

## Mexican utility reform

### Powering the future

Private investment opportunities are anticipated to emerge in Mexico from 2016 to 2030 for generation build, transmission construction, and customer service improvements.



#### Background

Since the 1930s, the Federal Commission of Electricity (CFE) has dominated Mexico's electricity sector by providing generation, transmission and distribution services to the entire country. Recent reforms initiated by President Enrique Peña Nieto and adopted by Mexico's Congress will liberalize much of the nation's electricity industry.

Though CFE has made great strides in expanding service and standardizing voltage and frequency, it has remained a vertically integrated monopoly with extremely limited access to capital to invest in the required generation and transmission infrastructure. CFE's current generation fleet has forced them to use more expensive oil, diesel and other fuel sources to power its plants, keeping its generation costs relatively high. This limits the ability of Mexico's industries to be competitive, and hurts consumers who would likely use more appliances and devices if the cost were lower. While minor reforms were implemented in the 1990's to partially open the generation market

they have proven to be insufficient. The recently adopted reforms dwarf those efforts and promise to dramatically reshape the power and utilities sector in Mexico.

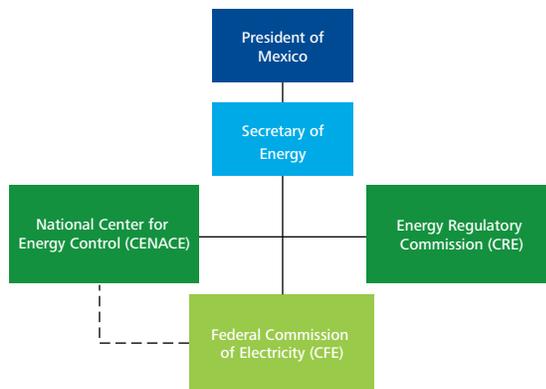
#### Drivers of the reform

The primary driver of reform is to reduce the price of electricity, promoting competitiveness and growth. While residential rates are subsidized (32 percent lower than the U.S. in 2012), industrial rates remain very high (72 percent above those paid by their U.S. counterparts).<sup>1</sup> The reforms should enable new generation sources, bringing down prices and improving economic growth and employment levels. Broader access to energy in the remote regions of the country should improve economic status and quality of life. Increasing the availability of renewable energy sources is another goal, with the target of producing 35 percent of generation from renewable sources by 2025. Greater transparency, improved energy security and increased utilization of the country's vast natural resources are also drivers of the reforms.

### Structural changes to Mexican regulatory agencies and CFE

To meet these lofty goals, the Mexican power and utilities sector will require an overhaul of the regulatory structure that has governed for nearly 60 years. Some regulators will take on increased responsibilities and scope to ensure electricity is provided in a reliable manner at a reasonable rate. The three entities that will be most impacted by the reforms are the National Center for Energy Control (CENACE), the Energy Regulatory Commission (CRE) and the Federal Commission of Electricity (CFE).

#### Newly Created Regulatory Structure



The Secretary of Energy will continue to define the energy policy for the country regarding generation, transmission, and customer service. The secondary laws, due in April 2014 (within 120 days of the original reforms passed in December 2013), will determine whether the Secretary of Finance will continue to determine residential rates, or if the Secretary of Energy will have an expanded rate-making role. CENACE will provide input to the Secretary of Energy on policy matters. CFE will make operational decisions that are consistent with that policy, as will private power producers approved to enter the generation market.

CRE's role will be similar to those of state public utility commissions in the U.S., authorized to certify new generation facilities.

CENACE will be moved out from under CFE and provided an independent role to match electric energy supply and demand. While variations to the regulatory model are significant even between regions in the U.S. and within Central America, the principle features of Regional Transmission Organizations and Independent System Operators are largely the same as the anticipated role of CENACE. It will have control of the electric grid, generate operating schedules and determine production levels to ensure safe and reliable operations. CENACE will also likely facilitate the wholesale generation electric market and govern the various mechanisms to determine current and future electricity generation prices.

