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Mexico Offers Diverse Opportunities for Investment in Renewable Energy

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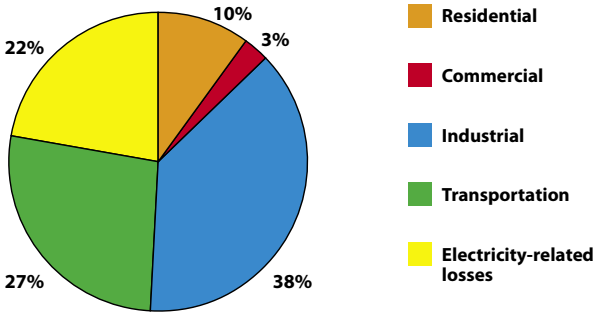
Investors seeking opportunities in renewable energy outside the United States should consider our next-door neighbor to the south. Mexico has an abundance of renewable power resources and a keen awareness of the environmental and social benefits of alternative energy development.

Mexico's consumption of energy is growing much more rapidly than in more-developed countries, and there is a shortage of conventional energy resources for power generation. The majority of the energy consumed in Mexico is used for industrial production (38 percent) or transportation (27 percent), and losses related to electricity generation and distribution account for a significant portion of consumption, at 22 percent (Figure 1). Within the electricity sector in particular, renewable energy sources will need to play a significantly expanded role if there is any hope of covering the gap between demand growth and generation capacity growth, even with the continued substantial expansion of efficient natural gas-fired, combined-cycle turbine generators as the dominant part of the overall generation mix (Figure 2). In 2006 the Mexican government's secretariat of energy (SENER) conservatively predicted important increases in installed capacity for hydropower (2,254 MW), wind energy (592 MW) and geothermal energy (125 MW) for the period from 2005 to 2014 (Figure 3). By 2005 the government had approved more than 50 renewable energy projects. When they were completed by the end of 2007, they already accounted for 1,400 MW of new capacity.

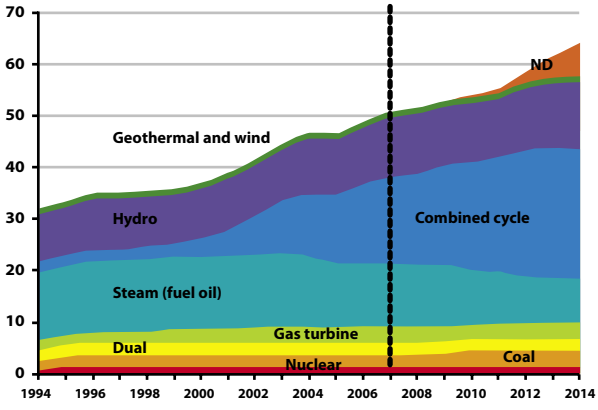
Given Mexico's available renewable energy resources, domestic and international incentives and other environmental and economic factors, the market for renewable energy projects in Mexico could well be considerably larger. A significant proportion of the new gas-fired power plants in Mexico will replace older, inefficient steam generators powered by fuel oil, rather than creating incremental new capacity. Indeed, the rapid and large increase in demand for natural gas to meet electricity generation needs in Mexico, as in the United States, has constrained available supplies and



Sector usage, projected 2010.
Total consumption: 7.9 quadrillion BTU
(1 quad BTU = 170 million barrels of crude oil)

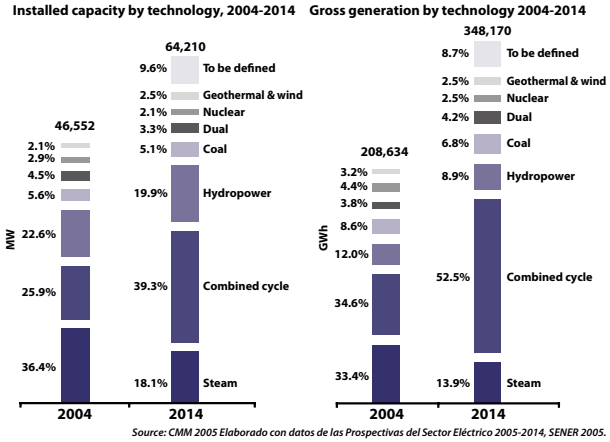
Source: U.S. DOE, International Energy Outlook 2006.

