

THE POWER SECTOR IN: GUATEMALA

Issue Area	GUATEMALA
I. Current Status of Sector Reform: Key Points	
Power System Overview	By the end of 1998, the total installed capacity in Guatemala was 1,358 MW. Electricity generation was 4,563 GWh and electricity sales were 3,739 GWh. Losses were estimated at 18.9% in 1997. Demand grew at an average 9.3% per year in the period 1991-1997, though its growth is expected to slow a little during the next decade. The electrification level of the country as a whole is only 66.7%, with the area outside Guatemala City quite low (52.3% in the rural areas). The system behaves as a sole market and will be part of the Central American Interconnected Market.
Structure	The General Electricity Law ratified by Congress in October 1996 required the key (national) sector enterprises to separate commercialization, distribution, transmission and generation functions within one year of its enactment. Large customers (more than 500 kW) are allowed to buy from any supplier. Both the Instituto Nacional de Electricidad (INDE) and Empresa Eléctrica de Guatemala Sociedad Anónima (EEGSA) have already unbundled generation, transmission and distribution activities. EEGSA privatized its generation and distribution companies in mid 1998 and INDE privatized its distribution companies at the end of 1998. More than half the installed capacity belongs to IPPs with long-term Power Purchase Agreements (PPA).
Competition	Until 1997, most PPAs were unsolicited, therefore awarded without competitive bidding. Competition will be mostly based at the wholesale level in which companies will compete in two markets, the deregulated contracts market and the spot market. The number of companies currently participating in the competitive market is not that large, specially taking into account that INDE generates almost 50% of the total demand. Due to the fact that most of the energy has already been contracted via PPAs with independent producers, competition in the wholesale market will be highly restricted. There will be no competition in the retail market; companies will be awarded concessions in each region.
Role of the State	There are already different entities in charge of the activities of the industry. The regulatory commission (CNEE) sets the rules and procedures for the market; and oversees the behavior of the different market agents. The Ministry of Mines and Energy is in charge of setting sector policies. The administration of the Wholesale Market is currently under the transmission company, but will be transferred to a new privately owned independent company (the AMM). The government will move out of most of the commercial activities, with the exception of INDE's hydro generation assets and the transmission network.
Regulatory Institution	The National Electricity Commission (CNEE) was created in 1996 as an independent agency under the Ministry of Energy and Mines (MEM), with the three Commissioners nominated as of December 1, 1996. It is in charge of regulating the electricity law, overseeing the market and defining the transmission and distribution tariffs.
Private Sector Participation	The new General Electricity Law does not make any provision for the privatization of existing assets, but the Government has indicated its intention of privatizing everything except hydroelectric and transmission assets. Two thermal-fired generating units owned by EEGSA have been sold for US\$ 30 million to the Guatemalan Generating Group (controlled by Constellation Power), securing a 18-year PPA that allows the winning bidder to construct up to 150 MW of new capacity on a BOO basis. Eighty percent of the government's shares on EEGSA's distribution assets were privatized in July 1998. The winning bidder was a consortium comprising Spain's Iberdrola, TECO Power Services from the US and Electricidade do Portugal. The government has already privatized INDE's distribution companies, selling them to Spain's Fenosa group. The government is currently studying the possibility of selling INDE's thermal plants. In addition to the already granted PPAs (700 MW), private investors will perform most of the expansion in the generation sector. Among the new projects that are already underway (and built by private investors) are the 40 MW GENOR thermal project, the 120 MW San Jose coal plant (which has already