The reforms require CFE to become a 'productive company', able to compete with private generation companies within two years. In order for CFE to become a productive company it will be required to lower its production costs and become more efficient in its delivery processes. Changes will be required in back-office and operational processes, requiring the adoption of new technologies. Primary back office changes will include procurement, finance, human resources, budgeting, and information technology. With the opening of the generation market to competition and the expanded role of CENACE, significant changes will be required at CFE in performing system planning. For example, it is likely that the Secretary of Energy and CENACE will assume some of the responsibility of deciding where and when new transmission lines are built. This influence will be necessary to establish a fair market for new generation providers and to ensure that CFE does not retain oversized influence over transmission access which could deter new power providers.

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Human resource and cultural changes will perhaps be the most dramatic of all for CFE, as it has been a monopoly since its inception. It is expected that CFE will undergo major changes in hiring, training, rewarding and measuring the performance of its employees.

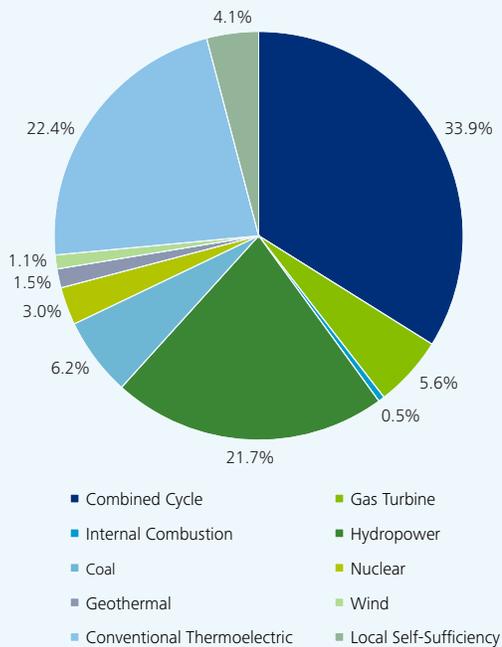
CRE's primary responsibility will include authorizing and revoking permits for generation in Mexico, and the management of the supply and sale of electric energy.

**Power and Utilities in Mexico Today**

**Generation.** Mexico provides electricity to over 97 percent of its residents.<sup>2</sup> The country’s electricity generation includes over 200 generating plants with capacity to produce 50+ gigawatts (GW) of power, of which approximately two-thirds is owned and operated by CFE. The remaining one-third is owned and operated by independent generators who use the electricity to power their own enterprises, or sell the surplus power to CFE.<sup>3</sup> The generation mix in Mexico today is dominated by conventional thermal sources, comprising 74 percent of capacity (primarily oil, diesel, coal and natural gas). Nuclear provides 2 percent, and the remaining 24 percent are renewable sources, including hydro (22 percent), geothermal, solar and wind. In 2010, Mexico developed a National Energy Strategy which established the goal of producing 35 percent of electricity through clean sources by 2024.<sup>4</sup> Mexican clean energy sources include hydropower, nuclear, solar, wind, geothermal and biomass.

A summary of Mexico’s generation mix in 2012 is provided in the chart below.<sup>5</sup>

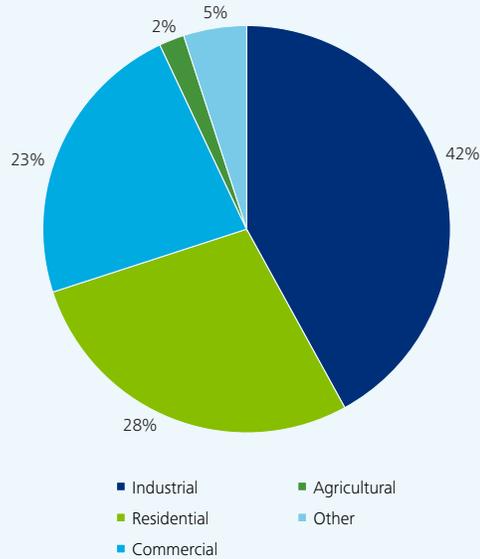
**Mexico Electricity Generation Mix, 2012**



From 2000 and 2011, electricity demand in Mexico increased at a rate of 2.08 percent per year, while production decreased by 0.3 percent per year. CFE forecasts electricity demand through the next ten years to increase at a rate of 3.7 percent per year.<sup>6</sup>

