

Appendix B

Electricity Regulation Questionnaire Responses by Country

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B-1. ARGENTINA

B-1.1 Reform framework

Reforms to date and restructuring laws

Law No. 23696 (1989), The Law of State Reform, directed the Executive office to reorganize and privatize public enterprises.

Decree No. 634/91 (1991), issued by the Ministry of Economy, implemented Law No. 23696. Law No. 24065 (1992), The Electricity Regulation Act, was the keystone for the ambitious reform and privatization of virtually all commercial electric activities that had been carried out by federally owned enterprises. It provided the guidelines for unbundling electricity sector activities, and for private participation in generation, transmission, distribution, and dispatching activities. It also defined the rights and obligations of providers in each area of service. It directed the establishment of a new sector regulatory agency, the bulk market, a spot market, and outlined the privatization schedule and plan for the sector. It established the basis for the Regulatory Entity and other institutional authorities in the sector, the administration of the wholesale power market, pricing in the spot market, tariff setting in regulated areas, and evaluating assets to be privatized.

Resolution 38/91, SEE, established rules for the Wholesale Electricity Market (WEM) and independent transmission basic rules.

Effects of reform

The electricity sector is almost completely unbundled with a large number of generation, transmission, and distribution companies competing for the different markets. There are currently more than forty private generation companies owned by US, European and Chilean investors. The largest private generation company has less than ten percent of the total national market. There are a number of industrial and commercial companies that contract directly with the WEM for a specified fee. The distribution companies operate under concession. Distribution companies serving the Buenos Aires region account for forty-four percent of the market share.

There are ownership restrictions intended to avoid the exercise of market power. Generation and distribution companies cannot hold transmission assets. Transmission companies cannot buy or sell energy and all existing transmission assets are compelled to provide open access on a fair and regulated basis.

The wholesale electricity market is extremely competitive, with an increased participation of deregulated customers. In the monopoly areas (such as distribution and transmission) concessions are awarded via a process of competitive bidding.

Planned reforms

Historically, demand has been growing at an annual rate of five percent for the last decade. In 1997, Argentina and Brazil agreed to integrate their electricity markets with free competition guaranteed among power generators, without federal or state subsidies, and a price system based on costs alone. In 1999, Argentina and Chile agreed to create a legal framework to enable private sector companies to invest in a transmission system linking the two countries' primary electricity grids. To date, almost 5,000 MW capacity transmission interconnections are operating or under construction between Argentina and its neighboring countries of Brazil, Chile, and Uruguay. Latin American countries are in the process of establishing a unified power transmission and energy market system, to afford price volatility and reliability concerns due to periodic hydroelectric shortages. These countries include the above-mentioned countries, and Paraguay, Peru, Ecuador, Colombia and Venezuela.

B-1.2 Industry structure

Argentina has the third-largest power market in Latin America, behind Brazil and Mexico. Argentina relies mostly on hydropower and natural gas to fuel its electricity sector. In 2001, the country had 24.3 gig watts (GW) of installed generation capacity, of which about 54% was fossil fuel-based (primarily natural gas), 41% hydroelectric, and about 4% nuclear. Electricity generation in 2001, which totaled 81.3 billion kilowatt-

hours (bkwh), was 44% thermal, 48% hydropower, and 8% nuclear.

Argentina was one of the first Latin American countries to privatize state-owned companies and reform the infrastructure sector unbundling activities and promoting competition. Most public utilities are now in the hands of the private sector, including telecommunications, airlines, power generation and distribution, natural gas transportation and distribution, water systems, and railways.

Electricity experts have warned that Argentina could face serious energy supply problems in the next few years if any new investment in the transmission and generation sector is not made.

Existing industry structure

Argentina has one of the most competitive deregulated power sectors in South America. Since 1991, the government has pursued an aggressive privatization program in tandem with the creation of an open electricity market. These market changes, along with the economic growth in the country during the last decade, have attracted foreign investors and project partners. Today, power generation capacity generally satisfies domestic demand, but there remain some remote areas that have yet to be connected to the national grid.

The Argentine electricity sector consists of a variety of distinct generation, transmission, distribution, commercialization and central load dispatch entities. Cross-ownership in these activities is strictly limited, with the transmission entities being forbidden from owning any part of a generating or distribution enterprises. Some monopoly constraint rules also apply on mergers, acquisitions and new investment in generating capacity to oversight a fair competitive framework.

Most of these companies are in private hands, with only a minor participation of the federal government in the generation sector. The majority of provincial utilities undertook only distribution activities and the remaining vertically integrated utilities have unbundled their distribution and generation activities.

Generation is carried out by independent companies, including some state-owned companies. Generators earn income from the sale of electricity and from providing reserve capacity to the system. The transmission function is carried out by six primary distribution companies and one high-tension 500 KV transmission company, Transener. In 2000, the government sold its remaining 25% stake in Transener and 39% stake in the main distribution companies Edenor and Edesur, thereby fully privatizing them.

Smaller distribution companies that share part of Transener's distribution lines operate under a separate organization—the Technical Additional Service of the Transportation Function (PFTT), which reports to CAMMESA. CAMMESA establishes expansions and modifications of the distribution networks, ensuring maximum stability and security within the system. Transmission companies operate as a regulated monopoly with regulated prices, and are not allowed to sell power. Distribution companies also operate as regulated monopolies within concession areas that are awarded on a competitive basis for 95 years. ENRE regulates tariffs, which include grid connection and usage charges. While most distribution companies have been privatized, a few remain in the hands of the provincial governments.

B-1.3 Market structure

The MEM is the point of convergence of supply and demand and is administered by CAMMESA. The participants in the MEM are the generators, the distributors, the transmission companies, the large consumers (more than 30 KW), and the marketers. The MEM consists of both a contract and a spot market. The plants are dispatched according to economic order and are remunerated according to the short run marginal cost at the respective nodes (taking into account transmission constraints). Since the dispatch does not consider the contracts signed by the different plants, generation companies are obliged to buy or sell excess energy to or from the pool at spot prices. Although the contracts market is purely financial, it is restricted to the participants of the wholesale market. Price offered by thermal generators is based on the operating costs and

the declaration for fuel prices has a maximum regulated value. Additionally, there are certain defined procedures for estimating the value of stored water, used by hydroelectric plants to bid into the market.

Bilateral contracts between generators and distribution enterprises and large consumers are negotiated between them at their own accord prices. CAMMESA uses the costs and availability declared by participants in the MEM to perform a centralized load dispatch and to estimate hourly spot prices. The reference point for calculating the load dispatch is the Ezeiza node, in which CAMMESA calculates the system short run marginal price (PM), based on the variable costs of the plants and the hourly demand on the system. The spot price is complemented by a charge for available capacity in the system. They are currently being paid \$4/KW for each peak hour.

Each plant is assigned a specific node within the interconnected system, and each one of these nodes has specific factors that determine the final prices at which the plants will be remunerated. The nodal factor (FN) is calculated by taking into account the restrictions in the transmission system and the transmission losses in the system. Due to the existence of transmission congestion, some negative nodal prices could exist, and this factor reflects the price differential in the specified node. The factor is applied to the calculated price at the market node (PM). For plants located in exporting regions, the nodal factor is less than one. There is also an adaptation factor (FA), which is calculated based on the probability of failures in the system, and is multiplied by the capacity charge in each node.

Seasonal prices (averaging SRMC) are also calculated for distribution companies in order to stabilize prices and protect final consumers. These are the prices that companies must use to compute the final prices to their consumers. Fees to cover CAMMESA's operating costs are applied to MEM participants. If insufficient capacity in the system causes failure, penalties are charged to the generators; if distribution enterprises cause a failure by underestimating their demand, they are charged penalties. Overall bulk power prices have declined considerably from 1992 levels, which has led to an increase in spot-

market transactions.

Adequacy of generating capacity

Some confusion and a lack of confidence in the ability of the current transmission pricing system's ability to provide incentives for new investment in capacity is a critical issue of debate. The transmission system has experienced some bottlenecks, but the regulatory entity has not yet intervened to allocate the responsibility for expansion or allocate costs among the relevant interest groups. Therefore, investors are reluctant to build new facilities. The SE has established a fund ("SALEX") to support an emergency expansion of the system to relieve the immediate pressure. It has also set a new reliability fund to build some main high volt lines, to provide new interconnections between the regions of the whole system.

Due to the characteristics of the power market in Argentina in which the entrance of new plants is based on the market rules, there is no specific central planning or even indicative planning entity. The SE has assumed a limited role in sector planning, under Law No. 24065's directive to the SE to prepare and publish the plans and trends of supply and demand conditions in the national interconnected high-voltage system (SIN). New investments are left entirely up to the private sector. ENRE approves expansion plans for distribution concessions created from SEGBA and sets physical criteria and reviews proposals for new transmission lines (for cost allocation purposes). New generation projects do not require concessions, but must register with the SE.

B-1.4 Regulatory framework

The federal government has restricted its participation in the electricity market to regulatory, oversight, and policy-making activities. These activities have been assigned to different agencies, which share a close working relationship and sometimes, even overlap in their responsibilities. The federal government **has limited** its holdings in the commercial sector to the operation of the International Hydropower Project and to the nuclear plant.

Regulatory agencies

Secretariat de Energia (SE) /Under-Secretariat of Electricity formulates National Energy Policy and defines dispatch criteria for the wholesale power market (Mercado Electrico Mayorista- MEM). The SE is also in charge of overseeing the electricity sector and proposing any changes to improve the market's operation.

National Regulatory Entity for Electricity (ENRE) defines the technical, safety, and operating standards, and determines the basis for and approves tariffs for the sector's transmission and distribution enterprises. It supervises the compliance of regulated transmission and distribution entities with established laws, regulations, and operating criteria, including quality of service and environmental standards, and guards against monopolistic behavior in the market. It also undertakes dispute resolution among stakeholders and protects consumer interests.

Wholesale Power Market Administrative Company/ Compañía Administradora del Mercado Mayorista Eléctrico S.A. (CAMMESSA) is a corporation in charge of the administration and coordinated dispatch and operation of the MEM, in accordance with established guidelines. Its members are the national government and four associations representing the generators, the transmissions companies, the distributors and the marketers.

Federal Energy Council (Consejo Federal de la Energía) assists the government in relation with the electricity service in the provinces and administers a fund to subsidy local tariffs and transmission facilities.

Many of the provincial governments are engaging in electricity/energy sector privatization and have either recently established or are in the process of establishing politically and financially quasi-independent regulatory bodies. Previously, the utilities themselves had played a major role in making energy sector policies and setting tariffs for the provinces.

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in sector planning, there is no specific central planning or indicative planning entity. Thus, new investment is left entirely up to the private sector. ENRE approves expansion plans for the distribution concessions created from SEGBA and sets physical criteria and reviews proposals for new transmission lines. New generation projects do not require concessions, but must register with the SE.

Regulation of TransCos

Transmission and distribution services are regulated concessions awarded under competitive bidding and subject to periodic rebidding for the concession. Generation or distribution entities can only hold minority shareholder participation in transmission concessionaires. Transener, for which the concession was awarded in 1993, is responsible for the integrity and maintenance of the SIN, but not for the expansion of the system. The regional transmission concessions operate under the technical, safety, and reliability standards established by ENRE. Penalties are applied when the transmission concessionaire fails to meet these criteria, particularly those regarding outages and grid downtime.

