PERUVIAN POWER SECTOR MONTHLY REPORT - JANUARY 2012

NATIONAL ENERGY SECURITY

In the energy sector, current international attention is focused on energy security, which incorporates technology, economics, politics, efficiency, innovation, diversification, pricing, geopolitical, and interdependence. The volatility of fossil fuel prices and the continued likelihood of future price increases, combined with climate change, have shifted the gaze to clean and renewable energy sources. There is new focus on the recovery and upgrading of wind and biomass technologies and the development of new technologies for solar, hydrogen, and biofuel energy.

The current international economic and financial crisis is forcing countries to rethink the role of government in the economy, opting to strengthen regulatory bodies and intervening in the shareholding of private companies. The energy sector is betting on a change of strategy with clean economy. South America is producing partnerships between state enterprises for the exploration and exploitation of energy, highlighting the recent agreements between Chile-Ecuador-Venezuela, Peru-Brazil, and Peru-Venezuela (Memorandum of Understanding.)

Within the framework of ongoing changes, the global economy tends to restore the balance between liberalization and regulation of markets. Similarly, the energy sector is returning to the sustainable development of energy resources in order to be competitive, while still considering environmental protection (such as CDM-Clean Development Mechanism,) social equity, and cultural diversity.

Currently in Peru, the demand for electricity is about 5 GW. If the trend continues, over the next 40 years the country will need to invest in 80 GW of electricity generation capacity in the forms of water, wind, and other renewable resources and enhance the capacity and robustness of the transmission lines. To provide for the growing demand for electricity, Peru is developing:

- 500 kV lines on the coast;
- 220 kV lines in the mountains, one of which will run through the Amazon to Moyobamba and Iquitos and will be promoted by PROINVERSION;
- the use of renewable energy through bid submittals; and
- investments in large hydroelectric power plants.

1. Highlighted Issues

2011 HIGHLIGHTS

1. The 2011 maximum demand in the SEIN reached 4,961.19 MW, which represents an increase of 8.35 percent compared to 2010.

2. The hydraulic and thermal generation trends from 2002 until the end of 2011 are shown in Figure 1. It is important to note that between 2002 and 2011 the annual average growth rate of thermal generation reached 21.73 percent; in contrast, the hydraulic generation average growth rate for the same period reaches only 1.80 percent.

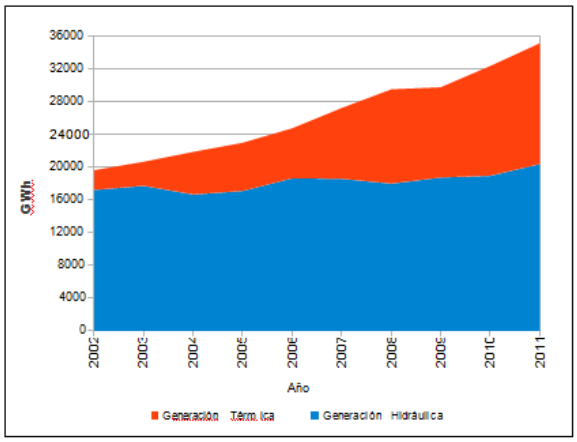

Figure 1: *Thermal and Hydraulic Generation in the SEIN (2002-2011)*
Source: *COES*
Development: *Mercado Energía*

JANUARY 2012 HIGHLIGHTS

1. The Ministry of Energy and Mines (MEM), though the Rural Electrification Department (DGER,) publish the National Plan for Rural Electrification (NREP) 2012–2020. This important plan will benefit 305,000 people and will improve rural electrification ratios from 63 to 69 percent and from 84.8 to 88 percent nationally.

2. MAPLE ETHANOL, a subsidiary of U.S. MAPLE ENERGY requested the final concession for its thermoelectric power plant. According to the document, this plant will be located in the Piura's La

Huaca District.

3. The Ministry of Energy and Mines approved Enersur S.A. for an indefinite period to develop the future thermoelectric power plant facility: Plant Ilo for the generation of electric energy. This plant will be located in the Moquegua region with a potential power of 568.66 MW and should become operational September 30, 2013.