Figure 1: Total energy consumption by sector



Source: SENER, "Prospectiva del Sector Eléctrico 2005-2014"

Figure 2: Current and future generation mix



Source: CMM 2005 Elaborado con datos de las Prospectivas del Sector Eléctrico 2005-2014, SENER 2005.

Figure 3: Forecast electricity generation mix (2004-2014)

raised real wholesale gas prices. This has created new opportunities for companies using renewable energy to compete, and it has prompted the Mexican government to look favorably on foreign investment in renewable energy projects.

Investment Climate

Any discussion of investment opportunities and incentives in Mexico must first broadly consider political stability, the rule of law and macroeconomic factors. The current attractiveness of Mexico as a source for serious, long-term private investment in energy and infrastructure results from many dramatic shifts over the past several years. Mexico has become a considerably more stable country in which to invest since the 1994 passage of the North American Free Trade Agreement (NAFTA). Democratization and a commitment to market discipline, especially in the financial sector (through privatization of banks, pension reforms, new insolvency laws, growing capital markets, recent tax reform, greater regulatory transparency and other measures), have strengthened the nation's economy, banking system, government institutions, the rule of law and monetary policy.

The results include steady growth in gross domestic product (GDP) and GDP per capita, deeper capital markets and electoral stability – all despite serious internal political challenges and increasing foreign economic competition from Asia. Income inequality remains a major social and political problem, but the percentage of the population in extreme poverty has declined markedly in the past decade. GDP has grown about 4 percent per year for about 10 years. Aggregate external debt has dropped both in absolute terms and as a share of GDP, and the government budget deficit has been reduced. Inflation in the late 1990s was in the double digits and has declined dramatically to under 5 percent on average for most of this decade (Figure 4). It is no surprise, then, that the value of the Mexican peso has nearly doubled against the U.S. dollar in the past 12 or so years, and that Mexico (along with Chile) has the highest sovereign debt credit rating in Latin America.

Additionally, Mexico's relative political stability and investor-friendliness (compared to such other countries in the region as Argentina, Venezuela, Ecuador and Bolivia) and, conversely, the longer-term trend of economic liberalization and political stability in Latin America's major economies (Mexico, Brazil and Chile) have combined for steady growth in inbound foreign investment. High global oil prices, liquid domestic financial markets and a more transparent tax system also contribute to currency stability and positive trends in Mexico's current account deficit. So while much remains to be done in these areas, the trends are positive. Consequently, Mexico appears to attract a much lower risk premium from foreign investors than in the past.

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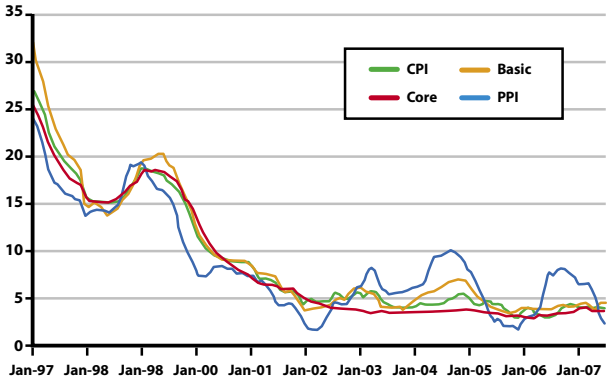
Historically, most foreign investment in Mexico comes from the United States or international companies building manufacturing facilities for the export of goods to the United States. After NAFTA, this trend has accelerated. Most of the rest of the foreign direct investment in Mexico comes from European countries. In the near future, capital flows from Asia (especially China, Japan and Korea) will become increasingly important. Capital flows within Latin America (such as Brazilian investment in Mexico) also are on the rise, with promising implications for regional stability. Regardless of the source, investment in high technology and export-oriented industries is particularly welcome.

Although reforms are under active debate, investments in energy remain tightly restricted. In recent years, though, both electricity generation and natural gas distribution have been opened to foreign investment. Indeed, due to the opening of the electric sector, renewable energy projects (like wind, solar and geothermal power plants) can offer more liberal investment opportunities and incentives than do other energy sectors (like upstream oil and gas facilities and petrochemicals), which remain largely off-limits to direct foreign investment.