Issue Area	GUATEMALA
	<p>contracted its energy with EEGSA and will begin operations in the year 2000) and the Orzunil geothermal project.</p> <p>Most of the private generation companies hold PPAs with either INDE or EEGSA.</p>
Major Outstanding Issues	<ol style="list-style-type: none"> 1. The regulatory commission is dependent on the MEM, lacking independence in a market in which government owned generation is still large. 2. The MEM lacks the personnel or technical capacity to carry the policy role assigned by the 1996 law. 3. The nature of the bulk power market administrator, AMM, is not specified. It is supposed to be a private, non-profit entity, but its structure needs to be clearer. The government should also move forward in the creation of this institution, as it will bring transparency to the market. 4. Private investors may choose to continue pursuing long-term power purchase agreements (PPAs) rather than competing in the bulk power market. Even with the privatization of distribution companies, there is no possibility for getting real competition in the short-term. Both existing and future private generators already have long term contracts with the distribution companies and the total installed capacity after the year 2000 additions will be more than enough for supplying the demand for a number of years. 5. The schedule for implementing regulations and other important elements of the law are extremely ambitious and may result in less than optimal applications of the law.
II. Legal & Regulatory Framework	
Legal Basis	<p>The <i>General Electricity Law</i> (Decree No. 93, October 1996) defined the new sector structure for the system. It created the new regulatory commission (CNEE); defined the new wholesale power market administrator (AMM) and required INDE and other sector enterprises to unbundle their commercial activities. Both, the municipal utilities that are not of private or mixed ownership and the enterprises possessing less than 5 MW of generating capacity were excluded from the unbundling rule. The law provides for generation, transmission, and distribution projects to be freely undertaken by any entity (unless public resources are involved). It provides for authorizations by MEM for any sector activity under conditions defined in the law. It also established the new Wholesale Power Market consisting of a contract and a spot market and defined the basis for pricing in the wholesale power market and for regulated tariffs and tolls. These rules have been further elaborated in the implementing regulations, taking into account a time line provided by the law.</p> <p>The <i>Establishing Law for the Instituto Nacional de Electrificación/INDE</i> (Decree No. 1287, 1959) was modified by Decree 64-94, issued in February 1996, which directed INDE to be corporatized and endowed with greater autonomy over its administration and management as a decentralized company under state ownership. This change aimed to provide more flexibility in INDE's financing, budget administration, and contracting authority.</p>
Role of the State	<p>The Electricity Law created the new regulatory entity, the Comisión Nacional de Energía Eléctrica (CNEE) in 1996. Policy-making remains under the Ministry of Mines and Energy (MEM). The wholesale power market is currently administered by the transmission company, but a new company, the administrator of the wholesale market (AMM) will be created as a private company.</p> <p>The government will keep the transmission assets and INDE's hydroelectric plants.</p>
Institutional and Regulatory Entities and Jurisdiction	<p>CNEE is in charge of formulating, issuing and overseeing the compliance for the new regulatory framework that is being implemented in the country. The law assigns it the role of protecting consumer rights; preventing anti-competitive behavior; defining regulated transmission and distribution tariffs; attending the disputes among sector participants; and issuing provisions and standards that guarantee open access to transmission networks.</p> <p>The Ministry of Energy and Mines (MEM) is responsible for establishing and coordinating sector policies, norms, indicative programs, and sector planning.</p>

