Power Planning and Development Division

Electric Power Industry Management Bureau

Department of Energy

Contents

2010 Philippine Power Sector Situationer

EXECUTIVE SUMMARY

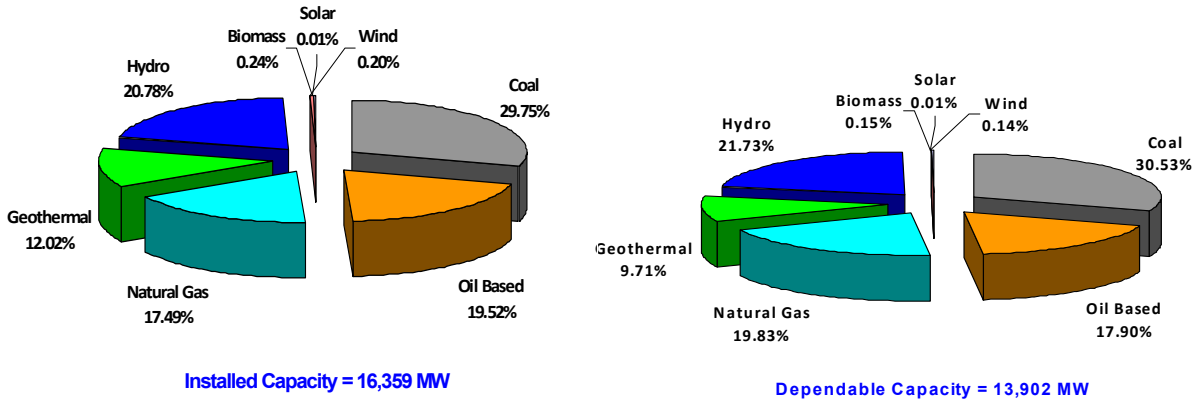
The stability and reliability of power supply remained the major challenge in the powersector in 2010. Despite the natural calamities and the adverse effect of climate change that hit the country, the performance of the power industry in 2010 had improved compared to 2009.

Total installed and dependable capacity in the country increased to 16,359 MW and 13,902 MW, respectively, with the entry of new capacities in Visayas and Mindanao grids. Four new power plants were connected to the grid adding 632 MW in capacity.

In Visayas, three (3) coal-fired power plants, the 3 x 82 MW owned by Cebu Energy Development Corporation (CEDC), 2 x 72 MW by Panay Energy Development Corporation (PEDC) and the 2 x 100 MW by KEPCO-Salcon were tested and commissioned in 2010 which resulted to an increase in the total installed capacity of Visayas to 2,407 MW.

In Mindanao, the first unit (26 MW) of the 42 MW Sibulan hydroelectric power plant in Davao del Sur commenced testing and commissioning in April 2010 while the second unit (16 MW) followed in August 2010.

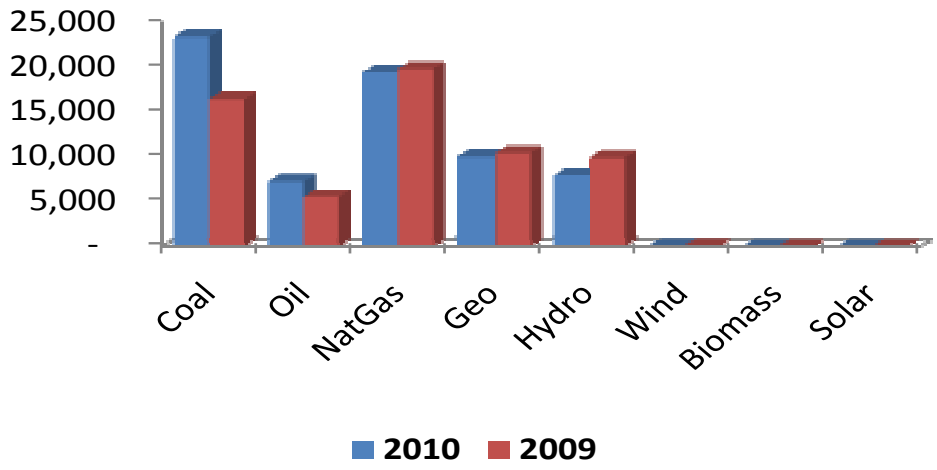
Figure 1. Installed and Dependable Capacities, in MW
Total Philippines



Gross generation all over the country increased by 9.4 percent in 2010 reaching 67,743 GWh from 61,934 GWh in 2009, significant increase was noted from coal-fired power plants (41.4 percent) and oil-based power plants (32.0 percent) since these were utilized to compensate for the lower output of geothermal and hydroelectric power plants.

