DEMOGRAPHICS AND TRENDS IN THE CALIFORNIA – MEXICO BORDER REGION


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Introduction

Rapid population, industry, and transportation growth in the border region is stimulating the need for new energy development and binational cooperation. Increased energy consumption and production, along with increased traffic congestion, is affecting the region’s air quality, water supply, and economy. To meet the region’s growing energy needs, California and the State of Baja California, Mexico, must cooperate to find viable options that provide energy while maintaining economic growth and protecting the environment.

This white paper lays the groundwork for developing these options by providing an overview of the region’s population growth and composition, industrial development, transportation trends, and energy supply and demand data.

Population Growth and Composition

San Diego–Tijuana Border Area

The major areas in the California-Mexico border area are San Diego-Tijuana and Imperial Valley-Mexicali. The San Diego–Tijuana border area has a combined population of nearly 4 million people, with approximately 2.8 million in the San Diego region and 1.2 million in Tijuana. The San Diego region encompasses San Diego County and includes several cities, the largest of which is San Diego at 1.29 million. On the Mexico side, in Baja California, the region includes one major city, Tijuana, and smaller outlying cities such as Rosarito and Ensenada on the Pacific coast and Tecate to the east.

Between 1980 and 2000, population growth in the San Diego region averaged 2.5 percent per year. This rate is expected to slow to 1.2 percent per year between 2000 and 2030, although some cities in the region will significantly increase their populations. The populations of Chula Vista and Carlsbad, for example, are expected to increase by 60 and 65 percent respectively. Overall, the San Diego region is projected to add more than one million new residents between 2000 and 2030.

Tijuana’s population is expected to increase rapidly. By 2020, the city will add more than 1 million residents and reach 2.28 million. The population in other smaller cities in this part of Baja will also increase significantly: Rosarito will add over 200,000 new residents (including the rural area); Tecate will add about 170,000; and Ensenada will add just over 300,000.¹

The population composition in the San Diego region includes Caucasian (52 percent), Hispanic (28 percent), Asian American (10 percent), African-American (5 percent), and other (6 percent).² Projections through 2030 show the Caucasian
population will drop slightly in number and percentage, while the Hispanic population will increase. According to the San Diego Association of Governments (SANDAG), these changes are driven by the following factors: higher Hispanic fertility rates, a younger age structure among Hispanics, a significant inflow of Hispanics into the region from outside the U.S., and the migration of Non-Hispanic Whites out of the San Diego region.

The ethnic breakdown of Tijuana’s population was not available for this report; however, the overall ethnic breakdown for Mexico is: Amerindian-Spanish or Mestizo (60 percent), Amerindian (30 percent), Caucasian (9 percent) and other (1 percent).³

**Imperial Valley–Mexicali Border Area**

The Imperial Valley–Mexicali border area has a combined population of nearly one million residents. The Imperial Valley’s border towns include Brawley, Imperial, El Centro, Calexico, Heber, and Seeley; on the Mexico side of the border is Mexicali.

The overall population for Imperial County is expected to double in the next 30 years, from nearly 150,000 to 300,000. To accommodate this growth, Imperial Valley’s border towns are expected to add 22,000 new homes in 2005 and beyond. In 2000, the racial breakdown for Imperial County’s population was Hispanic (72 percent), Caucasian (20 percent), African-American (4 percent), and other (4 percent).⁴

A population forecast for Mexicali shows a steady rise in the current population between now and 2030 from 800,000 to 1.5 million. A specific ethnic breakdown for Mexicali was not available for this report.

**Industrial Development**

**San-Diego Region and Imperial County**

During the first half of the 1990s, San Diego experienced its longest and deepest recession of the past 60 years. The economy has since recovered, in large part because of its trade relationship with Mexico and Canada under the North American Free Trade Agreement (NAFTA). Today, San Diego is an export-driven economy, with more than one-half of its exports going to Mexico and Canada.