Issue Area	GUATEMALA
	<p>The National Environmental Commission (CONAMA) is the main normative and regulatory authority over the sector in environmental areas, and must approve and/or set parameters for proposed generating and transmission projects.</p> <p>INDE's transmission company is temporarily in charge of operating the system and the wholesale market. These activities will be assumed by the administrator of the wholesale market (AMM), which will be an independent, private and nonprofit company that will be further created.</p>
Sector Planning	<p>Until recently, INDE's Board of Directors formulated sector expansion plans in consultation with municipal authorities and the Ministries of Finance and of Planning. The 1996 General Electricity Law assigns the planning function for the sector to the MEM. The main role of the Ministry is to provide indicative planning in the sector, but in some extreme cases it may oblige transmission and distribution enterprises to undertake targeted system expansion projects in return for payments and guarantees by the Government.</p>
III. Sector Structure and Participants	
Structure	<p>Under the new electricity law, all sector enterprises are required to separate generating, transmission, distribution, and commercialization functions. Cross-ownership of these activities is allowed (e.g., through holding companies), but each function must be undertaken by legally distinct companies with separate accounting for each activity, though 100% municipally-owned utilities and (other) distribution utilities with less than 5 MW of generating capacity are exempt. Although not required by the law, the objectives of introducing competition and greater private participation in the sector may also require horizontal restructuring to create competitive conditions, and is under active consideration by the Government.</p> <p>The national utility, INDE owns almost 50% of the country's installed generation and owns and operates the national interconnected system (SIN). INDE behaves as a holding company, in which each sector activity has separate budgets and operates independently. Its two distribution companies have already been privatized. Many of the distribution utilities also own some generating capacity. EEGSA, the largest distribution company (serving the metropolitan area of Guatemala), has already been privatized and subdivided into different sector activities.</p>
Participants and Degree of Private Sector Participation	<p><i>Generation:</i> The state-owned Instituto Nacional de Electricidad (INDE) owned more than 83% of the capacity serving the country's public power supply requirements until 1992. The remainder was owned by EEGSA, with more than 100 MW of its own generating capacity, by some of the other municipal distribution utilities that had small generating plants, and later by a bagasse-fired cogeneration plant from which EEGSA purchased excess power under a contract signed in 1989. After 1992, a number of cogenerators and new IPPs entered the market by signing supply agreements with EEGSA or INDE and around 700 MW are already in operation.</p> <p>Under the new electricity law, generation under INDE and EEGSA and other sector enterprises with more than 5 MW of capacity (except 100% municipally owned companies) has to be spun off to separate generating enterprises. EEGSA already privatized two of its thermal generation units. The Government has indicated that it plans to privatize INDE's thermal generation as well. The Government apparently intends to keep hydropower units now owned by INDE under state ownership.</p> <p>Private investors will perform most of the generation expansion. In the near term, two private companies have already signed PPAs with EEGSA and are building their thermal plants, which will add approximately 270 MW of capacity to the system and are expected to begin operations in the year 2000.</p> <p><i>Transmission:</i> INDE owns most of the transmission lines and operates the national interconnected transmission system (SIN). Local utilities provide transmission service in isolated systems. The transmission company is a separate company under INDE's holding and is also in charge of the control of the system. Generators and distribution enterprises (under any type of ownership) are allowed to own secondary transmission lines and facilities for the purpose of connection to the SIN, requiring authorization from MEM only if they utilize goods in the public domain. There is open access to transmission and distribution networks.</p>

Issue Area	GUATEMALA
	<p><i>Retail Distribution:</i> EEGSA, the largest distribution utility (80% of its shares were privatized in July 1998) serves about 450,000 customers in the area of Guatemala City, which amounts to approximately 66.3% of the total demand. INDE's two distribution companies serve most of the remaining demand and were both recently privatized. There are also 14 municipally owned utilities that serve their population centers (accounting for about 5.4% of the total demand). INEL provides distribution service to about 300,000 customers in isolated areas.</p>
Targets for Privatization	<p>EEGSA's generation assets were sold in 1997 to the Guatemalan Generating Group (a subsidiary of Constellation), its distribution assets were sold in July 1998 to a group formed by Spain's Iberdrola, TECO Power Services Ultramar from the US and Electricidade do Portugal. Spain's Union Fenosa bought INDE's distribution companies in December 1998. The only remaining assets in government hands are under INDE's holding and of those only the thermal generation plants will be privatized.</p>
New Investments	<p>Private investments in thermal, hydro, geothermal IPPs and self-generating (including cogenerating) projects are expected to provide most of the future supply requirements, but there are no existing barriers to public or mixed investments in any sector activity. The Guatemalan Generating Group, which bought EEGSA's generation assets, holds an 18-year contract with EEGSA that includes the construction of a 150 MW generation unit by the year 2001. A group of private investors is building the first coal-fired plant in Central America. This 120 MW plant already holds a Power Supply agreement with EEGSA and is expected to begin operations in the year 2000. In addition to those two projects, private investors are also considering the construction of the 24 MW Orzunil geothermal project.</p> <p>Due to the conditions of demand and supply in the country, no further investments in generation will be needed in the medium-term.</p> <p>The government has an aggressive plan of rural electrification, which will be partly financed by private initiatives.</p>