Generators can only build lines to connect to the grid, or directly to consumers. Users pay for new transmission capacity undertaken by them or on their behalf. A public hearing process for these projects is conducted by ENRE, which issues a "Certificate of Public Convenience and Necessity." Expansion of SIN Transmission or distribution networks connected to an integrated system must provide open access to third parties under a regulated toll system unless there is a capacity constraint.

Regulation of DisCos

Distribution enterprises under ENRE's jurisdiction compete for concession contracts and for the large consumers (> 30 kW) market. Concessions are issued for distribution and commercialization services, with specific terms for the concessionaire stated in the contract. The 95-year contract term is broken into "management periods," which allow the concessionaire to give up the concession at certain (usually 10-year) intervals. EDENOR, EDESUR, and EDELAP are the major distribution companies split from SEGBA, the former national utility, when it was privatized. ENRE

establishes a (five-year) tariff for those distribution utilities that incorporate performance criteria according to efficiently run model enterprises of similar zone and service features.

Provincial authorities control concession contracts and terms for utilities serving the provinces. Many provincial governments that have launched electricity sector reforms have followed the general concession terms and conditions used for distribution utilities under national jurisdiction.

Large consumers are allowed to participate directly in the wholesale market after paying a regulated transportation fee to the distribution companies.

Role of ISO

CAMMESA was created in 1992 to administer the MEM and to perform the economic dispatch of the interconnected system. CAMMESA is an independent corporate entity owned equally by associations representing the generators, distribution entities, large consumers, and transmission entities as well as the Secretary of Energy.

B-1.5 Pricing

Price setting process

The price of energy reflects the short-term marginal cost given by the cost of providing an additional MW of demand within the pre-established quality and reserve conditions. Such cost is measured in the Market node and, thus, corresponds to the cost of production of the electric power plus the associated marginal cost of transmission. The cost of production corresponds to the thermal engine or hydraulic power plant with which the marginal demand (or last MW of energy to satisfy demand) would be taken, without using the power pre-established as reserve.

The marginal cost of a thermal engine in the Market is calculated by multiplying its marginal cost by its node factor, which measures the marginal cost of producing the energy delivered by an engine to the network plus the variable cost of transmission.

The dispatch model puts the supplied hydro and thermal generation in order, including failure engines, by increasing costs or “water value” in the Market and dispatches it, that is, accepts the supply of each engine, in such order until covering all power established as a requirement to supply the demand.

It is understood that the engine which would supply an additional increase in demand, given a level of reserve, determines the price of energy.

In the event of a deficit in supply to cover demand increases, the price of energy reflects the cost of the demand restriction which would represent not being capable of providing such additional demand.

Cut-off area is that which, due to the lack of transmission capacity or other operating restrictions, may not transport all the energy accepted by the dispatch. Each cut-off area defines a Local Market with a price of its own called local price, given by the most expensive engine generating within the area.

Spot price of energy in the market is reflected as different prices at each point of the transmission network, through the Node Factor, if it is linked to the Market without restrictions, or the local price, if it is cut-off. Each agent buys or sells energy at the price resulting from its node.

Price setting process

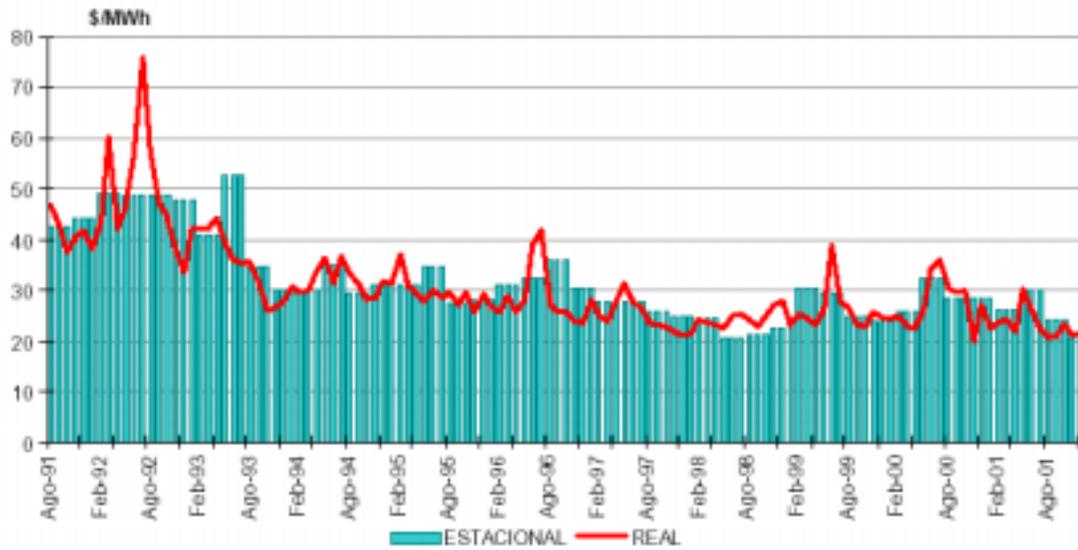
Generators are compensated also with “capacity payments” according to the capacity requirement of the WEM’s economic dispatch, both to cover demand and to have a reserve margin which guarantees the operability of the electric system and service continuity. Current Capacity Price is equal to 12 \$/MW-h.

Current price levels and structures

The graphs that follow show Monomic Price (energy + capacity) historic evolution between years 1991 to 2001.

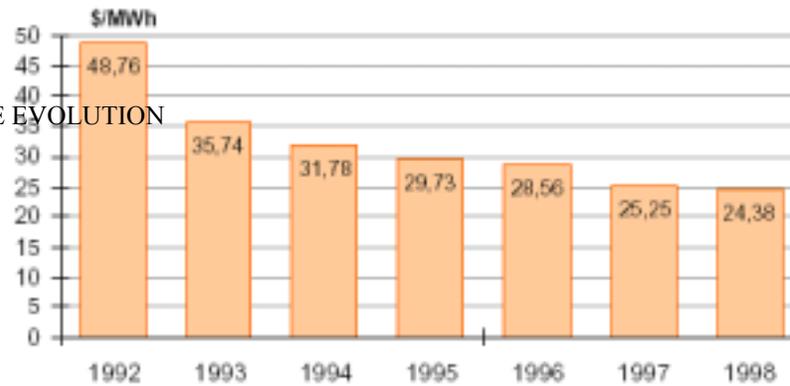
In the first month of 2002 Energy and Capacity Prices in US\$/MWh were decrease due to the strong devaluation impact in Argentina.

MONOMIC PRICE EVOLUTION



Source: 2001 Annual report of CAMMESA
 Rate @09/24/02: 3.67 Argentine Peso/US Dollar

ANNUAL MONOMIC PRICE EVOLUTION



Source: 2001 Annual report of CAMMESA
 Rate @ 09/24/02: 3.67 Argentine Peso/US Dollar

The following graph shows Energy and Capacity Prices registered until May-02.

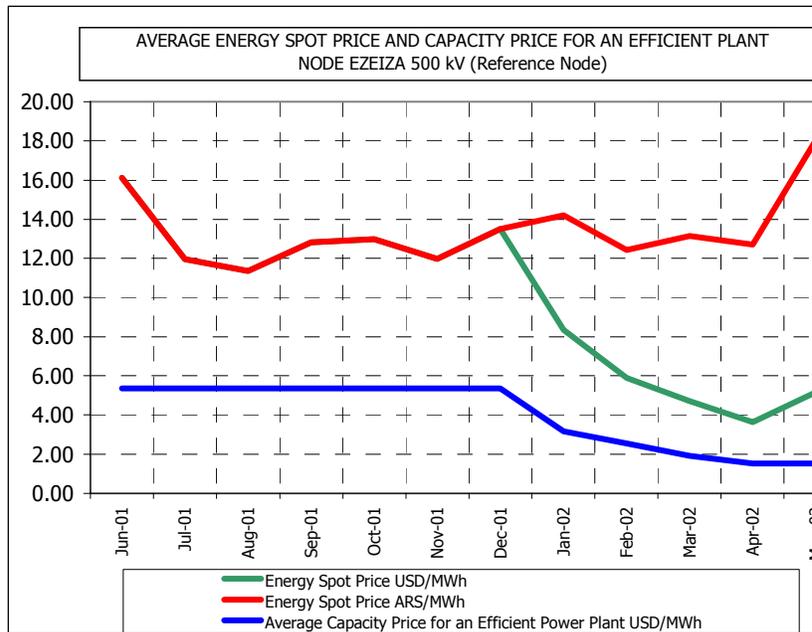
B-1.6 Efficiency, electrification, and environment

The electrification rate in Argentina is around 95%, but a very important percentage of rural population has not an electric service (approximately 30%).

In Argentina, renewable energy - basically HPP - supplies 50% of the electric demand.

The abundance of natural gas and the existence of big hydro resources discourage the investment in renewable energy projects as solar panels, eolic, etc., which are developed only in isolated areas.

Decree N° 634/91 and Law N° 24.065/92 defines the conditions according to which will be considered the environmental aspects.



B-2. BRAZIL

B-2.1 Reform framework

Reforms to date and restructuring laws

Bills No. 8.987/95 and 9.074/95 under Article 175 of the Federal Constitution provide a minimum legal basis to start restructuring and privatization of the electricity sector. They focus on the concession regime and require mandatory tendering of hydro plant projects and public services. The laws permit the entrance of IPPs and allow consumers with a demand higher than 10MW to choose their electricity provider. Law 9.074 also determined open-access to the transmission network and the unbundling of the integrated companies.

Law 9427 (December 1996) established the Agencia Nacional de Energia Eletrica (ANEEL) as the new sector regulator.

Decree No. 459/97 (November 1997) rules the open-access conditions to the transmission grid. It defines rate-setting procedures and allows non-regulated consumers to buy energy from all parts of the country.

Law 9648/98 (May 1998) restructured Eletrobras, establishing six holdings and 14 generation and transmission companies. The law also created the wholesale energy market (MAE) and the Independent System Operator (ONS).

Decree No. 2655/98 (July 1998) set the rules for the MAE and defined the organizational rules for the ONS.

The Market Agreement of 1998 set the MAE procedures and rules of the operation, as well as the rules of participation and the commercial and technical rules of the market.

Planned reforms

Brazil plans to increase the percentage of its energy derived from natural gas. Currently, natural gas sources provide 3% of the country's energy, but are expected to compose 21% of Brazil's consumption by 2020. Much of this increase will be fueled by imports. Hydropower

will not develop as rapidly, and thus decline in its percentage share of the market. Brazil's ten-year expansion plan (1994 - 2004) foresees an annual market growth of 4.9% from 1999 to 2004, where the projected per capita consumption in 2004 is expected to reach 1950 kWh annually. The break-up and privatizing of utilities is expected to continue through this ten-year period.