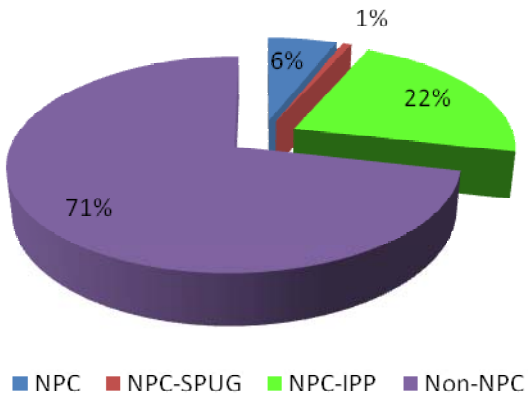
Generation from geothermal power plants fell by 3.8 percent from 10,323GWh in 2009 to 9,929 GWh in 2010. This drop was due to the forced outage of some units of geothermal power plants in the Visayas grid during the months of February to May and last quarter of 2010. At the same time, the aggregated output of hydroelectric power plants were lower by 20.3 percent from 9,788 GWh in 2009 to 7,803 GWh in 2010, due to their limited capability brought about by low water levels in dams and river as a result of the severe El Niño phenomenon.

Figure 2. Gross Generation by Plant Type, in GWh



Since the turned over of the NPC assets and NPC-IPP contracts to private sector, generation from Non-NPC generating facilities has a share of 71.5 percent or 48,442 GWh to the totalgeneration in 2010. It was also noted that the generation from Non-NPC power plants doubled in 2010, from 24,315 GWh in 2009 to 48,442 GWh.

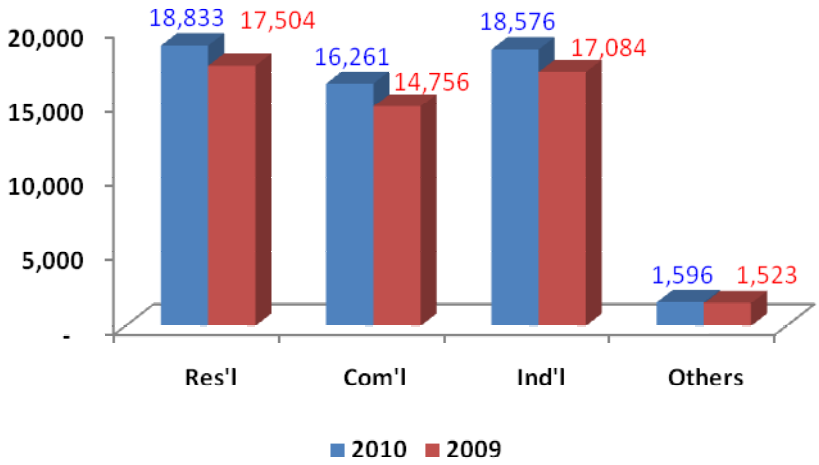
Figure 3. Generation by Ownership, in GWh
Total Philippines



Electricity consumption rose by 9.4 percent in 2010. In terms of energy sales, the country posted an increase of 8.6 percent from 50,868 GWh in 2009 to 55,266 GWh in 2010. This was primarily attributed to the increased demand for cooling appliances due to the intense summer heat. This also brought Luzon grid to an all-time high temperature of 38 degrees centigrade in 2010. Correspondingly, peak demand in Luzon shoot up to 7,656 MW which was 10.5 percent higher than the peak in 2009.

The highest increase was noted in commercial sector at 10.2 percent driven by the expansion of commercial establishments and services sector. On a per grid basis, Visayas recorded the highest growth due to the recovery from the previous year's suppressed demand.

Figure 2. Electricity Sales, GWh (2010 vs. 2009)
Total Philippines



I. CAPACITY[1]

Total installed capacity in the country increased by 749MW or 4.8 percent from 15,610 MW in 2009 to 16,359 MW in 2010 with the entry of new capacities in Visayas and Mindanao grids. In 2010, four (4) new power plants were connected to the grids adding 632 MW in capacity. These are the coal-fired power plants in the Visayas, such as 3 x 82 MW by Cebu Energy Development Corporation, 2 x 72 MW by Panay Energy Development Corporation, and 2 x 100 MW by KEPCO-Salcon Corporation; and the 42 MW Sibulan Hydro power plant in Mindanao grid.