Source: LatinFocus

Figure 4: Consumer prices and producer prices, 1997-2007

Incentives for Foreign Investors

The attraction for foreign investors in renewable energy projects in Mexico is further enhanced by the existence of strong domestic and international incentives. Mexican law encourages such investments in several ways. The federal tax laws allow for 100 percent depreciation in the first year for all renewable energy capital investments.

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There is a fiscal credit of 30 percent for research and development. And the law covering the use of renewable energy sources, passed in December 2005, sets a goal of having renewables constitute 8 percent of the power generation mix by 2012, not including large hydro projects, and creates a trust to support renewable energy projects, rural electrification, biofuels and technological research and development. The fiscal reforms enacted in September 2007 fall short of reforming Mexico's energy sector. It is possible that the potential energy legislation planned for the coming year may create further incentives to stimulate more private investment, including by foreign investors, in Mexico's energy sector and specifically in renewable energy projects.

The other source of incentives is the Kyoto Protocol, which became effective in 2005 and seeks to reduce carbon emissions and address the problem of global warming. Under the Kyoto Protocol, Mexico is designated an Annex II country, which makes it eligible for Clean Development Mechanism (CDM) projects. The objective of the CDM is to displace future carbon emissions by rewarding investors who build power generation or other facilities using cleaner technology, rather than hydrocarbons, coal or other fuels that produce harmful carbon emissions.

As of January 2008, Mexico accounts for 100 of the nearly 900 CDM projects registered worldwide, over 11 percent of the world total (Figure 5). Of these, 767 projects globally are related to energy production and efficiency. Overall, Mexican CDM projects have been awarded 2,333,150 carbon emission reduction credits, which represent about 2.8 percent of the world total (Figure 6). By this measure, Mexico is second only to Brazil in Latin America in the creation of carbon credits. In Mexico, while most CDM projects are for methane recovery and energy production in conjunction with other agricultural or industrial activities, renewable energy projects for either hydropower or wind energy generation account for the largest number of credits awarded. About a third of Mexico's CDM projects are in the energy sector.

If the Mexican government certifies a proposed undertaking as a CDM project and the United Nations Framework Convention on Climate Change approves it under the Kyoto Protocol, the owner of the new project will earn carbon emission reduction credits based on the number of carbon emissions that the facility is avoiding by not using carbon-based fuel.

Carbon emission reduction credits have economic value that can be monetized in advance of the construction of a renewable energy power plant in Mexico. Already these credits are being traded in European carbon futures markets, though the forward price curve remains difficult to predict for a variety of economic and political reasons.

To finance a wind farm in Mexico, for example, the investors could raise some of the money to build it by selling the credits expected to be earned. Credits for an approved CDM project constitute an additional source of capital to fund capital costs.

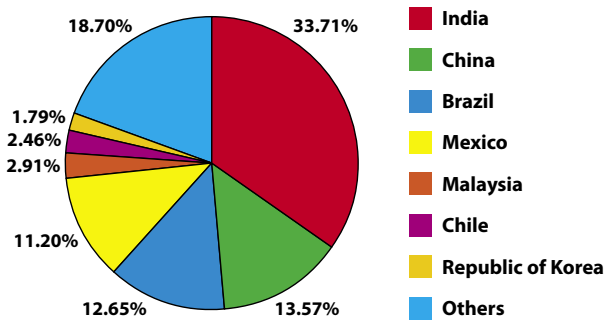

Figure 5: CDM projects (by host country)

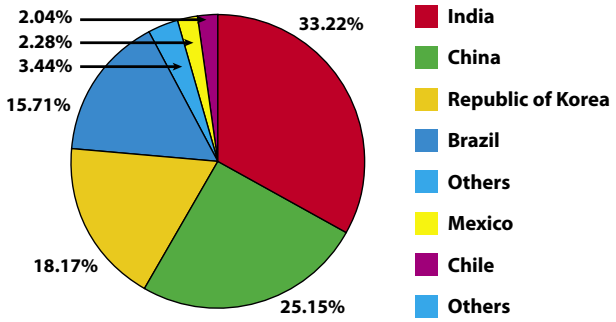

Figure 6: CDM projects (carbon emission reduction credits issued, by host country)

As oil and gas prices rise, the expected revenues for power sales – even power generated by renewable sources – can be expected to rise. As such, renewable power projects today are benefiting from a happy confluence of factors:

1. new government subsidies and incentives;
2. improving technology, which is boosting both efficiency and reliability;
3. higher costs for traditional energy sources, which makes renewable energy significantly more competitive even without subsidies; and
4. popular support for all things "green."