4. Supreme Resolution Nº. 002-2012, ratified the agreement by the Board of PROINVERSIÓN to amend the Plan for the Promotion of Private Investment of the International Public Competition to grant a concession for the project "Transmission Line North Cajamarca-Carhuaquero in 220 kV" to incorporate the project "Transmission Line North Cajamarca-Cáclic-Moyobamba in 220 kV." The project name was also changed to "Transmission Line Carhuaquero-North Cajamarca-Cáclic-Moyobamba in 220 kV."

2. Performance of Monthly Demand

2.1 Progression of the Highest Demand

The maximum demand for electricity in January 2012 reached 4863.19 MW, which is 6.03 percent higher than the January 2011 peak. Figure 2 indicates the January demand in the SEIN from 2007 to 2012.

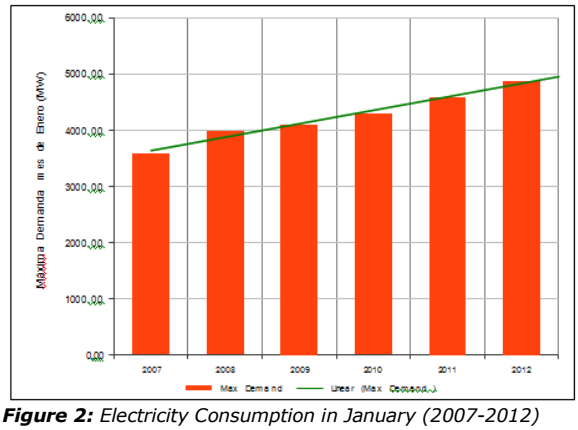

Figure 2: *Electricity Consumption in January (2007-2012)*
Source: *COES*
Development: *Mercado Energía*

2.2 Progression of the Rate of Growth

Figure 3 shows the variation of the rate of growth for electricity consumption in January from 2007 to 2012. In Figure 3, a slight decrease is observed in the rate of growth of electricity consumption in January 2012 over the same period in 2011.

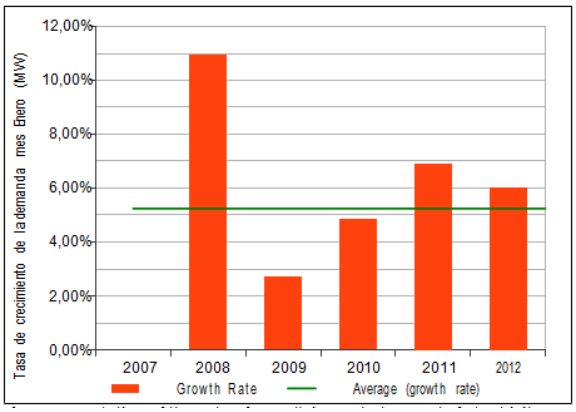

Figure 3: *Rate of Growth at Peak Electricity Demand in January (2007-2012) with Base Year 2007*
Source: *COES*
Development: *Mercado Energía*

3. Performance of the Monthly Offer

3.1 Production of Electricity in the SEIN

The production of electricity in January 2012 reached 3069.84 GWh, up 5.56 percent from the previous year. Progress in energy production for the month of January is shown in Figures 4 and 5. Figure 4 shows a clear increase in the production of thermal energy despite January's mountain rains.

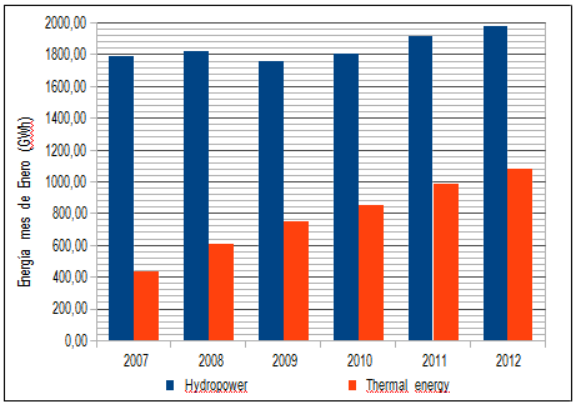

Figure 4: *Progress of Energy Production (GWh) in January (2007- 2012)*
Source: *COES*
Development: *Mercado Energía*

Figure 5 shows a clear downward trend in hydroelectric production from 80.3 percent of total production in January 2007 to only 64.6 percent in January 2012.