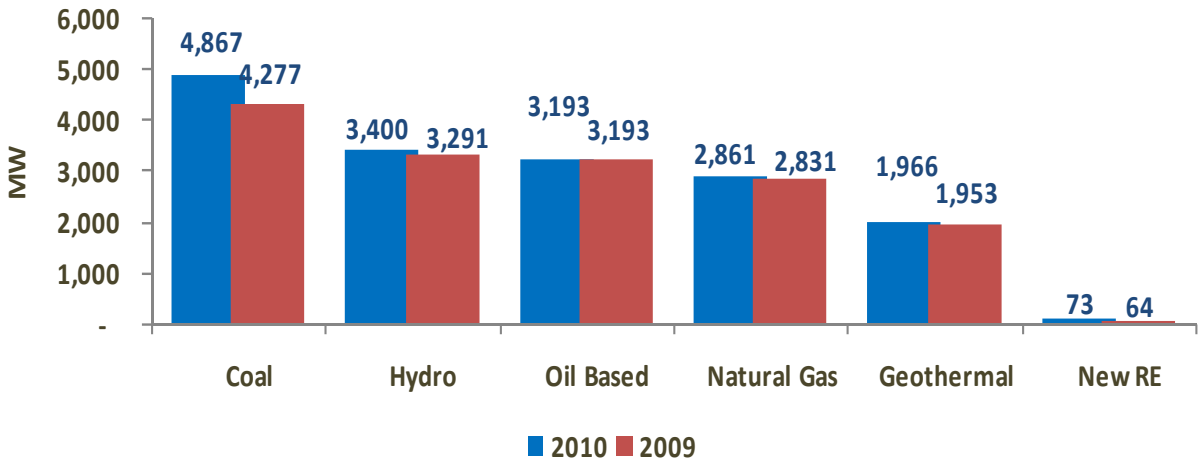
In terms of dependable capacity, it is recorded at 13,902 MW, equivalent to 85 percent of the total installed capacity. Table 1.1 shows theinstalled and dependable capacity per fuel type of the entire country.

Table 1.1: 2010 Installed and Dependable capacity, Philippines

PLANT TYPE	2010 PHILIPPINES			
	Installed Capacity		Dependable Capacity	
	(MW)	% Share	(MW)	% Share
Coal	4,867	29.75	4,245	30.53
Oil Based	3,193	19.52	2,488	17.90
Diesel	*1,768*	*10.81*	*1,204*	*8.66*
Oil Thermal	*650*	*3.97*	*646*	*4.65*
Gas Turbine	*775*	*4.74*	*638*	*4.59*
Natural Gas	2,861	17.49	2,756	19.83
Geothermal	1,966	12.02	1,350	9.71
Hydro	3,400	20.78	3,021	21.73
Wind	33	0.20	20	0.14
Solar	1	0.01	1	0.01
Biomass	39	0.24	20	0.15
TOTAL	**16,359**		**13,902**	

[1] The data for the installed and dependable capacity of each power plant were based on the 2010 Monthly Operations Report (MOR) submitted by the generating companies to the Department of Energy (DOE) excluding off-grid generators. These data were verified through the Daily Operations Report (DOR) of the National Grid Corporation of the Philippines.

Figure 3. Installed Capacity, MW (2010 vs. 2009)
Total Philippines



Coal-fired power plant installed capacity increased by 13.8 percent, from 4,277 MW in 2009 to 4,867 MW in 2010. A total of 590 MW new coal-fired power plants were connected to the Visayas grid, notably the 3 x 82 MW of Cebu Energy Development Corporation, 2 x 100 MW of Kepco-Salcon Power Corporation, and 2 x 72 MW of Panay Energy Development Corporation.

The share of **hydroelectric** in the installed capacity was 20.8 percent or 3,400 MW, second to coal-fired power plants. A newly commissioned 42 MW Sibulan Hydroelectric power plant (Unit 1 – 16 MW & Unit 2 – 26MW) in Davao del Sur wasadded in Mindanao grid in 2010.