Reform experience

Electricity demand has exceeded GDP growth in recent years, and analysts are concerned that electricity shortages will result from insufficient construction of new generation facilities. One of the goals of reform has been to increase the reliability of the electricity sector by decreasing the sector's reliance on hydro facilities, with the intent to reduce the frequency of brown- and blackouts. In February 1999, the two main electric power systems in Brazil were integrated by a 500 kV transmission line, creating one national interconnected power system (only 3.9% of the total capacity is not part of the system). This coordinated operation has allowed Brazil to increase the system energy availability without investment in new plants.

B-2.2 Industry structure

Existing industry structure

Under restructuring, generation, transmission, and distribution activities are on their way towards being carried out by separate corporate entities. When fully restructured after a ten-year transition period, these entities will be subject to some cross-ownership limits but could be affiliated companies. Transmission companies cannot have any interest in generation or retail activities.

Eletrobras was divided into 14 companies. Generation and, in most cases, distribution will be privatized. For example, a number of large distribution companies have been split and sold to various investors. The nuclear generation assets and transmission network will remain under government ownership.

Currently, transmission is state operated and regulated. Distribution functions as a natural monopoly. There is some competition in generation.

Planned industry structure

With the exception of Itaipu and the nuclear plants, the generation assets that belong to Eletrobras are in the process of being privatized. The generation assets held by state governments are also in the process of being privatized. The remaining distribution companies are being privatized in the near-term. And the privatization of transmission assets will probably occur in the mid-term.

Private companies will perform much of the needed expansion. After allowing the entrance of IPPs into the market, the Brazilian government awarded many concessions to private companies to build new generation plants and is providing incentives for companies to invest in generation.

B-2.3 Market structure

Pools description

All generators with installed capacity above 50 MW, retailers with annual sales in excess of 250 GWh, and non-regulated consumers must participate in the wholesale energy market (MAE). The market is governed by the MAE Agreement, signed in 1998, which includes an obligation to trade all energy through the MAE.

The MAE replaced a system of regulated generation prices and rolling supply contracts. The new Independent System Operator (ONS) is responsible for operational planning, scheduling, and dispatch. Under this new structure, generators and the public service distribution and retail companies are required to trade 85% of their energy under bilateral contracts that specify prices and volumes for their entire duration. Only non-contracted energy flows are directly traded in the MAE and settled at the MAE's clearing prices.

During the transitional period (1999 - 2002), companies have an initial set of contracts to initiate the MAE. Most initial contracts are between generators and distribution/retail companies, each one specifying the volume of

energy that will be supported by the generator's whole plant portfolio. Contracting volumes will gradually decline starting in 2002, leaving the generators and distribution/retail companies free to negotiate new contracts at market prices to replace the non-contracted volumes and meet growing demand.

Due to the dominance of hydroelectric generation in the system, and to the associated hydrologic risks, all the hydroelectric plants are centrally dispatched and make use of an "energy reallocation mechanism" in order to participate in the electricity market. Under this mechanism, each hydro plant can trade a certain amount of energy in the bilateral market. This energy is defined by the dispatch of the plant in a deterministic simulation taking into account a risk deficit of 5%. The plants that produce less energy than expected (i.e., their "assured energy") must purchase energy from those that produce more than expected. Such purchases are made at MAE clearing prices. If the total dispatched energy is lower than the energy assured to all generators, then the difference is allocated among all the market participants.

The ONS is in charge of scheduling and dispatching the system. It performs energy accounting and settlements, taking into account the signed contracts and the additional transactions of the wholesale market (MAE). It is also in charge of the operation of the transmission grid, charging transmission services and remunerating those who provide the transmission services. It performs short-term planning of generation and transmission as well.

Reliability

Brazil is currently working on diversifying its installed capacity, which is heavily dependent on hydropower and long transmission lines. The introduction of natural gas has greatly increased the ability to provide thermal generation. There are several gas fired combined cycle plants under construction with some that are close to completion. These are being built closer to load centers, which reduces the reliance on long transmission lines.

Adequacy of generating capacity

The electricity market is expected to grow at a rate of 4.3% per year over the next decade. There is a need to increase the available power by 30,000 MW, which will

entail investments on the order of R\$ 33 billion in the 2002 - 2008 period. Considering the schedule of generation works under way, new electricity purchase contracts for generation enterprises must be negotiated in the short run in order to ensure the required expansion as of 2002. Brazil has established reference prices for distributors and generators entering into PPAs. These prices aim to ensure the required expansion of the generation sector while providing fair tariffs. The prices were established based on the generation expansion costs, taking into account competitiveness in the generation market and those sources still being developed.

B-2.4 Regulatory framework

Regulatory agency or agencies

The Ministry of Mines and Energy is responsible for policy and regulation formulation.

ANEEL was created in December 1996 as the regulatory authority. Its responsibilities include price regulation and competitive behavior, technical regulation and standards, and awarding concessions. Although it isn't involved in operational activities, it is responsible for overseeing the market to ensure correct operation. ANEEL also develops government electricity policy. ANEEL's stated mission is "to provide favorable conditions for the electric energy market to develop in an environment of balance among industry players and to benefit society."

With the MAE (which will be fully operational in 2002), contract prices will be deregulated and will be the subject of agreements between the parties within the framework of a competitive market. During the transitional period, 1999 - 2002, companies have an initial set of contracts to initiate the MAE.

B-2.5 Agency structure

Professional skills and size

ANEEL consists of two levels: a board of directors made up of one director-general and four directors on one level and twenty superintendents on the other level to carry out ANEEL's actions.

There's been a reduction in directly employed personnel

to increase business efficiency.

Responsibilities

Responsible for	YES	NO
Distribution	X	
Transmission	X	
Generation	X	
Power Supply Planning	X	
Siting	X	
Environment		X
Energy Efficiency	X	
Renewables		X
Consumer Protection		X
Other specific statutory requirements (e.g. low income support, economic development, etc.)		

Relationship among regulatory authority and state energy ministry, state utility entity, etc.

The Ministry of Mines and Energy and the Energy Secretariat are in charge of setting policies for the sector. ANEEL is in charge of the regulatory functions of the electricity system and of overseeing the competitive performance of the sector. Long-term planning will be performed by IDESE, a new and independent organization. The Independent System Operator (ONS) will operate the system.

B-2.6 Pricing

Current price levels and structures

Distribution/retail companies use a formula that gives them some freedom to determine the structure of tariffs used to raise the allowed revenue, particular to some safeguards. Final tariff revenue is given by the sum of transmission, distribution/retail regulated elements, and the cost of purchases of bulk energy made under contract or directly from the MAE.

Price setting process

An ANEEL resolution in August 1998 “provided for the procedures to be adopted to calculate the transfer, where the so-called Reference Prices (Valor Normativo) constitute the reference cost for comparing the purchase price with the price to be passed on to the tariffs. The established Reference Prices set forth the necessary conditions for distributors and generators to enter into...long-term contracts (PPAs) with a view to ensuring the required expansion of the generating complex, as well as fair tariffs. With this in mind, these prices were established based on the generation expansion costs, taking into account competitiveness in the generation market and those sources still being developed.”

B-2.6 Efficiency, electrification, and environment**Energy efficiency and renewable energy policy experience**

Distribution concessionaires are under the obligation to expend 1% of their revenues in energy-efficiency type activities. PROCEL is the technical advisor, catalyst, and executing agency in charge of energy efficiency issues.

Rural electrification policy

No References Found

Extent of service in country

Ninety percent of all households in Brazil are connected to electricity, but in rural areas, that number drops to 63%. In some states (such as Piani) the number is as low as 27%.

Existing and planned policies

PRODEEM is the Brazilian agency responsible for rural electrification. In the past, funds for rural electrification have come from the government, but currently the aim is to work with the multilateral agencies to create incentives that promote private sector participation in the program. Many of the non-served areas are productive and can attract private companies that can implement new technologies in these isolated regions. The US is currently assisting Brazil in promoting small-scale renewable systems in remote, rural areas.

Environment

No References Found

Environmental requirements for generating sector

Due in large part to its dependency on hydropower, Brazil’s carbon intensity is relatively low. In January 1999, Brazil’s congress implemented an environmental pollution law that fines polluters for violations of environmental standards. Industrial polluters are given five years to come into compliance with the law.

B-3. CENTRAL AMERICA

B-3.1 Background

Central America's electricity sectors consist of small systems that are marked by significant differences in per capita electricity consumption (299 kWh to 1,501 kWh) and percentage of population with access to electricity (50% to 95%). These differences reflect the wide range of GNP per capita (US\$2,050/yr to US\$7,600/yr). A number of countries have created a major role for the private sector in generation from independent power

American Development Bank in 1998 concluded that total investment to meet the regions anticipated 6% annual average power demand growth over the next ten years would reach over \$7 billion. To raise this investment, Central America is restructuring itself to allow greater private participation in the sector. Perhaps the most important element of this restructuring is SIEPAC.

	Peak Demand	Installed Capacity	Population with Access to Electricity %	Consumption per Capita (kWh)	Population (mil.)	Per Capita GNP (\$US) 1999	% of GWh from IPP/PPAs in 2000	Number of PPA Plants
Costa Rica	1060	1500	95	1501	5.7	7100	N/A	
El Salvador	716	999	73	55	6.1	3100	21.9	1
Guatemala	962	1439	65	371	12.6	3900	42.4	20
Honduras	661	906	56	441	6.3	2050	38.3	5
Nicaragua	387	602	50	299	4.8	2650	53.4	7
Panama	755	1097	65	1277	3.9	7600	N/A	
SIEPAC	4543	6543	N/A	N/A	39.4	N/A	N/A	

plants (IPPs) and from power purchase agreements (PPAs). Data for Central America as of 1999-2000, including Panama, are summarized in the table above.

Of Central America's generating capacity, approximately 56% is hydroelectric, 40% is thermal, and 4% is geothermal and biomass. Hydro, geothermal, and biomass accounted for 28% of total regional energy consumption in 1998. Costa Rica is the most dependent (about 50%) on renewable energy, while El Salvador, Honduras, Nicaragua, and Panama are around 25% reliant on renewables. Overall, Central America is a marginal net importer of energy, importing oil and coal. At least two new natural gas pipelines are projected to be built to accommodate increasing demand. One will deliver gas from Mexico to Guatemala, while the other will deliver gas from Columbia to Panama. A study by the Inter-

B-3.2 SIEPAC

SIEPAC (Sistema Interconexión Eléctrica para América Central) is a planned electricity interconnection among six Central American countries: Costa Rica, El Salvador, Honduras, Guatemala, Nicaragua, and Panama. SIEPAC's roots go back decades, but it was launched by the December 1996 Treaty of the Regional Electricity Market of Central America. SIEPAC seeks to develop a Central America 1830 km, 230kV Panama to Guatemala power grid that will have a joint transport capacity of 300 MW among the countries, in any direction. It will also establish a regional wholesale electricity market (MER). SIEPAC's Regional Electric Interconnection Commission (CRIE) and its Regional Operating Agency (EOR) will serve respectively as regulator for the new wholesale market and the system's operator and

administrator. Future interconnections may link SIEPAC with the grids of Mexico and Belize.

SIEPAC is anticipated to cost US\$347.75 million. Of this the Inter-American Development Bank has approved a US\$240 million financing plan and Spain is contributing US\$70 million through a special fund administered by the IDB. Under the financing plan, the Central American utilities will transfer IDB loan resources to ELP (Empresa Propietaria de la Lines) that will own the SIEPAC transmission line. ELP under its charter will be able to receive capital from private investors.

