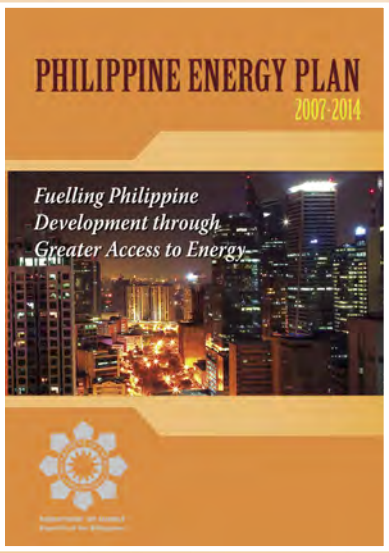
PHILIPPINE ENERGY PLAN

2007-2014

ABOUT THE COVER



The cover design depicts the crucial role of energy in fuelling global development efforts and the necessary engine essential for sustained economic growth. It is in this light that the Department of Energy remains firm and resolute to aggressively pursue the energy agenda focused on enhancing the country's access to energy. This is instrumental in reducing poverty as well as promoting social equity.

The development of indigenous energy resources is critical in achieving greater energy supply security for the country. Likewise, the implementation of relevant energy reforms will encourage more investors to engage in energy projects in a business-friendly environment. The trickle-down effect is a wider range of economic opportunities in the countryside.

This Plan Update outlines the strategies to ensure that energy requirements of future generations are provided adequately and in affordable manner in the context of an integrated energy-environment development approach. This is an affirmation to the country's commitment to sustainable development.

PHILIPPINE ENERGY PLAN
2007-2014

Fuelling Philippine Development through Greater Access to Energy

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MESSAGE FROM THE SECRETARY

Energy is indispensable to our economic growth and to the country's drive towards global competitiveness. It is crucial to sustaining a nation's progress and prosperity and an instrument for poverty reduction and social equity. In recent times, the energy sector has been confronted with several challenges, which continue to be multi-dimensional. The specter of high energy prices brought about by depleting resources, mostly fossil fuel-based, is causing economies, both large-scale and fast developing ones, to scamper and compete for their equal share in the world energy resource pie to fund their own development agenda. An equally compelling concern which has reached universal proportions is to look for cleaner energy alternatives to mitigate the long-term effects of energy development to global warming. A country's economic progress has thus become intertwined with the level of its energy security and environmental sustainability.

In this context, the 2007 Philippine Energy Plan Update has been formulated to serve as a potent tool in carrying out the national economic plan of the government. The energy choices as indicated in the Plan are also biased to the overall thrust of the government to ensure an integrated energy-environment approach.

With the 2005-2014 PEP as its reference plan as well as the actual accomplishments of the sector from 2006 to 2007 as bases, the 2007 PEP Update builds on existing plans and programs and incorporates new directives to reflect emerging developments. It remains focused on attaining a 60.0 percent self-sufficiency level by 2010 in the pursuit of energy independence and ensuring reasonably-priced electricity through the effective implementation of power sector reforms. Recent developments have been cited, to include: the passage of the "Biofuels Act" in January 2007 to provide the impetus to the country's Alternative Fuels Program; the surge in the privatization level of the generation assets of National Power Corporation (NPC) from 11.0 percent in 2006 to 42.7 as of end-2007; and the 96.6 percent barangay electrification status resulting from a strong collaborative public-private partnership.

The Plan provides specific directions for the accelerated exploration and development of indigenous energy resources to reduce our vulnerability to high oil prices, intensified use of renewable energy resources and alternative fuels for a cleaner environment, enhanced promotion of energy efficiency and conservation as a way of life, implementation of rural electrification projects to light up remote and far-flung communities in the countryside and continuous accomplishment of reforms in the power sector. A major addition to the Plan Update is the consideration of the viability of nuclear power as a long-term policy for clean energy option. In the immediate term, the emphasis will be on building the requisite human resource capability and preparing the substantive framework and technical aspects of a nuclear power program.

The Department of Energy is confident that the goal to a brighter and cleaner energy future has been laid down in this Plan Update but all these initiatives will come to naught without the support and cooperation of everyone who has a stake on energy- the economic sectors composed of the consumers, transport, industrial, commercial and agriculture; national government agencies, non-government organizations, and civil society, among others.

The government alone cannot single-handedly implement the imperatives of this Plan as these would require multi-sectoral commitment and engagement. We thus, enjoin and encourage every concerned and responsible Filipino to put his stake in this Plan and make this a reality.

Maraming Salamat and Mabuhay!

ANGELO T. REYES
Secretary

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I. Overview

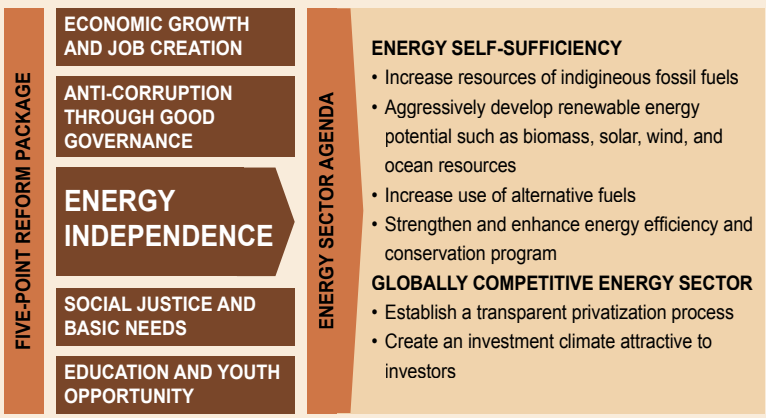
The 2007 Philippine Energy Plan (PEP) Update is an affirmation of the state's commitment to pursue the energy independence agenda under the Government's Five-Point Reform Package. The energy sector's agenda focuses on attaining a sustainable 60.0 percent energy self-sufficiency beyond 2010 and promoting a globally competitive energy sector. The first objective is anchored on the effective implementation of the following goals: (a) accelerating the exploration; development and utilization of indigenous energy resources; (b) intensifying renewable energy resource development; (c) increasing the use of alternative fuels; and, (d) enhancing energy efficiency and conservation. On the other hand, the continuing reforms in the power sector as well as the downstream oil and gas industries will pave the way in realizing a globally competitive Philippine energy sector.

Those energy goals and the corresponding strategies support the Medium-Term Philippine Development Plan (2005-2010) and the Medium-Term Public Investment Program. The PEP is also consistent with international agreements such as the 2002 Johannesburg Summit and the 2000 UN Millennium Development Goals, specifically in addressing poverty, and ensuring environmental sustainability.

The Update takes stock of the energy sector's accomplishments in 2006 vis-à-vis the targets set in the 2006 PEP Update as Reference Plan. It also evaluates the extent to which the sector has responded to the challenges that have hindered the effective implementation of the plans and programs as identified in the Reference Plan. On the bases of these actual assessments, adjustments in targets and desired timelines were made in the Plan Framework. Indigenous fossil fuels and renewable energy were discussed based on geographical clustering under the Super Regions to highlight each cluster-region's energy resources potentials. Likewise, the current update takes into consideration the impact of recent energy developments, i.e., the landmark passage in January 2007 of Republic Act (R.A.) 9367 or the *"Biofuels Act of 2006,"* renewed interest in the upstream development sector through the Philippine Energy Contracting Round (PECR), commitments to regional frameworks such as the ASEAN Plan of Action for Energy Cooperation (2004-2009) and the ASEAN initiative to move forward the harmonization of biofuel standards.

Over the planning horizon, the Update's overall energy and power demand forecasts of annual growth rates are 3.3 percent and 5.2 percent, respectively. Essentially, it will also be guided by the same policy directions, planning horizon, sets of assumptions and sectoral plans and programs with due consideration to gender sensitive approaches. Some modifications, however, will include the amount of oil displacement resulting from the mandatory biofuels blend starting

Figure 1. FRAMEWORK OF THE PEP 2007 UPDATE



in May 2007 for biodiesel and two years after for bioethanol. In the power sector, the list of indicative and committed projects has been revised. The line-up of transmission projects has also been updated consistent with the rulings of the Energy Regulatory Commission (ERC).

The highlights of the sector's performance are as follows:

- The country posted an energy self-sufficiency level of 55.4 percent in 2006. Among renewable energy resources, geothermal contributed the biggest share of indigenous energy of about 9.0 million tones of oil equivalent (MTOE) or 23.2 percent of the total primary energy mix, which is a slight improvement over its 2005 share of 21.6 percent. This is due to an increase of 5.7 percent in geothermal production. The share of imported fuels such as oil gradually declined in view of reduced consumption of oil in both power and non-power applications.

- Towards attaining the 60.0 percent primary energy self-sufficiency level by 2010, the Department of Energy (DOE) continued to promote intensive upstream exploration and development through the PECR. As of end-2006, there were 28 oil and gas service contracts (SCs) currently operating. Twenty-two of these SCs were granted during the period of 2004-2006. There are also 38 existing Coal Operating Contracts (COCs).

- The promulgation of the Biofuels Act of 2006 is expected to reduce the country's dependence on imported fuels over the long-term by mandating the graduated use of biodiesel and bioethanol nationwide. Subsequently, in May 2007, the law's Implementing Rules and Regulations (IRR) was approved following a series of nationwide public consultations. Meanwhile, investments came in the form of infrastructure facilities to support the widespread dissemination of biofuels such as the launching of the Biofuels Center in Quezon City in February 2006.

- In power generation, the country's self-sufficiency level rose to 66.0 percent in 2006 from the 65.0 percent level in 2005. Natural gas provided the largest contribution of 16,366 gigawatt-hours (GWh) or 29.0 percent of the total power generation while coal accounted for 27.0 percent. The 2.9 percent decrease on the use of natural gas in 2006 level was due to the 25-day scheduled maintenance of the Malampaya Gas-to-Power project while the slight increase in power generation from coal-fired power plant came from the commercial operation of the 210-megawatt (MW) Mindanao coal-fired power plant.

- The DOE continued to ensure the reliability of energy supply through the installation of new power plants and uprating of existing power projects. In the last months of 2006, the commissioning of the 210-MW Mindanao coal power plant located in Villanueva, Misamis Oriental brought significant improvement in the power supply in the grid. To further boost this effort is the ongoing capacity uprating of Units 1 and 2 of Agus 6 Hydroelectric Power Plants. In February 2007, the Philippine National Oil Company-Energy Development Corporation (PNOC-EDC) inaugurated the 49.4-MW Northern Negros Geothermal Power Plant located in Bago City, Negros Occidental, adding to the capacity of the Visayas Grid.

- To counter the effects of intermittent increase in the price of oil to the country's economy, the DOE remained vigilant in ensuring consumer protection and healthy competition among the industry players. As a safety net, the DOE issued and implemented for a six-month period (June to November 2006) Executive Order (E.O.) 527 *"Temporarily Modifying the Rates of Import Duty on Crude Petroleum Oils and Refined Petroleum products Under Section 104 of the Tariff and Custom Code of 1978 as Amended."* Likewise, various oil players offered price discounts for diesel sold at the pump nationwide for the public transport sector.

- For 2006, the energy conservation efforts of the government generated energy savings of about 0.88 MTOE with equivalent carbon dioxide (CO_2) emission avoidance of 2.1 million metric tons (MMMT). This included savings accounted from the energy management activities conducted by DOE such as the spot check program of government agencies nationwide mandated by Administrative Order (A.O.) 126, the continuing energy standards and labeling program, and the conduct of energy audit of various commercial and industrial entities.

- The Wholesale Electricity Spot Market (WESM) started commercial operation in Luzon in June 2006 signaling an important phase in promoting open access in accordance with the Electric Power Industry Reform Act (EPIRA) of 2001.

- The government's continuing efforts to privatize the National Power Corporation's (NPC) generation and transmission assets made significant headway with the successful bid-out of the 112-MW Pantabangan-Masiway Hydroelectric Plant in Nueva Ecija in September 2006, the 360-MW Magat Hydroelectric Plant in Ramon Isabela in December and the 600-MW Masinloc coal-fired plant in Zambales in July 2007. This resulted in a 24.8 percent privatization level.

- The DOE has energized over 95.5 percent barangay of the country during the third quarter of 2007. Based on 2005 Census, only 1,894 barangays remain to be energized to achieve 100 percent barangay electrification target as committed in the ten-point legacy agenda of the Arroyo Administration.

- To provide timely, reliable and accurate energy data and information for the Department and its stakeholders, the Energy Information Management Program (EIMP) had been implemented under the theme "One Database, One System, One DOE." The EIMP entails four Cs strategy, namely: Centralization, Computerization, Connectivity and Collaboration.

Way Forward

- Given the severe impact of climate-altering greenhouse gas emissions and skyrocketing crude oil prices, the DOE has started a reassessment of nuclear energy as a long-term power option for the country. This reassessment also considers that many of our Asian and ASEAN neighbors are using or will use nuclear power to provide them with cheaper and more reliable electricity, making them even more economically competitive. Ultimately, the decision to tap nuclear power will have to be undertaken in a rational, informed and transparent manner. This requires consultation not only with all local stakeholders but with recent international partners such as the International Atomic Energy Agency (IAEA), ASEAN and others.

  To prepare for this eventuality, however, the training of nuclear scientists and experts who can help policy makers and authorities need to start immediately. Towards this end, the DOE in collaboration with the Department of Science and Technology (DOST)-Philippine Nuclear Research Institute (PNRI) and the University of the Philippines-College of Science are preparing a long-term nuclear technology manpower development program.

- An ongoing review of the government's privatization of its generation and transmission assets is aimed at responding to the various market needs and requirements with due consideration to timeliness and transparency. The Power Sector Assets and Liabilities Management Corp. (PSALM) is set to launch more aggressive marketing efforts with the goal of increasing the existing 24.8 percent privatization level to 50.0 percent by end-2007 and 70.0 percent by end-2008[1].

- In its continuing effort to ensure energy supply security, institute market reforms, and promote consumer welfare and protection, the DOE will re-file with the 14th Congress the following legislative measures:

  - Renewable Energy Bill to promote the development, utilization and commercialization of renewable energy resources such as geothermal, hydropower, wind, solar and ocean. Private sector participation will also be encouraged through the granting of additional fiscal and non-fiscal incentives;

  - Natural Gas Bill to create favorable conditions for the establishment of the downstream natural gas industry by providing the necessary regulatory and non-regulatory measures, as well as the granting of additional fiscal and non-fiscal incentives that will encourage greater investments in the industry;

  - Liquefied Petroleum Gas (LPG) Bill to provide monitoring and supervisory framework for the LPG industry, as well as address unfair trade practices which include under-refilling, unauthorized or illegal refilling, use of unbranded cylinders, use of unsafe and dilapidated cylinders, among others. Likewise, the DOE will be given additional powers to develop and implement a comprehensive program that will promote national consciousness on safety requirements and proper use of LPG including provision of appropriate penalties for violators;

  - Energy Conservation Bill to institutionalize energy conservation and enhance the efficient use of energy in the country. The bill will also revitalize and strengthen the energy conservation programs developed such as the nationwide energy monitoring program, product labeling, energy efficiency promotion, etc.; and

  - TransCo Franchise Bill to grant the National Transmission Company (TransCo) an assignable franchise to construct, install, operate and maintain a transmission system and the grid nationwide for a period of 50 years. It will also provide conveyance or transmission of electricity through the high-voltage backbone system of interconnected transmission lines, substation and related facilities, grid connections and ancillary services.