Oil-based power plants remained at the 2009 level of 3,193 MW or 19.52 percent of the installed capacity. **Natural gas**, which is concentrated in Luzon grid, has a share of 17.5 percent or 2,861 MW. **Geothermal** energy, the main source of power in the Visayas grid has a share of 12.0 percent or 1,966 MW. Other renewable sources of energy such as **Wind, Biomass**, and **Solar** have a small share of 0.20 percent, 0.24 percent and 0.01 percent to the total installed capacity, respectively.

Table 1.2: 2010 Installed and Dependable Capacity, Luzon

PLANT TYPE	LUZON			
	Installed Capacity		Dependable Capacity	
	(MW)	% Share	(MW)	% Share
Coal	3,849	32.45	3,531	33.72
Oil Based	1,984	16.72	1,586	15.80
Diesel	*614*	*5.17*	*343*	*3.33*
Oil Thermal	*650*	*5.48*	*646*	*6.31*
Gas Turbine	*720*	*6.07*	*596*	*6.16*
Natural Gas	2,861	23.86	2,756	26.39
Geothermal	899	7.47	500	4.21
Hydro	2,346	19.22	2,101	19.54
Wind	33	0.28	20	0.32
Biomass	9	0.01	5	0.01
TOTAL	**11,981**		**10,498**	

Table 1.3: 2010 Installed and Dependable Capacity, Visayas

PLANT TYPE	VISAYAS			
	Installed Capacity		Dependable Capacity	
	(MW)	% Share	(MW)	% Share
Coal	786	10.76	501	10.99
Oil Based	615	33.85	464	30.59
Diesel	*560*	*30.83*	*422*	*27.14*
Gas Turbine	*55*	*3.03*	*42*	*3.45*
Geothermal	964	53.05	751	56.86
Hydro	13	0.73	13	0.94
Biomass	29	1.61	15	0.62
TOTAL	**2,407**		**1,745**	

Table 1.4: 2010 Installed and Dependable Capacity, Mindanao

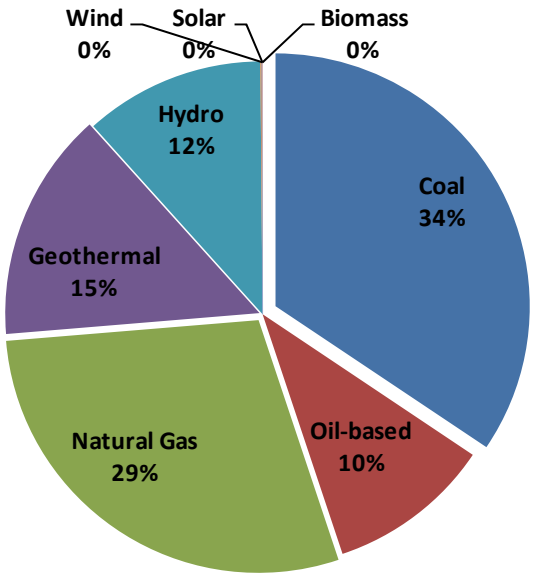
PLANT TYPE	MINDANAO			
	Installed Capacity		Dependable Capacity	
	(MW)	% Share	(MW)	% Share
Coal	232	12.03	212	12.38
Oil Based	594	30.81	438	28.61
Diesel	594	30.81	438	28.61
Geothermal	103	5.35	100	5.79
Hydro	1,040	51.76	907	53.16
Solar	1	0.05	1	0.06
TOTAL	**1,971**		**1,658**	

II. GENERATION

A) Generation by Fuel Type

Gross generation increased by 9.4 percent in 2010, to 67,743 GWh from 61,934 GWh in 2009 in spite of the 20.3 percent decline in hydro power generation brought about by the El Niño Phenomenon during the summer months.

Figure 1.1: 2010 Gross Power Generation, Philippines



Total Generation = 67,743 GWh

Significant increase in electricity generated was noted from coal-fired and oil-based power plants, at 41.4 percent and 32.0 percent, respectively. This can be attributed to the limited capability of hydroelectric power plants (HEP) during summer months in 2010 when the country experienced El Niño Phenomenon (Figure 1.1).