By creating a regional market, SIEPAC will make competition possible. The restructuring activity to create the regional market is being designed to not hinder the restructuring processes already underway in each country. Once the SIEPAC grid is in place, suppliers and buyers will be able to complete transactions regardless of geography. This will allow, among other things, the development of larger power plants with lower unit costs, trade in more economical energy and surpluses that would not be possible without the interconnection, coordinated operations among the systems in the six countries taking advantage of the diversity of hydrology and climates in the region, load management to take advantage of peak demand differences across the region, and increased diversity of supply leading to greater reliability.

At present, Guatemala is interconnected with El Salvador through a 230 kV transmission line, but this line is separated from the transmission system that connects the national grids of Costa Rica, Nicaragua, Honduras, and Panama. Many of these existing interconnections are old and unreliable and have limited transmission capacity. Regulations for the regional market were drafted in late 2001. The initial phase of SIEPAC is scheduled for completion in 2003. Operations are expected to begin in 2006. Depending on future generation needs, SIEPAC's second phase will be a new 230 kV line running parallel to the first SIEPAC line, and is anticipated to be completed around 2008-2010.

B-3.3 Costa Rica

In September 1998, the president of Costa Rica proposed modernizing the power generation market by encouraging private investment and introducing full competition after a five-year transition period. The state power monopoly, ICE, would not be privatized. Instead, it would be reorganized into a profit-and-loss based structure. Plans also called for retaining sales obligations of independent power producers to ICE for five years. After that time period, IPPs could market power directly to local end-users in competition with ICE and to customers elsewhere in Central America. ICE would maintain its monopoly on distribution. All new IPP projects would be required to be hydro or gas-fired. The proposal also encouraged ICE to form strategic alliances with private developers. Ultimately, this proposal failed. Several of its legal requirements were ruled to be unconstitutional. IPPs will now continue to sell power until the expiration of their contracts. Once the contracts expire, it is not clear what the government will do. ICE remains in charge of most of the commercial activities in the system, as well as technical operation and sector planning.

B-3.4 El Salvador

El Salvador's electric industry has already undergone significant privatization. A regulatory entity, SIGET, was formed as part of the reform of the sector. CEL, the state-owned utility, does not plan to privatize its 395.8 MW of hydroelectric generating assets, though it has sought partners to invest in geothermal units. The government plans to transfer ownership of CEL shares in the geothermal electricity generator (GESAL) to an independent government entity. Generation, transmission, and distribution are now the responsibility of separate companies that make use of a private dispatch center. However, vertical integration is still possible under the current legal framework. Currently, one firm controls 80% of distribution in El Salvador and has plans to build a large generating station in Honduras with a direct transmission line into El Salvador. The El Salvadoran energy market consists of a spot market as well as longer-term contracts between participants.

Several companies have expressed interest in building

power plants, and the government has privatized some state-run thermal plants (purchased by Duke Energy). The country's distribution sector is completely privatized, with four companies operating in a regulated market. Reforms have yet to lower prices significantly. Power generated in El Salvador can be exported to Guatemala via an existing interconnection, and a connection to Honduras opened in 2002.

B-3.5 Guatemala

Guatemala is Central America's sole oil producer, producing 30,000 barrels per day as of late 1999. While the government hopes to increase production, in February 2000, two government environmental agencies recommended suspending oil drilling operations in the ecologically sensitive Maya Biosphere, part of the world's second largest rain forest.

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. Under the Law, large customers (more than 500 kW) are allowed to buy from any supplier. Private generators have free access to the power grid, distributors, and wholesale customers.

More than half the installed capacity in Guatemala now belongs to IPPs with long term Power Purchase Agreements. Until 1997, most PPAs were unsolicited, and therefore were awarded without competitive bidding. Now competition takes place at the wholesale level, with companies competing in two markets: the deregulated contracts market and the spot market. There is no competition in the retail market.

Guatemala suffers periodic droughts that cut hydro output and increase prices during peak demand. In 1990, hydro made up 92% of Guatemala's total electricity generation. In 1999, 65% of the population was electrified, though the numbers are lower in rural areas. Annual power demand is growing rapidly, and the government plans significant capacity increases along with increased private investment. Among the new projects planned are 12 hydro plants, a geothermal plant, and two 120-MW

thermal plants.

Guatemala's Ministry of Energy and Mines (MEM) is responsible for proposing, determining, and implementing sectoral policies. It enforces the Electricity Law of 1996 and other regulations through the Comision Nacional de Energia Electrica (CONAE). CONAE's primary functions are: supervising the contract performance of generation, transmission, and distribution companies; protecting the rights of the user and preventing obstacles to free competition in the sector; regulating transmission and distribution tariffs according to the Electricity Law and its regulations; and issuing rules to guarantee free access to transmission and distribution networks.

In July 1998, 80% of the shares of EEGSA (the urban power distributor of 70% of the country's power) were sold. In December 1998, INDE, the rural power authority responsible for distribution of the remaining 30% of power, was auctioned off.

B-3.6 Honduras

Honduras' power sector is still vertically integrated under ENEE, its state owned national utility. Since 1993, however, several private generators have signed contracts to provide ENEE with a significant amount of additional capacity. The country's 1994 electricity law states that ENEE should be unbundled both vertically and horizontally. Although the law does not expressly forbid vertically integrated enterprises, it does specify conditions under which vertical integration can exist, and it limits ENEE's participation in distribution activities to 30% of the market. Currently, the government is a major participant in the commercial activities of the industry, and through ENEE it controls generation, transmission, and distribution activities. ENEE is also in charge of sector planning and system operation. An IMF accord commits the government to privatizing ENEE. The estimated price of privatization is US\$500 million.

Honduras' power demand is increasing rapidly, though slower than prior to Hurricane Mitch. Honduras suffered extensive damage from Mitch, and a fire in early 1999

made the 300 MW El Cajon Dam inoperative. Together, these two disasters knocked out 60% of the country's electricity supply. The situation highlights Honduras' over-dependence on hydropower, which is almost half its estimated 906 MW capacity. Electricity service coverage has reached 56% at the national level, though that number drops significantly in rural areas.

B-3.7 Nicaragua

Nicaragua between 1980 and 1994 made no investment in its energy sector. At 299 kWh per capita, its energy consumption is the lowest in Central America. The country suffers from power shortages and must import power from Panama during times of peak demand. Nicaragua's geothermal and hydroelectric plants operate significantly below capacity. Power demand is expected to increase at about 6% annually for the next twenty years, requiring \$1.8 billion in new investments. Panama hopes to boost generating capacity by 1,179 MW over the next twenty years.

A 1998 IDB loan has been used to promote renewable generation projects in under-served areas. At present, electricity coverage is 50%. Nicaragua's Master Plan for Rural Electrification plans to increase national coverage to 90% over ten years.

The state owned ENEL currently dominates the electricity market in Nicaragua. It is a vertically integrated utility that provides all the commercial services in the sector and is the government agency responsible for generation, transmission, and distribution. An electricity law approved in 1998 provides for the unbundling of ENEL into different industry segments. The companies resulting from the restructuring will be privatized, with the exception of the transmission company. The new law envisions the creation of a wholesale electricity market, in which new investors will be allowed to participate and compete in a deregulated contracts market. Due to the size of the market—currently only a few independent generators operate in the system—participating firms could exercise market power. Actualization of the 1998 law has been delayed by the aftermath of Hurricane Mitch.

Nicaragua's National Energy Commission (CNE) is in charge of sector policy-making and planning functions. Instituto Nicaragüense de Energía (INE) is in charge of the regulatory and oversight activities in the sector. It also grants new concessions and licenses. The government currently owns all the commercial activities in the industry through ENEL. After its restructuring/privatization, the government will keep its transmission assets, creating the Empresa Estatal de Transmisión (EST), which will also be in charge of the operation of the system and of the new wholesale market. ENEL will transfer its planning responsibilities to CNE.

Panama is covered in section A-6 of the Appendix.

B-4. CHILE

B-4.1 Reform framework

Reforms to date and restructuring laws

DL No. 2224 (1978) established the Comisión Nacional de Energía (CNE), National Energy Commission, as the oversight and regulatory entity for the sector with ministerial rank. It established a new tariff regime that was later codified in the 1982 Electricity Law. It also formulated and oversaw the implementation of the reform plan for the electricity sector.

DFL No. 1, Mining (1982), The Electricity Law, opens the sector to private ownership and sets rules for sector structure, operations, markets, and pricing at various levels of activity. It establishes quality and safety guidelines. It allows open sector entry without concessions or permits for most transmission and retail distribution activities, which are regulated as natural monopolies. It provides for open access to transmission and distribution grids, establishes a coordinating unit for load dispatch (CDEC), and deregulates large consumers. The rights and obligations of sector participants and other standards are also defined.

DFL No. 6 (1982), Coordination of Operation Rules, defines the criteria under which the interconnected system is operated, including technical criteria for transmission as well as connection and participation criteria for

generators. It charges the CDEC, the members of which are generators with more than 2% of the system's capacity, with setting coordinated operating rules according to minimal cost and other guidelines established by the CNE.

Decree No. 327 (1998), defines the criteria under which the interconnected system is operated, including technical criteria for transmission as well as connection and participation criteria for generators. It charges the CDEC, the members of which are generators with more than 9 MW of installed capacity, with setting coordinated operating rules according to minimal cost and other guidelines established by the CNE. The law also establishes criteria to improve the transmission tolls regulations and fixes quality services parameters.

The Water Code sets the basis for allocating water use rights. These are issued by the Directorate of Water and approved by the Ministry of Economy.

Planned reforms

Hydropower accounted for 40% of Chile's installed electric generation capacity in 2000, and over 60% in the Central Interconnected System (SIC). The evolution of the electric sector can be viewed in the following tables. Imports of natural gas from Argentina, which started in 1997, have had a significant impact on the

Installed Capacity											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
% Thermal	45.3	39.4	40.2	40	39.8	44.8	37.5	33.5	37.5	37.4	34.4
% Natural Gas	N/A	N/A	N/A	N/A	N/A	N/A	6.1	13.9	14.8	22.2	25.8
% Hydro	54.7	60.6	59.8	60	60.2	55.2	56.4	52.6	47.7	40.4	39.8
Total (GWh)	4,444	5,117	5,202	5,423	5,448	5,954	6,716	7,278	8,423	9,942	10,372

Generation											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
% Thermal	51.4	34.2	25.1	28.3	32.8	34.3	44.2	40.1	43	47.2	30.1
% Natural Gas	N/A	N/A	N/A	N/A	N/A	N/A	1	3	12.1	17.4	23.7
% Hydro	48.6	65.8	74.9	71.7	67.2	65.7	54.8	56.9	44.9	35.4	46.2
Total (GWh)	18,374	19,961	22,359	24,005	25,277	28,028	30,790	33,292	35,503	38,389	41,268

Primary Energy Consumption						
	1978	1988	1998	1999	2000	2008e
% Oil	48	38	40	40	41	39
% Natural Gas	9	9	11	16	23	33
% Coal	9	12	16	16	13	4
% Hydro	18	23	17	13	6	14
% Wood & Others	16	18	16	15	17	10
Consumption (teracalories)	104,370	139,524	226,715	245,542	256,730	448,138

energy matrix in Chile.