[1] As of end 2007, actual privatization level reached 42.7 percent with the successful bidding of Calaca and Ambuklao-Binga power plants during the last quarter of 2007.

II. Energy Supply and Demand

A. SITUATIONER (2006)

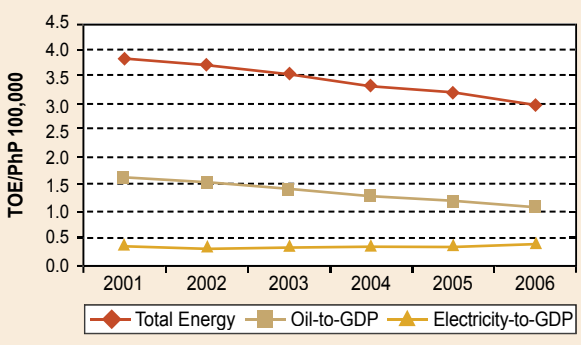
ENERGY-ECONOMY INDICATORS

The country's economy kept its dynamic pace in 2006,[2] registering a 5.4 percent growth in Gross Domestic Product (GDP). The Services sector continued to boost the economy with a 6.7 percent growth while the Agriculture, Fishery and Forestry sectors expanded by 3.8 percent. On the other hand, the Industry sector grew by 4.6 percent due mainly to the stable output of the manufacturing and construction sectors with respective growths of 4.6 percent and 7.3 percent each. On the demand-side, the strong GDP growth was backed up primarily by strong private and government expenditures which grew by 5.5 percent and 6.1 percent respectively, while exports rose by 14.9 percent.[3]

Energy Intensity

The ratio of total primary energy supply (TPES) per unit of economic output or energy intensity in 2006 was recorded at 3.04 tonnes of oil equivalent (TOE)/ Philippine Peso (PhP) 100,000, a little lower than the 2005 level of 3.2 TOE/PhP 100,000, (Figure 2) due to the slowdown in energy use particularly of petroleum products. Evidently, oil-to-GDP intensity dropped to 1.08 TOE/PhP 100,000. The lower oil intensity level was due to the noted restraint in petroleum products consumption, as well as the decline in the utilization of oil-fired power plants during the year. This was triggered mainly by the continued increase in the prices of oil in the international market. This may likewise have been driven by improvements in energy efficiency through the introduction of new technologies, more efficient utilization of existing technologies, or construction of relatively less energy-intensive industries. Meanwhile, electricity-to-GDP intensity likewise plummeted to 0.31 TOE/Php 100,000.

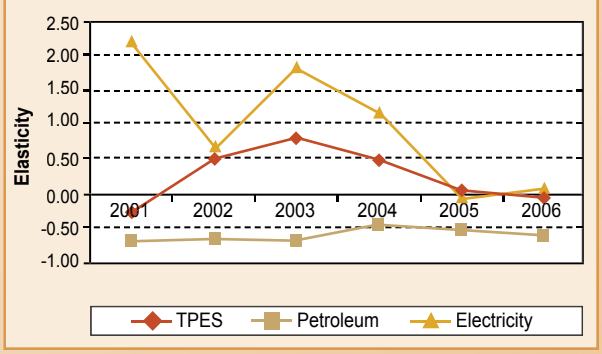
Figure 2. ENERGY INTENSITY, 2001-2006



Energy-to-GDP Elasticity

The GDP growth during the year did not translate to a corresponding increase in energy consumption as indicated by the negative 0.05 energy-to-GDP elasticity (Figure 3). As cited above, the economic growth was primarily triggered by the less energy-intensive commercial or services sector. The declining trend in energy-to-GDP elasticity, notably from 2005, may be attributed to the effective energy efficiency

Figure 3. ENERGY-TO-GDP ELASTICITY, 2001-2006



[2] Estimated population was 86.97 million; GDP per capita was PhP14,650 per person.

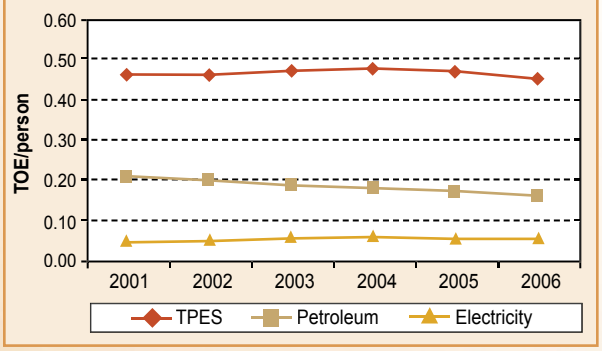
[3] National Economic and Development Authority (NEDA), FY 2006 National Income Accounts

and conservation measures that were implemented by the various economic sectors. This was evidently reflected by negative elasticity in Oil Consumption-to-GDP at 1.2 in 2005 and 1.1 in 2006. Meanwhile, electricity consumption posted a positive elasticity of 0.2 during the period which was lower compared to the previous year's level of 0.5 (Figure 3).

Per Capita Consumption

Similarly, per capita consumption of total energy, oil and electricity dropped to 0.45 TOE, 0.16 TOE and 0.05 TOE, respectively (Figure 4).

Figure 4. PER CAPITA CONSUMPTION, 2001-2006



PRIMARY ENERGY SUPPLY

The country's total primary energy supply in 2006 reached 38.7 MTOE, lower by 0.3 percent from the 2005 level of 38.9 MTOE. Total indigenous production increased by 1.2 percent from the previous year's level of 21.2 MTOE. Net imports[4], on the other hand, slightly increased by 2.1 percent from the year-ago level of 17.6 MTOE.

Oil accounted for the biggest share of 35.5 percent in the supply mix (Figure 5) despite the decrease in total oil supply from 14.5 MTOE in 2005 to 13.8 MTOE in 2006. Share of indigenous oil slightly went down by 0.1 percentage points over the previous year's 1.6 percent. This was attributed to the shut-in of Nido and Matinloc wells which are now in near-depletion state.

Year-to-date production of natural gas reached 2.5 MTOE or 6.5 percent of the total energy supply (Figure 5). This level is lower by 0.17 MTOE from last year's 2.7 MTOE caused by the 25-day scheduled maintenance of the Malampaya Gas-to-Power project.

Coal supply increased from 5.23 MTOE in 2005 to 5.32 MTOE in 2006. While majority of our coal requirements were sourced through importation, the share of indigenous coal accounted for 23.4 percent in the total coal supply. There was however, a notable decrease in indigenous coal supply by 18.2 percent from the year-ago level of 1.52 MTOE which was caused by the slow down in the production of Semirara brought about by a substantial decrease in the demand for local coal.

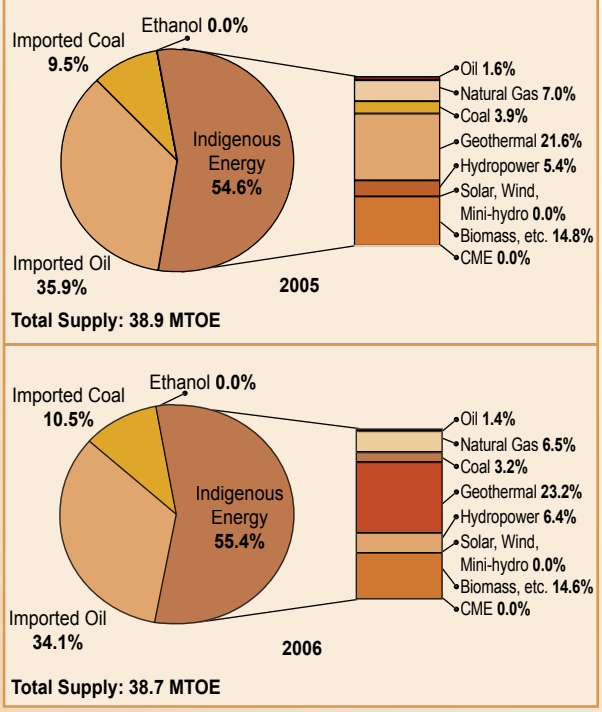
Meanwhile, geothermal energy registered an increase of 5.7 percent from 8.52 MTOE last year. Its current level accounted for 23.2 percent in the overall primary energy mix (Figure 5). Hydro went up from 2.09 MTOE in 2005 to 2.47 MTOE in 2006. Its share in the primary energy mix increased from 5.4 percent in 2005 to 6.4 percent in 2006 (Figure 5).

Total supply of other renewable energy, which includes fuelwood, charcoal, and other biomass (baggase and other agriwaste), reached 5.7 MTOE, about 2.0 percent lower than the previous year's level. Of the total supply of biomass, fuelwood accounted for 62.4 percent share, charcoal for 12.1 percent share and other biomass for 25.5 percent share.

Imported Energy

In 2006, 44.6 percent of the TPES was imported energy (Figure 5). This level was 0.83 percentage point lower than the previous year's level. Net oil importation reached 13.2 MTOE, 5.3 percent lower from 2005 level. On the other hand, coal imports increased by 9.8 percent from the 3.71 MTOE level in 2005.

Figure 5. PRIMARY ENERGY MIX



[4] Less export, bunkering and (+/-) stock change

TRANSFORMATION SECTORS

Oil Refining

Out of the 10.05 MTOE crude refinery input, about 96.8 percent of various petroleum products were produced. This indicates a 0.3 percentage point improvement from the previous year's production notwithstanding the decline in the total refinery input by 0.6 percent. The improvement in the production ratio was due to an increased output in diesel (8.4 percent), jet fuel (5.2 percent) and LPG (1.2 percent).

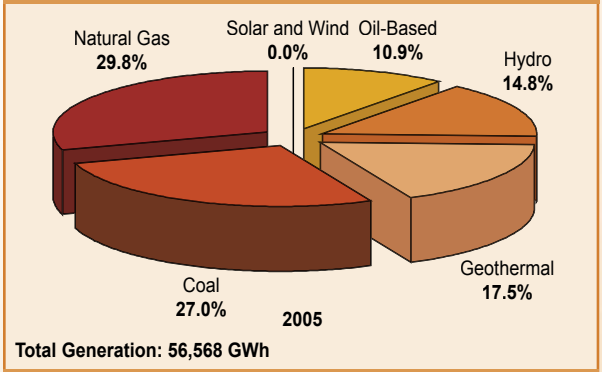
Moreover, the refinery capacity utilization remained at 72.9 percent,[5] suggestive of refining efficiency.

Power Generation

The country's total power generation in 2006 reached 56,784 GWh, slightly higher by 0.4 percent from last year's level of 56,568 GWh.

Generation from natural gas-fired power plants dominated the power generation mix with 28.8 percent share (Figure 6). However, compared to its year ago level, power generation from natural gas-fired power facilities decreased by 2.9 percent due to the 25-day scheduled maintenance of the Malampaya Gas-to-Power project resulting in the interruption of natural gas supply to Ilijan, Sta Rita and San Lorenzo power plants.

Figure 6. POWER GENERATION MIX



Power generation from coal-fired power plants reached 15,294 GWh, ranking second with 26.9 percent share to the power mix (Figure 6). The slight increase in the generation from coal-fired power plant may be attributed to the commercial operation of the 210-MW Mindanao coal power plant of Steag in the last quarter of 2006.

On the other hand, geothermal energy contributed 18.4 percent share to the generation mix while hydroelectric power plants accounted for a 17.5 percent share (Figure 6). Generation from oil-based power plants dropped by 24.0 percent from 6,141 GWh in 2005 to 4,665 GWh in 2006 due largely to restraint in oil consumption triggered by the continued increase of oil prices in the international market. Meanwhile, renewable energy sources such as solar and wind, contributed 0.1 percent share to the generation mix.

Fuel Input

The total amount of fuel used for power generation in 2006 reached 18.6 MTOE, which was 0.6 percent lower than the 2005 level of 18.7 MTOE.

Coal remained as the major fuel for power generation with total usage of 3.71 MTOE, which was 10.1 percent lower than the previous year's level of 4.13 MTOE. The use of natural gas for electricity generation likewise went down by 7.3 percent, compared with last year's 2.5 MTOE. Power generation from oil (diesel and fuel oil) reached 1.04 MTOE, 26.9 percent lower than the 2005 level of 1.42 MTOE.

FINAL ENERGY CONSUMPTION

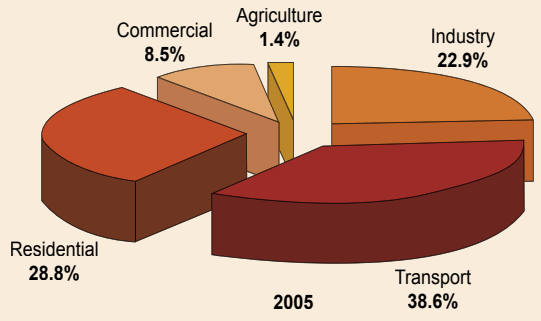
Total final energy consumption (TFEC) reached 22.5 MTOE in 2006, registering a decline of 3.0 percent from the 2005 level of 23.2 MTOE.

Most sectors of the economy experienced a down trend in terms of energy utilization. The pattern of energy demand for the period can be attributed to the continuing increase in the costs of petroleum products which turned consumers in more prudent ways of utilizing energy.

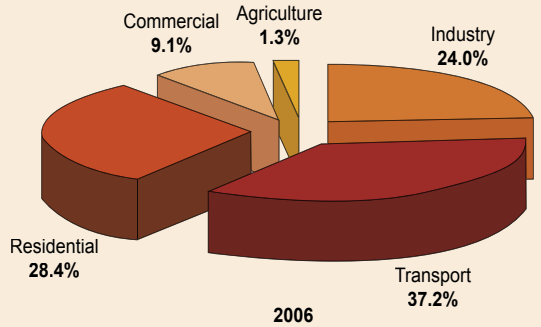
Out of the total energy demand in 2006, the transport sector remained the largest energy-consuming sector of the economy with 37.2 percent share, followed by the residential sector at 28.4 percent (Figure 7). Energy consumption of industry sector represented 24.0 percent share while commercial and agricultural sectors accounted for 9.1 percent and 1.3 percent, respectively (see Figure 7).