Table 2.1: 2010 and 2009 Comparative Generation, Philippines

FUEL TYPE	PHILIPPINES					
	2010		2009		Difference	
	GWh	% Share	GWh	% Share	GWh	%
Coal	23,301	34.40	16,476	26.60	6,825	41.42
Oil-based	7,101	10.48	5,381	8.69	1,720	31.97
Natural Gas	19,518	28.81	19,887	32.11	(369)	(1.86)
Geothermal	9,929	14.66	10,323	16.67	(395)	(3.82)
Hydro	7,803	11.52	9,788	15.80	(1,984)	(20.27)
Wind	62	0.09	64	0.10	(3)	(4.21)
Biomass	27	0.04	14	0.02	14	98.91
Solar	1	0.00	1	0.00	0	0.18
Total Generation	**67,743**		**61,934**		**5,808**	**9.38**

Coal-fired generation showed the largest increase in 2010 as it was up by 6,825 GWh or 41.4 percent higher than the 2009 generation. The high utilization of coal in Luzon and Mindanao grids was mainly to compensate the lower output of the hydroelectric power plants. While in the Visayas grid, this was attributed to the testing and commissioning of new coal-fired power plants in Cebu (3 x 82 MW CEDC and 2 x 100 MW KSPC) and Panay (2 x 72 MW PEDC).

Electricity output from **natural gas** was down by 369 GWh or 1.86 percent. Electricity generation from natural gas-fired power plants was affected by the Malampaya gas field shutdown from 10 February 2010 to 13 March 2010.

Oil-based generation increased by 1,720 GWh or 32.0 percent from 5,381 GWh in 2009 to 7,101 GWh in 2010. In Luzon grid, oil-based power plants were dispatched as a must run unit to address the insufficient reserve capacity during the first quarter of 2010 when some coal-fired power plants experienced forced outages.The effect of El Niño which limited the HEP in Mindanao grid resulted to high utilization of oil-based power plants.

The El Niño phenomenon which limited the capability of **Hydroelectric power plants (HEP)**due to low water elevation in the reservoir, decrease the electricity output from HEP by 1,984 GWh or 20.3 percent, from 9,788 GWh in 2009 to 7,803 GWh in 2010.

Generation from **geothermal** power plants declined by 395 GWh or 3.9 percent. Some units of geothermal power plants in the Visayas grid were on forced outage during the months of February to May and last quarter of 2010.

Other renewables **(wind, biomass, and solar)** contributed 90 GWh or 0.13 percent to the total gross generation.

Table 2.2: 2010 and 2009 Comparative Generation, Luzon

FUEL TYPE	LUZON GRID					
	2010		2009		Difference	
	GWh	% Share	GWh	% Share	GWh	%
Coal	20,047	39.88	14,091	31.33	5,955	42.26
Oil-based	3,287	6.54	1,864	4.15	1,423	76.32
Natural Gas	19,518	38.83	19,887	44.22	(369)	(1.86)
Geothermal	3,323	6.61	3,516	7.82	(192)	(5.47)
Hydro	4,013	7.98	5,549	12.34	(1,536)	(27.67)
Wind	62	0.12	64	0.14	(2)	(4.21)
Biomass	14	0.03	3		11	422.25
Total Generation	**50,265**		**44,974**		**5,290**	**11.76**

Table 2.3: 2010 and 2009 Comparative Generation, Visayas

FUEL TYPE	VISAYAS GRID					
	2010		2009		Difference	
	GWh	% Share	GWh	% Share	MWh	%
Coal	1,529	16.84	822	9.42	707	85.97
Oil-based	1,726	19.03	1,864	21.37	(137)	(7.37)
Geothermal	5,771	63.59	5,985	68.60	(214)	(3.57)
Hydro	36	0.40	42	0.49	(6)	(15.37)
Biomass	13	0.14	11		2	17.69
Total Generation	**9,075**		**8,724**		**351**	**4.02**

Table 2.4: 2010 and 2009 Comparative Generation, Mindanao

FUEL TYPE	MINDANAO GRID					
	2010		2009		Difference	
	MWh	% Share	MWh	% Share	MWh	% Share
Coal	1,726	20.54	1,563	18.98	163	10.44
Oil-based	2,087	24.84	1,652	20.07	435	26.32
Geothermal	834	9.93	823	9.99	12	1.40
Hydro	3,754	44.68	4,196	50.95	(442)	(10.53)
Solar	1	0.01	1	0.02	0	0.18
Total Generation	**8,403**		**8,235**		**167**	**2.03**