**Transmission/Distribution.** Mexico’s national transmission grid, Sistema Electrico Nacional (SEN), is owned and operated by CFE across nine regions. All regions except the California peninsula are interconnected. The Baja California region has a live link with the U.S. Western Electric Coordinating Council through two 230 kilowatt (kW) connections that are used to import and export power. Region 6 (Noreste) has an on-demand interconnection with the Electric Reliability Council of Texas (ERCOT). The northeast transmission region has an on-demand interconnection with the ERCOT. Inefficiency, particularly at the distribution level, has become a significant challenge for the CFE in recent years. CFE’s distribution losses were 15.3 percent by the end of 2012.<sup>7</sup>

**Electricity Sales**



**Customer base.** Approximately 35.5 million electricity customers are served by CFE. Electricity rates are subsidized for low consumption residential and agriculture customers, comprising 30 percent of electricity sales. Industrial, commercial and other customers, comprising 70 percent of sales, are not subsidized. The chart above is a summary of the mix of electricity sales by customer type.<sup>8</sup>

### Changes to the generation, transmission and other segments of the electricity value chain

The implementation of the reforms over the next few years will determine the future electricity value chain in Mexico. The diagram below describes the segments of the value chain and who will have regulatory versus operational roles.



	Generation	Wholesale	Transmission	Distribution	Customer Service
Regulation	<b>CRE</b> <ul style="list-style-type: none"> <li>Grant and revoke generation permits</li> </ul>		<b>CRE/Secretary of Energy</b> <ul style="list-style-type: none"> <li>Set transmission rates</li> <li>Undetermined role in permitting new transmission and distribution</li> </ul>		<b>CRE/Secretary of Energy</b> <ul style="list-style-type: none"> <li>Undetermined role of setting customer rates</li> </ul>
	<b>CENACE</b> <ul style="list-style-type: none"> <li>Govern the various mechanisms to determine real-time and forward generation pricing</li> <li>Operate the wholesale generation electric market</li> <li>Develop grid operating schedules and determining production levels</li> </ul>				
Operation	<b>IPPs</b> <ul style="list-style-type: none"> <li>Independent Power Producers (IPPs) and CFE will build and operate generation facilities</li> </ul>	<b>CFE</b> <ul style="list-style-type: none"> <li>CENACE will operate the wholesale market to enable the pricing of generation</li> </ul>	<b>CFE</b> <ul style="list-style-type: none"> <li>CFE will maintain, operate and grow the transmission and distribution system</li> </ul>		<b>Future service providers</b> <ul style="list-style-type: none"> <li>CFE will continue to provide outage restoration services</li> <li>Billing services may be provided by private service providers in two years</li> </ul>

#### Impact on generation and wholesale energy market

The reforms call for the legal separation of CFE's generation assets from those required for transmission and distribution. The breakup of CFE's current fully integrated model will require CFE's assets to be divided into autonomous companies or subsidiaries with both financial and operational separation. Next, the reforms call for the creation of an open electricity generation market. Though the generation market currently allows private production, it is limited to cogeneration, generation for self-consumption (principally industries), and generation by IPP's with the requirement that essentially all output is sold to CFE.

In the future model, all customers (industrial, commercial, agricultural and residential), will be free to choose their generation provider, requiring CFE to compete with all other power producers. The timing of this choice will be determined in the secondary laws. It is anticipated that for the initial launch of competition in January of 2016, only industrial customers will have the ability to choose their energy providers.

Finally, in peak demand situations when surplus power must be obtained, CFE will no longer have a monopoly on providing that power. All generators will have the ability to bid to provide surplus power, with CENACE having the authority to determine the generator offering the best price, source, and location.

### Transmission and distribution

Changes to the transmission and distribution sectors will be far less radical than changes to the generation sector. CFE will continue to operate and maintain the transmission and distribution network. CENACE will determine which generators provide the power (CFE or private), and private producers will pay a portage fee to CFE to transmit the power to the end customer. The energy reform secondary laws will determine the roles of regulatory agencies (e.g. CRE) in making decisions on required upgrades to the transmission and distribution network. The Secretary of Energy, with input from CENACE, will determine the policy for what new transmission lines should be built. CFE will implement that policy, and will have the option to subcontract to private companies the maintenance and expansion of the transmission network.

### Partial Deregulation in the 90's

Various reforms in the early 1990's opened the door to foreign and private investment in electricity generation in Mexico. At the time, it was generally agreed that competition in generation would promote more efficient and technologically advanced plants that could be brought online in a shorter period of time and at lower costs than CFE. Private companies were allowed to build and use the output from their own generating facilities, but could not sell surplus power to other entities. CFE had the right to purchase surplus power, but was not mandated to do so. Though private generation was allowed, transmission and distribution remained under control of CFE. With CFE controlling what transmission lines could be built, significant barriers existed to large-scale investments by private generation companies.