[5] Oil Supply/Demand Report – FY 2006

Figure 7. FINAL ENERGY DEMAND BY SECTOR



Total Demand: 23.2 MTOE



Total Demand: 22.5 MTOE

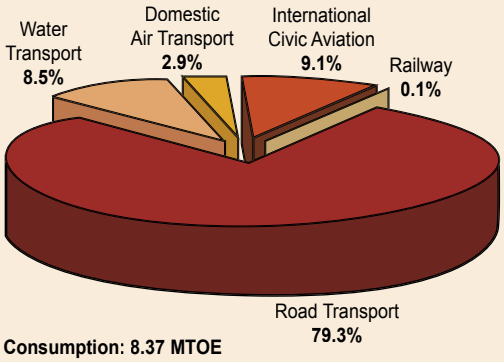
Transport Sector

The transport sector's overall energy consumption posted a 6.4 percent decrease from 8.94 MTOE in 2005 to 8.37 MTOE in 2006. Petroleum products (diesel oil, gasoline and aviation fuel) constituted the bulk of energy consumed by the sector with electricity representing only about 0.1 percent of the total (see Figure 8). The continued increase in oil prices in the world market has significantly caused the decline in oil consumption. Meanwhile, the substantial increase in the consumption of autoLPG, coco-methyl ester (CME) and ethanol has been triggered by the government's drive to promote alternative fuels for transport. The consumption of CME increased to 0.54 thousand tonnes of oil equivalent (kTOE) while ethanol used during the period reached 1.41 kTOE. Due to the significant price differential with gasoline, the use of LPG for transport has significantly increased, reaching 4.03 kTOE. AutoLPG has gained popularity among taxi fleets and to some extent privately-owned cars.

Almost 79.3 percent of the total fuel consumption of the sector was used for road transport (Figure 8). However, this is 6.3 percent lower than the year ago level of 7.09 MTOE to 6.64 MTOE in 2006.

The sector's demand for electricity is attributable to the growing ridership of the Light Railway Transit 1 and 2 (LRT 1 and 2) and the Metro Rail Transit (MRT). Electricity used for the transport sector registered an increase of 5.9 percent from 7.84 KTOE in 2005 to 8.30 KTOE in 2006.

Figure 8. ENERGY CONSUMPTION OF THE TRANSPORT SECTOR BY SUB-SECTOR, 2006



Total Consumption: 8.37 MTOE

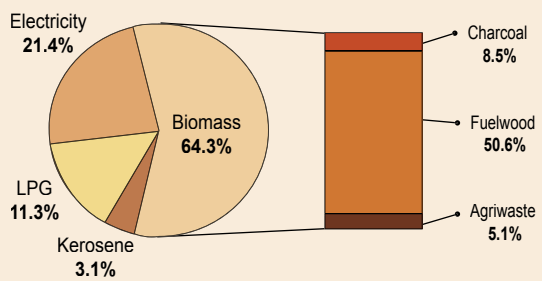
Fuel usage for air transport posted a 12.0 percent share of the total transport sector's consumption, slightly higher by 0.4 percent than the 2005 level of 1.01 MTOE.

Water transport, on the other hand, accounted for a 8.5 percent share of the sector's fuel consumption, which decreased from 0.84 MTOE in 2005 to 0.71 MTOE in 2006.

Residential Sector

The residential sector remained as the country's second major consumer of energy in 2006. Its utilization level reached 6.4 MTOE or 28.4 percent of the country's total final energy demand. Volume-wise, energy usage of the sector dropped by 4.3 percent from last year's 6.7 MTOE. This can be attributed to the sector's lesser usage of petroleum products (LPG and kerosene) and traditional fuels (fuelwood, charcoal and other biomass) (Figure 9). Obviously, the demand pattern of household between 2005 and 2006 was affected by soaring retail prices of oil products. Other factors such as the lesser sales of household appliances in 2006 and the government's advocacy on energy efficiency and conservation may have also contributed to the level of the sector's energy use.

Figure 9. ENERGY CONSUMPTION OF THE RESIDENTIAL SECTOR BY FUEL TYPE, 2006



Total Consumption: 6.37 MTOE

Total sales of major appliances[6] in 2006 was recorded at 4,736,800, about 20.7 percent lower than the 2005 volume. Notably, the sales of cooking appliances dropped by 50.5 percent during the period.

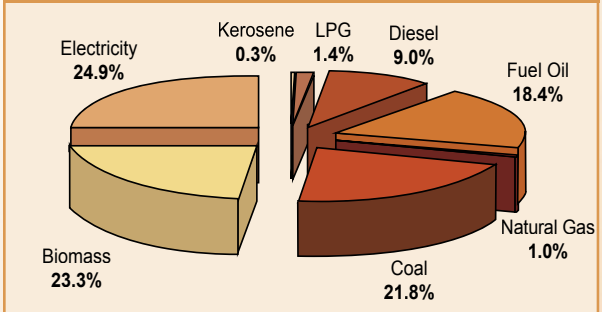
As shown in Figure 9, there is still continued reliance on traditional fuels in terms of fuel requirement for household activities. Biomass (fuelwood, charcoal, agriwaste) represented 64.3 percent of the sector's total demand due to its availability and abundance. Household consumption of biomass, however, decreased by 3.8 percent compared to last year's level. Among the biomass fuels, fuelwood was the primary household fuel for cooking which gained the highest demand level at 3.2 MTOE, followed by agriwaste and other biomass at 0.33 MTOE and 0.54 MTOE, respectively.

LPG and kerosene usage dropped by 7.3 percent and 21.4 percent, respectively. On the other hand, electricity consumption stood at 1.4 MTOE, down by 1.3 percent from last year's level of 1.3 MTOE though its share to the total sector's demand slightly went up to 21.4 percent compared to its share of 20.7 percent in 2005.

Industrial Sector

Final energy consumption of the industrial sector reached 5.39 MTOE in 2006, comprising almost one-fourth of the total energy consumption during the year. Majority of which, or about 96.4 percent was consumed by manufacturing industries. The remaining 3.6 percent were used by construction and mining (Figure 10).

Figure 10. ENERGY CONSUMPTION OF THE INDUSTRIAL SECTOR BY FUEL TYPE, 2006



Total Consumption: 5.39 MTOE

Petroleum product consumption fell by 7.3 percent due to the lower use in the manufacturing and construction sub-sectors. Meanwhile, electricity use went up by 1.4 percent. On the other hand, coal consumption rose by 11.2 percent mainly due to the increased demand of the cement and food industries. In terms of share, petroleum products remained the most consumed fuel of the sector at 29.0 percent followed by electricity at 24.9 percent and almost equally the rest is shared by coal (21.8 percent) and biomass (23.3 percent).

The industry sector grew by only 1.9 percent because of the routinary performance of the mining industry. The manufacturing sector, however, remained stable, accelerating by 2.0 percent particularly on account of food and beverages, electrical machinery, iron and steel and non-ferrous metals.[7] The reduction in the sector's energy consumption however, was indicative of the decline in its energy intensity.

On the other hand, the mining sub-sector's energy consumption rose by 28.4 percent particularly on the use of diesel, fuel oil and LPG. Surprisingly, its production decreased by 6.8 percent due to lower yields of major mines and various small scale mines (e.g. gold, copper, and crude oil).[8] In contrast, there was a notable decrease in the energy intensity of the construction sub-sector with 10.7 percent decrease in energy consumption vis-à-vis 4.7 percent growth in the gross value added (GVA).

Commercial Sector

Production performance of the commercial or service sector based on the GVA of 2005 and 2006 showed that private services, trade and finance contributed the highest growth to the overall performance of the sector.[9]

In 2006, final energy consumption of the sector increased by 4.7 percent from 1.96 MTOE in 2005 to 2.05 MTOE in 2006. Electricity (57.2 percent) showed the highest share of the sector's energy consumption with petroleum products (28.1 percent) having the second largest share and biomass (14.7 percent) as fuel substitutes (Figure 11). Electricity continued to provide the fuel requirements of the commercial sector primarily for lighting and space cooling. Electricity consumption of the sector grew by 3.9 percent from 1.13 MTOE in 2005 to 1.17 MTOE in 2006.

As the price of crude oil in the world market remained volatile, the sector's consumption of LPG declined by 2.6 percent in 2006. Diesel consumption on the other hand, rose by 35.9 percent from 0.12 MTOE in 2005 to 0.17 in 2006. Similarly, fuel oil increase by 3.4 percent during the period. The

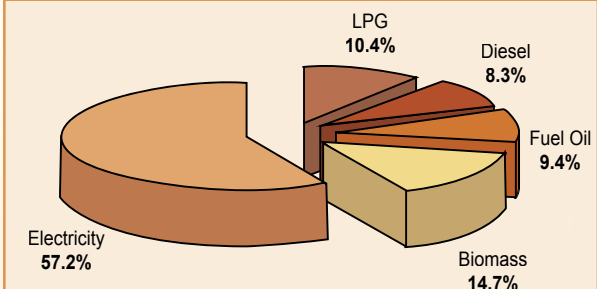
[6] Based on 2005-2006 data on sales of major appliances of the Philippine Electrical Electronics and Allied Industries Federation published in National Statistical Coordination Board's (NSCB) Economic Indicators.

[7] Statement of Socio-economic Planning Secretary Romulo L. Neri on the release of the FY 2006 National Income Accounts. Note: basic metals and metals industries are termed as iron and steel and non-ferrous metals, respectively in this report.

[8] Ibid

[9] Philippine National Accounts, NSCB

Figure 11. ENERGY CONSUMPTION OF THE COMMERCIAL SECTOR BY FUEL TYPE, 2006



Total Consumption: 2.05 MTOE

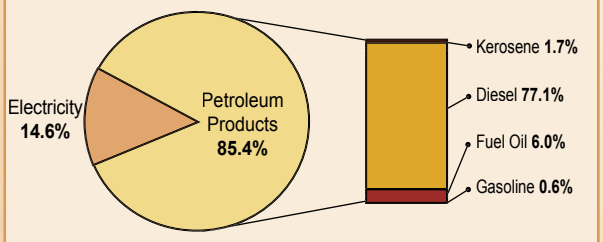
increase may be attributed to the additional power back-up requirement of the commercial buildings and the mobility needs of trading services.

Among the biomass resources, fuel wood utilization increased by 1.0 from last year's level of 0.15 MTOE. This can be attributed to the increased activity in commercial establishments like food chains, restaurants and hotels, spurred by the dynamic developments in the tourism sector.

Agriculture Sector

The agriculture sector remained the least energy intensive among the country's economic sectors, accounting for merely 1.3 percent share of the country's total final energy demand in 2006. The sector's total energy consumption dropped considerably by 10.0 percent from last year's 0.31 MTOE to 0.28 MTOE in 2006.

Figure 12. ENERGY CONSUMPTION OF THE AGRICULTURE SECTOR BY FUEL TYPE, 2006



Total Consumption: 0.28 MTOE

Petroleum products and electricity were the fuels used by the sector with 85.4 percent and 14.6 percent share, respectively (Figure 12). Total petroleum products used by the sector decreased by 11.2 percent from 0.27 MTOE to 0.24 MTOE for the period in review. Among the petroleum products, diesel was the most consumed fuel for commercial fishing which is used to fuel fishing boats, crop production, and other agricultural activities accounting for 90.3 percent of the total petroleum product share. Due to the ever-growing need for technological advancements as well as the modernization of the machines used for crop raising and harvesting, the total consumption of petroleum products of the agriculture sector will be expected to grow in the next couple of years.

Meanwhile, consumption of electricity for irrigation pumps and other agricultural activities posted a 2.2 percent decrease compared to the previous year.

B. OUTLOOK

PRIMARY ENERGY SUPPLY

Total primary energy supply is expected to grow at an annual average rate of 3.3 percent, translating to a yearly average volume of 48.93 MTOE across the entire planning period. Primary energy supply will comprise of 58.0 percent annual average share of indigenous energy and around 42.0 percent annual average share of imported energy. Indigenous energy, likewise, is projected to register an annual average volume of 28.38 MTOE while an average volume of 20.55 MTOE is expected to be sourced from other countries during the planning period.

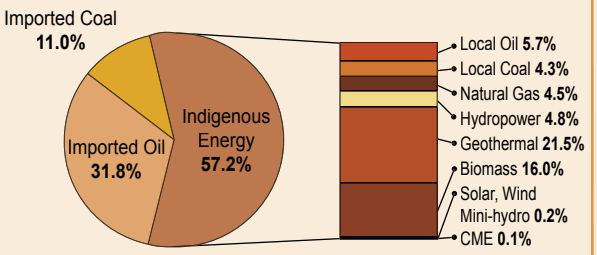
Indigenous Energy Supply

Indigenous energy will be comprised of fossil fuels such as oil, gas and coal, and renewable energy like geothermal, hydro, wind, solar, and other biomass. From 2007 to 2014, indigenous energy will account an annual average share of 29.0 percent production of fossil fuels and 71.0 percent annual average share of renewable energy sources.

Local production of oil and condensate is projected to increase by an average of 10.4 percent from 2007 to 2010 on account of the expected production from Malampaya field by 2010 and an additional production from Galoc by 2009. The combination of these fields will yield an estimated average annual production of 2.69 MTOE during the planning period.

Natural gas, being the largest indigenous fossil fuel source, is estimated to account for around 10.6 percent share of the total indigenous energy

Figure 13. PRIMARY ENERGY SUPPLY MIX, 2007

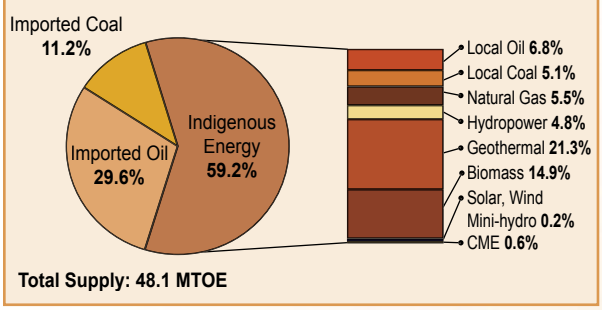


Total Supply: 43.5 MTOE

production with the foreseen addition of small gas fields from the North Luzon Agribusiness Quadrangle as well as the Visayas area. This will provide an annual average volume of 2.96 MTOE, posting growth in supply at an average rate of 12.0 percent annually.

Local coal supply will register an average volume of 2.56 MTOE and is estimated to increase by 8.8 percent. The bulk of local coal supply with 90.0 percent share of the total indigenous coal will come from Semirara, Antique while a significant amount will be sourced from prospective fields in Cebu as well as other areas of Luzon and Mindanao.

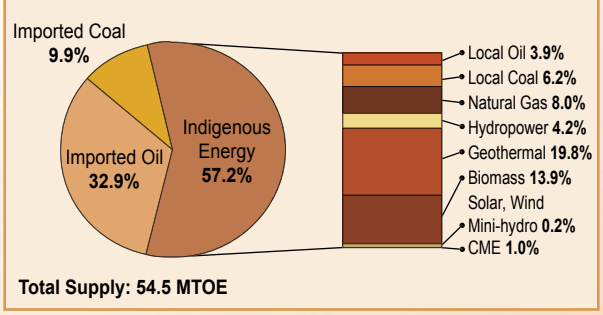
Figure 14. PRIMARY ENERGY SUPPLY MIX, 2010



Geothermal production will increase at an annual average growth of 2.0 percent or 10.24 MTOE average volume. Geothermal will account for around 21.0 percent average share of the total energy supply.

Hydropower will remain to make a significant contribution in the total primary energy supply for the planning period. Production will grow by an average of 1.3 percent with an estimated average volume of 2,25 MTOE.