B) Generation by Ownership

Generation from NPC power plants decreased by 5,692 GWh or 58.4 percent, from 9,745 GWh in 2009 to 4,053 GWh in 2010. Assets of NPC that were successfully turned over to private sector are the 620 MW Limay Combined Cycle power plant on 18 January 2010, 55 MW Naga Land Based GT on 29 January 2010,100 MW PB 117 Oil-based power plant on 1 March 2011 and, 100 MW PB 118 Oil-based power plant on 6 February 2010. Also, a total of 1,646 MW NPC-IPP's were turned over to its Administrator that caused the decrease of electricity output of NPC-IPP's to 14,725 GWh in 2010 compared to 27,400 in 2009. With all these NPC assets and NPC-IPP contracts turned over to private sector, generation from Non-NPC generating facilities rose by almost 100 percent at 48,442 GWh in 2010 (Table 3.1).

Table 3.1: 2010 and 2009 Comparative Generation by Ownership, Philippines

PHILIPPINES	2010		2009		CHANGES	
	GWh	% Share	GWh	% Share	GWh	(%)
NPC	4,053	5.98	9,745	15.73	(5,692)	(58.41)
NPC-SPUG	522	0.77	474	0.77	48	10.18
NPC-IPP	14,725	21.74	27,400	44.24	(12,675)	(46.26)
Non-NPC	48,442	71.51	24,315	39.26	24,127	99.23
Total Generation	**67,743**		**61,934**		**5,808**	**9.38**

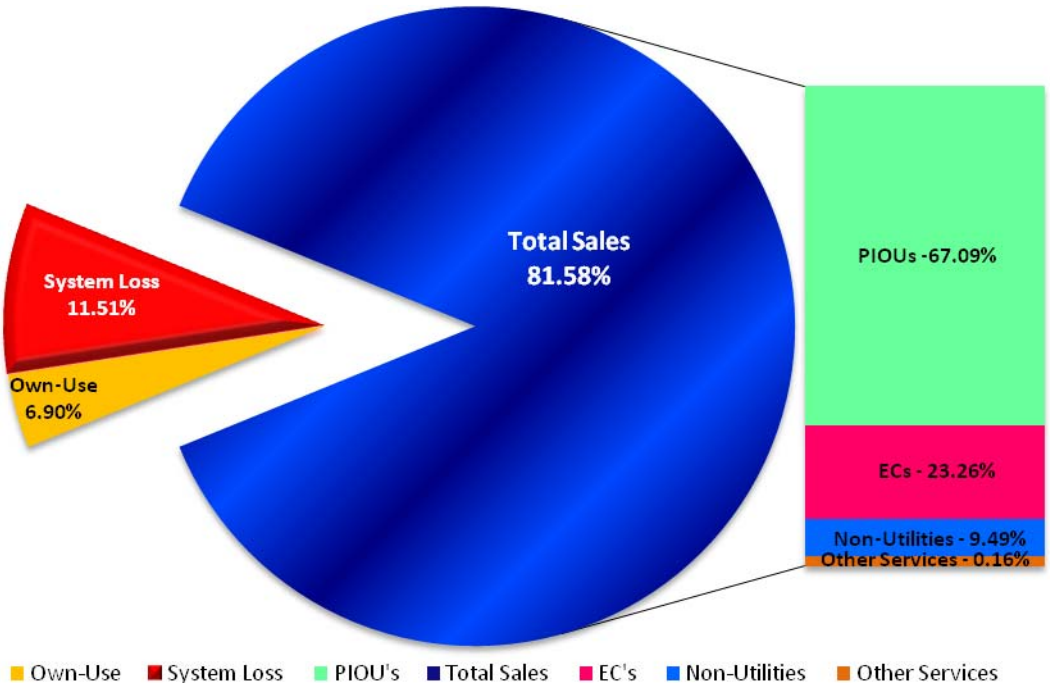
III.ELECTRICITY SALES AND CONSUMPTION

In 2010, the Philippine economy faced not only the challenge of the 2008-2009 global financial meltdowns but also by the destructive typhoons that hit the country and the El Niño phenomenon. The volatility in electricity sales and consumption can betraced to the effect ofgood economic performance with the GDP expanding by 7.3 percent. Election-related spending, remittance-supported household spending and rising exports and investments contributed to the robust increase in electricity sales and consumption.