Reform experience

Chile was one of the first countries worldwide to deregulate its energy sector, privatizing the electricity market. This took place in the early 80's, when the country underwent a series of structural reforms in diverse economic sectors. Thus, an electricity market power was formed, where generation, transmission and distribution companies are private, and their respective investment decisions are taken accordingly. The State has maintained its regulation, overseeing, and subsidiary roles. Accordingly, the price policy aims to reflect the actual costs of producing, transmitting and distributing energy efficiently. Taking this sector's characteristics into consideration, the law provides a system in which free and regulated prices are combined. Therefore, private companies have provided Chile's electricity since the 1980's. The numbers of consumers and consumption have both increased. Vertically integrated companies coexist with companies not structured vertically.

B-4.2 Industry structure

Regulation of TransCos

Transmission is considered a natural monopoly. The incomes of this segment are regulated in order to offer the owner a profit of 10% over its New Replacement Value. The current law allows for free price agreements; these negotiations must be done in accordance with the legal framework.

DFL No. 1 (Mining) provides for transmission enterprises to receive income that covers the long run annualized average costs for economically adapted system operations. For unregulated power sales, transmission service tariffs in the interconnected systems cover operating, maintenance, and investment costs and a return. Transmission service charges include regulated connection, entry and exit fees in a generator's defined zone of influence. Other fees apply for transactions in areas beyond this zone. Fees for wheeling services over lines not owned by the interconnection enterprise are negotiated between the owner and the party requesting

the service. As needed, a commission comprising representatives of both transaction parties is formed to resolve disputes over the service or fees.

According to running laws, generators can own transmission lines and are expected to build new transmission capacity. A concession or permit is required for transmission activities unless the transmission only occurs over privately owned property. Though not required to expand their system in order to provide wheeling service, transmission lines operating under concessions or permits must provide open access as long as there is sufficient capacity to accommodate the requested wheeling service. Any party, generation or transmission segment, may undertake projects for expansion of the transmission system based on market signals.

Until 2000, Endesa directly owned the assets of the high voltage SIC and operated the system through a subsidiary, Transelec. This situation changed in 2000 when Hydro Quebec bought Transelec, becoming the main grid owned and operated by an independent company. In the north (SING), Edelnor's subsidiary Sitranor owns and operates the high voltage interconnected system.

Unlike deregulated prices, the regulated node prices do not directly include the costs of transmission; however, they cannot differ by more than 10% from the average prices in the free market. Node prices are calculated for each node of the interconnected system for sales to distribution entities, based on the cost of generation delivered to the node. Supplying generators are paid the node price for their power minus/plus a so-called "penalty" factor that accounts for the marginal transmission losses occurring in the system related to the particular node where the power is taken. The revenue from the "penalty" factor is paid to the transmission enterprise.

Regulation of DisCos

Retail distribution (commercialization) is considered a public service. A concession or franchise is usually required for systems greater than 1,500 KW. The Ministry

of Economy authorizes concessions for an indefinite period. The distribution concessionaire is required to supply inside their concession area to both regulated and non-regulated customers.

Large consumers are deregulated; they can purchase power under negotiated contracts from the distribution utility or directly from generators. Distribution networks must provide open access in exchange for a negotiated service fee.

Retail tariffs for regulated end-consumers are based on the sum of the node prices for energy and capacity in the system and the Added Value of Distribution (VAD). Periodic tariff adjustments according to established criteria are allowed for distribution companies to change the node price. The VAD is based on costs for a model distribution enterprise operating in a similar type of zone (i.e., of similar density and other features) established for 4-year periods through CNE-authorized consultant studies. The VAD incorporates: a) the fixed costs of administration, billing and customer service; b) investment, O&M costs, and peak power losses over the distribution system; and c) energy losses in the distribution system. The global rate of return is set to a level between 6% and 14%.

B-4.3 Market structure

Pools description

The power market in Chile is split between a deregulated market for generators (or other agents) and large consumers and a regulated market, for inter-generator transfers and sales to distribution companies. The deregulated market represents around 27% of the demand.

Regulated spot pricing applies to inter-generator transfers (via a generators' pool) and to system spot sales to distributors. Spot prices are set at each node of the interconnected system and are based on the weighted average of short run marginal costs (SRMC) of generation for the entire system optimized over a 12- or 48-month horizon (which accounts for reservoir levels, plant availability, thermal plant operating costs, new capacity,

and rationing). A 50-MW gas turbine increment is used to set the capacity component of the price, and transmission losses are incorporated. For sales to distribution companies, prices are calculated adding up node prices plus the cost of transmission service. Node prices are adjusted every six months using indexation formulas with pre-defined variable ranges. Node prices must fall within a 10% range of deregulated prices.

Dispatch is undertaken on an economic merit order, pre-programmed basis for the entire system in hourly units.

Each interconnected system has an economic load dispatch center (CDEC), which is in charge of coordinating and programming load dispatch for generating units on the system, independently of the ownership. The CDEC itself does not hold shares in operating companies or own property. It serves to safeguard the reliability and security of the transmission system, guarantee equal access rights to generators, and coordinate system operation on a least-cost basis. The CDEC's oversight committee consists of generators supplying 2% or more of the system's requirements (the minimum threshold was 60 MW). This threshold will probably be lowered, perhaps to 10 MW. The committee sets the operating and technical rules for the CDEC/dispatch according to legal and regulatory provisions. The CNE has a very limited supervisory role over the CDEC and dispatch activities.

The CDEC has not been seen as optimal, and proposals have been made to increase its membership (by extending the members type: distributions companies and large customers) and give it a legal status and technical staff to increase its efficiency, objectivity, and transparency.

Reliability

Reliability parameters are settled in Degree N°327, however this issue must be improved in future regulations. In fact, CNE is promoting changes to the effective law in order to create a Complementary Services market.

Adequacy of generating capacity

Investments in new capacity and upgrading existing facilities have been and will continue to be built primarily by the private sector based on market signals. In all, over

2,000 MW of hydroelectric capacity and over 1500 MW of thermal-fired (mainly coal or natural gas) projects are now under construction or planned.

Both pipeline projects from Argentina to the Northern System in Chile consider the construction of large power projects. The Gas Atacama consortium has already started the construction of a 710 MW gas-fired plant in Mejillones and is planning to build a 360 MW gas fired plant in Taltal, which could be connected to the Central Electricity Grid. In order to provide feasibility to the Norandino pipeline, its affiliate Electroandina will build around 1,000 MW of capacity in the system. This large capacity addition and supply of electricity from Argentina could result in an over-investment in the system. If this is the case, no additional capacity will be needed in the following ten years.

B-4.4 Regulatory framework

Regulatory agency or agencies

The National Energy Commission (CNE), established by decree in 1978, formulated and implemented the sector reform program. It undertakes most of the normative and regulatory functions for the energy sector, including proposing policies and strategies for the sector; undertaking tariff studies; proposing tariff and self-regulating pricing formulas; establishing regulations, service standards, and operating criteria for sector enterprises; and overseeing the dispatch entities. It also undertakes indicative planning and may recommend state financing of generating (>200 MW) or major transmission projects that are not being pursued by other interests. The CNE consists of a Council of 7 Ministers (Economy, Finance, Defense, Mining, Planning, Secretary General, and a Chairman who is appointed by the president and has the status of a Minister) and an Executive Secretariat headed by a presidential nominee. The member ministries issue decrees implementing CNE recommendations, and ensure policy coordination of the important ministries. The size of the staff and the budget is set annually in the budget prepared by the Ministry of Finance.

The Superintendence of Electricity and Fuels (SEC) has evolved over decades as an oversight authority under the

Ministry of Economy for technical and operating (including safety) compliance of sector entities with sector legal and regulatory requirements and of tariff applications. It collects data on sector enterprises and sets the New Replacement Value for distribution assets. It may impose penalties or recommend rescission of concession contracts. The President appoints the Superintendent. The SEC has a relatively large technical staff.

The Ministry of Economy authorizes concessions, approves and publishes tariffs proposed by CNE, and generally oversees economic regulation of the sector. The Ministry of Finance implemented the restructuring and privatization of sector enterprises through the Corporacion de Fomento y de la Produccion (CORFO). It continues to handle privatization procedures as well as maintain an oversight role in the financial performance of enterprises in which the state has an ownership share.

CONAMA is the environmental protection agency established in 1990 with jurisdiction over environmental issues for the sector.

The Anti-Monopoly Commission is a judicial entity that oversees, investigates, and deliberates issues related to competition, reviewing anti-competitive charges and cases brought before it.

Agency structure

The CNE consists of a Council of seven Ministers (Economy, Finance, Defense, Mining, Planning, Secretary General, and a Chairman that is appointed by the president and has the status of a Minister) and an Executive Secretariat headed by a presidential nominee. The member ministries issue decrees implementing CNE recommendations, and ensure policy coordination of the important ministries.

Professional skills and size

The permanent staff is established by law and is around 30 persons. The budget is set annually in the national budget prepared by the Ministry of Finance.

Responsibilities

The CNE undertakes most of the normative and regulatory functions for the energy sector, including

proposing policies and strategies for the sector, undertaking tariff studies, proposing tariff and self-regulating pricing formulas, establishing regulations, service standards, and operating criteria for sector enterprises, and overseeing the dispatch entities. It also undertakes indicative planning and may recommend state financing of generating or major transmission projects that are not being pursued by other interests.

Relationship among regulatory authority and state energy ministry, state utility entity, etc.

The government has a minor role in commercial activities. The National Energy Commission (CNE) performs regulatory and policy-making functions. The superintendence of electricity and fuels (SEC), under the ministry of economy, is mostly in charge of oversight functions but also has minor regulatory functions. The government does not participate in the centers for economic dispatch, as they are pools comprised of different private companies in the generation sector.

B-4.5 Efficiency, electrification, and environment

Energy efficiency and renewables policy experience

No references found

Rural electrification policy

No references found

Environment

No references found

B-5. MEXICO

B-5.1 Reform framework

Reforms to date and restructuring laws

In Mexico, constitutional provisions set the legal framework for the electricity industry. Thus, reforms are restricted to these provisions. Article 27 of the Mexican Constitution establishes that generation, transmission, distribution, and supply of electricity are provided as a public service and exclusively the Federal Government's responsibility. Furthermore, Article 28 establishes that all strategic activities carried out by the Federal Government shall not be considered a monopoly. Finally, Article 25 provides that the Federal Government is empowered to own and operate public companies with the exclusive purpose of operating identified strategic activities such as the electricity sector.

Despite the strong presence of the Federal Government, there is limited private sector involvement in the electricity sector. In December 1992 the Public Electricity Service Act (*Ley del Servicio Público de Energía Eléctrica- LSPEE*) was amended to allow private domestic and international participation in generation activities. Under this Act, the private sector can participate in electricity generation. Article 3 lists various areas that are not to be considered public service, and therefore, are open to the private sector participation: self supply; cogeneration; IPP; small production; exports (produced under cogeneration), imports (solely for self supply purposes); and emergency electricity generation during public service breakdowns.