Figure 15. PRIMARY ENERGY SUPPLY MIX, 2014



As part of other renewable energy, the aggregate supply of energy from wind, solar, mini-hydro, biofuels and other biomass will account for an annual average volume of 7.34 MTOE.

Biomass will constitute an average share of 14.8 percent of the total energy supply and is foreseen to grow annually by 1.2 percent.

Wind, solar and mini-hydro will collectively contribute an average volume of 0.09 MTOE to the total energy supply. During the planning period, production of these resources will post an average growth rate of 0.5 percent.

Following the implementation of the Biofuels Act of 2006, appropriate programs in plantation, fertilization and/or expansion for coconut and sugarcane and other development requirement shall be implemented to increase the indigenous supply source potential for biofuels.

To date, there are already nine accredited CME producers in the country while application for accreditation of one company is still under review. The aggregate capacity of these plants is estimated at 287,620,000 liters per year.

Meanwhile, the San Carlos Bio-energy in Negros Occidental, which has a production capacity of 100,000 liters of ethanol per day, is expected to be operational in early 2009. The growth of bio-ethanol industry requires setting up of additional facilities and providing additional services related to bio-ethanol utilization.

The combined increasing demand for ethanol and CME will require an annual average volume of 0.34 MTOE or an annual average increase in production of 40.0 percent over the planning period.

Imported Energy Supply

To meet the escalating energy requirements of a growing economy, the country will continue to rely partly on imported fuel, particularly fossil fuels such as oil and coal.

Imported oil and oil products will account for the bulk share of 75.0 percent of total imports with an annual average growth of 3.8 percent over the planning period.

Meanwhile, with coal currently being the least-cost option for power generation, coal importation is projected to increase at an average annual rate of 1.8 percent which will translate to a yearly average volume of 5.22 MTOE.

FINAL ENERGY DEMAND

The country's total final energy demand is projected to increase annually by 3.3 percent from 2007 to 2014. The country's energy consumption is expected to reach 30.69 MTOE by 2014 from 24.53 MTOE in 2007, averaging an annual requirement of 27.44 MTOE.

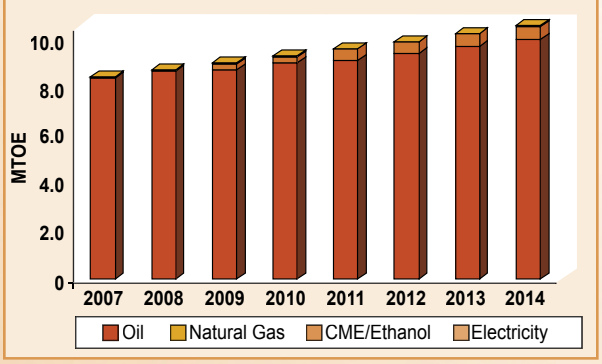
Oil will continue to dominate the country's energy requirement despite its unabated price increase in the world market. Over the reference period, oil consumption is projected to increase annually by 3.1 percent, with its annual average share of 49.3 percent in the total energy demand. Likewise, the growing population and burgeoning local industries is expected to trigger increased electricity consumption which is projected to grow by 5.2 percent annually. Meanwhile, propelled by the industrial sector such as cement manufacturing, slightly higher coal consumption is expected, recording an average increase of 1.2 percent annually.

Energy Demand by Sector

Transport Sector

Energy consumption for transport, the largest energy consuming sector, is projected to grow at an annual average rate of 3.2 percent over the planning period. The sector is expected to use up 34.3 percent of the country's total energy demand.

Figure 16. FINAL ENERGY DEMAND IN TRANSPORT SECTOR (MTOE)



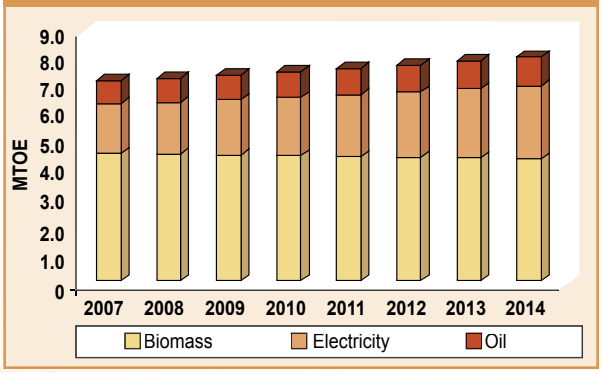
Oil remains to be the dominant fuel of the sector, accounting for 96.4 percent share in the total consumption, primarily for land transport use.

With the passage of the Biofuels Act of 2006, mandating specific biofuels blend, demand for CME and ethanol is projected to grow with a combined annual average growth rate of 42.1 percent during the reference period. This projection is based on the average annual growth rate of diesel and gasoline demand from 2007 to 2014.

Residential Sector

Households, the second largest energy-consuming sector, is foreseen to use up 27.8 percent of the country's total energy requirement over the planning period. The total energy demand of the sector is projected to grow by 1.6 percent yearly with an average consumption of 7.63 MTOE spread over the reference period. Biomass such as fuelwood, charcoal and agriwaste will remain the primary household energy sources. During the reference period, however, the use of biomass in the residential sector is foreseen to decline by 0.6 percent yearly owing to the continuing fuel shift to LPG particularly for domestic cooking. By this, consumption of LPG and kerosene is expected to rise at an average rate of 2.9 percent annually over the next ten years.

Figure 17. FINAL ENERGY DEMAND IN RESIDENTIAL SECTOR (MTOE)

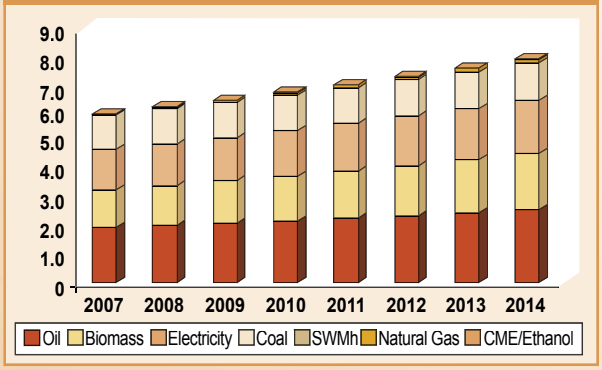


With the growing trend towards urbanization and technological revolution, the influx of electrical appliances in households is expected to impact on the sector's electricity consumption pattern increasing at an annual average rate of 5.7 percent over the planning period.

Industrial Sector

The industrial sector is the country's third largest energy consumer accounting for 25.4 percent share of the country's total energy demand during the reference period. With a yearly average consumption of 6.98 MTOE, the sector's energy requirement is projected to increase annually by 4.1 percent. Oil will continue to be the primary fuel of the sector, comprising more than 32.2 percent of its total energy demand. Meanwhile, in terms of growth, demand for CME and natural gas

Figure 18. FINAL ENERGY DEMAND IN INDUSTRY SECTOR (MTOE)

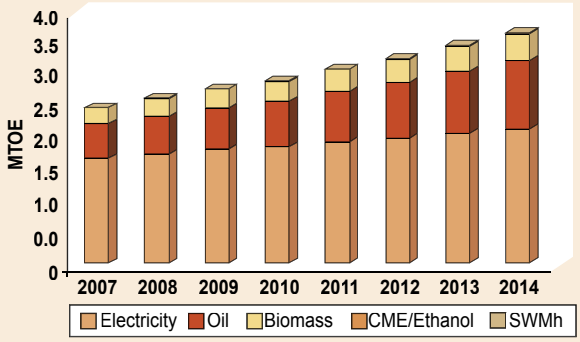


will register the highest at average rates of 14.4 and 13.3 percent annually, respectively.

Commercial Sector

Energy consumption in the commercial sector is forecasted to increase by 5.7 percent and account for 10.9 percent of the country's total energy consumption during the planning period. Electricity will be the sector's primary fuel with a 60.0 percent share in the sector's total energy requirement followed by oil which will account for 27.7 percent.

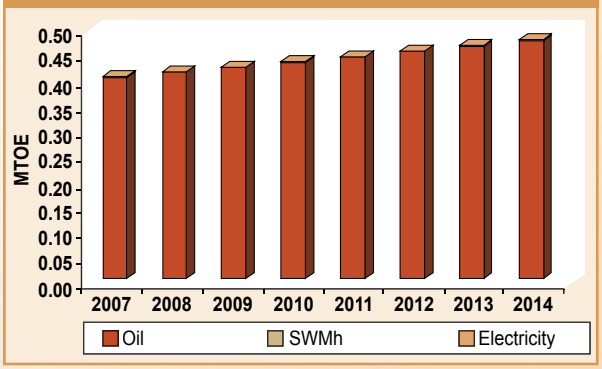
Figure 19. FINAL ENERGY DEMAND IN COMMERCIAL SECTOR (MTOE)



Agriculture Sector

Agriculture, being the least energy-intensive sector in the economy, is projected to use up 1.6 percent of the country's total energy consumption during the reference period. Energy requirement for agriculture will grow at an annual average of 2.4 percent, equivalent to 0.45 MTOE yearly consumption. Oil will be the main fuel for agricultural activities during the planning period.

Figure 20. FINAL ENERGY DEMAND IN AGRICULTURE SECTOR (MTOE)



III. Energy Independence

A. REVITALIZING THE EXPLORATION AND DEVELOPMENT OF INDIGENOUS RESOURCES

OIL AND GAS

The petroleum sector continues to work in attracting additional investments to develop more productive oil and gas fields. Thus, the 2007 Plan Update focuses on the sector's goals of increasing the country's oil and gas resources by 20.0 percent at the end of the planning period and increasing local production from other indigenous energy sources. Increasing production from indigenous hydrocarbon resources is a major pillar of the nation's energy independence agenda.

Performance Assessment

With the launching of the PECR, there is a resurgent interest on the country's upstream petroleum sector among local and foreign investors. As shown in Table 1, the country now has 28 service contracts (SC). Four of these were approved under PECR 2005 and three negotiated SCs were firmed up in 2006. Work programs under contracts awarded in 2005 and 2006 have committed investments of about US$ 155.1 million and US$ 46.2 million, respectively. Thus, the country's active service contracts will enhance the possibility of new commercial resource discoveries. A 10.0 percent likely success ratio of these contracts would also yield substantial reduction in crude oil importation and bring the country closer to meeting its goal of higher energy independence.

Based on work program commitments for 2007, five wells will be drilled in Northwest Palawan, Visayas, Ragay Gulf, Mindoro-Cuyo and the East Visayan Basin by four service contractors, to wit:

- Singapore-based Premiere Oil to drill one exploration well in Ragay Gulf under SC No. 43, in December 2007;
- Malaysia's Petronas Carigali Overseas Bhd. to drill one exploration well in offshore Mindoro;
- Galoc Production Company to drill two horizontal production wells within the Galoc sub-block or SC-14C in Northwest Palawan between August and October; and,
- Japan Petroleum Exploration Philippines, Ltd. (JAPEX) is committed to drill one exploration well over offshore Tañon Strait under SC 46.

In view of the positive results of the PECR, the DOE conducted another bidding round in December 2006. Offered in PECR 2006 were nine areas covering 72,639 square kilometers (sq. kms.) for exploration and development. These sites are located in Central Luzon, Cagayan, Mindoro-Cuyo, East Palawan and Agusan-Davao. The DOE expects to award the PECR 2006 service contracts before the end of 2007.

Exploration and Production

The year 2006 saw significant increases in production of oil, gas and condensates. Production of crude oil reached 0.18 million barrels (MMB) for the year or a 7.1 percent increase from its 2006 target of 0.17 MMB. On the other hand, production of natural gas reached 108,606 million cubic feet of gas (MMCFG) equivalent to a 23.0 percent gain from its 2006 target of 88,323 MMCFG. Simultaneous with the production of natural gas, the Malampaya gas field also produced condensate with actual output reaching 5.1 MMB for the year.

Acquisition of geophysical, principally seismic data was conducted throughout the year to determine and delineate underlying structures that could hold significant amount of hydrocarbon resources. For 2006, a total of 640 sq. kms. of 3-D seismic data and 11,296 line kilometer of 2-D seismic data were acquired.

Table 1. ACTIVE SERVICE CONTRACTS, as of June 2007

Operator	Contract Number	Location	Area (has.)	Effective Date
North Luzon Agribusiness Quadrangle				
PNOC-EC	SC 37	Cagayan Valley	36,000	18 Jul 1990
Aragorn Power and Energy Corp	SC 48	Cagayan Valley	748,000	22 Feb 2005
EF Durkee and Associates	SC 52	Cagayan Valley	96,000	08 Jul 2005
Metro Luzon Urban Beltway				
Pearl Oil (Ragay) Ltd.	SC 43	Ragay Gulf	806,550	14 Jan 2004
PNOC-EC	SC 47	Offshore Mindoro	1,466,700	10 Jan 2005
Central Philippines				
Forum Energy	GSEC 101	Reed Bank	1,036,000	13 Jun 2002
Philodrill/OPMC	SC 6A/B	Northwest Palawan	164,838	01 Sep 1973
Philodrill Corp.	SC 14	Northwest Palawan	70,888	17 Dec 1975
Shell Philippines Exploration B.V.	SC 38	Northwest Palawan	158,526	23 Feb 1989
Forum Exploration, Inc.	SC 40	Northern Cebu	458,000	19 Feb 1994
Gas2Grid Pte. Ltd.	SC 44	Central Cebu	100,000	28 Jan 2004
JAPEX Phils. Ltd.	SC 46	Offshore Tanon Strait	328,000	21 Dec 2004
Ranhill Bhd.	SC 49	South Cebu	265,000	01 Mar 2005
NorAsian Energy Ltd.	SC 50	NW Palawan	172,000	11 Mar 2005
NorAsian Energy Ltd.	SC 51	East Visayan Basin	444,000	08 Jul 2005
Laxmi Organic Industries	SC 53	Onshore Mindoro	660,000	08 Jul 2005
Nido Petroleum Phil	SC 54	NW Palawan	537,616	05 Aug 2005
NorAsian Energy Ltd.	SC 55	West Palawan	900,000	05 Aug 2005
PNOC-EC	SC 57	Calamian Block, NW Palawan	720,000	15 Sep 2005
Nido Petroleum Phils.	SC 58	West Calamian	1,344,000	12 Jan 2006
Shell Philippines Exploration B.V.	SC 60	Northeast Palawan	1,008,000	10 Feb 2006
Burgundy Global Exploration Corp.	SC 61	Northeast Palawan	1,356,000	07 Jul 2006
Burgundy Global Exploration Corp.	SC 62	Southeast Palawan	1,302,000	07 Jul 2006
PNOC-EC	SC 63	Southwest Palawan	1,056,000	24 Nov 2006
Mindanao Agribusiness				
Tap Oil (Phils.) Pty. Ltd.	SC 41	Sulu Sea	832,386	10 May 1996
South Sea Petroleum	SC 45	Agusan-Davao	748,000	15 Dec 2004
Mitra Energy Ltd.	SC 56	Sulu Sea	862,000	05 Aug 2005
PNOC-EC	SC 59	West Balabac	1,476,000	13 Jan 2006
Ranhill Bhd.	SC 64	Sulu Sea	1,264,900	28 Nov 2006

The DOE, in collaboration with various petroleum exploration companies, has started the study and evaluation of previously marginal fields such as the Galoc and Octon fields in offshore Palawan. The exploration firm, Galoc Production Company will commence the development of Galoc oilfield in the Northwest Palawan basin in 2007. The work plan includes the committed drilling of two horizontal wells and one optional well. Likewise, oilfields in current state of suspended operations (West Linapacan and Cadlao) are being considered for rehabilitation.