IV. Electricity Markets: Areas of Competition and Monopoly

Bulk Power	<p>The wholesale power market was de facto opened to private power suppliers in 1989 when EEGSA signed a PPA with sugar mill cogenerators. A period of rationing in August 1991 provoked EEGSA to sign additional contracts with private suppliers to meet its power requirements. In 1992, it signed a 15-year PPA with Enron to build the 110 MW Puerto Quetzal thermal plant. This plant became operational in 1993. Subsequently, it signed more PPAs for an additional capacity of 80 MW. Due to continued supply constraints, a 1993 emergency decree issued by MEM temporarily authorized INDE to purchase power under contract with private generators to meet critical supply needs. INDE signed its first PPA that year with a private 12-MW hydropower plant developer. The Guatemala Generating Group has secured an 18-year PPA that will allow the consortium to construct up to 150 MW of new capacity, with free choice of site, fuel and technology. During the first phase of the PPA (3 years), GGG will sell EEGSA 80 MW of output from the existing units they recently acquired, providing part of the cash needed to build the new plant that will sell power on a dispatchable basis during the next 15 years. EEGSA also has the San Jose PPA for 120 MW <i>take-or-pay</i> for capacity and energy. Currently, INDE and EEGSA have around 1000 MW of power under 15-year PPAs with IPPs and cogenerators/self-generators (about 560 MW are already in operation). INDE resells this power to distribution entities.</p> <p>The new wholesale market is supposed to bring competition to the market, as it will be open to new investors and companies will be free to sign contracts at agreed prices with their customers. The spot market will be administered by an independent entity, which will guarantee competition. Marketers, distribution companies and large consumers are obliged to hold contracts that cover their capacity and energy requirements for both the current and subsequent year. This restriction puts most of the generation under the contracts market. The current number of long-term contracts already signed by INDE and EEGSA does not allow for the healthy operation of the market, and there is not enough new and non-contracted demand to promote the entrance of new investors.</p> <p>Under the new law, no authorization is needed for generation units up to 5 MW of capacity. Larger units and plants that use public goods/resources, including geothermal resources, require an authorization from</p>
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Issue Area	GUATEMALA
	MEM (for a maximum of 50 years). Authorizations for one year may be issued for studies, exploration, and measurements on a non-exclusive basis for projects related to potential generation units. For example, hydro site studies.
Transmission and Distribution (Networks)	The law requires open access to all transmission and distribution networks connected to a public system. System expansions needed to accommodate wheeling requests will be required. Regulated tolls will be charged for power transfers over these systems when they cannot be established through negotiations between the involved parties. Transmission enterprises will own, operate, and maintain their facilities, and may undertake system upgrading or expansion projects. Distribution enterprises will be allowed to require customers to help finance system expansion that is for the customer's benefit on a reimbursable basis. Generators and distribution enterprises with secondary transmission lines will require authorizations and will have to follow established SIN connection and operating rules as well as other relevant rules and regulations (i.e., for open access and setting tolls).
Retail Distribution	<p>The retail power market in Guatemala is concentrated in the area of Guatemala City, which accounts for 75.9% of the country's total consumption though only about 50% of the customers. In addition, 14 municipally owned utilities serving other population centers account for about 5.3% of total retail sales. These enterprises currently hold exclusive distribution franchises. The two distribution companies recently divested from INDE supply the remaining distribution service to customers in rural and isolated areas, accounting for 18% of total retail sales.¹ Demand has been growing by an average 9% per year over the last several years (in 1995, it was 10%), and it is expected to be no less than 7% per year over the next 3 years.</p> <p>The General Electricity Law required the separation of INDE and EEGSA's retail distribution (commercialization) activities into separate enterprises, as well as that of other sector enterprises except purely municipally owned companies or companies with less than 5 MW of generating capacity. Retail distribution companies will require a concession from MEM, valid for a maximum of 50 years, which will be awarded competitively and may be transferred with MEM's approval. They will be obliged to serve any customer either within 200 meters of existing installations or connecting to its designated (but not exclusive) service area who requests the service. Other marketers may compete for large customers in the utility's service territory. Large consumers (as defined by the implementing regulations) will be able to freely negotiate their own supply contracts with generators, distributors or other marketers.</p>
V. Load Dispatch and Pool Operation	
Dispatch Entity and Basis	INDE was in charge of all load dispatch functions for the SIN under criteria included in its establishing legislation. The new General Electricity Law created the AMM. This entity will establish central load dispatch criteria and order to fulfill the contractual supply obligations of the market participants and to manage the spot market. The AMM will also define other operating criteria for transactions over the system. The Transmission Enterprise for the system will carry out dispatch functions according to AMM's criteria.
Pool Operation	<p>The new wholesale market began its operations in July 1998. It is currently under the control of the transmission company, but will be operated in the future by a market administrator (Administrador del Mercado Mayorista, AMM). It consists of generators, transmission companies, distributors, marketers, exporters, importers and large consumers (more than 500 KW). The market will consist mainly of a contracts market with a small, regulated market in which market participants can trade non-contracted energy.</p> <p>Commercialization entities will be required to have contracts, awarded through competitive bidding, with generators that cover their capacity and energy requirements for the current and following year. The AMM will impartially coordinate the operation of generators, international interconnections, and transmission lines under minimum cost criteria to perform the transactions contracted by market</p>