Available Renewable Energy Sources in Mexico

Mexico is better suited for some types of renewable energy than others. Here is a rundown of the various types of renewable energy sources available in Mexico and the issues involved in developing those sources.

Wind. Mexico has relatively few installed wind power projects today. The country has a potential wind energy generation capacity of over 40,000 MW, according to SENER. The key to a successful wind energy project is identifying areas where the wind is consistently strong. Wind resources in Mexico are becoming much better known. The most promising areas for wind generation facilities in Mexico are in the states of Oaxaca and Baja California. The Yucatan Peninsula and other areas also may be suitable. By metering the intensity of the air flow in targeted areas, developers can determine appropriate places to construct wind farms, matching turbine technology to the specific characteristics of each site.

Any wind farm that is constructed in Mexico will almost certainly be far from most load centers, the population concentrations or factories where the demand for power is greatest. Delivering power to these load centers must be done via Mexico's power grid, and the nearest access point may be a considerable distance away.

Thus, interconnection arrangements often can present the biggest challenges in developing a wind power generation project. Then there is the issue of who will pay for and own the necessary transmission line upgrades, substations and other interconnection facilities. It may turn out that the planned wind farm does not generate enough revenue to finance the upgrade and pay other expenses, absent subsidies.

There also will be practical and commercial issues involved in the delivery of wind farms' power to customers. The national public utility in Mexico, la Comisión Federal de Electricidad (CFE), is essentially a monopoly. There are some areas in which CFE is not the power provider – Mexico City, for instance – but CFE handles power transmission in most parts of the country where wind farms are operating or planned. Consequently, working out interconnection and transmission arrangements with CFE may be necessary even if CFE is not the ultimate purchaser of the power. For commercial reasons it may be preferable to sell a wind farm's power to industrial hosts, such as "big box" retailers, factories or other large users of power. In such cases, careful project planning will address both dispatch procedures (by which power deliveries are scheduled and supplies balanced) and the reliability of transmission services (Figure 7).

Another issue that must be confronted is backup power. Wind farms can generate electricity only when the wind is blowing, and potential customers will want to schedule power deliveries at any time they need it. The only source of backup power generally is CFE, so the wind developer's arrangements with CFE must cover the provision of backup power on commercially reasonable terms.

Fortunately, the Mexican government and CFE have taken steps to harmonize the wholesale tariffs for backup power and to address the dispatch priority more equitably, so that CFE does not abuse its monopoly position.

Solar. Mexico has vast areas in which the sun shines year-round. The International Energy Agency estimates that the installed photovoltaic capacity in the country is just 14 MW, and most of that is not connected to Mexico's power grid. So finding an appropriate site for harnessing solar energy is much less an issue than transmitting that energy to its users. Here, the transmission issues for large solar power arrays match those already discussed with respect to wind power plants.

A large-scale solar power development will, of course, require a lot of land. Acquiring such sites, securing