Measurable Sectoral Targets

The exploration program of active SCs is expected to increase the country's proven oil and gas resources to 20.0 percent within the planning period 2007 to 2014. Likewise, a total of 40 wells are programmed for drilling, majority of which are offshore wells.

Recent developments led to some adjustments in the exploration and production targets set in the Reference Plan. Specific amendments to the 2007 Plan Update include the following:

a) Oil production from the Malampaya oil leg shall commence by 2010 to run up to 2013.
b) Cadlao field shall be reactivated and production is seen to start by 2012 at 1,700 barrels of oil per day (BOPD) for ten years.
c) Galoc field shall be developed to commence production by 2009.
d) Daily gas production of 1 million standard cubic feet (MMSCF) from the San Antonio gas field will be enhanced with the scheduled replacement of the current gas turbine into a more efficient one.
e) Libertad gas field will be developed and production is expected by 2009.

In view of the above, production targets (Annex A.1.5) show that the country's existing oil and gas fields will yield about 37.4 MMB of oil and 1,138 BCF of gas for the planning period. Oil production from the Malampaya oil leg is expected to commence by 2010 with an initial production of 8.76 MMB. On the other hand, its daily gas production of 400 MMSCF will run for 20 years.

The highest level of oil production is seen by 2010 with the entry of production from the Malampaya field. On the other hand, annual gas production is estimated at about 146.0 billion cubic feet (BCF) for the period 2008-2014.

Acquisition of new geophysical data over the planning period is expected to cover 22,400 line-kilometers of 2D seismic data and 3,600 sq.kms. of 3D seismic data.

Development Challenges

- Promotion/marketing of marginal fields or those fields with resources considered *"less profitable"* for development such as those found in the Maniguin in Panay Island, Calauit and West Linapacan in Palawan and South Cebu and Libertad fields in the Visayas.
- Isolated but lingering opposition by some NGOs to oil exploration has complicated and delayed seismic surveys.
- Worldwide boom in hydrocarbon exploration has made it difficult for some service contractors to acquire drilling rig and seismic boat services in time.

Action Plan

For the 2007 Plan Update, the upstream petroleum sector goal has been modified to focus on achieving a 20.0 percent increase in oil and gas resources instead of reserves as stipulated in the 2006 Plan Update. The modified target is more quantifiable since it is verified through the acquisition, processing and interpretation of new/additional seismic data.

To meet the twin goals of increasing resources and boosting indigenous oil and gas production, the DOE has identified the following courses of action:

Increase oil and gas resources by 20.0 percent

- Improve prospectivity to increase acreage for offer under the PECR to draw more investment interest in the country's petroleum resources. This will be done through the evaluation of prospective areas to be offered in the bid rounds, promotion of the bid rounds in international promotion activities. The DOE shall also assist petroleum contractors by closely monitoring and supervising agreed geological and geophysical work commitments stipulated in the SCs. This would include the conduct of seismic activities to cover 30,000 line-kilometers, basin evaluation/assessment for the identification of leads and prospects using the Department's geological, geophysical and engineering data. Furthermore, the development of hydrocarbon discoveries and the conduct of independent field development and reservoir studies will be pursued as long-term activities to determine economic viability of newly discovered oil and gas fields.
- Enhance fiscal incentives through the review of existing laws on oil and gas exploration and development. Likewise, special incentives shall be formulated for investors willing to further assess/ develop marginal or "less prospective" basins.
- Improve information database through the enhancement of the DOE webpage on petroleum to ensure information accessibility by foreign exploration companies.

Table 2. OIL AND GAS MEASURABLE TARGETS

Field	2007	2010	2014
Exploration Well Drilling	**5**	**5**	**5**
Production			
Oil (MMB)	**0.19**	**10.27**	**0.56**
- Nido	0.12	-	-
- Matinloc	0.07	-	-
- Malampaya	-	8.76	-
- Cadlao	-	-	0.56
- Galoc	-	1.51	-
Gas (BCF)	**113.88**	**146.30**	**146.12**
- Malampaya	113.51	146.00	146.00
- San Antonio	0.37	0.18	-
- Libertad	-	0.12	0.12
Condensate (MMB)			
- Malampaya	5.15	4.93	4.22
Total Imported Fuel Oil Displacement			
in MMBFOE	**25.51**	**40.61**	**30.79**
in MTOE	**3.68**	**5.86**	**4.45**

Note: Please refer to Annex A.1.5

Increase oil and gas production

- To meet the production target of 10.36 MMB of oil and 2.24 BCF of gas from undeveloped marginal fields, there is a need to further evaluate and assess previously discovered marginal fields or existing oil fields, which have been considered as *"non-economic."* Along this context, the medium and long-term activities would include encouraging service contractors/investors to undertake the application of innovative technologies in the development of these fields. In due course, the DOE will work on amending Presidential Decree (P.D.) 87 or the Oil Exploration and Development Act of 1972 to provide additional incentives to prospective investors.
- Production from the Nido, Matinloc and Malampaya fields shall be pursued as an immediate measure to help improve the country's indigenous energy production. In the medium-term, the DOE shall

evaluate the possibility of rehabilitating oil and gas fields with suspended operations such as West Linapacan and Cadlao fields.

- A case study on the cost-effective development scheme for marginal fields shall also be conducted to improve the economic viability of such fields. The DOE is also looking at the possible development/ rehabilitation of Galoc and Cadlao oilfields as part of its long-term activities.

- Assistance will be provided by the Department on the implementation of the Enhanced Oil Recovery (EOR) and Improved Oil Recovery (IOR) projects for existing/producing fields and newly discovered fields.

COAL

The government will continue to develop the country's indigenous coal resources to fuel the country's energy requirements. Environmental concerns will be addressed through regular and proper monitoring of coal mines and the promotion of emerging clean coal technologies.

Performance Assessment

The Philippines has about 19 coal districts that contain significant coal deposits. Such deposits are found in the areas of Batan Island, Bukidnon, Cagayan-Isabela, Catanduanes, Cebu, Davao, Maguindanao. Masbate, Mindoro Negros, Quezon-Polilio, Samar-Leyte, Sarangani, Semirara, Sorsogon, Surigao del Sur, Sultan Kudarat, Quirino, and Zamboanga Sibugay. Total coal resources in these areas are estimated at about 2.3 billion metric tons.

In 2006, the country's in-situ reserves stood at 323.3 million metric tons (MMMT), registering a 3.0 percent increase from its 2006 target of 313.2 MMMT. This is mainly due to the exploration activities conducted by the new coal exploration contractors of the DOE. As of December 2006, the country has 38 active coal operating contracts (COCs) with development, production and exploration commitments. A new COC to develop and explore the coal resources in Negros Occidental was issued in 2006. This is in addition to 15 COCs awarded to 11 local companies in 2005 for the exploration and development of coal areas in Southern Luzon, Cebu and Mindanao.

The country's coal operating contractors produced 2.3 MMMT or about 1.0 MMMT less than the targeted 3.3 MMMT. Contribution came largely from large-scale coal mines as it accounted for 97.0 percent of the total production. Production from small-scale coal mines, on the other hand, increased by 12.2 thousand metric tons (MMT) as it reached 70.6 MMT in 2006. Meanwhile, the reduced operation of the Semirara Mining Corporation due to maintenance and repair of its power plant, as well as mine accidents in the coal mining areas of Cebu and Albay, and the damages wrought by typhoons Milenyo and Reming during the last quarter of 2006, contributed to the drop in production.

Under the PECR 2006, 14 coal prospective areas were offered to investors for exploration and development. Areas for offer are found in the following sites: (a) Bayawan City, Negros Oriental; (b) Bunawan, Agusan del Sur; (c) Calatrava, Negros Occidental; (d) Danao City, Cebu; (e) Gen. Nakar, Quezon; (f) Cagwait-Marihatag, Surigao del Sur; (g) Gigaguit, Surigao del Norte; (h) Kitcharao, Surigao del Norte; (i) Naga, Cebu; (j) Siay, Zamboanga Sibugay; (k) San Agustin-Lianga, Surigao del Sur; (l) Tandag-Tago, Surigao del Sur; (m) Tarragona, Davao Oriental; and (n) Trento, Agusan del Sur.

The DOE started the drafting and subsequently initiated consultations on the amended Small-Scale Coal Mining (SSCM) Circular, the Coal Mine Safety Rules and Regulations, as well as the circular on Coalbed Methane (CBM). The revision on these circulars governing coal mine operations in the country is timely in view of the increased interest in the use of coal in the power generation sector and the cement manufacturing industry. Operations of small-scale coal mining are also being encouraged as these provide employment and livelihood opportunities for host communities.

Representations made with the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR) led to modified requirements for the grant of Environmental Compliance Certificate (ECC) to coal mining operations. As a result, the Procedural Manual for the implementation of DENR Department A.O. No. 30, Series of 2003 was effectively amended through the issuance of Memorandum Circular No. 005. The circular provides that small-scale coal mining operations (or those with annual production of 20,000 MT and below) need only to provide an Initial Environmental Examination (IEE) checklist to secure their ECC. Coal mining operations with annual coal production of more than 20,000 MT but not exceeding 70,000 MT will just be required to provide an IEE Report. A full blown EIA is required only for coal mine operations with annual committed production of more than 70,000 MT.

To effectively monitor the country's coal flow and update the coal market database, research works were conducted with various coal end-users. Results of the database update facilitated energy planning and policy formulation for the upstream coal sector.

Measurable Sectoral Targets

The country's in-situ reserves will reach 420.8 MMMT by 2014, the bulk of which will be sourced from Mindanao, particularly in Region XII. Production is estimated to maintain its 3.0-MMMT level for the period 2007-2008. This is expected to gradually reach the 5.0-MMMT mark by 2011 due to increased contribution from coal-producing areas in Central Philippines and the Mindanao Super Regions. Region VI remains the biggest source of the country's indigenous coal. By 2014, production is expected to hit a record high of 6.6 MMMT to contribute to the sector's goal of increasing its self-sufficiency target level. Projected coal production will fuel the coal-fired power plants located in Antique, Sultan Kudarat, Surigao, Cagayan and Isabela, which are scheduled to be commissioned within the planning period.

Table 3. COAL MEASURABLE TARGETS

	2007	2010	2014
In-Situ Reserves (MMMT)	**318.81**	**318.82**	**420.82**
North Luzon Agribusiness Quadrangle	38.42	41.14	40.27
Metro Luzon Urban Beltway	0.79	0.79	0.79
Central Philippines	84.14	79.40	71.85
Mindanao Super Region	195.46	197.49	307.91
Production (@10,000 BTU/lb MMMT)	**3.67**	**4.78**	**6.60**
North Luzon Agribusiness Quadrangle	0.02	0.31	0.67
Central Philippines	3.36	3.79	4.92
Mindanao Super Region	0.28	0.68	1.01
Imported Fuel Oil Displacement			
In MMBFOE	**12.96**	**16.85**	**23.30**
In MTOE	**1.87**	**2.44**	**3.36**

Note: Please refer to Annex A.1.6

Development Challenges

- Need for a policy issuance mandating the use of Clean Coal Technologies (CCT) among existing and new coal end-users to improve local coal consumption and at the same time ensure the conformity of coal utilization to environmental standards.
- Need to study the impact to cost of power generation and retail electricity prices of using indigenous coal with CCT.
- Improvement of guidelines/strategies on the conduct of Information, Education and Communication (IEC) campaign activities on the use of local coal as an acceptable fuel for power generation.

Action Plan

The DOE will pursue activities to increase indigenous coal production to meet the growing demand for coal by the power generation sector and manufacturing industries.

Implementation of Plans and Programs

- A major undertaking is the project on Potential Coalbed Methane and Related Coal Resources in the Philippines to be conducted jointly by the DOE and the U.S. Geological Survey of the Department of Interior under the Memorandum of Understanding (MOU) signed between the United States and the Philippines on 07 March 2007. Coalbed methane is natural gas found in coal beds and used for a variety of purposes ranging from domestic, commercial and industrial to electric power generation. Methane is generally considered a cleaner form of energy and cost-effective as well, considering that exploration and extraction costs are low. Initially, the project will collect, analyze, compile, synthesize, interpret, and publish critical new data on coalbed methane and coal resources in the coalfields and on recoverable coal mine methane (CMM) and abandoned mine methane (AMM) reserves in the coal mine areas of the Philippines.

  The project is ultimately intended to assist coal operating contractors in identifying their estimated coalbed methane resources. In addition, it will provide technical assistance and technology transfer on the use of coalbed methane for the contractors' own power requirements.

- Another project to be implemented is the *Mine Safety, Rescue and Emergency Preparedness in Coal Mining Project* which promotes safety in mining operations. Among its main objectives is to minimize the occurrence of mine accident particularly methane gas explosion. It will also implement a program aimed at promoting safety among coal operators and coal mine workers in the country.

- A continuing activity of the DOE for the planning period is the *Coal to Market Linkage Program* which aims to update database on coal specifications of end-users and supplier technologies on coal utilization and handling. This would serve as basis for future development studies, policies and plans on coal.

- To sustain the projected demand for coal during the planning period, coal blocks will continue to be offered in the PECR. Activities attendant to the conduct of contracting rounds include the prioritization of coal areas to be offered, evaluation of submitted proposals vis-à-vis the PECR criteria, and the subsequent awarding of development/ exploration contracts to qualified bidders. Likewise, the DOE will identify and promote small-scale coal mining areas for possible development.

Institutional Strengthening

- To lay the framework for improved indigenous coal production, a review of the consolidated draft of the

amended SSCM Circular and the Coal Mine Safety Rules and Regulations shall be undertaken in 2007. Upon approval of these statutes, implementation is expected within the length of the planning period.

- A new Circular providing the guidelines for coal bed methane exploration, development and production will be drafted and issued not only to improve our self-sufficiency in energy but promote safe coal mining as well.

- Drafting and implementation of policies on the use of indigenous coal and clean coal technology are expected within the planning period to address marketability and environmental issues of indigenous coal. Other strategies to promote the use of indigenous coal include the conduct of information campaign on CCTs for power generation, conduct of training/seminars on safe and efficient coal mining practices, as well as the pursuit of environmental programs and innovative technologies for the reduction of coal emissions and effluents.