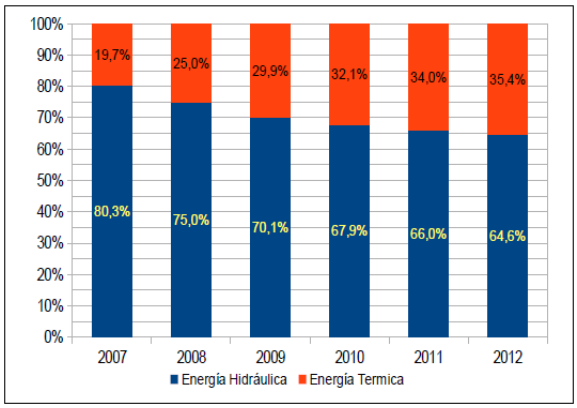

Figure 5: *Share of thermal power and hydropower in January (2007-2012)*
Source: *COES*
Development: *Mercado Energía*

3.2 Energy Production by Company

3.2.1 COMPANY PARTICIPATION IN THE PRODUCTION OF HYDRAULIC AND THERMAL ENERGY

Tables 1 and 2 show data related to the involvement of various companies in the production of hydraulic and thermal power, respectively.

JANUARY 2012		
Company	**Hydropower Generation (GWh)**	**Participation (Percent, %)**
ELECTROPERU	636.92	32.12
EDEGEL	314.18	15.84
EGENOR	232.30	11.71
SN POWER	164.40	8.29
CHINANGO	133.13	6.71
CELEPSA	124.32	6.27
ENERSUR	95.51	4.82
EGASA	86.56	4.36
SANGABAN	74.97	3.78
EGEMSA	61.69	3.11
MINERA CORONA	13.79	0.70
HIDROELECTRICA SANTA CRUZ	12.45	0.63
EGESUR	9.05	0.46
AGUAS Y ENERGIA PERU	8.64	0.44
SINERSA	6.05	0.31
GEPSA	5.81	0.29
MAJA ENERGY	2.73	0.14
HIDROELECTRICA SANTA ROSA	0.60	0.03
TOTAL	**1983.11**	**100.00**

Table 1: *Generation of Electricity with Hydropower Sources in January 2012*
Source: *COES*
Development: *Mercado Energía*

JANUARY 2012		
Company	**Thermal Power Generation (GWh)**	**Participation (Percent, %)**
EDEGEL	341.47	31.42
ENERSUR	316.53	29.13
KALLPA GENERACION	254.19	23.39
EGENOR	34.66	3.19
EEPSA	33.50	3.08
TERMOSELVA	31.71	2.92
EGASA	27.68	2.55
SDF ENERGIA	21.24	1.95
EGESUR	9.94	0.91
AIPSA	8.02	0.74
SHOUGESA	4.26	0.39
PETRAMAS	2.57	0.24
ELECTROPERU	0.88	0.08
SAN GABAN	0.09	0.01
EGEMSA	0.00	0.00
SN POWER	0.00	0.00
TOTAL	**1086.74**	**100.00**

Table 2: *Generation of Electricity with Thermal Energy Sources in January 2012*
Source: *COES*
Development: *Mercado Energía*

From the previous tables, it can be concluded that together ELECTROPERU, EDEGEL, EGENOR, and SN POWER are responsible for 67.96 percent of hydropower generation. Similarly, EDEGEL, ENERSUR, and KALLPA GENERACION together dispatched 83.94 percent of thermal power generation.

3.2.2 COMPANY PARTICIPATION IN THE PRODUCTION OF HYDRAULIC AND THERMAL ENERGY AT PEAK MONTHLY DEMAND

Tables 3 and 4 show data related to the participation of various companies in the production of hydraulic and thermal power, respectively, during the peak monthly demand.

JANUARY 2012		
Company	**Hydropower Generation (GWh)**	**Participation (Percent, %)**
ELECTROPERU	864.78	31.65
EDEGEL	429.17	15.70
EGENOR	346.67	12.69
SN POWER	218.48	7.99
CELEPSA	211.53	7.74
ENERSUR	131.66	4.82
EGASA	118.17	4.32
CHINANGO	114.76	4.20
SAN GABAN	110.00	4.03
EGEMSA	85.04	3.11

EGESUR	29.56	1.08
HIDROELECTRICA SANTA CRUZ	19.1	0.70
MINERA CORONA	18.56	0.68
AGUAS Y ENERGIA PERU	11.8	0.43
GEPSA	9.62	0.35
SINERSA	9.15	0.33
MAJA ENERGY	4.04	0.15
HIDROELECTRICA SANTA ROSA	0.62	0.02
TOTAL	**2732.71**	**100.00**