### Customer service

It is expected that the April clarifying legislation will provide some specificity on the role of generators versus CFE in providing billing and other service to customers. CFE currently provides billing services for all customers. However, it is common in markets where the choice of generator is opened to all customers that an intermediary such as a retail energy provider is allowed to provide billing services. There remain many questions and open issues to be addressed. For example, CFE will likely continue to get the calls from customers when there is a power outage. However, if a customer has a question about the bill for power produced by a private generator, it will need to be determined whether the customer will contact CFE, the private generator, or a third party who is retained to perform billing services. It is assumed that the secondary legislation will address these issues, but it may take several rounds.

**Potential impact of reform on private investment opportunities**

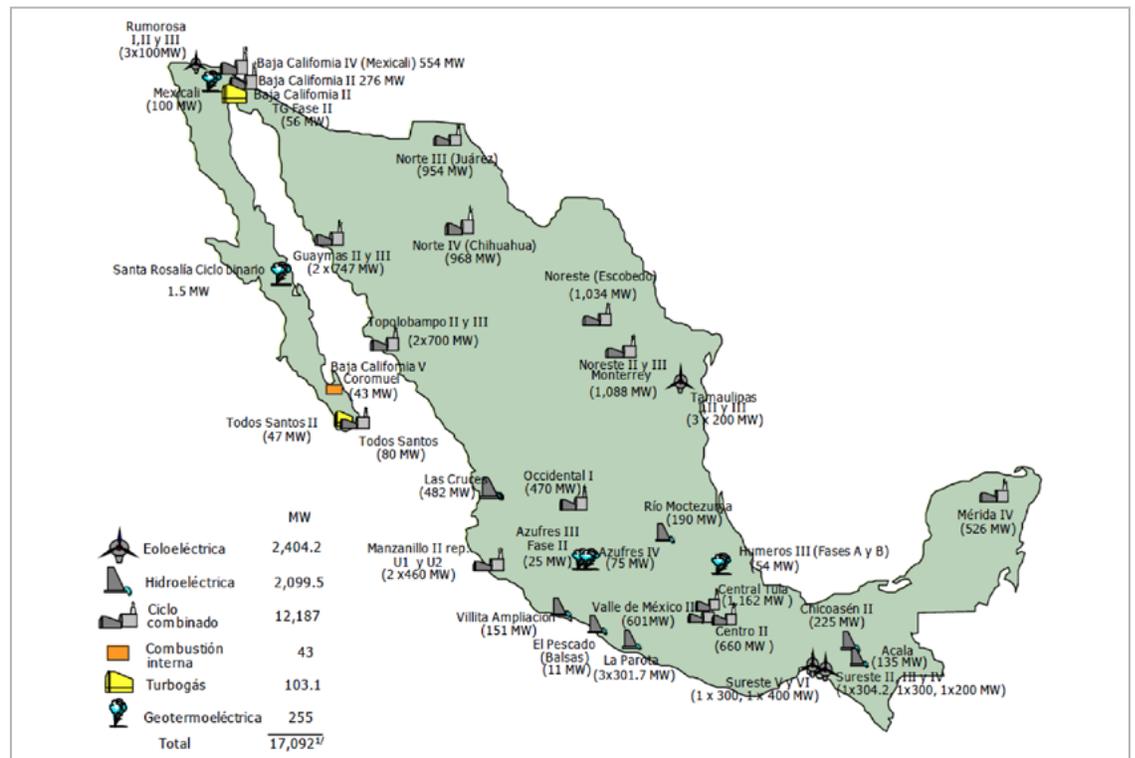
**Strong prospects for private generation**