RENEWABLE ENERGY

As of end 2006, the country's total installed capacity from renewable energy stood at around 5,261.2 MW. Hydropower accounted for the largest share of 61.9 percent followed by geothermal with 37.6 percent and the remaining 0.5 percent was provided by solar and wind. Indicative projects in biomass, solar and ocean are expected to contribute their shares during middle to end of the planning period. Meanwhile, assessed potential wind sites promise a huge contribution to the achievement of the envisioned double capacity from renewable energy.

Table 4. RENEWABLE ENERGY INSTALLED CAPACITY (MW)

Renewable Energy	Installed Capacity
Hydropower	3,257.00
Geothermal	1,978.00
Wind	25.18
Solar	1.00
Total	**5,261.18**

Table 5. INDICATIVE GEOTHERMAL CAPACITY ADDITIONS (MW)

Region	Plant	Location	Potential Capacity	Year Available
North Luzon Agribusiness Quadrangle				
CAR	Batong Buhay	Batong Buhay, Kalinga	60.0	2013
	Buguias Tinoc	Buguias Tinoc, Ifugao	60.0	2014
	Daklan	Daklan, Benguet	20.0	2014
II	Baua	Baua, Cagayan	20.0	2014
Metro Luzon Urban Beltway				
III	Natib	Natib, Bataan	40.0	2012
IV-A	Mabini	Mabini, Batangas	20.0	2012
IV-B	Montelago	Montelago, Oriental Mindoro	40.0	2012
Central Philippines				
V	Tanawon	Albay and Sorsogon	40.0	2011
	Rangas	Albay and Sorsogon	40.0	2013
	Manito Kayabon	Manito, Albay	40.0	2013
VI	Northern Negros*	Bago City, Negros Occidental	49.4	2007
	Mandalagan	Mandalagan, Negros Occidental	20.0	2014
VII	Nasulo**	Palinpinon, Negros Oriental	20.0	2010
	Dauin	Dauin, Negros Oriental	40.0	2011
VIII	Biliran	Biliran, Biliran	20.0	2012
Mindanao Agribusiness				
IX	Lakewood	Lakewood, Zamboanga del Sur	40.0	2012
XI	SE Apo	SE Apo (Kapatagan), Davao del Sur	40.0	2014
	Amacan	Amacan, North Davao	20.0	2013
XII	NW Apo	NW Apo (Tiko), North Cotabato	20.0	2012
	Mindanao III	Mt. Apo, North Cotabato	50.0	2010
Total			**699.4**	

* *commissioned in February 2007*
** *committed projects*

Geothermal

Performance Assessment

Development of geothermal energy potential is continuously being pursued to increase its share in the over-all energy mix and support the country's bid in becoming the largest producer of geothermal energy in the world. In the 2006 primary energy portfolio, the share of geothermal energy stood at 22.8 percent compared to 21.5 percent in 2005. Meanwhile, gross electricity generated from geothermal resource stood at 10,465 GWh in 2006 exhibiting an increase of 5.7 percent from the previous year's level and posting an 18.4 percent share in the overall power generation output.

As a result of the increase in the electricity generation, fuel oil displaced increased from 17.07 MMBFOE in 2005 to 18.03 MMBFOE in 2006. Due primarily to the continuous oil price increase, foreign exchange savings also increased from US$ 873.46 million in 2005 to US$1,140.72 million in 2006.

The completion of rehabilitation works for MakBan and Tiwi geothermal power plants in the last quarter of 2005 resulted in the increased power plant capacities of 32.8 MW and 14 MW, respectively. Moreover, PNOC-EDC's[10] first merchant power plant – the 49.4 MW Northern Negros Geothermal Power Plant (NNGPP) – started its commercial operation in February 2007 providing additional power

[10] The government's arm in geothermal energy production, which is now privatized with 40.0 percent of shares offered to the public and the remaining 60.0 percent bought by Red Vulcan Holdings Corp., a consortium led by First Gen Corporation, Spalmare Holdings BV and Terracota Holdings Corp.

capacity for the Visayas grid. Also in 2006, three production wells were drilled and completed by PNOC-EDC: PT-11D in Northern Negros, and 421D and 424D both in Leyte to boost the steam production in the said geothermal fields.

Under PECR 2006, three areas were offered namely: the 20-MW Mabini in Batangas, 20 to 40-MW Biliran in Biliran Province and 20 to 40-MW Amacan in Compostela Valley. Once harnessed, these fields could add about 60 to 100 MW additional capacity.

Measurable Sectoral Targets

Potential capacity addition of 699.4 MW from geothermal resource could be harnessed within the planning period. Bulk of such additional capacity shall come from the Central Philippines with a total capacity of 269.4 MW, while the Mindanao Super Region has a total of 170-MW potential capacities that could be tapped. From these capacity additions, the 20-MW Nasulo Geothermal Power Project in Palinpinon, Negros Oriental and the 50-MW Mindanao III Geothermal Project are already committed and expected to be available both in 2010.

To further accelerate the utilization of geothermal and increase its share in the energy mix, around 236 wells are envisioned to be drilled within the planning period by the private sector (Table 6) in pursuit of developing new geothermal areas and expanding the existing steam fields. On the other hand, the private sector will be encouraged to undertake the drilling of the remaining wells located outside the PNOC-EDC contracted areas.

Table 6. GEOTHERMAL MEASURABLE TARGETS

	2007	2010	2014
No. of wells to be drilled	**8**	**35**	**19**
Luzon	0	21	7
Visayas	4	7	7
Mindanao	4	7	5

Note: Please refer to Annex A.1.7

Development Challenge

Foreign investors are restricted to a maximum of 40.0 percent ownership of any geothermal venture. This legal provision is a major stumbling block to the entry of foreign investors, holding back more extensive development of the country's geothermal resources.

Action Plan

As part of government's bid to becoming the world leader in geothermal energy, the following strategies shall be carried out to advance its exploration, development and utilization:

- Conduct further assessment of geothermal prospective fields to identify sites that can be offered in the PECR.
- Monitor closely the exploration and development of awarded geothermal areas.
- Conduct reservoir and production studies for optimized utilization of geothermal resources in existing power plants. Optimization projects shall likewise be encouraged from the service contractors.
- Pursue optimization of low-temperature geothermal energy by promoting the cascading scheme of development through the project: *"Resource Assessment of Low-Enthalpy Geothermal Resources in the Philippines."* This will be implemented over a five-year period to commence in 2007. The project aims to promote and accelerate the development of small and low enthalpy geothermal resources in the Philippines through the conduct of detailed geo-scientific investigations, socio-economic and environmental baseline studies on identified small and low enthalpy geothermal resource areas.
- Pursue the implementation of the Memorandum of Agreement (MOA) between DOE, PNOC and the local government of Puerto Princesa, Palawan.

  The MOA provides for the assessment of Palawan's geothermal energy resources for power and non-power utilization.
- Enhance policy framework in the development of geothermal energy through the following policy initiatives:
  - Formulation of a Department Circular (D.C.) for the direct use of geothermal energy for non-power applications
  - Seek Department of Justice (DOJ) Opinion on possible review of P.D. 1442, *"An Act to Promote the Exploration and Development of Geothermal Resources,"* allowing 100 percent foreign equity participation in geothermal projects.

Hydropower

Performance Assessment

In 2006, the country's total installed capacity from hydropower stood at 3,257 MW. The 345-MW San Roque hydropower plant in Pangasinan and 350-MW Kalayaan 3 and 4 in Laguna remain the biggest contributors. Fuel oil displacement of the sector reached 17.14 MMBFOE in 2006.

The DOE issued non-exclusive reconnaissance permits for 15 mini-hydro projects in 2006. Additional 11 mini-hydro projects were given such permit during the 1st quarter of 2007. Feasibility studies for these projects are still being undertaken.

There were 14 hydropower projects with feasibility studies, which are estimated to provide an additional 255.2 MW to the country's existing hydropower capacity. These are being undertaken by following developers: Solution Using Renewable Energy (SURE), Province of Biliran, PNOC-EDC/SOLUZIONA, Chase Makros Management, Inc. (CMMI), Benguet Power Resources Development Corp., First Gen Visayas Hydro Power Corporation, and the Sta. Clara Power Corporation. Two of these projects will proceed to the construction phase, namely: (a) Colasi in Mercedez, Camarines Norte; and, (b) Sipangpang in Cantilan, Surigao del Sur projects with potential capacity of 1 MW each. Both projects are expected to be completed in 2009.

Meanwhile, the DOE continuously supervises the on-going constructions of committed mini-hydropower projects. These stand-alone projects will provide a total of 4.6 MW in different areas of the country by 2008. Table 8 shows the details of projects' ongoing constructions.

Measurable Sectoral Targets

The 2007 Plan Update identifies 41 hydropower projects consisting of 10 large hydropower (924.8 MW) and 31 mini-hydropower (100.3 MW) projects or an aggregate capacity of 1,025.1 MW (Table 7). The Metro Luzon Urban Beltway and Mindanao regions host the greater bulk of the potential projects with total capacity of 368 MW and 369.8 MW, respectively.

The Provincial Government of Ifugao is expected to implement

Table 7. INDICATIVE HYDROPOWER PROJECTS (MW)

Region	Name of Plant	Capacity	Target Year	Location
North Luzon Agribusiness Quadrangle				
CAR	Ibulao MHP	1.5	2010	Lagawe, Ifugao
	Bulanao RIS	0.3	2010	Tabuk, Kalinga
	Atok 4 MHP	0.3	2010	Atok, Benguet
	Buguias 1 MHP	0.6	2010	Benguet
I	Pansian River MHP	0.7	2010	Pagudpod, Ilocos, Norte
II	Uddiawan MHP	1.0	2010	Solano, Nueva Viscaya
III	Pantabangan Expansion	78.0	2011	Pantabangan, Nueva Ecija
	Balintingon River Multi-Purpose Project	44.0	2013	Nueva Ecija
Metro Luzon Urban Beltway				
IV-A	Kalayaan Pumped Storage Power Plant III (CBK expansion)	360.0	2011	Kalayaan, Laguna
IV-B	Catuiran MHP	8.0	2011	Naujan, Mindoro Oriental
Central Philippines				
IV-B	Langogan MHP	6.8	2011	Puerto Princesa Palawan
	Batang Batang MHP	3.5	2014	Palawan
	Cabinbin MHP	0.8	2014	Palawan
V	Vera Falls	0.2	2010	Malinao, Albay
	Palali Falls	0.1	2010	Malinao, Albay
	Cumaginking	0.2	2010	Malinao, Albay
	Lower Dugui MHP	3.2	2010	Virac, Catanduanes
	Hitoma 1 MHP	1.5	2010	Caramoran, Catanduanes
	Hitoma 2 MHP	1.6	2010	Caramoran, Catanduanes
	Solong Falls MHP	2.3	2010	San Miguel, Catanduanes
	Kapipian MHP	3.0	2010	Catanduanes
VI	Villasiga HEP	8.0	2012	Antique
	Timbaban HEP	23.5	2012	Madalag, Aklan
	Aklan Hydropower Project	41.0	2012	Libacao, Aklan
VII	Sicopong HEP	17.8	2013	Negros Oriental
	Siaton MHP	5.4	2013	Negros Oriental
	Pacuan HEP	33.0	2013	Negros Oriental
	Igbolo MHP	4.0	2013	Igbaras, Iloilo
VIII	Bugtong MHP	1.0	2014	Samar
	Amandaraga MHP	4.0	2014	Eastern Samar
Mindanao Agribusiness				
IX	Salug Daku MHP	225.0	2011	Saguiaran, Lanao del Norte
	Lower Dapitan MHP	6.0	2010	Josefina, Zamboanga del Sur
	Upper Dapitan MHP	3.8	2013	Zamboanga del Norte
	Middle Dapitan MHP	3.6	2013	Zamboanga del Norte
X	Agus 3 Hydroelectric Plant	4.4	2013	Zamboanga del Norte
	Tagoloan Hydropower	68.0	2012	Sumilao, Bukidnon
	Cabulig MHP	8.0	2010	Claveria, Misamis Oriental
XI	Suwawan MHP	5.5	2011	Davao City
	Tamugan AB, Panigan and Suawan Hydroelectric Power	34.5	2010	Davao City
	Talaingod MHP	1.0	2012	Talaingod, Davao del Norte
XII	Magpet MHP	10.0	2012	Magpet, North Cotabato
Total		**1,025.10**		

Table 8. MINI-HYDROPOWER PROJECTS ON-GOING CONSTRUCTION (MW)

Project	Capacity	Location	Commissioning Year
Sevilla	2.50	Sevilla, Bohol	2008
Hinubasan	0.35	Dinagat Island, Surigao del Norte	2008
San Luis	0.75	San Luis, Aurora	2008
Cantingas	0.96	Sibuyan Island, Romblon	2008
Total	**4.56**		

the Ambabag MHP with 0.2 MW additional capacity in 2009. In the same year, the LGUs of Mercedes, Camarines Norte and Cantilan, Surigao del Sur have scheduled the implementation of Colasi and Sipangpang MHPs.

Meanwhile, HEDCOR, Inc. targeted the implementation of Sibulan HEP located in Davao del Sur in 2009. The project has a potential capacity addition of 42.5 MW. Gerphil will proceed with the implementation of the 110-kW Panoon Falls MHP in Impasug-ong, Bukidnon also within the same year.

Development Challenges

- Encouraging greater private sector participation in the development of hydropower with the immediate passage of the Renewable Energy Bill.
- Limited interested developers due to high initial investment costs.

Action Plan

Administer R.A. 7156 (Mini-Hydropower Law) with enhanced participation of the Market Service Center (MSC) created under the *Capacity Building to Remove Barriers to Renewable Energy Development (CBRED) project.*

BIOMASS, SOLAR, WIND

To further promote the wide scale use of renewable energy sources, about 740.4 MW of indicative capacities from biomass, solar, and wind energy sources are identified for possible development. About 556.5 MW will come from wind power projects and the balance of 183.9 MW from biomass.

Table 9. INDICATIVE BIOMASS PROJECTS (MW)

Region	Project	Capacity	Year Available	Location
North Luzon Agribusiness Quadrangle				
I	Ricehull Cogeneration	9.9	2014	Calasiao, Pangasinan
II	Ricehull Cogeneration	0.8	2014	Gamu, Isabela
	Ricehull Cogeneration	9.9	2014	Isabela
III	Ricehull Cogeneration	9.9	2014	San Jose City, Nueva Ecija
	Ricehull Cogeneration	2.5	2014	Quezon, Nueva Ecija
	Ricehull Cogeneration	2.5	2014	Talavera, Nueva Ecija
	Ricehull Cogeneration	2.5	2014	Muñoz, Nueva Ecija
Metro Luzon Urban Beltway				
III	Ricehull Cogeneration	15.0	2009	Bocaue, Bulacan
IV-B	Ricehull Cogeneration	3.7	2014	Mindoro Occidental
	Ricehull Cogeneration	10.0	2010	Mindoro Oriental
Central Philippines				
IV-B	Ricehull Cogeneration	2.5	2014	Narra, Palawan
V	Ricehull Cogeneration	5.0	2014	Pili, Camarines Sur
VI	Ricehull Cogeneration	25.0	2010	Panay
	Bagasse Cogeneration	12.0	2010	Kabangkalan, Negros Occidental
	Ricehull Cogeneration	50.0	2013	Victorias, Negros Occidental
	Bagasse Cogeneration	5.0	2014	Pototan, Iloilo
VII	Ricehull Cogeneration	2.5	2014	Bohol
Mindanao Agribusiness				
X	Ricehull Cogeneration	10	2010	Cagayan de Oro City
XII	Ricehull Cogeneration	5.2	2014	Surallah, South Cotabato
Total		**183.9**		

Biomass

Performance Assessment

Renewable energy from biomass is targeted to contribute 122 MW to the overall energy self-sufficiency target of 60.0 percent in 2010. Initiatives from private sectors provide a good indication on the potential of biomass energy development in the country. This is evidenced by the 12-MW Cogeneration Plant of JG Summit Holdings, Inc. in Negros Oriental endorsed by DOE to the Board of Investments for registration under the Omnibus Investment Code. Said cogeneration plant will use the bagasse generated from the sugar milling operations of the Kabankalan, Negros Occidental and Manjuyod, Negros Oriental sugar mills and refineries of Universal Robina Corporation, one of the subsidiaries of JG Summit Holdings, Inc.

