas, particularly Mexico City, Guadalajara, Toluca and Monterrey, is poor and can lead to increased incidence of respiratory disease. For example, the concentration of nitrogen dioxide (NO^2) in Mexico City is above the national standard nine days out of 10. Most metropolitan areas in Mexico have air quality monitoring mechanisms and local regulations in place; however, enforcement of these regulations is often weak as many of the municipalities do not have sufficient technical capability or resources.

Official ambient air monitoring is conducted by the Mexican environmental federal regulator SEMARNAT, which tenders openly to U.S. businesses. Increased opportunities under the Climate Change Strategy's Program for the Strengthening of the Environment of States (*Programa de Fortalecimiento Ambiental de las Entidades Federativas*), which provides funding for projects at the municipal, state and federal level for compliance with environmental rules,³ should emerge for monitoring as local governments ramp up their monitoring efforts.

Technologies and Services in Demand:

- Continuous emissions monitoring systems
- Ambient air quality monitoring equipment
- Source emissions measurement technologies
- Analytical and laboratory testing goods and services

Air Pollution Control

In terms of air pollution control approaches, various regulatory plans call for vehicle emissions testing, catalyzer replacement programs and industrial pollutants reduction. Moderate regulatory enforcement, however, has translated into moderate demand for these technologies compared to the overall potential in Mexico's industrial market. While

vehicles and other mobile source control measures have long been emphasized, meeting the goal of reducing harmful emissions will require implementation of control technologies for industrial sources.

The Climate Change Law aims to reduce the country's output of carbon dioxide by 51 million tons, forcing Mexican companies to report and reduce their emissions. Furthermore, this law also focused on the reduction of short-lived climate pollutants like black carbon, methane, tropospheric ozone, hydrofluorocarbons (HFCs) and Volatile Organic Compounds (VOCs). Compliance with the General Climate Change Law will require industries to institute improved monitoring and control technologies, opening up a variety of opportunities for in-line and end of pipe industrial monitoring systems.

Technologies and Services in Demand:

- Air pollution control equipment
- Fuel vapor control systems
- Selective Catalytic Reduction
- In-line monitors and software
- Electrostatic precipitators
- Thermal oxidizers
- Catalytic converters
- Scrubbers

Water and Wastewater Treatment

While the population percentages for drinking water and sewage services connection are 89.6 percent and 86 percent, respectively, large gaps still remain in serving rural areas, where both resources and infrastructure is scarce. Lack of access to potable water and sewerage is a fundamental challenge Mexico is seeking to address through the National Water Plan 2014-2018. The government estimates that 9 million Mexicans do not have access to potable water and that 11 million do not have access to sewerage. The overall Mexican municipal water and wastewater market is expected to grow 7 percent annually between 2013 and 2018.

Subsequent projects are to be financed through public private partnerships (PPPs), a model recently adopted through the Public and Private Partnership Law. The new PPP model anticipated USD 950 million of private investment in 2014 to match the CONAGUA's allocation of USD 6 billion,⁴ During the 2015 to 2018 period, CONAGUA's budget for water infrastructure

development is USD 4 billion, which will be leveraged to develop 1,200 new potable water treatment plants, the upgrading of wastewater treatment plants, new desalination plants, water pipelines and dams.⁵ U.S. companies interested in developing PPPs should work with CONAGUA, which will remain the tendering agency for these projects.

Municipal Drinking Water Treatment

Drinking water conveyance and distribution are expanding at a steady rate in Mexico. Total mains water consumption is expected to rise from 169,356 million m³ in 2014 to almost 194,546 million m³ by 2018. This is largely due to the continued expansion of the pipeline network and increasing number of households connected to water mains.⁶ Water infrastructure projects will continue to grow at a 4.3 percent rate through 2015 following the 2013 Mexican housing market crash, which negatively impacted the construction industry.⁷

Water treatment facilities are also upgrading to improve coverage. CONAGUA plans to invest USD 200 million in upgrades to existing drinking water plants in the states of Morelos, Puebla, Guerrero, Coahuila, Sinaloa, Tamaulipas, Zacatecas, Mexico City and Veracruz.⁸ The push for centrally distributed water services is likely to continue, which will discourage the implementation of decentralized systems.