¹ The electrification level outside of Guatemala City is very low, and that of the whole country is around 66.7%. With the Government and Private Sector's efforts, this index has increased from 46.4% to 66.7% between 1991 and 1998.

Issue Area	GUATEMALA
	participants. It will also establish spot market prices for non-contracted capacity and energy transfers between market participants and will ensure the adequacy and security of electricity supply.
VI. Pricing	
Bulk Power	The contracts at the wholesale level will be freely negotiated among the parties. Spot market prices for power transfers that are not under supply contracts will be established by the AMM based on hourly average system costs for available capacity and energy.
Transmission/ Distribution (Networks)	<p>Involved parties are free to negotiate the prices for transmission and distribution network services. In those cases where there is no agreement, the CNEE will establish a toll according to the provisions of the new electricity law and further defined in its implementing regulation. These established tolls would reflect the average costs of investment and operation for transmission/distribution systems that are economically adapted.</p> <p>The service toll in the main transmission system will be based on the annualized investment cost (itself calculated on the basis of the New Replacement Value for optimized installations, the discount rate used in tariff calculations, and a useful operating life of 30 years) plus operating and maintenance costs for optimally sized installations, and the total firm power connected to the relevant system. These tolls will be automatically adjusted every 2 years. Other tolls may be payable to other transmission or distribution enterprises when their facilities (outside of the main system) are involved in a power transfer.</p> <p>All generators and power importers connected to the national electricity system will pay connection fees.</p>
Retail Tariffs	<p>Tariffs have historically not been adequate to cover supply costs. To address this problem, EEGSA's tariffs were adjusted by 30%, to US\$92/MWh, but the estimated economic cost of supply is US\$100/MWh.²</p> <p>Retail tariffs (and the methodology for calculating them) will be set by the CNEE. The tariffs will use a pass-through formula that adds the generation costs, the transmission costs and the distribution costs. The distribution service cost component will be established by the CNEE and should cover the costs of supplying the power to final consumers, including losses, over an efficiently run network of similar features. This distribution component is the Aggregate Value for Distribution (VAD), and the terms of reference for related studies, will be further defined by the CNEE. Tariffs will consist of separate power and energy charges. Retail tariffs will not be allowed to incorporate cross-subsidies between customer categories or to give discounts to utility employees. The methodology for setting tariffs will be reviewed every 5 years. Customers may be disconnected for non-payment of bills after the utility has issued a warning. Customers exceeding the limits of contracted supply may also be cut off and be charged according to provisions defined in the regulations. Compensation payments will be made to regulated customers if supply is cut off for more than permitted lengths of time.</p>
Subsidies	No cross-subsidies will be allowed under the General Electricity Law, but the Government may totally or partially subsidize system expansions for the purpose of rural electrification. The government plans to create a special fund for rural electrification using \$200 million from the sale of EEGSA's shares and another amount, which has not been defined yet that will come from the privatization of INDE's distribution companies. It will also use funds that will come from loans and donations from other governments.
VII. Sector Problems and Priorities	
Framework and Other Issues	<ol style="list-style-type: none"> 1. The regulatory entity depends on the MEM, which reduces its independence. A change in this structure will require a two-thirds majority vote in Congress, which was not perceived as forthcoming when the General Electricity Law was ratified in October 1996. 2. The distribution companies are allowed to prepare tariff proposals based on criteria specified by law.