Table 3: *Generation of Electricity with Hydropower Sources During Peak Demand in January 2012*
Source: *COES*
Development: *Mercado Energía*

JANUARY 2012		
Company	**Thermal Power Generation (GWh)**	**Participation (Percent, %)**
EDEGEL	650.43	30.53
KALLPA GENERACION	558.16	26.20
ENERSUR	423.00	19.86
EGENOR	212.40	9.97
TERMOSELVA	78.95	3.71
EEPSA	70.94	3.33
EGASA	69.30	3.25
SDF ENERGIA	29.11	1.37
EGESUR	22.34	1.05
AIPSA	11.62	0.55
PETRAMAS	4.18	0.20
SHOUGESA	0.00	0.00
EGEMSA	0.00	0.00
SAN GABAN	0.00	0.00
ELECTROPERU	0.00	0.00
SN POWER	0.00	0.00
TOTAL	**2130.43**	**100.00**

Table 4: *Generation of Electricity with Thermal Power Sources During Peak Demand in January 2012.*
Source: *COES*
Development: *Mercado Energía*

3.2.3 CONCENTRATION IN THE POWER GENERATION MARKET FOR THE SEIN

Figures 6 and 7 disclose the market trend of concentration for January from 2007 to 2012. The Herfindahl Hirschman Index (HHI) will be used to assess the concentration of electricity supply. HHI values above 1,800 indicate that there are economic groups with a high market share in the production of electricity in the SEIN.

The following business groups were taken into account to produce Figure 6: ESTADO, ENEL, DUKE ENERGY, GDF SUEZ, HIDROELECTRICA SANTA ROSA, HIDROELECTRICA SANTA CRUZ SAC, GEPSA, DIA BRAS EXPLORATION, SN POWER, CELEPSA, SINERSA, AGROINDUSTRIAS MAJA, Y AYEPSA. The decrease of this index in the years 2011 and 2012 is mainly due to the entry of new economic groups such as AGROINDUSTRIAS MAJA and CELEPSA.

The following business groups were taken into account to produce Figure 7: STATE, ENEL, DUKE ENERGY, GDF SUEZ, SHOUGANG, KALLPA GENERACION, FIBRAS-SDF, AIPSA, and PETRAMAS. The decrease of this index is mainly due to the entry of the Kallpa power plant.

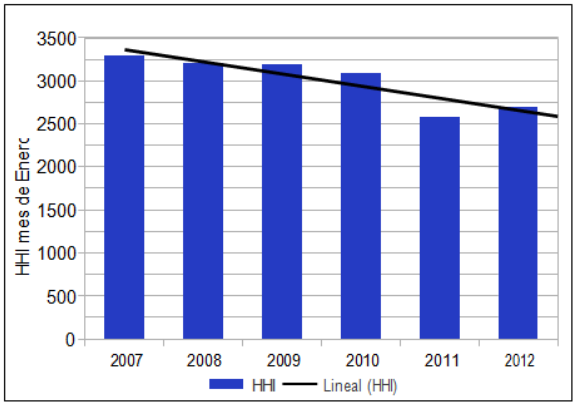

Figure 6: *Evolution of the Hirschman Herfindahl Index for the Hydropower Market in January (2007-2012)*
Source*: COES*
Preparation: *Mercado Energía*

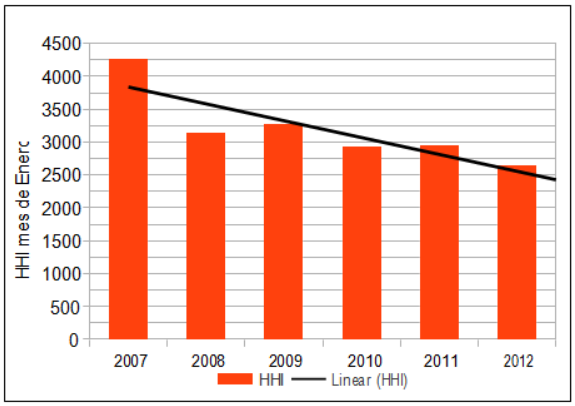

Figure 7*: Evolution of the Hirschman Herfindahl Index for the Thermal Generation Market in January (2007-2012)*
Source: *COES*
Preparation: *Mercado Energía*

The previous graphs show that the HHI in both the hydro and thermal market generation has a decreasing trend.