Despite the 1992 reforms, due to the constitutional provisions mentioned above, the State still holds the exclusive right to generate, transport and supply electricity for public service. This is carried out by the two State-owned utilities: Comisión Federal de Electricidad (Federal Power Commission –CFE) and Luz y Fuerza del Centro (Light and Power Company –LFC). Private generators are not allowed to sell energy to end-users; and energy surplus may be sold only to CFE.

In October 1995, the Energy Regulatory Commission Act (*Ley de la Comisión Reguladora de Energía-LCRE*)

transformed CRE from an advisory body on gas and electricity issues (as set out in its 1993 creation decree) into an autonomous agency in charge of regulating the electricity and natural gas industries.

The CRE promotes and enforces the efficient development of the following activities:

- Electricity supply for public service
- Electricity generation, and exports and imports between private parties
- Electricity acquisitions for public service
- Transmission services between the utility and private generation permit holders.

Planned reforms

The Federal Government is currently working on a proposal to amend the Electricity Legal Framework to set the stage for a structural change to guarantee a reliable, high quality and competitively priced supply for the long term.

Recently, the Minister of Energy presented the Energy Sector Program according to the 2001-2006 President's Electricity Development Plan for the Energy Sector. This plan is a 2025 vision in which the population will have access to electricity with competitive prices and world-class quality. This plan includes, among others, the following objectives:

- To ensure a sufficient electricity supply according to international reliability standards at competitive prices
- To promote private participation in energy infrastructure projects in non strategic activities
- To guarantee non discriminatory open access to the National Transmission Grid
- To establish a tariff policy which will ensure sustainable development of the electricity sector

- To promote the use of renewable energy sources and energy saving programs
- To strengthen international cooperation and participate in international markets

In order to accomplish the goal set to supply the electricity demand in the next few years and to meet the needs of the electricity industry, it will be necessary to further expand the scope for the private participation in the sector.

From February 1999 to March 2002 nine proposals regarding the restructuring electricity sector have been submitted to Congress. Seven of these concern modifications to the electricity sector, and the other two presented by the Tabasco and Veracruz legislatures consider changes in the electricity tariff structure.

Each of these proposals represents a stand regarding the private and public participation in the electricity industry, as well as the performance of market mechanisms. However, all proposals agree to the necessity of undertaking an organizational reform for the electricity sector.

Reform experience

Private participation in the electricity sector has been rather limited. As mentioned before, CFE and LFC are Mexico's two state-owned electricity companies. The state had monopolized the electric power sector for decades, although reforms instituted in 1992 allow independent power producers (IPPs), self-suppliers and cogenerators on a limited basis. The single enterprise management of the electricity sector is essentially a central system operator, Centro Nacional para el Control de la Energía (CENACE), which is part of CFE and controls the interconnected system and two isolated grids as one coordinated system.

As private investment is slowly growing in the activities allowed by law, the Federal Government is working to improve the essential principles and elements of the regulatory framework. The goal is to direct the operative control towards more a favorable market-based condition in order to foster the participation of a greater number of electricity producers.

According to LSPEE, Article 36-bis, since 1992 CFE has been mandated to meet an economic cost criteria by dispatching energy at the lowest cost possible and taking into account the security and reliability constraints. This criterion enhances an incipient market-based economy in which corporations in the energy sector can produce and sell their surplus electricity to CFE. The import and export permit holders can buy and sell energy from/to abroad, complying with international trade agreements.

Current challenges

The improvements in the energy sector and the growing demand for electricity that arises from national development necessitates an increase in the supply of electricity and modernization and expansion of the transmission and distribution systems.

The modernization of the energy sector has become a fundamental issue for the development of the Mexican economy. The present government intends to provide a basis for profound structural reform of the national electricity industry, in order to assure an adequate supply of reliable, high quality and competitively priced electricity in the long term.

To accomplish the availability of electricity in the next few years and to meet the needs of the electricity industry, it will be necessary to further expand the legal framework in order to allow increased private participation in the sector.

The eventual structure of the electricity industry will have a major influence on how regulatory issues will be addressed. In this matter, Mexico is working to improve its regulatory standards to ensure that a continuous supply/demand balance is maintained and that transmission systems are operated in an efficient fashion.

B-5.2 Industry structure

Existing industry structure

In December 1992, the LSPEE was amended to allow private sector participation in generation. Despite this important reform, private participation has been limited. This reform enabled private participants to engage in generation under five categories, all of which require a

generation permit from the CRE.¹ Currently, private generation projects are only developed for self supply uses or for the exclusive selling of energy and capacity to CFE through long term contracts as IPP-type projects. Today 96% of Mexican electricity is generated by state-owned companies. The remaining 4% controlled by the private sector tends to be concentrated in self-supply and cogeneration. Since changes to the legal framework in 1992, CRE has granted 202 power generation permits, of which 179 are still valid and represent 18,295 MW. Of these valid permits, 26% are in operation, 37% are under construction, 32% are about to begin construction and the remaining 5% are inactive. The estimated private investment for projects is around 9.9 billion dollars.

Planned industry structure

Considering the 1992 amendments, the percentage of private generating capacity is expected to increase 25% by 2003. Sixteen IPP projects have been approved as of February 2002. They are expected to add 7,200 MW of capacity by 2005. Foreign investment needs to be encouraged, according to the CRE Five-Year Report, though no specific steps are taken on that direction.

Financial condition of generating companies

The vast majority of generation is state-owned and supported.

Financial condition of distribution utilities companies

Distribution is entirely state-owned and supported.

B-5.3 Market structure

Pools description

There currently is no power pool in Mexico. CFE is in charge of dispatching generation, transporting the electricity, and selling it to final users.

Reliability

Currently, CFE is responsible for central load dispatch. CFE has historically set the operating criteria for dispatch and has been virtually free of oversight in this area. The scope of its authority to take action has not yet been defined. However, the growing private participation in the electricity sector will create the need for new regulations to provide certainty and transparency to

participants. Thus, CRE will need to redefine the characteristics of the electricity service including reliability, as well as the technical and economic requirements that will be needed to face the challenges for Mexico's long-term sustainable energy development.

Adequacy of generating capacity

Currently, the installed capacity only guarantees electricity supply until 2005. Electricity demand is expected to grow almost 6% per year for the next ten years. To accommodate this growth, Mexico will need additional generating capacity of about 27,000MW. This amount is equal to two-thirds of Mexico's current capacity. Mexico also needs to expand and modernize its transmission and distribution systems. The total investment needed is US\$ 67 billion, which is almost 40% of the Mexican federal budget for 2000.

Twenty-five-year contract with IPPs, in which the State bears the investment risks, is one method used to encourage electricity production. The Mexican government is also investing in Financed Public Work (OPF) and Build-Lease-Transfer (BLT) models. As with IPPs, the State bears the investment risks. OPF and BLT investments are called Long-Term Productive Infrastructure Projects with Deferred Impact on the Budget (Pidiregas), and the State is trying to avoid using them. Pidiregas meets short-term investment needs, but it is not good for the State in the medium- and long-term. CRE refers to this type of financing as "a palliative, not a permanent, solution to the electricity industries' expansion problem." Pidiregas is being used to guarantee electricity supply until 2004. In general, Mexico's reserve capacity is thinning.

B-5.4 Regulatory framework

Regulatory agency or agencies

Regulatory policy is set by the Energy Regulatory Commission (CRE), which was established in 1995. Nevertheless, CRE cannot establish electricity tariffs. CRE is entitled to:

- Participate in determining rates for the supply and sale of electricity;
- Approve the criteria to determine the

fees related to contributions by state governments, municipalities, and beneficiaries of electric public service for the construction of specific works and expansions or modifications of existing facilities whenever requested by such parties for the supply of electricity;

- Verify that entities responsible for electric public service purchase electricity at the lowest cost and also offer optimum stability, quality, and safety in the provision of such service for the national electric system;
- Approve the methodologies for calculating payments for the purchase of electricity used in public service;
- Approve the methodologies for calculating payments for electricity transmission, transformation, and delivery services.

The Ministry of Finance, at the proposal of the CFE, and with the participation of the Ministry of Energy and the Ministry of Economy, sets the electricity tariffs. It is also responsible for adjustments, modifications or restructuring of the tariff, taking public interest and the requirements of public service into consideration. CRE participants provide an opinion in determining rates for the supply and sale of electricity.

In 1995, as legal reforms were established, the President promoted an initiative to foster institutional strengthening within the energy industry and ensure the adequate development of the new regulatory framework. Institutional reform aimed to clearly define and assign the duties and attributes of each agency in the development of natural gas and electricity. This new redistribution of functions specified objectives for each governmental agency.

Proprietor duties of the Ministry of Energy (SENER) were enhanced. The SENER is now specifically in charge of conducting Mexico’s energy policy, making decisions about exploration and development activities according to the National Development Plan, and surveying the

operations of industry-related agencies. Pemex, CFE and its subsidiaries, such as LFC, continue to operate Mexico’s oil and power industries.

Agency structure

Professional skills and size

CRE has 150 employees. Middle and upper management field of expertise: Administration 11%; Economics 15%; Engineering 26%; Law 17%; Accounting 12%; other 19%.

The CRE is an autonomous entity, which consists of five commissioners whose decisions are kept on public record. The President of Mexico appoints commissioners for five-year staggered terms. The five commissioners meet as a group and decide matters on a majority vote, although the chairman has the right to veto.

The five commissioners, who comprise an interdisciplinary group, have vast experience in regulation-related activities. Projects are assigned to and overseen by each commissioner, in accordance to their field of expertise. In each case, the commissioner that leads the project must ensure that the working group created to analyze it carries out its task according to CRE’s principles.

Responsibilities

Responsible for	YES	NO
Distribution		X
Transmission		X
Generation	X	
Power Supply Planning		X
Siting		X
Environment		X
Energy Efficiency		X
Renewables		X
Consumer Protection	X	X
Other specific statutory requirements (e.g. low income support, economic development, etc.)		

Relationship among regulatory authority and state energy ministry, state utility entity, etc.

Enactment of the Energy Regulatory Commission Act (CRE Act) by Congress in 1995 assigned regulatory duties to the CRE. The CRE was created in 1994 as a consultative body reporting to the SENER, and its role was purely advisory and limited to the electricity industry. The CRE Act transformed its role to that of an empowered, independent regulator with technical and operational autonomy and provided the CRE with a legislative mandate to regulate the activities of both public and private operators in the electricity and gas industries.

The objective of the CRE is to achieve the efficient development of the energy sector to benefit industrial, commercial and residential users by combining the regulation of natural and legal monopolies.

B-5.5 Pricing

Current price levels and structures

In 1988, the public service of electricity had thirteen (13) rates. Currently, the tariff structure consists of 31 different rates grouped as follows:

Residential rate: For end domestic users.

Commercial rate: For general service users in low voltage, focused primarily on commercial establishments, service and micro industries.

Service rate: For public lighting, waste and potable water pumping and temporal services.

Large industry rate: For general service users in high voltage, focused primarily on large industrial units and large potable pump systems.

Industrial rate: For medium and large industries.

Agricultural rate: For irrigation and watering.

Price setting process

The electricity tariff structure has been repeatedly revised in order to grant a larger number of options for the different consumer segments. In this way, the price paid by each user depends on the demand, voltage,

temperature, service type and availability. Furthermore, in the case of the industrial tariffs, there are hourly rates so qualified users may implement efficient energy management.