The total electricity consumptionall over the country posted a remarkable increase of 9.4 percent from 61,934 GWh in 2009 to 67,743 GWh in 2010. Total electricity sales, which accounted for 81.6 percent of the total electricity consumption was recorded at 55,266 GWh in 2010. These comprised of Private Investor Owned Utilities (PIOU's) at 37,080 GWh, Electric Cooperatives at 12,852 GWh, Non-utilities and Other Services

at5,244 GWh and 90 GWh, respectively. “Own-use” of power plants and distribution utilities was pegged at 4,677 GWh while transmission and distribution losses were at 7,800 GWh.

Figure 3.1: 2010 Electricity Sales and Consumption, Philippines



Industrial Sector

Electricity sales of the industrial customers comprised 18,576 GWh or 27.4 percent of total electricity consumption, implying 8.7 percent growth from17,084 GWhin 2009. Industrial customers in Luzon and in other load centers of the country registered a huge increase of 10.9 percent in 2010, a remarkable increase as compared with previous year. However, significant increase was observed in the Visayas grid with 8.2 percent. On the other hand, electricity sales declined in Mindanao industry sector from 2,778 GWh in 2009 to 2,776 GWh in 2010. The adverse effect of the El Niño weather disturbance, which resulted in insufficient, delayed rainfall and prolonged drought, greatly affected Mindanao industry players, traders, producers and exporters since about 50 percent of the power in area is being supplied by hydropower plants. Despite this situation, the electricity utilization for 2010 is still higher at a modest decline of 0.07 percent as compared to the negative 10.2 percent recorded a year ago.

Residential Sector

Electricity sales in residential sector grew by 7.6 percent from 17,504 GWh in 2009 to 18,833 GWh in 2010. Sales of residential sector comprised 34.1 percent of the total electricity sales. More prominent contributor in the growth observed in the residential sector was the increase in the utilization of cooling system due to the early onset of summer season and long dry summer months because of El Niño.

Luzon grid sets the stage for growth in the whole country and was immensely fueled by the expansion of household utilization of electronic appliances in food preparation and recreation that encompasses various devices that consumers use on a daily basis, including televisions, audio components, gaming devices, DVD players and other familiar consumer appliances.

In addition, construction activity for 2010 remained strong as the total number of constructed residential buildings escalated, thus additional residential connections. Specifically, residential sector in Luzon grid posted an 8.3 percent increase of electricity sold, from 12,801 GWh in 2009 to 13,865 GWh in 2010, led by increased number of energized housing units since the residential real estate market in the Philippines particularly in Luzon was back on track.

In Visayas, electricity sales have also jacked up by 7.8 or an equivalent of 2,523 GWh from the year-ago level of 2,341 GWh.

On the other hand, sales of electricity in Mindanao were more rigid than of the other two grids as Mindanaoans immensely suffered the worst of the extended scorching heat as a result of the changing weather patterns brought by climate change. Amid the continued uncertainties brought by the challenges of El Nino all over the grid, a 3.5 percent rise in overall residential sales for Mindanao in 2010 was modest compared to last year's 7.34 percent climb, the restrained expansion was significant given the current economic and weather conditions.

Commercial Sector

Notwithstanding the global financial turmoil, the commercial sector has been the fastest-growing segment of the Philippine electricity sales and has been relatively resilient for 2010. Improved commercial energy sales in 2010 was driven by the increase in cooling load due to El Niño and can be attributed to the strong, broad-based performance of the services sector. On the back of this strong growth performance of 10.2 percent in 2010 from a bland growth of 4.3 percent in 2009 was the buoyant business and consumer confidence in the inflation of small-scale trade and retail

establishments, particularly shopping malls and construction of buildings. Improvement in electricity sales for the three power grids, on the other hand, was mainly due to an increase in the number of wet and dry markets, groceries, supermarkets, hyper marts, warehouse, discount clubs and convenience stores throughout the country. This was supported by the brisk pace of expansion in manufacturing and services.