Consumer confidence in the ability of municipalities to deliver safe potable water is low; this has driven double-digit growth in residential treatment options as a backstop to the water quality issues encountered in urban and suburban areas of Mexico.

Technologies and Services in Demand:

- Engineering, procurement and construction services
- Pipes, pumps and valves
- Clarifiers and flocculators
- Sedimentation systems
- UV disinfection
- Ozone disinfection
- Meters and monitoring equipment
- Point-of-use treatment equipment

Municipal Wastewater Treatment and Plant Development

Wastewater treatment continues to lead in Mexico's environmental priorities, as it is the least developed part of Mexico's water sector. Less than 50 percent of wastewater receives treatment,⁹ though Mexico has almost doubled the volume of wastewater being treated in the last decade, indicating that expansion of services is not keeping pace with demand. Mexico's most recent National Water Program, released in 2013, sets treatment goals of 100 percent for municipal waters by 2030, requiring a near USD 500 million public annual investment in wastewater treatment plants.

Currently, over USD 1.7 billion is invested in wastewater infrastructure, USD 1.1 billion in sewers and USD 621 million in treatment plants. Development of new wastewater plants in the states of Puebla, Colima, Yucatan, Quintana Roo, State of Mexico, Nayarit, Guerrero, Colima and Mexico City,¹⁰ as well as USD 150 million in upgrades to existing wastewater plants in the states of Aguascalientes, Chihuahua, Guanajuato, Jalisco, Nuevo Leon, Oaxaca, Puebla and Mexico City,¹¹ is also planned.

Technologies and Services in Demand:

- Engineering, procurement and construction services
- Advanced filtration
- Membrane filtration
- Waste to energy technology
- Anaerobic digestion
- Nitrification
- Biological denitrification
- Monitoring equipment
- Testing equipment

Desalination and Water-Efficiency

Mexico is increasingly faced with scarce water supplies, and the heavy reliance of the agricultural sector on these resources is straining an already troubled system.¹² Unsustainable extraction from ground and surface sources has threatened the stability of the conventional water supply.

Mexico is turning to alternative methods in an effort to protect surface water and aquifer sources while providing fresh water for human consumption and industry. Areas facing significant scarcity challenges include large urban centers in northern and central

Mexico and the western Baja Peninsula. Promoting efficient water use by industry and citizens and building complementary efficient local water utilities is a key government priority.

In northern Mexico, authorities are coping with water scarcity through the construction of new reservoirs and costly transport infrastructure, implementation of complex purification technologies, and increases in tariffs to improve supply and encourage conservation. An example of this type of infrastructure expansion can be found within the 2015 to 2016 project pipeline period via the USD 78 million La Laja Dam project, which will create an additional fresh water source for 120,000 residents of the Ixtapa-Zihuatanejo metropolitan area.¹³

Similarly, in several areas of northeast Mexico, the use of sophisticated water purification technologies is needed since the available water requires the elimination of materials such as heavy metals or even arsenic.

In some areas, such as the Baja peninsula, saline conversion has become the only viable drinking water option, thus three large desalination projects are in the project pipeline during 2015 to 2016. The Cozumel desalination plant will provide 17,280 cubic meters a day (m³/d) of fresh water to residents of Cozumel and is estimated to be worth USD 27.4 million.¹⁴ In the state of Baja, two desalination projects are slated for the Tijuana municipal area. The collective value of these twin projects is USD 75 million.¹⁵ Other major desalination projects slated for 2016 include the Planta San Carlos project valued at USD 307 million, the Metates water for mining project valued at USD 86.7 million and the La Paz desalination project valued at USD 41.7 million.