² "Guatemala: Programa de Reforma Sectorial de Infraestructura e Inversiones: Informe sobre Asistencia Técnica para Apoyar la Reforma del Sector," Manuel Dussan, IDB, October 21, 1996.

Issue Area	GUATEMALA
	<p>In order to prevent the different utilities to abuse the influence on their own tariffs, the regulatory commission should create parameters for the contracting procedure for the consultants that will perform the valuation process.</p> <ol style="list-style-type: none"> 3. The size of the power market in Guatemala is small (with a maximum demand of around 900 MW in 1998). The amount of market participants that might exist in the market might not be enough to have competition in the wholesale power market. This is added to the small amount of capacity that will participate in the spot market, as a high percentage of the capacity is already under long term contracts, at prices that in many cases are above those of a competitive market. This means that neither the contracts market, nor the spot market will be very active in Guatemala in the medium term. 4. It will probably be difficult to establish appropriate regulated prices for final consumers because of the large amount of contracted capacity (via PPAs) with purchase prices above the ones that could be obtained through competitive solicitations. These high prices have been balanced by subsidies to final consumers. The new private distribution environment without subsidies will represent significant increases in the prices for final consumers, especially taking into account that the new tariff formula passes the generation costs directly to consumers. 5. The composition of the AMM is not defined in the new electricity law, and there are no signs of intentions to create it.
Operating Needs	<ol style="list-style-type: none"> 1. The operating system is very inefficient and unreliable, and the quality of service remains poor, largely because the financial constraints on sector enterprises, which were never able to increase their tariffs to economic levels. 2. There are currently major capacity constraints for transmission and distribution networks caused by a protracted period of neglected maintenance, investment, and upgrading programs. 3. The entrance of natural gas to the country and the initiation of operations of the regional electricity market could result in significant variations in the country's expansion plans.
Electrification and Energy Efficiency	<p>An aggressive electrification program performed by the Guatemalan government has allowed them to improve its service coverage from 46.4% in 1991 to 66.7% in 1998. Most of the improvements have occurred in rural areas where the service coverage increased from 33.9% to 52.3% in the same period. This means that the government's goal of having coverage of 70% by the end of 1999 will be easy to reach. INDE was mainly responsible for rural electrification efforts, supported by national budgetary funds. The General Electricity Law provides for the extension of service coverage in specified rural areas to be authorized and subsidized by the State, and carried out through a designated sector enterprise, which will then operate and maintain the system. Distribution enterprises will be responsible for a specified level of service extension within their designated territories. In addition to the local efforts, the government signed agreements with the Mexican government to electrify 40 communities in the border zone between the two countries.</p>

VIII. Sources and Relevant Web Pages

ECLAC-United Nations, Energy Unit, 1999. "La Industria Eléctrica del Istmo Centroamericano: Situación de los Procesos de Reforma y Perspectivas para el Corto y Mediano Plazo".

Ministry of Mines and Energy, Energy General Division, Guatemala, 1998. "Modernización del Subsector Eléctrico: Una Oportunidad Para el Desarrollo y la Inversión".

Relevant web Pages:

Empresa Eléctrica de Guatemala (EEGSA): <http://www.eegsa.com/>

Catholic University of Chile: <http://www.ing.puc.cl/~power/southamerica/southamerica.htm>