Committed Projects

In the municipalities of San Manuel, Cabatuan and Luna in Isabela province, own-use ricehull cogeneration plants are expected to provide an additional capacity generation of 5 MW by 2008. Proponents of these projects are La Suerte Rice Mill, Family Choice Grains Processing Center and Golden Season Grain Center.

On the other hand, by-product from sugar cane industry is providing an option for energy resource in the Central Philippines super region. The Central Azucarera de San Antonio in Passi, Iloilo has an ongoing pre-commissioning activities on bagasse cogeneration plant with 15-MW capacity. Likewise, the municipality of Talisay in Negros Occidental through its proponent, the First Farmers Holdings, Inc. is 40.0 percent complete in the construction of the physical structure of a 30-MW bagasse cogeneration plant. Both cogeneration plants are planned to serve the energy requirement of the proponents by 2008 and the excess will be distributed through the grid.

Table 10. INDICATIVE WIND POWER PROJECTS (MW)

Region	Capacity (MW)	Year Available	Location
North Luzon Agribusiness Quadrangle			
I	40.0	2009	Burgos, Ilocos Norte (Phase 1)
	46.0	2010	Burgos, Ilocos Norte (Phase 2)
	40.0	2014	Pagudpud, Ilocos Norte
	57.0	2014	Pasuquin, Ilocos Norte
	40.0	2014	Suyo, Ilocos Sur
	25.0	2014	Western Pangasinan
	35.0	2014	Eastern Pangasinan
III	50.0	2014	Carranglan, Nueva Ecija
Metro Luzon Urban Beltway			
IV-A	50.0	2013	Mauban, Quezon
	25.0	2013	Caliraya, Laguna
IV-B	5.0	2013	Sta. Cruz, Marinduque
	3.4	2009	Marinduque
	10.0	2014	Abra de Ilog, Occidental Mindoro
	20.0	2013	Puerto Galera, Oriental Mindoro
Central Philippines			
IV-B	1.7	2009	Romblon
	3.4	2009	Tablas Island, Romblon
	5.0	2012	Tablas Island, Romblon
V	5.0	2009	Baleno, Masbate
VI	30.0	2010	San Carlos Negros Occidental
	20.0	2010	Pandan, Antique
	20.0	2010	San Remigio, Antique
	10.0	2012	Manoc-manoc, Aklan
Mindanao Agribusiness			
CARAGA	15.0	2011	Nuventa, Surigao del Sur
Total	**556.5**		

Indicative Projects

A total of 183.9 MW rice hull and bagasse-fueled co-generations projects distributed over the super regions are lined up within the planning period (Table 9). The Bulacan Biomass-to-Energy Project in Bocaue by the Global Green Power Plc (GGP) shall be expected to generate additional capacity of 15 MW to the Luzon grid in December 2009. GGP also has three other biomass projects – the Panay Biomass Power Project (25 MW), Mindoro Biomass Power Project (10 MW), and the Cagayan de Oro Biomass Project (10 MW) – which are proposed to be completed in 2010. The Panay and Cagayan de Oro Biomass Projects shall be connected to the grid.

Capacity additions expected from these biomass indicative projects are: 15 MW in 2009, 57 MW in 2010, 50 MW in 2013 and 61.9 MW in 2014. A number of these co-generation projects are located in the provinces covered by the North Luzon Agribusiness Quadrangle and Central Philippines super regions.

Wind

Performance Assessment

Wind power in the country is gaining interest from potential investors. A total of seven applications for Production-Sharing Contracts (PSC), such as Pre-Commercial Contract (PCC) and Pre-Negotiated Commercial Contract (PNCC), have been processed. The PCC covers the detailed wind resource assessment and feasibility study phase while PNCC covers the actual project implementation or commercial phase.

The PNOC-EDC – the country's leading geothermal energy developer – now ventures into the development of other renewable energy. It has filed its application for a PSC with DOE for wind power development in Nagsurot, Burgos (Ilocos Norte) while the UPC Asia's application covers areas located at Burgos and Pagudpud both in Ilocos Norte.

The DOE monitored the activities of six wind sites with existing PCCs. It is expected that ongoing activities would lead to the development and implementation of wind projects in the contract areas.

Committed Project

Phase 2 of the wind project in Bangui, Ilocos Norte is targeted for commissioning in 2008 with Northwind Power Development Corp. as the proponent. The project is expected to provide additional 8-MW capacity addition to the Luzon grid.

Indicative Projects

Additional capacity of 556.5 MW is expected from 23 indicative wind sites during the planning period (Table 10). Indicative projects of 333 MW potential capacity additions located in North Luzon Agribusiness Quadrangle as well as those in Metro Luzon Urban Beltway (113.4 MW), Central Philippines (95.1 MW) and Mindanao Agribusiness (15 MW) can either be connected to grid or off-grid.

Solar

Performance Assessment

The 25-MW initial capacity of the Sunpower Solar Wafer Fabrication Plant was raised to 50 MW in 2005 and increased further to 108 MW in 2006. It is planned to gradually increase its capacity to 400 MW by 2010. Photovoltaic battery charging stations installed in the year under review with the capacity of 110.4 kWp were able to energize 3,680 households in off-grid barangays in Visayas (six barangays) and Mindanao (86 barangays).

Development Challenges

- Implementation of the Victorias and Talisay bagasse co-generation power plants, with combined total capacity of 80 MW, has been deferred due to changes on the investment priorities of the project proponents.

- High upfront capital costs limit interested developers to invest on development projects in biomass, solar wind and ocean energy projects.

Action Plan

- Conduct promotion activities on the development and utilization of biomass, solar and wind resources.

- Continuous conduct of detailed wind resource assessment

- Offer the feasible sites identified under the detailed resource assessment through wind contracting rounds.

B. INCREASE USE OF ALTERNATIVE TRANSPORT FUELS

The intensified development and utilization of alternative fuels for transport use is seen as a continuing strategy to reduce the country's dependence on imported oil. It also provides a viable solution to cushion the impact of highly volatile petroleum prices to the economy as well as promote clean and ecology-friendly energy sources.

The major alternative fuels being promoted are biofuels that include biodiesel and bioethanol, autogas and compressed natural gas (CNG). Prospect on the use of jatropha curcass as a potential biodiesel feedstock is also being explored.

Performance Assessment

Biofuels

The signing of R.A. 9367, *"An Act to Direct the Use of Biofuels, Establishing for this Purpose the Biofuels Program, Appropriating Funds thereof, and for other Purposes,"* otherwise known as the Biofuels Act of 2006, on 12 January 2007 by President G. M. Arroyo provides the impetus for the full development and utilization of biofuels in the country. Said Act mandates the use of biofuels and establishes the National Biofuels Program to ensure a sustained investment climate for production, distribution, and utilization of biodiesel and bioethanol.

Correspondingly, this was followed by the issuance of D.C. No 2007-05-0006 or the IRR of the Biofuels Act of 2006 on 17 May 2007 in consultation with the National Biofuels Board[11] (NBB) and other stakeholders. The creation of the NBB is mandated under the law to monitor and evaluate the implementation of the National Biofuels Program.

The Biofuels Act of 2006 seeks to reduce dependence on imported fuels with due regard to the protection of environment and consistent with the country's sustainable economic growth thrust to expand opportunities for livelihood, specifically in the countryside. With the regulatory environment in place, the development of the local biofuels industry will accelerate government's efforts towards attaining energy self-sufficiency.

The Biofuels Act of 2006 was signed by Pres. Arroyo in ceremonies held on 12 January 2007 in Malacañang.

The importance of biofuels was highlighted during the 24th ASEAN Ministers on Energy Meeting (AMEM) held in Vientiane, Lao PDR in July 2006. Emphasis was given on the need for closer cooperation and exchange of experience among ASEAN countries in promoting the development, production and utilization of biofuels, including the relevant fiscal incentives, funding facilities and regulatory infrastructures. Similarly, the East Asia-ASEAN Declaration on Energy Security,[12] acknowledged the significance of biofuels as one of the measures in realizing the common goals of Regional Energy Security.

Biodiesel

Coco Methyl Ester (CME). The government continued to implement and monitor compliance to Memorandum Circular No. 55 issued on 09 February 2004, *"Directing all government agencies, including government-owned and controlled corporations to incorporate the use of one percent (1%) by volume in their diesel requirements."* The total number of government agencies complying with M.C. 55 has increased from 59 agencies (1,100 diesel-fuelled vehicles) in 2005 to 127 agencies (1,542 diesel-fuelled vehicles) in 2006.

[11] The NBB is composed of the DOE Secretary as Chairman and the Secretaries of the Department of Trade and Industry (DTI), DOST, Department of Agriculture (DA), Department of Finance (DOF), Department of Labor and Employment (DOLE), and the Administrators of the Philippine Coconut Authority (PCA) and the Sugar Regulatory Administration (SRA) as members.

[12] The East Asia Declaration on Energy Security was espoused during the 12th ASEAN Summit in Cebu City in January 2007.

The increase in utilization of CME as an alternative transport fuel is likewise provided in various executive issuances such as A.O. Nos. 103 (31 August 2004), 126 (13 August 2005), and 110-A (27 March 2006), which deal on government austerity measures, energy conservation program and Government Energy Management Program, respectively.

To ensure a stable supply of CME in the market, the DOE approved the accreditation of Romtron, Inc. in Odiongan, Romblon and Pure Essence International, Inc. in Quezon City. Currently under review is the application of Mount Holly Coco Biodiesel Plant in Lucena City. These new entrants are in addition to the first two approved manufacturing companies in 2005, namely: Senbel Fine Chemicals, Inc. and Chemrez, Inc., which are now very much active in the manufacturing and marketing of CME.

As of end-2006, local CME production reached 111.9 million liters while sales of manufacturers/ retailers reached 655,401 liters of pure CME and 32.3 million liters of the CME blend (B1). The B1 blend is commercially available in 38 stations of Flying V with the same price as pure petroleum diesel. On the other hand, the first Biofuels Center was launched at the Philippine Coconut Authority (PCA) Compound in Quezon City in February 2006 to serve as venue to all IEC-related activities.

The Philippine National Standard (PNS) for pure CME has been promulgated while the Technical Committee on Petroleum Products and Additives (TCPPA) is formulating the PNS for the B1 blend. On the other hand, the Chamber of Automotive Manufacturers of the Philippines, Incorporated (CAMPI) has stamped its approval on the 1.0 percent CME blend for diesel without any modification.

Jatropha Curcas (Tubang Bakod). In recognizing the importance of developing baseline information on the potential of jatropha as a viable feedstock for biodiesel, the government has embarked on intensive consultations with various stakeholders. Coordination meetings are continuously being carried out on technology exchange, resource assessment as well as on the various modes of processing jatropha oil to ensure capability in meeting the requirements of the program.

To further address issues on supply security, resource assessment was also conducted in the cities of Davao and General Santos. In addition, the PNOC-Alternative Fuels Corporation[13] (PNOC-AFC) also planned to put up a jatropha plantation in Mindanao Geothermal Production Field in Kidapawan.

On the other hand, the Malaysian firm Biogreen Energy SDN BHD is preparing to sign an agreement with PNOC-AFC on the establishment of jatropha nursery and plantation in two different locations. The MOU provides for the production of about 30 million seedlings by the Biogreen Energy to supply the PNOC-AFC's seed requirement for its 700,000 hectares of jatropha plantations in the country.

With regard to product standard, the test protocol for jatropha methyl ester-diesel fuel blend is being formulated by the TCPPA. The DOE also conducted a test on jatropha oil as a possible fuel for plant oil stove in coordination with the Leyte State University.

As part of building local capability, the DOE together with the DA, PCA and DOST participated in a study mission to India, a country known to have proven experiences in cultivating jatropha.

Bioethanol

The introduction of E10 (10.0 percent bioethanol blend) in the market was initiated by new industry players such as Seaoil and later, Flying V in at least four of its stations in Metro Manila. The Pilipinas Shell also launched the *"Shell Super Unleaded E10"* in 31 gasoline stations in Metro Manila with a 50-centavo cheaper price than its regular unleaded gasoline at the pumps.

The government issued the following policy directives to encourage stakeholder participation in the program:

a) E.O. 488 *"Modifying the Rate of Import Duty on Components, Parts and Accessories for the Assembly of Hybrid, Electric, Flexible Fuel and CNG Motor Vehicles under Section 104 of the Tariff and Custom Code of 1978"* issued on 12 January 2006, allows importations under the Motor Vehicle Development Program at zero percent rated-import duty on parts and components that will be used for the assembly and manufacture of vehicles powered by alternative fuels;

b) E.O. 449 *"Modifying the Rates of Import Duty on Bioethanol Fuel under Section 104 of the Tariff and Customs Code of 1978"* issued on 22 July 2005, reducing import duties on bioethanol products to be used in the program from 10.0 percent to 1.0 percent;

c) Revenue Regulations No. 08-2006 issued in May 2006 by the Bureau of Internal Revenue (BIR) implementing the guidelines on the taxation and monitoring of bioethanol-blended gasoline and imported or locally manufactured fuel bioethanol for excise tax purposes; and,

[13] The PNOC-AFC was established in July 2006. Its primary mandate is to explore, develop and accelerate the utilization and commercialization of alternative fuels in the country.

d) D.C. No. 2006-08-0011 issued by the DOE in August 2006 prescribing *"Interim Guidelines for the Accreditation of Oil Industry Participants in the Bioethanol Program"* for the effective monitoring and implementation of the program while in the voluntary phase and in the preparation for a smooth transition to nationwide legislated mandate.

Meanwhile, the DOE has endorsed the proposals of local investors, such as JG Summit Holdings and Biofuels 88 Corporation, who have signified their intention on bioethanol production to the BOI. It also endorsed the application of Zambo Norte Bioenergy Corporation to the Securities and Exchange Commission (SEC).