San Diego’s employment in the industrial sector totals 1,253,100.⁵ According to the San Diego Regional Chamber of Commerce, the region’s top three industries are manufacturing, military defense, and tourism. Nearly one-third of San Diego’s manufacturing dollars come from international trade.
Agriculture makes up about one-quarter of Imperial County’s industry mix, based on a nine-month average calculated by the California Employment Development Department. In 2001, agriculture brought in a gross income of over $1 billion. Currently, 22 percent of the population is employed in this sector, compared to only 1 percent in San Diego.6

Imperial County’s employment in the industrial sector totals 53,000. Part of Imperial County’s economic plan is to expand its industrial base along the border with the opening of Gateway of the Americas, a master-planned commercial and industrial complex located on the California–Mexico border. The Gateway consists of over 1,500 acres of developable land, and all or part of the area may be designated as a Foreign Trade Zone. With access to rail lines and the Port of Entry, the Gateway could become a major industrial center for the southwestern United States.7

**Baja California**

The maquiladora (also referred to as maquila) industry continues to be the driving economic force along the U.S.–Mexico border. Maquiladoras are Mexican companies that operate under maquiladora programs approved by the Mexican Secretariat of Commerce and Industrial Development. Begun in 1965, maquiladora programs allow up to 100 percent foreign participation in terms of capital investment in and management of the companies, as well as duty-free imports of machinery, equipment, raw materials, parts, safety items, and administrative materials (provided the goods do not remain in Mexico permanently).

Tijuana is the maquiladora center of Mexico, with over 700 factories employing 115,000 workers.8 Mexicali is home to 125 maquilas with approximately 51,700 employees, although several companies have moved to China in recent years to take advantage of cheaper labor. The number of maquilas in Baja California dropped from 943 to 870 between 2002 and 2004.9

Currently, manufacturing employs more than 28 percent of the workforce in the Mexico border region.10 On a broader scale, the entire country has experienced a loss of manufacturing jobs, with only four of Mexico’s nine manufacturing sectors experiencing positive growth in 2004. In addition, Mexico’s growth index is projected to slow to 3.7 percent in 2005 – similar to worldwide trends – compared to a rate of 4.4 percent in 2004.11

Mexico’s projections are more optimistic for the maquiladora industry. According to Carlos Palencia, Director of Export Maquiladora Industry (a private organization with 2,000 members), Mexico expects to add more than 70,000 jobs in 2005 and increase the number of companies in the sector.12
Transportation Trends

Three notable migration trends are affecting traffic in the San Diego–Tijuana border area. San Diegans looking for more affordable homes are buying in Riverside, Imperial County, and Tijuana and commuting long distances to work. At the same time, the number of Mexicans crossing the border into California daily for work is increasing. Both trends, combined with a growing number of cargo trucks crossing the border each day, put significant pressure on the region's congested border crossings, roads, and highways.

The vehicle miles traveled (VMT) in San Diego dramatically increased between 1980 and 2000, by 5.2 percent per year. SANDAG’s estimates show that between now and 2030, the VMT will increase at a slower rate, about 1.6 percent per year. Still, the VMT in the region will grow rapidly over the next 25 years compared to population, housing units, and jobs, as shown in Figure 1 below.

![Figure 1](source: San Diego Regional Association of Governments)

Currently, it takes a commuter in the San Diego region an average of 26 minutes to get to work. Only 13 percent of commuters use a carpool or vanpool; 74 percent drive alone. Two of the region’s major interstate highways, I-805 and I-5, are operating at or near capacity during peak commute hours in the morning and late afternoon.

The border crossings are also getting more congested. In 2002, the Otay Mesa Port of Entry from Baja into California handled nearly $20 billion in commercial traffic. Nearly 11,000 cargo trucks travel daily on I-805, which provides the main route from Otay Mesa into San Diego and northward. By 2030, this number is expected to increase to 15,000 trucks per day. This congestion at the border has
negative effects on the environment and the economy: idling cargo trucks are polluting the air, and long delays are slowing the movement of goods and products into California.

**Energy Supply and Demand Data**

This section provides an overview the energy situation in the border region. For more details, one should refer to the *Energy Supply and Demand Assessment White Paper*.