**Natural Gas.** The reform provides significant opportunities for those involved with bringing new power generation to market. This applies to IPPs, developers, banks, and original equipment manufacturers. It is expected that the generating facility of choice will be powered by natural gas, given the parallel reform effort to increase natural gas production in Mexico. The Secretary of Energy, in its Prospective on the Energy Sector, 2013-2017 (see chart below), forecast that combined cycle plants using natural gas will comprise over two-thirds of CFE’s new generation capacity from 2014 to 2020.<sup>9</sup> CFE has obtained approval to build a new natural gas pipeline from Texas to the Occidental region (northwest of Mexico City), which is home to many automobile manufacturers and other heavy industries. This will enable the import of natural gas to fuel these plants until Mexico can increase production from its own reserves. Companies appearing to be well positioned to build new natural gas plants are Iberdrola and KTS Electrical Power who have built combined cycle natural gas plants in Mexico in the last seven years.<sup>10</sup>

**Wind.** Wind power appears to be the most likely new source of generation after natural gas, forecast to provide 2,404 megawatts (MW) of capacity through 2020. Mexico has several regions that are rated good to excellent in wind conditions, particularly the states of Oaxaca in the south, Zacatecas in the highlands (center of the country), Tamaulipas and Veracruz on the coast of the Gulf of Mexico, the Pacific coast of the Baja California peninsula, the shoreline of Quintana Roo on the Caribbean, and in Hidalgo north of Mexico City.<sup>11</sup>

Wind power will potentially be a major source of new generation because of the continuation of transmission subsidies from the federal government. The Secretary of Energy Prospectus states the subsidies will be continued, thus both CFE and IPP’s will have incentives to build wind farms. Of the six new private generation facilities built and brought online since 2011, five have been wind farms for a total of 511 MW of capacity.

**CFE Requirements for Additional Capacity 2014-2020**



Prospectiva del Sector Eléctrico 2013-2027, Secretario de Energía, page 150

The builders of these facilities include Venta Renewable Energy and Oaxaca Renewable Energy and all were built in the Oaxaca (southern) region.<sup>12</sup>

A significant consideration for the Secretary of Energy and other policy makers in Mexico is achieving balance in bringing on 'clean' sources of energy such as wind which are of relatively high cost compared to natural gas plants, and still achieving the broad reform objective of lowering electricity costs. Other countries such as Germany and Spain and have made strides in increasing the use of wind and other renewable sources. However, these countries have seen significant increases in their electricity rates largely driven by use of such renewable resources.

southern area of the country has the greatest potential for new hydro production, particularly the states of Chiapas, Veracruz, Tabasco and Puebla.<sup>13</sup>

#### Uncertainty for other generation sources

It is more difficult to forecast the other types of generating facilities that will need to be built, particularly coal, geothermal and solar. In 2012, coal represented 6 percent of electricity generation in Mexico and is forecast to remain the same by 2027. Mexico does not have deep sources of coal and some of the coal burned in current plants is imported from the U.S. because it is of a higher grade. The Sabinas and Fuentes-Río Escondido basins in the states of Coahuila and Nuevo Leon produce more than 90 percent of Mexican coal, and three new 700 MW plants are planned in the Coahuila and Guerrero states by 2024.<sup>14</sup>

In contrast, Mexico has relatively strong geothermal capacity and is the world's fourth largest producer of geothermal power, behind the U.S., Philippines, and Indonesia.<sup>15</sup> An additional 255 MW of geothermal generation is planned to be added by 2020, primarily in the Baja California and Puebla regions.<sup>16</sup> This should provide new opportunities for large developers of geothermal plants.

Solar represents the most uncertain generation opportunity. While the northern part of Mexico has regions with significant solar potential, only a few projects located in the states of Baja California and Baja California Sur have been developed. Given that the primary goal of the reforms is to reduce the price of electricity, it is expected that solar development will proceed but at a slower pace than others due to the relatively high production costs.



**Hydro Production.** Hydro facilities are forecast in the Secretary of Energy Prospectus to provide 2,100 MW of new capacity between 2014 and 2020, just under the 2,404 MW forecast for wind. Hydro production is included in Mexico's definition of renewable resources and is thus expected to receive some transmission subsidies. The

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**Transmission.** The reforms will provide opportunities for private companies to contract with CFE to upgrade the transmission network. CFE has planned an expansion of 16.7 percent of the transmission network between 2013 and 2026, yet demand is forecast to increase 75.4 percent in this same period.<sup>17</sup> In 2012, CFE projected to expand the transmission network at a rate of 1.1 percent per year between 2013 and 2026. Because electricity demand is forecast to grow at a rate of 3.7 percent per year over the next ten years, it is likely that additional lines will be needed. CFE will need to partner with the private sector to support expansion of the grid. Companies with experience in building and upgrading transmission lines will have opportunities to subcontract to CFE.