Incentive rate setting

Currently, as the CRE is not permitted to establish electricity tariffs, there are no incentives for the rate setting process. Nevertheless, CRE approves the electricity transmission, transformation and delivery services methodologies for the payment calculation.

Automatic adjustment mechanisms

There is an automatic monthly adjustment system for low voltage general rates, time of use and medium voltage rates that will be subject to fuel price variations. Additionally low voltage rates are adjusted depending on the inflation index. As for the medium and high voltage rates, the monthly adjusting factor includes the average variation of the producer price index and the international fuel price index.

B-5.6 Efficiency, electrification, and environment

Energy efficiency and renewables policy experience

In 1994, Mexico began using renewable energy resources to support electrification on farms. As of 1999, the program had implemented approximately 200 photovoltaic and wind energy projects.

Three percent of the country's electricity generation in 2001 came from renewable energy (wind, solar, biomass). Oil consumption contributed 65% of the total commercial energy consumption in 1998. Natural gas comprised 23.1% of consumption in 1997, but this percentage is expected to grow as new combined cycle power plants are built and existing plants are converted to use natural gas.

Over the past 25 years, the amount of carbon consumed in Mexico has increased 32%. Current government strategies to decrease carbon intensity include the promotion of natural gas, hydro, geothermal, solar and wind power as well as efforts to enforce mandatory environmental standards. One specific long-term goal is to increase the share of electricity generated by natural

gas from 11% in 1995 to 27% in 2020.

Rural electrification policy

Extent of service in country

Currently, more than 116,840 localities are being served, of which 113,676 are rural zones and 3,164 are urban zones. Even though 95.8% of Mexican households have electricity, 81,470 localities with a small number of inhabitants are still without electricity service.

Existing and planned policies

In the past ten years, 52,169 solar modules have been installed in several households. This technology is intended to be used mostly in under served rural zones.

Environment

Environmental requirements for generating sector

There are no environmental requirements for private or public generators on behalf of CRE. Nevertheless, a private generator applying for a self-supply or cogeneration permit will have to comply with the environmental and municipal regulations.

According to the General Law of Environmental Balance and Protection, any party (private or public) interested in building an International Transmission Line must submit an Environmental Impact Assessment and a Risk Analysis of the project to the National Ecology Institute (INE). The INE will review all the information provided, and if the proposal complies with the requirements established in the General Law of Environmental Balance and Protection, an environmental impact license and a risk license will be granted.

¹ No permit is required for small energy production, which does not exceed 0.5 MW. Permits are also not required for operation of generation plants of any capacity when they are intended exclusively for use in emergencies arising from interruptions in the public electric power service.

B-6. PANAMA

B-6.1 Reform framework

Reforms to date and restructuring laws

Interim Law No. 6 (February 1995) was formulated as a transitional law pending the enactment of the new sector law. The law required an independent regulatory entity to be established within one year, but meanwhile preserved IRHE as a vertically integrated monopolistic enterprise with sector regulatory, tariff setting, and oversight functions. The law modified IRHE's founding law to allow private power generation companies to sell electricity to IRHE or other approved third parties. It also allowed private construction and operation of transmission and distribution systems associated with these generation activities. However it limited private generators' capacity to 45% of the country's total installed capacity.

Law No. 26, Establishing a Regulatory Entity for Public Services (January 1996), creates a Public Services Regulatory Entity (ERSP) as an independent agency responsible for the regulation, supervision, and oversight of public water supply and sanitation, telecommunications, and electricity services. This entity will regulate each sector according to the provisions of this and the other relevant sector laws. The law provides for the ERSP's financial resources; the approval process and minimal qualifications for the three Directors of the ERPS; and other staffing, budgetary, reporting, and administrative procedures. It defines the ERSP's jurisdiction as the areas of regulation, oversight, verification, and enforcement of laws and operating standards in the relevant sectors.

Law No. 6, Electricity Public Service Law (February 1997) creates an Energy Policy Commission (CNPE) to define a strategy and a set of policies for the energy sector and outlines a new sector structure and guidelines for each activity. The law also directs the government to restructure and sell IRHE's generation and distribution assets and delineates the possible roles of the government and other public entities as well as the private interests in commercial activities in the sector. The law sets the basis for pricing, tariffs, subsidies, and sanctions, and

establishes principles for protecting the environment and promoting energy efficiency and conservation. It also defines the specific duties of the Public Service Regulatory Entity. An English version of these laws was not available.

Planned reforms

The government expects that most of the future expansion in the sector will be performed by the private sector. This expansion will depend on the new incentives of the market, such as demand growth, the interconnection of the markets and the possible entrance of natural gas from Columbia. No planned legislative reforms were found.

Reform experience

The sector has completed its unbundling both vertically and horizontally. A new market structure has been implemented and IRHE has been subdivided into 4 generation and 3 distribution companies. IRHE's distribution and generation companies were privatized in September and November 1998, respectively, and the transmission company will remain in government hands.

B-6.2 Industry structure

Existing industry structure

In 1998, IRHE, the state electricity company, was broken into eight electricity generators and three distributors. The distribution sector is divided by region, meaning they are still regulated monopolies. Transmission is controlled by the government via the publicly owned Entesa Company.

The sale of majority shares to institutional investors of IRHE's generation and distribution companies has already been performed. Ten percent of the shares in those companies are reserved for the permanent employees of the companies, and the remaining shares are floated on the stock markets with a maximum individual ownership of 5%. The operation of these companies in the sector is subject to a concession or a license; the law stipulates a 50-year term limit for concession in hydro generation activities, 25 years for transmission activities, and 15 years for distribution activities. Upon expiration, these

concessions will be re-offered by the regulator for an equivalent period of time. The transmission company will remain in government hands.

Planned industry structure

It is expected that private investors will undertake all the new investments in new generating capacity, as well as rehabilitation of existent generating facilities. Although hydro (which is subject to economies of scale and often less attractive to investors) dominates the least-cost expansion plan (60% of new capacity), most of the new capacity to be added in the near- to medium-term might be thermal. Therefore, private investors will probably have different incentives to invest in the new market, as they will probably take into account the new common electricity market and the possible availability of natural gas from Columbia.

The new sector law also permits municipalities and the national government to participate in commercial sector activities, even though the government has indicated its intention to abdicate its responsibilities in all operating areas except the transmission and dispatch functions for the national interconnected system. The government may also provide funding for electrification programs in specified areas.

Financial condition of distribution utilities companies

IRHE's three distribution companies were privatized in 1998. Fifty-one percent of the shares were sold to institutional investors, 10% to permanent employees, and the rest were floated in the stock market.

B-6.3 Market structure

Pools description

The new wholesale market will consist of a regulated and a deregulated market. In the deregulated market, generators will be free to negotiate the prices and quantities sold to the different buyers, who will include the distribution companies, large consumers, marketers, and foreign companies. Non-contracted energy will be sold on the spot market, which will be operated by the CND.

During the initial five-year period after the promulgation

of the electricity law (February 1997 - February 2002) the sector will be structured under the Single Power Purchaser (SPP) model. Under this model, most of the generators will be required to sell 100% of their capacity to the transmission company under terms specified in their individual contracts. The SPP will resell the capacity and energy to the distribution companies without making a profit. A minimum of 85% of all electricity transactions will flow through this market, while the balance will be negotiated directly by large end users with the generation company of their choice. After this initial phase, the power sector will move to a wholesale market model.

Reliability

Historically, IRHE has performed central load dispatch for all generation units and centrally set the dispatch and other system operating standards and criteria. The Central Dispatch Unit (CND) under the Transmission Enterprise now performs system coordination and dispatch independently, according to economic merit order and system integrity. The ERSP is responsible for setting dispatch and other operating standards and criteria, and for overseeing compliance with the standards and norms.

Adequacy of generating capacity

Panama currently imports over 70% of its energy, and electricity demand is growing at a rate of 5.8% per year. As stated above, it is expected that private investments will increase generating capacity to meet growing needs. In addition, projects such as the possible construction of a natural gas pipeline from offshore Colombian gas sources will increase capacity.

B-6.4 Regulatory framework

Regulatory agency or agencies

The Public Service Regulatory Entity (ERSP) is in charge of establishing the rules, and regulations for power sector activities. Specific duties defined in the Electricity Law include:

Issuing concessions, licenses and other authorizations for public service providers including (new) hydro and geothermal plants as well as public transmission and distribution services.

- Setting efficiency and performance standards for the relevant public service

providers.

- Defining the rights and obligations of service providers and consumers.
- Confirming the service providers' compliance with all legal and regulatory requirements and established norms, including expansion and efficiency criteria stated in the concessions.
- Promoting competition and efficiency in the areas under its jurisdiction and guarding against monopolistic or discriminatory behavior.
- Establishing the principles, methodologies, and formulas for tariff setting purposes in regulated market areas under its jurisdiction and for overseeing their application.
- Establishing procedures to resolve conflicts among public service entities.
- Arbitrating conflicts between public service providers under its jurisdiction and other government agencies, municipalities, or customers and handling complaints and claims of customers, government entities, or service providers.
- Recommending actions including expropriation to assure the provision of public services or intervening in the service under designated circumstances.
- Organizing public hearings as required by law or considered necessary by the ERSP.
- Establishing accounting standards and information requirements for sector entities.
- Organizing and undertaking inquiries as necessary to gather the viewpoints of customers regarding the quality of the public service.

The National Commission for Energy Policy (CNPE), under the ministry of planning and economic policy is in

charge of defining strategies and policies for the energy sector and proposes new laws, as needed with the aim of fostering adequate energy supplies to meet demand.

Panama is currently transitioning to an unregulated market. The transition is expected to be complete in February 2002.

Agency structure

Relationship among regulatory authority and state energy ministry, state utility entity, etc.

With the establishment of the Public Service Regulatory Entity (ERSP) in 1996, regulatory functions (including tariff- and standard-setting responsibilities) were separated from sector commercial activities. The 1997 Electricity Law assigns policy functions to a new entity, the Comision Nacional de Politica Energetica (CNPE), under the Ministry of Planning and Energy Policy. The responsibility for central planning will fall under the Transmission Enterprise, and specific system coordinating, regulating, and oversight activities to the Central Dispatch Unit (CND). Commercial activities are to be carried out by private entities. All of these functions were formerly performed by IRHE.

Responsibilities

Responsible for	YES	NO
Distribution		X
Transmission		X
Generation	X	
Power Supply Planning		
Siting		X
Environment		X
Energy Efficiency		X
Renewables		X
Consumer Protection	X	X
Other specific statutory requirements (e.g. low income support, economic development, etc.)		

B-6.5 Pricing

Current price levels and structures

The Public Service Regulatory Entity has set the procedure for determining the “value-added of distribution” (VAD) and price cap principles for distribution enterprises. These and the pass-through of generation and transmission costs are the basis for the regulated distribution tariffs, which will be reviewed every four years. The final tariff consists of the sum of the generation and transmission costs plus the VAD.