3.2.4 USE OF FUEL FOR THERMAL GENERATION

The progression of the use of fuels for thermal generation can be seen in Figure 8. As shown in the figure, natural gas is the main fuel for thermal generation in the SEIN. It is used to generate approximately 90 percent of the thermal energy produced.

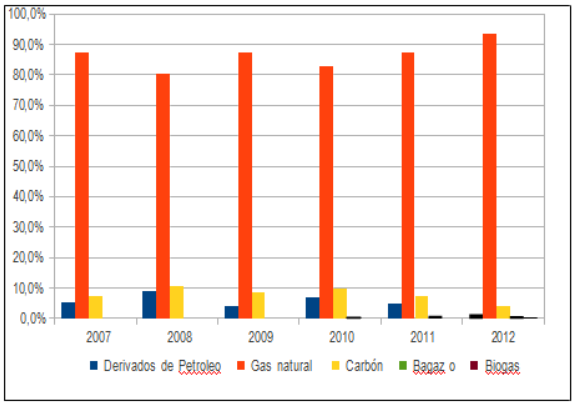

Figure 8: *Use of Fuel for Thermal Generation in January (2007-2012)*
Source: *COES*
Preparation: *Mercado Energía*

3.2.5 RESULTS OF RENEWABLE ENERGY BID SUBMITTALS

Figure 9 shows the increase in energy output of power plants that went into operation as a result of the renewable energy bid submittals RER.) In January 2012, the power produced by these plants represented 1.86 percent of the total energy dispatched.

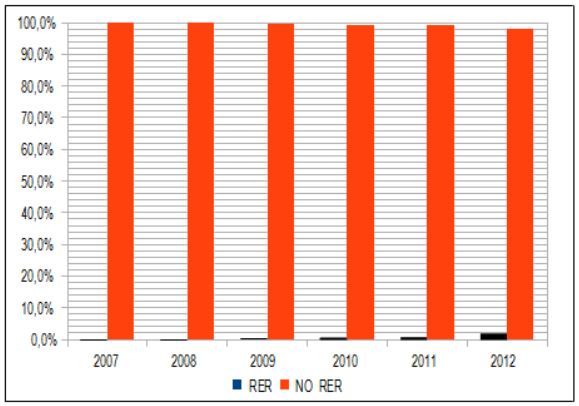

Figure 9: *Energy Produced by Hydroelectric Plants Operated at SEIN Entered through the Bid Submittals, January (2007-2012)*
Source: *COES*
Preparation: *Mercado Energía*

4. Marginal Monthly Cost Performance

The marginal cost for the first month of 2012 amounts to S/56.55 soles/MWh ($20.94 USD per MWh), up 17.35 percent compared to January of 2011. Figure 10 shows the marginal cost variation for January from 2007 to 2012. The average marginal cost is S/57.89 soles/MWh ($21.44 USD/MWh), with an exchange rate of 2.70 soles per dollar.

According to Emergency Decree No. 049-2008, short-term marginal costs in the SEIN are determined without considering production restrictions, natural gas transportation, or electricity transmissions. Also, marginal costs cannot be greater than S/313.50 soles/MWh ($116.11 USD/MWh) as defined by the Ministry of Energy and Mines Ministerial Resolution No. 607-2008-MEM/DM.

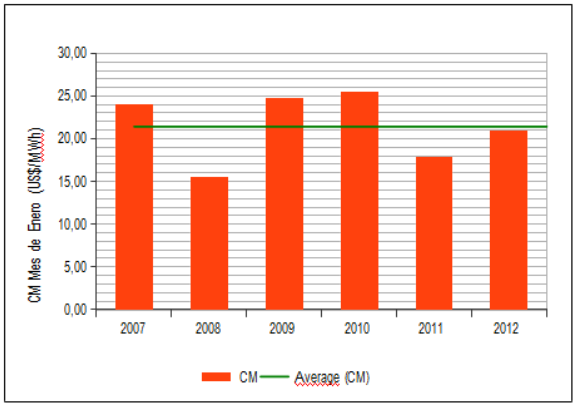

Figure 10: *Marginal Cost Variation for January (2007-2012)*
Source: *COES*
Preparation: *Mercado Energía*

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