Key Technologies in Demand:

- Water reclamation technologies
- Engineering and construction services
- Water reuse equipment and services (process specific)
- Advanced filtration
- Membrane filtration
- Reverse osmosis
- UV disinfection
- *Anaerobic digestion*
- Nitrification
- Biological denitrification
- Testing equipment

Groundwater Monitoring and Pollution Prevention

Scarce water supply in Mexico has necessitated comprehensive monitoring of groundwater availability and quality. Of Mexico's 653 subterranean aquifers, more than 100 are overexploited.¹⁶ Overexploited aquifers produce roughly 60 percent of the groundwater that Mexico relies on for agriculture and drinking water. The National Water Plan has emphasized the promotion of geo-hydrological exploration, increasing groundwater monitoring and an integrated ground water management plan. Other projects deemed necessary to the maintenance of groundwater resources are artificial aquifer recharge and evapotranspiration management.

Key Technologies in Demand:

- Environmental engineering and consulting services
- Water quality monitoring equipment
- Monitoring wells
- Site characterization technology
- Groundwater recharge technologies

Waste Management and Recycling

Municipal Solid Waste and Recycling

Municipal waste in Mexico is governed by local and state governments, who apportion part of their budgets for waste collection and disposal. In recent years, there has been a push towards modernizing Mexico's waste infrastructure to better address the roughly 102,850 mt processed a day.¹⁷ The open sky dumps prevalent in Mexico pose a threat to human health and the environment and have increased public support for the improvement of waste infrastructure.

In 2009, the Government of Mexico developed financial support programs designed to help modernize the country's waste management system and provided grants for upgrades to landfills, closures of open sky dumps, technical landfill studies, municipal waste collection, and the development of state, municipal or inter-municipal waste management plans. SEMARNAT also issues tenders for solid waste management and recycling projects. SEMARNAT received a USD 40 million budget allocation in 2014 to fund local and state-level projects for waste management through the Program for the Prevention and Management of Waste (*Prevención y Gestión Integral de Residuos*).¹⁸

In 2014, USD 43 million¹⁹ was approved for projects in municipal waste development, providing significant opportunities for U.S. businesses. Recycling is also an emerging area of opportunity in Mexico, as municipalities recognize the cost-recovery benefits of the practice. In 2011, the Institute for Scrap Recycling Industries estimated that 18 percent of U.S. export sales of scrap equipment were destined for Mexico.

Key Technologies in Demand:

- Waste handling equipment
- Cranes, crushers and shredders
- Odor control systems
- Bio-gas capture technologies
- Separators
- Protective equipment for separating lines
- Garbage trucks with compactors
- Engineering services
- Waste collection technologies
- Sanitary landfill systems
- Environmental monitoring and analytical equipment
- Sorting machines
- Crushing and grinding machines
- Materials handling equipment
- Collection services, containers and vehicles
- Recycling process expertise
- Waste incinerators

Environmental Engineering and Consulting

As of 2015, while permits exist for environmental impact and the use of natural resources, both of which involve an environmental impact assessment (EIA), environmental audits are not mandatory. The EIA, however, is a required instrument of environmental policy that establishes the legal framework through which federal or state authorities are able to evaluate environmentally threatening activities in order to protect the environment. Under the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA), environmental regulators enforce violations of law through fines, closures, forfeitures, suspension or revocation of permits, and implementation of corrective measures.²⁰

Fernando A. Gonzalez, the CEO of the Mexican building materials company, CEMEX S.A.B. de C.V., explained that "Construction is likely to be one of the most dynamic sectors globally in the next fifteen years and is utterly crucial to the evolution of prosperous societies around the world." The construction sector in Mexico

specifically is projected to grow at a quick pace, potentially overtaking Brazil in the Latin American construction market by 2030.

Key Technologies in Demand:

- Environmental Impact Assessment

ETWG Agency Initiatives and Programs

WEFTEC International Buyer Program

WEFTEC, the largest water technology exhibition in North America, works with the U.S. Department of Commerce's International Buyer Program to encourage foreign participation in the show. This platform is leveraged to exchange relevant technical information and to advance U.S.-Mexican water cooperation through targeted activities at WEFTEC. Business relationships with U.S. water technology providers are facilitated.