Commercial sector performance continued to be a significant growth mechanism for the Philippine electricity sales in 2010 and demonstrated an obvious indication that this magnitude has been maintained for the whole year. For the past seven years, average annual growth rate of electricity sales to the commercial sector recorded at 5.6 percent as compared to residential and industrial sectors at 2.99 percent and 2.96 percent, respectively. Electricity sales to the commercial sector in 2010 increased by 9.3 percent (Luzon), 19.9 percent (Visayas) and 10.7 percent (Mindanao) compared to the previous year. The full year expansion of the sector remained stable and was associated to the vigorous domestic investment, healthy growth in business process outsourcing, wholesale and retail trade, import and export trade, private services and recreational services such as laundry services, medical and health services, educational services, hotels and restaurants, spas and beauty parlors. The continuing demand for such services justified the constant growth of electricity sales to the commercial sector.

OTHERS

Others refer to public buildings, street lights, irrigation and "others not elsewhere classified". This group recorded a reasonable growth of 4.8percent increase from 1,523 GWh in 2009 to 1,596 GWh in 2010.

Own-Use and System Loss

Total percentage share of system loss posted a modest growth of 3.4 percent from 7,542GWh in 2009 to 7,800 GWh in 2010. Meanwhile, utilities' own-use for office and housing and station used of the power plants remained vigorous, standing an aggressive double-digit rise at 32.7 percent in from 3,524GWh in 2009 to 4,677GWh in 2010.

The slight increase in the System Loss for 2010 which includes Distribution Utilities Loss and Transmission Loss such as substation use, transformation and other unaccounted losses still demonstrates a steady improvement on loss reduction as compared to previous years, immensely due to the continuing endeavors of the Distribution Utilities such as continuous enhancement in network efficiency and improved pilferage management. Notwithstanding, the national government initiativesthrough sustained energy efficiency improvement programs, operations and management practices are

other relevant factors and intervention that contributed to the system loss performance in 2010.

Table 4.1: 2010 and 2009 Comparative Electricity Sales and Consumption, Philippines

PHILIPPINES						
Sector	2010		2009		Difference	
	GWh	% Share	GWh	% Share	GWh	%
Residential	18,833	27.80	17,504	28.26	1,329	7.59
Commercial	16,261	24.00	14,756	23.83	1,504	10.19
Industrial	18,576	27.42	17,084	27.58	1,492	8.73
Others	1,596	2.36	1,523	2.46	72	4.75
Total Sales	55,266	81.58	50,868	82.13	4,398	8.65
Own-Use	4,677	6.90	3,524	5.69	1,152	32.70
System Loss	7,800	11.51	7,542	12.18	258	3.42
Total Consumption	**67,743**		**61,934**		**5,808**	**9.38**

IV. SYSTEM PEAK DEMAND

The extensive heat of El Niño Phenomenon brought **Luzon** an all-time peak temperature for the year recorded at 38°C. With high utilization of cooling system, the peak demand for the year was recorded at 7,656MW on 26 May 2010, the same day when the temperature reached 38°C. This is 10.5 percent higher compared to the same period in 2009.

The commissioning of 590 MW new capacity in the **Visaya**s grid eases the system that has been experiencing suppressed demand for the past years. Coincident peak demand in 2010 reached 1,431 MW, higher by 15.3 percent from the previous year. In sub-grid level, Cebu reflected highest demand with a 674 MW or 47.2 percent share to the total Visayas grid demand (Table 5.1).

Table 5.1: 2010 Coincident Peak Demand, Visayas

Sub-grid	MW	% Share
Cebu	674	47.1
Negros	263	18.4
Panay	243	17.0
Ley-Sam	204	14.2
Bohol	48	3.3
Visayas	**1,431**	

Mindanao immensely suffered the worst of the power shortage brought by El Niño Phenomenon, since more than 50 percent of its electricity requirement mainly sourced from hydro-generated power plants. Power supply in the island was insufficient as water elevation in lakes and rivers all over the grid continued to lowered down to its critical level.

As such, suppressed demand was observed since several hydroelectric power plants were operating below capacity, a substantial decline in the electricity demand in Mindanao of 15 MW or -1.2 percent from 1,303 MW in 2009 to 1,288 MW in 2010. In April 2010, demand curtailed at peak reached 320.5 MW which is the highest unserved demand for 2010 in Mindanao grid.

Table 5.2: 2010 and 2009 Comparative System Peak Demand

GRID	2010	2009	Difference	
			MW	%
Luzon	7,656	6,928	728	10.5
Visayas	1,431	1,241	190	15.3
Mindanao	1,288	1,303	-15	-1.2
Philippines*	10,231	8,965	1,266	14.1