**The California Border Area**

**Electricity**

The Imperial Irrigation District (IID) is a community-owned utility that provides water and electricity to the Imperial Valley and parts of Riverside and San Diego Counties. The IID entered the power industry in 1936 after completion of the All-American Canal, which provides hydroelectric power to the region. The IID is the sixth largest energy provider in California, with more than 90,000 customers. Because of this desert region’s warm climate, power consumption ranks among the highest in the U.S. In 2003, IID peak load was 792 megawatts (MW). Peak system demand is forecast to increase to about 976 MW by 2013.17

San Diego Gas and Electric (SDG&E) is an investor-owned utility that provides electricity for the San Diego region. SDG&E serves 3.3 million customers and has a service area that spans 4,100 square miles. In 2001, total electricity consumption within the utility’s service area was 17,908 Gigawatt hours (GWh), about 7 percent of the statewide total. During summer 2004, peak energy demand reached record levels at 4065 MW. The Energy Commission forecasts peak demand for the service area to grow to 4,855 MW by 2013.20

**Renewable Energy**

Senate Bill 1078 requires California’s three investor-owned utilities (Pacific, Gas & Electric, Southern California Edison, and SDG&E) to increase their power purchases from renewable resources to 20 percent of all purchased electricity by 2017. However, SDG&E has committed to achieving the 20 percent goal by 2010.

SDG&E currently has 992 GWh of renewable energy under contract and will need to secure an additional 2,496 GWh (for a total of 3,488 GWh) to meet its goal. Under its Renewable Procurement Plan, the utility plans to acquire the additional
renewable energy supply from wind (34 percent), biomass (26 percent), geothermal (17 percent), biogas (15 percent), solar (6 percent), and hydro (2 percent).

Renewable generation facilities in Imperial County currently total 635 MW of SDG&E’s capacity. Of this, 552 MW are from geothermal; 18 MW biomass; and 65 MW from small hydroelectric facilities.\(^22\) Another 240 MW of geothermal capacity and 80 MW from biomass projects are proposed for development in Imperial County. The remaining MW will come from smaller renewable projects.

Examples of smaller renewable projects include SDG&E’s wind energy projects either recently completed or currently being developed. For example, the Kumeyaay Wind Power Project in San Diego County is currently under construction and should be completed in 2005. It is owned by Superior Renewable Energy and will have a 50 MW capacity. Another example is the SDG&E-owned Mountain View III project in the San Gorgonio Pass, which began operation in 2003. The project consists of 34 Vestas 650 wind turbines with a 22.4 MW capacity. Finally, SDG&E also purchases power from the Oasis wind project (in Tehachapi), a 60 MW project that came on-line in 2004.\(^23\)

Although the Imperial Irrigation District is not required to comply with S.B. 1078, the public utility voluntarily adopted a Renewable Portfolio Standard in May 2004. To help meet this standard, IID is negotiating with CalEnergy to purchase approximately 200 MW of energy from its Salton Sea Unit 6, now under construction.\(^24\) In addition, MidAmerican Energy’s 185 MW geothermal steam turbine operation, currently under development, will be the largest in the United States.\(^25\) The Imperial Valley is home to one of the state’s major geothermal areas and contains more undeveloped geothermal resources than anywhere else in California.

The IID is prepared to export renewable resources from its service area to energy providers throughout the United States, using its 1,300-mile transmission network as the “Green Path.”

**Natural Gas**

Natural gas is one of the two primary fuels driving California’s energy usage (the other is petroleum). Because of its low price and clean-burning characteristics, natural gas has become the fuel of choice within California, particularly for electricity generation. Its usage is expected to grow in the coming years to meet the state’s environmental objectives.\(^26\)

In 2003, total annual natural gas demand within the area served by SDG&E was about 90 billion cubic feet. Approximately 52 percent of demand was from core customers (that is, residential and small commercial/industrial), 11 percent from non-core customers, and 37 percent from power generation. Natural gas demand within the SDG&E service area is forecast to grow between 1.2 and 1.6 percent.
annually after 2006. The primary drivers for near-term growth are power plant demand and increased use of natural gas for cogeneration.

Eleven natural gas infrastructure projects have been completed in California since 2001 in the form of upgrades or expansions and, in some cases, new pipelines. In the border region, the North Baja pipeline was completed in September 2002. This pipeline, owned by Pacific Gas & Electric (PG&E) and Sempra International, runs through California, Arizona, and Mexico, and has a capacity of 500 million cubic feet per day.