WasteExpo International Buyer Program

WasteExpo, one of the leading U.S. waste management trade shows, has partnered with the U.S. Department of Commerce's International Buyer Program to encourage foreign participation in the show. This platform is leveraged to exchange relevant technical information on the Mexican market and U.S. environmental technology capabilities. Business relationships with U.S. waste management providers are facilitated.

U.S. Environmental Solutions Toolkit

The Toolkit is an online searchable database that marries U.S. Environmental Protection Agency (U.S. EPA) expertise on solving environmental challenges and developing environmental rules with a catalogue of U.S. technology providers. In 2015, the International Trade Administration and U.S. EPA introduced a Spanish-language version of the Toolkit to expand its usability in Latin America. It serves as a reference tool in bilateral engagements that focus on increasing Mexican capacity to address environmental concerns.

Green Expo

Green Expo is Mexico's preeminent environmental technology show. This event is leveraged through the U.S. Department of Commerce's trade fair certification

program to promote the development of U.S.–Mexico business relationships in the environmental sector.

Border 2020

The U.S. Environmental Protection Agency has awarded over USD 1.1 million in grants to fund 25 new environmental projects along the U.S-Mexico border with Arizona, California, Texas and New Mexico. The projects include improving air monitoring, expanding waste collection and recycling, green infrastructure and improving environmental awareness, and education among area residents. U.S. companies seeking a foothold in the market should consider participating in this program.

Market Contacts and Program References

Secretariat of Environment and Natural Resources (SEMARNAT)
<http://www.semarnat.gob.mx>

The Security, Energy and Environment Agency (ASEA)
<http://www.asea.gob.mx>

National Water Commission
<http://www.cna.gob.mx>

National Institute of Ecology and Environmental Change (INECC)
<http://www.inecc.gob.mx>

Attorney General for Environmental Protection (PROFEPA)
<http://www.profepa.gob.mx>

Mexican Institute of Water Technology (IMTA)
<http://www.imta.gob.mx>

National Bank for Public Works (Banobras)
<http://www.banobras.gob.mx>

Border Environment Cooperation Commission (BECC)
<http://www.becc.org>

National Council of Industrial Ecologists of Mexico (CONIECO)
<http://www.conieco.com.mx>

National Association of Water and Sanitation Companies of Mexico (ANEAS)
<http://www.aneas.com.mx>

The Green Expo
<http://www.thegreenexpo.com.mx>

ANEAS Expo & Conference
<http://www.aneas.com.mx>

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¹ Environmental Business International, Global Data Pack, 2011.

² SEMARNAT lists funded environmental projects here: <http://www.semarnat.gob.mx/apoyos-y-subsidios/pef/beneficiarios>. (U.S. Commercial Service Mexico City 2015).

³ Country Commercial Guide 2014.

⁴ Country Commercial Guide 2014.

⁵ Commercial Service Mexico, 2015.

⁶ *Mexico's Water and Wastewater Sector*. Market Intelligence Latin America S.C. October 2013.

⁷ "Mexico- Water Q2 2014." Business Monitor International (BMI) Industry View. Published: 07 March 2014.

⁸ Country Commercial Guide 2014.

⁹ Ibid

¹⁰ Country Commercial Guide 2014.

¹¹ Country Commercial Guide 2014.

¹² The agricultural sector in Mexico uses approximately 77% of the country's water (http://www.conagua.gob.mx/english07/publications/National_Water_Program_2007-2012.pdf)

¹³ Global Water Intelligence Project Tracker.

¹⁴ OEEI estimates based on historical project data.

¹⁵ Global Water Intelligence Desalination Tracker, 1/15/15.

¹⁶ Mexico's National Water Plan: (http://www.conagua.gob.mx/english07/publications/National_Water_Program_2007-2012.pdf)

¹⁷ Mexico's Environmental Sector, Executive Summary, Market Intelligence Latin America

¹⁸ Country Commercial Guide 2014.

¹⁹ Mexico's Environmental Sector, Executive Summary, Market Intelligence Latin America

²⁰ International Comparative Legal Guides. <https://www.iclg.co.uk/practice-areas/environment-and-climate-change-law/environment-and-climate-change-law-2016/mexico>. Accessed April 20, 2016