**Customer service.** Industrial customers will be able to choose their generation provider under the reforms. In countries that have allowed customer choice, generators have also been given the option to partner with retail electric providers (REPs) who also perform billing and customer services. When Texas opened the generation market, it allowed for the formation of REPs who purchase power from generators and sell it to the end consumer. Under this model, the power is still delivered by the transmission and distribution company which is responsible for getting the power back on in the case of an outage. This is consistent with the role expected of CFE, who will continue to serve as the transmission and distribution company in Mexico.

A potential market for REPs may be billing and customer services. For example, customer information and billing systems or phone call routing systems may be needed, providing opportunities for service providers to assist the new REPs in establishing processes and implementing the systems to provide these services. It remains to be seen if REPs will be allowed, and how they will serve the market. The secondary reform laws or the Secretary of Energy will ultimately determine if REPs can be formed.



#### **Other private sector opportunities with CENACE, CRE, and CFE**

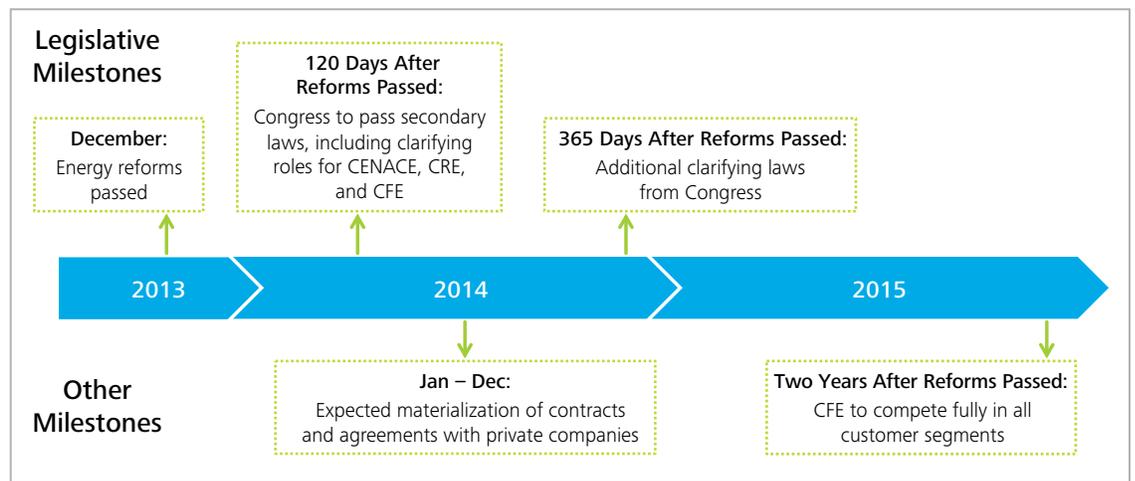
The employees of CFE, CRE and CENACE are expected to experience major changes in how they do their work. Advisory services will be needed in the areas of organization design, strategies for retention of critical personnel, recruitment of resources with relevant experience to lead new areas of scope, and performance management processes and systems.

Another private sector opportunity involves providing personnel with the technical skills required to serve in the electricity sector. The reform document references the pending retirement of many engineers in the power sector.<sup>18</sup> Mexican universities and private training organizations can play an important role in providing individuals with the engineering and other technical skills required to serve in the electricity sector.

**Next steps and important up-coming decisions**

The next milestone in energy reform is for the Mexican Congress to pass clarifying secondary legislation, expected by April 2014, specifying the roles of CRE, CENACE and CRE. Up to 25 laws are expected to be passed, affecting not only the power and utilities sector, but also oil and gas. Following the April milestone, additional legislation is anticipated by the end of 2014 addressing environmental rules and regulations. The timeline for next steps in the reform is provided below.

Given the size of the power and utilities sector in Mexico and the magnitude of the reforms, the opportunity for energy providers, services firms, and technology companies is significant. With the increased availability of lower-cost electricity, the Mexican economy should experience significant growth, providing new opportunities for those serving both within and outside of the power and utilities sector.





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*Deloitte has also produced a point-of-view on the impact of energy reform on the oil and gas sector in Mexico, which can be obtained at [Deloitte.com](http://Deloitte.com).*

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