**The Mexico Border Area**

**Electricity**

Baja California is geographically isolated from the rest of Mexico and is not connected to Mexico’s power grid. Yet, the state must still abide by Mexico’s energy laws and regulations under the authority of three federal agencies. The Comisión Federal de Electricidad (CFE) is the government enterprise tasked with the ownership and operation of Mexico’s public electric system infrastructure. The Comisión Reguladora de Energía (CRE) is an independent regulatory agency that regulates the importation and exportation of electricity by private sector entities. Finally, the Secretaria del Medio Ambiente y Recursos Naturales (SEMARNAT) is the agency that enforces compliance to environmental regulations for any party interested in building cross-border transmission lines or pipelines.

In 2001, Baja California’s total energy consumption was 7,785 GWh, almost 33 times less than in California (which was 253,614 GWh). Currently, Tijuana gets its electricity from a natural gas-fired plant in Tijuana and one in Rosarito. The plants have a combined output of 520 MW. Tijuana is linked to Mexicali, where 720 MW of electricity is produced at the geothermal fields of Cerro Prieto.

The CFE’s 2004-2013 electricity demand forecast projected demand growth for Baja California Norte to continue at about 7 percent for this time period, compared to 7.5 percent for the prior 10 years. Although this projection shows a slight slowdown, it still reflects growing demand. To help meet this demand and increase efficiency, the Rosarito power plant will double its capacity and convert from fuel oil to natural gas.

**Renewable Energy**

The Baja California border region presents great potential for renewable energy development. Mexican President, Vicente Fox, set a goal for the country to bring another 1,000 MW of renewable energy on-line by 2006. The second largest
geothermal field in the world, Cerro Prieto, is located just south of Mexicali. It is estimated that Mexico’s geothermal capacity could reach 8,000 MW, but specific data on Cerro Prieto’s potential capacity was not available for this report.

In addition, the Baja region has excellent wind and solar resources. The border region’s mild, sunny climate makes it an excellent candidate for solar and photovoltaic projects. It is also home to a major wind area, La Rumorosa, located in the Sierra Juarez mountain range halfway between Mexicali and Tijuana. Data showing La Rumorosa’s total wind capacity was not available for this report.

Although Mexico shows interest in expanding its renewable resource base, CFE has no formal plans to further expand the installed capacity at Cerro Prieto for its current planning cycle (2004-2013). Currently, Mexico's total installed capacity of wind energy is only three MW, and there are no commercial solar facilities in the entire country.

Natural Gas

Mexico’s natural gas reserves are the sixth largest in the Western hemisphere, with 59 percent of the reserves in the northern part of the country. Despite vast natural gas resources, the country has relied heavily on U.S. imports over the past decade, accounting for 35 percent of Mexico’s trade deficit in 2003. One of President Fox’s energy reforms calls for new domestic natural gas development to decrease reliance on expensive imports.

The demand for natural gas in the Baja California is driven mainly by power generation. The only local distribution of natural gas is found in Mexicali, whose sales represent roughly 4.8 percent of the overall average natural gas demand for the Baja California Norte region. Between 2008 and 2013, CFE plans to build an additional 1,282 MW of generating capacity in Baja California. The role of natural gas in power generation will continue to grow as most planned generation capacity is likely to be natural gas-fired.

In terms of other natural gas activities, Baja California is presently developing several liquefied natural gas (LNG) infrastructure projects:

- San Diego-based Sempra and Shell Oil have obtained permits for the Costa Azul LNG project near Ensenada, Mexico, which is expected to be operational in 2008.

- ChevronTexaco has obtained permits to build the Terminal GNL Mar Adentro, a 1.4 billion cubic feet (bcf)/day terminal off the coast of Baja California’s peninsula, near the Coronado Islands. The degasification will be supplied from the company’s Gorgon Joint Venture offshore Australia. Pending regulatory approval, startup is intended for 2007.
• In December 2004, the California Public Utilities Commission (PUC) voted to allow Sempra to deliver regasified LNG to California by pipeline.
End Notes

1 San Diego Association of Governments, San Diego Region – Baja California Cross Border Transportation Study, prepared by Parsons Transportation Group, November 1, 2000, p. 159.
5 Ibid, p. 6.
8 Sellstate Achievers Realty Network, Inc. via Amelia Barreto real estate, Featured City - Tijuana http://www.ameliabarreto.com/content/article.html/81840
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