Price setting process

During the SPP (Single Power Purchaser; see IVa for further description) process, generators will sell all their generation to the transmission company according to preset contracts. Generators will be forced through these contracts to sell to distribution companies, but large end-users can purchase directly from generators at negotiated prices with the generation companies. This deregulated market will only handle 15% of the total electricity transactions. After the initial phase, the power sector will move to a wholesale market model in which distribution companies will be free to purchase power through either the electricity spot market or energy supply contracts, which will competitively bid out to generation companies.

Regulated transmission (and distribution) system access and retail wheeling fees will be established by the regulatory entity and are expected to be based on a forward-looking, efficient cost-of-service. The rates will allow for financial sustainability as they permit cost recovery and compensation for capital employed, which is measured against an efficient company with comparable risk. The rates will also promote economic efficiency as they will be close to the price structure of competitive markets and rate setting will take into account not only costs but also expected increases in productivity. The Public Service Regulatory Entity has set the procedure for determining the Value-Added of Distribution (VAD) and price cap principles for distribution enterprises. These and the pass-through of generation and transmission costs are the basis for the regulated distribution tariffs, which will be reviewed every four years. The final tariff then consists of the sum

of the generation and transmission costs plus the VAD.

B-6.6 Efficiency, electrification, and environment

Energy efficiency and renewables policy experience

No references found

Rural electrification policy

Extent of service in country: Electricity service coverage is 70%.

Existing and planned policies: The government may provide transparent investment subsidies for uneconomic expansion of service in rural areas.

Environment

Environmental requirements for generating sector

With 1998 electricity restructuring, the government also restructured the environmental regulatory framework. Autoridad Nacional del Ambiente (ANAM) became the government agency responsible for the implementation and administration of environmental law. ANAM holds significant enforcement authority.

B-7. PERU

B-7.1 Reform framework

Reforms to date and restructuring laws

The *1992 Electricity Concession Law* defined the current industry structure in Peru. It created the Electricity Tariffs Commission (CTE) and the regional COES (dispatch pools) to be in charge of the dispatch of the system. It set the rules for awarding concessions for commercial operations in a competitive manner and emphasized in the role of the private sector in undertaking commercial operations in the sector. It also defined the new pricing and market entry rules at all levels. This law also required the unbundling of sector generating, transmission, and distribution activities and called for the privatization of all state-owned commercial operating assets in the sector.

The *1997 Law Against Monopoly and Oligopoly in the Electricity Sector* limits horizontal integration between companies in the generation, transmission and/or distribution businesses to 15% of the total market. Companies also may not hold more than 5% of the market in any one sector. Under this law, companies that are planning to merge or sell their shares must first obtain approval from INDECOPI, the consumer protection institute. The government will own “golden shares” in the utilities that are privatized in the future. These golden shares will give the government a deciding vote in decisions on whether to shut down the company, incorporate new shareholders, reduce capital, issue obligations convertible into shares, register shares on the stock exchange, or merge with other companies.

Planned reforms

The pace of power privatization in 1999 and 2000 was slower than expected — mostly because President Fujimori decided to retain control over key hydroelectric plants (including the 1,200 MW Mantaro hydro plant, which supplies 35% of Peru’s power). Peru now hopes to increase privatization earnings through sale of some large state assets, including the Talara oil refinery and the Mantaro hydroelectric complex, possibly in 2003. Over the next three years, the Toledo administration hopes to raise between \$3 and \$4 billion on sales of state assets.

Reform experience

Eighty percent (80%) of generation capacity and 50% of distribution is handled by private companies.

B-7.2 Industry structure

Existing industry structure

The two major vertically integrated, state owned sector enterprises, Electrolima (EL) and Electroperu (EP) were vertically and horizontally unbundled by function. EL was reorganized into four distribution units, divested in 1994, and one generating unit, which was divested in 1995. EP was separated into four generating units, and its high-voltage transmission assets were combined with those of EL to form a national transmission enterprise for the main interconnected system, which is now state-owned. Pending their restructuring, the nine other regional utilities under joint local and central government ownership were given greater autonomy. Some regional utilities have already been restructured into separate generating, transmission, and distribution units. Some of the generation and distribution units have already been privatized.

The government still holds a significant portion of the commercial assets in the sector, including the Mantaro hydro project, the transmission companies, and 30% of most of the privatized generation and distribution companies.

Planned industry structure

The government plans to continue privatization.

Financial condition of distribution utilities companies

In December 2000, the Inter-American Development Bank approved a loan of up to \$53 million to help upgrade the power transmission and distribution system of southern Peru. Peru also has plans to integrate its power grid with Colombia and Ecuador.

B-7.3 Market structure

Pools description

Dispatch is based on economic merit order, which is pre-programmed in hourly units. The power market in Peru is based on two types of markets: a deregulated market for transactions between generators and large consumers, and a regulated market for transfers between generators and sales to distribution companies. Customers who consume more than 1 MW can choose their energy supplier. Node prices are set at each node of the system and are based on the weighted average of short-run marginal costs of generation for the entire system optimized over a 48-month horizon. This optimization takes into account water levels, thermal operating costs, capacity expansions, rationing costs and plant availability. Transmission costs are added to these generation costs to reflect the final node price.

Reliability

There is no independent system operator in Peru. Instead, each one of the systems has an operating committee (Comite de Operacion Economica del Sistema, COES) formed by the generation and transmission companies. These operating committees are operated by the transmission owner and are in charge of performing the central dispatch functions for the generators in that system. In figuring charges, COES includes a weighted average of short-run marginal costs of generation for the entire system optimized over a 48-month horizon.

B-7.4 Regulatory framework**Regulatory agency or agencies**

The Ministry of Energy and Mines (MEM) is ultimately responsible for the sector's policies, concessions, and indicative planning functions. Under MEM, Consejo Nacional de Energia (CNE) directly assumes the formulation and implementation of medium- and long-term strategies and planning functions. Also under MEM, the Direccion General de Electricidad (DGE) issues concessions and other authorizations for sector participants in all operating activities, sets technical operational standards, oversees contracts and undertakes other regulatory and oversight functions. The Electricity Tariffs Commission (CTE) is responsible for establishing the electricity energy tariffs according to the criteria stipulated by law.

Agency structure

Relationship among regulatory authority and state energy ministry, state utility entity, etc.

The Ministry of Mines and Energy is in charge of policy functions. The Energy Tariffs Commission and the National Direction of Electricity share the regulation activity.

Responsibilities

Responsible for	YES	NO
Distribution	X	
Transmission	X	
Generation	X	
Power Supply Planning	X	
Siting	X	
Environment		X
Energy Efficiency		X
Renewables		X
Consumer Protection		X
Other specific statutory requirements (e.g. low income support, economic development, etc.)		

B-7.5 Pricing**Current price levels and structures**

Retail rates are composed of the bus bar prices plus an aggregate value of distribution (VAD). The VAD is calculated using a relevant efficient distribution model for each concession area. Rates of return are set every four-year period, based on a 25-year operating framework, and consider necessary investments, operation and management costs, and New Replacement Value for existing assets.

Price setting process

Contract prices between generators and distribution

companies and large consumers (with loads above 1 MW) are deregulated. There is also a regulated market, and these prices are used for inter-generator transfers. Regulated prices are reviewed semi-annually and are calculated by each COES. Wholesale power prices are calculated for each bus bar (node) on the transmission system based on the demand projections for the following 48-month period. These prices are calculated taking into account economic expansion of the system and the current conditions of fuel prices, reservoir levels, hydrology, and discount rate. COES calculates energy and power prices for each hourly block in the market node. Energy prices are calculated as an average of the short-run marginal cost for each one of the blocks. Capacity charges are calculated based on the cheapest generation unit to supply the needed load in the hours of peak annual demand, the price is the annualized investment cost for that unit. For each one of the nodes in the system, COES calculates a factor for power losses and a factor that reflects energy losses in the transmission system. These factors would be equal to 1 in the market node. The final bus bar prices are calculated by multiplying the market node prices by their respective factors, and adding a transmission toll to the power prices in each bus bar. COES relays its calculations to CTE, which is in charge of approving and commenting on the calculations. Regulated prices cannot vary by more than 10% of prevailing market prices.

Incentive rate setting

None were found.

Automatic adjustment mechanisms

None were found.

B-7.6 Efficiency, electrification, and environment

Energy efficiency and renewables policy experience

During 1996, the government implemented an aggressive program to promote the use of compact fluorescent lamps with the aim of avoiding power shortages. In addition, for several years the government has used bilateral and multilateral donations to run CENERGIA, an energy efficiency agency.

Rural electrification policy

Extent of service in country

The current rate of electrification is less than 75%; this rate is much improved from the rate of 47% in 1992.

Existing and planned policies

Distribution concessionaires are responsible for carrying out electrification efforts under the direction of the central government, which defines programs to extend and finance service coverage. Targeted electrification efforts are financed with electricity consumption taxes.

Environment

Environmental requirements for generating sector

Environmental impact studies have become a requirement by authorities for any expansion of power projects.

Questionnaire

B Electricity Regulation Questionnaire

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I. General

Please provide a general description of reforms to date (include copies of restructuring law, if any).

Please provide general description of planned reforms.

Please give a general description of reform experience. What has happened to prices, service, reliability, capacity, etc.?

II. Regulatory Agency or Agencies

Who sets electricity regulatory policy? (Cites or copies of primary laws)

Who sets electricity regulatory prices?

Is the regulatory agency in existence? How Long?

Structure

Professional skills

and size

_____ No. Regulators _____ No. Staff _____

Scope of authority (please check yes or no)

Responsible for	Yes	No
distribution		
transmission		
generation		
power supply planning		
siting		
environment		
energy efficiency		
renewables		
Consumer protection		

Other specific statutory requirements (e.g. low-income support, economic development)
Please list

III. Pricing

Describe the current price levels and price structures.

Describe the price setting process. (Is it based on cost-of-service reviews? How often are prices reviewed, etc.?)

Is there any type of incentive rate setting process that is being used or contemplated? If so, please describe

Are there any type of automatic adjustment mechanisms (e.g. for fuel costs)?
If so, describe.

What are the relationships among the regulatory authority on the one hand and the state energy ministry, state utility entity, and other relevant government agencies on the other

IV. Industry Structure

Describe the existing industry structure and the steps taken to achieve the existing structure (e.g., ownership, role of IPPs, role of foreign investors).

Describe the planned industry structure and the steps to be taken to achieve the planned structure (e.g., ownership, role of IPPs, role of foreign investors).

V. Market Structure

Describe form and nature of Pools.

Who is responsible for maintaining reliability? What is the scope of that body's authority to take actions and maintain reliability?

Describe Energy and other markets

Describe how markets or regulation addresses adequacy of generating capacity.

VI Policy experience with energy efficiency and renewables to date, including successes, failures. Give reasons for each.

VII. Rural electrification policy

Describe the extent of service in the country.
Describe existing and planned policies relation to rural electrification.

VIII Environment

Describe the environmental requirements imposed on the generating

Describe planned environmental reforms relating to the electricity sector.

IX. Financial condition of generating companies

Describe the current financial condition of the generating companies.

X. Financial condition of distribution utilities companies

Describe the current financial condition of the distribution companies.

XI. Other Issues

What do you consider to be the most urgent challenges to be faced? What steps do think should be taken to solve these difficulties?

XII. Other comments

The Energy Group



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