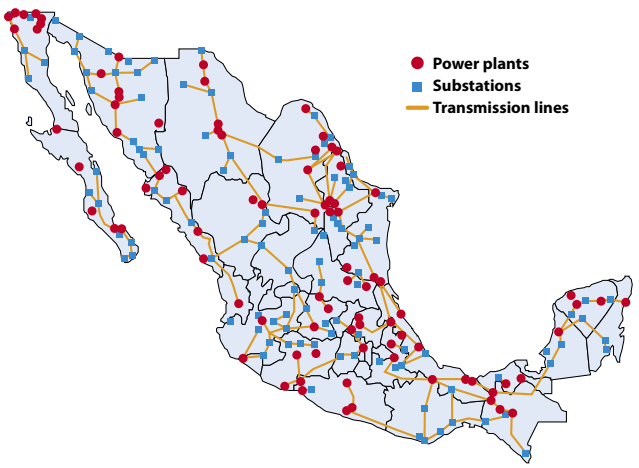

Figure 7: Transmission system in Mexico

the necessary rights-of-way and perfecting title can be time-consuming. For these reasons, some of the most promising solar projects involve smaller arrays that are located at a host facility (such as an industrial plant, a hotel or a "big box" retailer) that is also the purchaser of the power. In such cases transmission issues are avoided. Likewise, solar projects that produce process heat (like steam) for industrial uses, rather than power, also show promise.

Mexico offers many opportunities for investment in renewable energy. Incentives and resources are real.

Another issue with solar power is its high cost. The materials for a solar facility – glass, silica and copper – are expensive. Eventually new photovoltaic technology will bring those costs down, but currently making new solar power plants economically viable without subsidies or tax credits is a challenge.

Geothermal. Mexico is the world's third-largest producer of geothermal electricity, behind only the United States and the Philippines. In 2003, the latest year for which solid figures are available, Mexico had 955 MW of installed geothermal capacity. That is a small portion of the potential for this energy source; the U.S. Department of Energy estimates that installed geothermal capacity could increase to 8,000 MW. These projects hold enormous potential.

Hydroelectric. Just under one-quarter of Mexico's electricity supply is generated by hydroelectric power. The 2,300-MW Manuel Moreno Torres hydroelectric plant in the southern state of Chiapas is the largest in Mexico and, according to the U.S. Energy Information Administration, is the world's fourth most productive hydroelectric plant. However, much of Mexico's hydropower comes from small, outdated plants, many of which were built in remote areas as far back as 1920. Large new hydro plants are coming on line, such as the 750-MW El Cajon dam in the state of Nayarit, funded with foreign capital on the strength of an offtake contract with CFE. Hydropower, although not as directly subsidized as other renewable sources, will continue to play a substantial role in helping Mexico to meet its energy needs.

Biomass. Biomass energy is produced from various sources: solid wastes and sludge gases; industrial waste incineration or processing, which costs little and displaces landfill use; and agricultural waste. The last of these sources displaces open field burning, and even with minimum control over emissions, air quality can be significantly improved. Consequently, many CDM projects in Mexico will be in the agricultural sector. But air emissions from biomass production can still create permitting and environmental issues.

The waste management authority in metropolitan Monterrey is the only municipal waste utility generating electricity from biomass. This project was financed with World Bank funds.

Other municipalities – among them Mexico City, Tlalnepantla, Cancún, Naucalpan, Puebla, Querétaro, Aguascalientes, Guadalajara and Tijuana – are currently studying the feasibility of a biomass production facility like that of Monterrey.

Conclusion

Mexico offers many opportunities for investment in renewable energy. Incentives and resources are real. Careful planning through regulatory, transmission and market issues may yet boost investment in green energy in Mexico.

The government capacity to cover the costs of new energy facilities through CFE or otherwise is limited. The shortfall in public funds will likely become more dire in the coming years as Mexico faces the politically sensitive conundrum of energy and fiscal reform. The vast majority of Mexico's federal budget is funded by Pemex, the national oil company. As Pemex requires the ability to reinvest more of its revenues to maintain otherwise declining oil and gas production, the government will face a serious budget deficit. The passage of major new tax legislation in 2007 helps, so far as it goes. How and whether the government can cover the gap through tax reform or other measures will determine to some extent how flexible the government can be to stimulate private investment in energy infrastructure. Conversely, it will also enhance the attractiveness to the government of private investment, both domestic and foreign, as an alternative source of development capital and expertise, particularly for renewable energy. ■

Allan T. Marks is a partner in Milbank, Tweed, Hadley & McCloy LLP, an international law firm based in New York, and a member of the firm's Global Project Finance Group. He represents international energy companies and financial institutions in a wide range of financings, investments and cross-border transactions for energy and infrastructure projects throughout the Americas. He is also an adjunct professor at the University of California, Berkeley School of Law, and was a visiting lecturer at the Universidad Panamericana in Mexico City.