A major development in the program was the PhP 1.0 billion investment commitment of Ford Philippines for the building of a flexible fuel engine plant in Sta. Rosa, Laguna. This was followed by the commercial launching of the first Ford Flexi-Fuel Vehicle (FFV) model in April 2006 to boost the country's bid of becoming the ASEAN Center of Excellence for Flexible Fuel Technology. The FFV can run on regular gasoline or a blend of 85.0 percent ethanol (E85) and 15.0 percent gasoline.

Compressed Natural Gas (CNG)

Policy Initiatives. On 20 April 2006, the DOE issued D.C. No. 2006-04-0004 adopting D.C. No. 2004-04-004 titled *"Guidelines on the issuance of certificate of accreditation and certificate of authority to import under the Natural Gas Vehicle Program for Public Transport (NGVPPT)" as the implementing rules and regulations of E.O. Nos. 396 and 488 dated 31 December 2004 and 12 January 2006, respectively, and D.C. No.2005-07-006 dated 05 July 2005 and amending certain provisions of the said D.C. No. 2004-04-004."* The policy directive aims to ensure a unified and coordinated effort in establishing a successful and robust natural gas industry. The D.C. also puts in place a portfolio of incentives for private sector participation in the required logistics and infrastructure support to the program.

Supply Infrastructure. The launching of the CNG mother station in Tabangao, Batangas and the daughter refilling station in Biñan, Laguna in October 2007 will provide a strong boost to the use of CNG in the transport sector. Meanwhile, the DOE and PNOC jointly conducted a site inspection in the province of Batangas to look for a possible location of another mother station.

Market Development. A total of 22 imported CNG-Original Equipment Manufactured (OEM) commercial buses, five of which are self-drive away (SDA) chassis, are already in the country. Preliminary inspections were conducted on the SDA CNG units while test runs were done for the CNG buses owned by H.M. Transport and K.L. CNG Bus Transport Corp. On 09 January 2006, a Certificate of Authority to Import (CAI) was issued to RRCG Transport and a preliminary evaluation for the application of accreditation for Grandstar and First CNG, Inc. was undertaken.

For a continuous tie-up with the CNG-NGV industry at the international level, the DOE renewed its membership with the Asia Pacific Natural Gas Vehicle Association (ANGVA) on 28 February 2006. Coordination meetings are also continuously being held with the accredited bus operators[14] for regular updates on the program. Meanwhile, the DOE has received expressions of interest from private entities/companies to participate in the program.

In terms of promotional activities, a CNG three-wheeler vehicle was showcased during the First National Conference and Exhibit on Tricycle Transportation Development held in Iloilo City on 28-30 June 2006. On the other hand, the Automobile Association of the Philippines Motorshow Exhibit held at the Philippine International Convention Center in May 2006 featured the DOE's CNG demonstration units.

Pilot Pinoy CNG buses launched by Pres. Arroyo on 24 October 2007 in Laguna to highlight the commercial operation of first ever mother-daughter refilling station.

As part of the study on CNG buses, the DOE conducted test runs from Taguig City to Cavite on 11-13 January 2006 to determine its fuel efficiency and performance. Capacity building and IEC activities were organized for the stakeholders in collaboration with the United States Agency for International Development (USAID) and United States Department of Energy (USDOE).

Standards Development. In November 2005, two additional CNG/NGV standards were promulgated to guide the stakeholders in the effective implementation of NGVPPT, namely: DPNS NFPA: 2005 (2002 Edition) on the CNG Vehicular Fuel Systems; and, DPNS ASME B3.3:2005 (2002 Edition) for the Process Piping Code.

[14] To date, NGVPPT Accredited Bus Operators include: HM Transport Inc., RRCG Transport System Inc., KL CNG Bus Transport Corp., Paradise Transport Corp., BBL Transport System Inc., Greenstar Express Inc., CNG Vehicles Corporation

AutoLPG

Policy Initiatives. To regulate the fast-growing autoLPG industry in the country and protect the consuming public, the DOE issued D.C. No. 2007-02-0002 *"Providing for the Rules and Regulations Governing the Business of Supplying, Hauling, Storage, Marketing and Distribution of LPG for Automotive Use"* on 13 February 2007. The D.C. aims to eliminate illegal and unsafe operation practices in the auto-LPG business and impose penalties on violations to health, safety and product quantity/quality standards.

Supply Infrastructure. There is a growing demand of LPG use in the transport sector in view of the cheaper autoLPG prices as compared to conventional fuels. From nine dispensing stations, the number has abruptly increased to over 80 and continuously increasing, while the garage-based dispensing stations has totaled to 35. The inventory of existing dispensing pumps and their operators is as follows: Petron (13); NAIADDS (2), Petronas (13), Shell AutoLPG (11), Liquigaz (7), Total Phil. (2), Seaoil (1), and Pryce Gas (1). These dispensing pumps are located all over the country, though majority of these are found in Metro Manila.

To monitor compliance to safety standards, the Technical Committee on Dispensing Station (DOE, DOST, LTO, DTI-BPS, DOLE and Fil-Car Foundation) regularly conducts inspection activities.

Market Development. There is also an increasing demand for autoLPG conversion. To date, a total of 19 autoLPG government-recognized conversion shops are currently operating in the country and there are about 7,000 autoLPG converted units throughout the country from only 800 units in 2005. The local transport operators have been encouraged to convert their units for autoLPG use considering the minimal cost of conversion kit ranging from PhP 24,000 to PhP 55,000 per unit and the economic advantage of using low-cost priced LPG over conventional fuels whose prices are highly volatile.

Standards Development. To ensure the protection and safety of the public and the industry in the use of auto-LPG and its technology, the DOE and DTI-BPS in coordination with the private sector have developed and promulgated four sets of auto-LPG standards in November 2006 namely: (1) PNS/UN ECE 67:2006 – Uniform provision concerning, (1.1) Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system; (1.2) Approval of vehicle fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of equipment; (2) PNS/UN ECE 115:2006 – Uniform provisions concerning the approval of Specific LPG retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion system; (3) PNS 04-2006 – Road Vehicles-automotive LPG components – CONTAINERS; and, (4) PNS/DOE FS 3:2006 – AutoLPG Dispensing Stations. In October 2006, the DOE participated in the Public Consultation on Standards and Regulations for the effective implementation of the Philippine Auto-LPG Program in Metro Manila.

Measurable Sectoral Targets

Biofuels

The implementation of Biofuels Act of 2006 is one of the many strategies that the government is taking seriously to mitigate our dependence on imported fuels. It is expected to impact in the country's economic growth since it will accumulate savings through fuel displacement and opens up new opportunities for investments.

Biodiesel (CME)

Under R.A. 9367, the DOE envisage the nationwide blending of 1.0 percent biodiesel in all diesel-fuel requirements of the country commencing in May 2007 to reach 2.0 percent by 2009. The 1.0 percent mandated blend would correspond to a total of 64.4 million liters of diesel fuel displacement in 2008. Meanwhile, the 2.0 percent biodiesel blend, which shall start in 2009, is expected to displace a total of 133.7 million liters of diesel fuel to reach 160.7 million liters by the end of the planning period (Table 11).

Table 11. BIODIESEL MEASURABLE TARGETS

Year	Diesel Demand (In million liters)	Biodiesel Blend (In accordance with R.A. 9367)	Fuel Displacement (In million liters)
2006	5,985.29	-	-
2007	6,209.74	1%	62.10
2008	6,442.60	1%	64.43
2009	6,684.20	2%	133.68
2010	6,934.86	2%	138.70
2011	7,194.92	2%	143.90
2014	8,035.08	2%	160.70

Note:
** Based on actual 2006 OEB and 2005-2014 per fuel growth rate*
** Based on 2006 average price of diesel, PhP 34.50/liter*

Bioethanol

A nationwide mandatory blending of 5.0 percent bioethanol by volume shall compose the total gasoline to be sold and distributed by oil companies within two years from the date of effectivity of the law. This is targeted to expand to 10.0 percent blend by 2011. The 5.0 percent mandatory blend in 2009 would displace a total of 208.1 million liters of gasoline fuel, while the 10.0 percent blend would result to a total of 460.6 million liters of fuel displacement in 2011 to reach 536.3 million liters by 2014 (Table 12).

Table 12. BIOETHANOL MEASURABLE TARGETS			
Year	Gasoline Demand (In million liters)	Bioethanol Blend (In accordance with R.A. 9367)	Fuel Displacement (In million liters)
2006	3,574.96	-	-
2007	3,760.86	-	-
2008	3,956.43	-	-
2009	4,162.16	5 %	208.11
2010	4,378.59	5 %	218.93
2011	4,606.28	10 %	460.63
2014	5,362.87	10 %	536.29

Note:
** Based on Actual 2006 OEB and 2005-2014 per fuel growth rate*
** Based on 2006 average price of gasoline products, PhP 39.30/liter*

CNG

The delay in the commercial operation of both the mother and daughter refilling stations in Tabangao, Batangas and Biñan, Laguna, respectively has held back the implementation of the NGVPPT resulting in corresponding adjustment in its target for this Plan Update.

As a result of the inauguration of CNG mother-daughter stations in October 2007, 70 CNG buses are expected to be on commercial operation in 2009 to increase to 200 the following year for the completion of the pilot phase implementation. The number of CNG buses will reach a total of 3,000 in 2014 for the full implementation of the program. In anticipation, ten CNG daughter stations will be put up by 2010 and additional five CNG refilling station by 2014.

Development Challenges

Biofuels

The government is keen on expanding the utilization of biofuels blend in the areas of power, shipping, air transport and other industries. In this context, the DOE has identified issues that may hinder the expansion of the program, such as the acceptability of biofuels blend in said sectors/industries, the availability of fuel supply in the future, and the absence of standards for higher blends of biofuels.

Biodiesel

- Need to create new domestic market and increase public awareness on the program especially among prospective CME manufactures, car manufacturers and associations, oil companies, government agencies and government financing institutions (GFIs), legislators, non-government organizations (NGOs), and transport group
- Readiness of vehicles to utilize biodiesel blend beyond 5.0 percent

Bioethanol

- Sustainability of sugarcane supply and other feedstocks for bioethanol production
- Need for more investors to meet the mandated blend
- Readiness of vehicles to utilize bioethanol blend beyond 10.0 percent

CNG

- Envisioned expansion of CNG requires compliance to standards in technology application such as re-powering/conversion of used vehicles into CNG-fed.
- Gas supply and infrastructure that will respond to the need of the growing CNG industry.

AutoLPG

- Need to provide policy options to hurdle price fluctuations in LPG, which is similar to the current situation of gasoline and diesel.
- Abrupt increase of LPG utilization in the transport sector could soon compete with that of the residential sector requirements that could trigger supply constraints and possible increase in LPG prices

Action Plan

To advance the development, production and utilization of alternative fuels, the following action plans will be carried out for the planning period:

Biofuels

- Address supply sustainability issues through enhanced research and development activities for other potential feedstock of biofuels in cooperation with concerned government agencies and academic institutions.
- Develop standards for higher biofuel blends and test protocols for multi-blends to set the benchmark for future mandates.
- Intensify IEC and market development of biofuels nationwide to obtain greater support from different sectors.
- Issue guidelines for the accreditation of new biofuels producers as well as on the production, handling, transport and storage of biofuels to protect the industry from any malpractices and irregularities.

- Conduct continuing study on the effects of using higher blends of biodiesel to determine potential damages to vehicles.
- Expand utilization of biofuels in power plants, industries and other modes of transport.
- Create a One-Stop Shop Action Center/Satellite Offices to assist investors on biofuels.

Biodiesel (CME)

- Increase biodiesel blend by 3.0 to 5.0 percent in 2011.
- Conduct cost benefit analysis of biofuel blend ratios for power plants and marine transport.
- Conduct durability test for engines and parts of all diesel-fed vehicles that will run on increasing biodiesel blend.

Bioethanol

- Increase bioethanol blend by 10.0 percent in 2011.
- Prioritize promotion of flexi-fuel vehicles since these can cope with higher fuel ratios of bioethanol.
- Intensify IEC programs to attract prospective investors.

CNG

- Enhance the policy directives to expand the utilization of CNG for transport and to encourage private sector investment.
- Strengthen coordination with program stakeholders to facilitate the program implementation.
- Conduct viability studies on the commercial operation of CNG buses in Metro Manila and nearby provinces as well as in the Northern corridor and other parts of the country.
- Improve local expertise on CNG conversion and retrofitting technology.
- Intensify IEC in Southern Luzon and Metro Manila areas in order to instill public awareness on the CNG program.
- Develop database for CNG utilization and NGV buses to ensure proper monitoring of the program.
- Establish a multi-agency certification body to handle the issuance of certification for CNG buses, refilling stations and related facilities.
- Develop manpower technical capability on CNG/NGVs technology and related facilities.

AutoLPG

- Coordinate with other concerned government agencies and stakeholders to address issues and concerns related to the implementation of AutoLPG program.
- Conduct study on "Fuel Price Mechanism" for LPG utilization by the transport sector to determine the impact of its fast growing demand to the residential sector.
- Intensify IEC activities on safety and standards to inform the consuming public on the technology.
- Coordinate with the private sector on other LPG technologies for transport.
- Conduct a comprehensive study on possible utilization of autoLPG in tricycles.

C. ENERGY EFFICIENCY AND CONSERVATION PROGRAMS

The government's National Energy Efficiency and Conservation Program (NEECP) launched by President Gloria Macapagal-Arroyo in August 2004, was aimed to further strengthen the implementation of the energy efficiency and conservation programs through the promotion of judicious and efficient utilization of energy in the country. Its objective is to make energy conservation a way of life for every Filipino through the theme *"EC Way of Life"*.

To effectively promote the NEECP, the DOE in partnership with the private sector has continuously pursued the aggressive implementation of existing energy conservation programs to rationalize energy demand consumption, particularly for petroleum products and electricity. The overall goal is to curb the impact of oil price volatility to the economy and reduce carbon dioxide emissions to protect the environment.

Performance Assessment

The energy conservation efforts of the government generated energy savings of about 6.1 MMBFOE (0.88 MTOE) in 2006, with equivalent CO_2 emission avoidance of 2.1 MMMT. This includes savings accounted from the energy management activities conducted by DOE such as the spot check program of government agencies nationwide per A.O. 126, energy standards and labeling program, energy audits of various commercial and industrial establishments and recognition award program.

IEC Campaign. The main focus of the IEC campaign is to promote the efficient utilization and conservation of electricity and fuel in all energy-consuming sectors. The campaign is in compliance with E.O. 123 *"Institutionalizing the Committee on Power Conservation and Demand Management"* (Power Patrol) and E.O. 472 *"Institutionalizing the Committee on Fuel conservation and Efficiency in Road Transport"* (Road Transport Patrol). Among the activities conducted under the IEC campaign include seminar-workshop for target participants in the commercial, residential, industrial and government buildings; fuel economy run for road transport vehicles; and the use of television, radio and print media ads to reach wider target sectors.

The first DOE-Flying V Biodiesel Fuel Economy Run was held on 09 December 2006 with a total of 20 participants coming from national government agencies and various associations of mega taxis and passenger jeepneys. This is in line with the government's program on the mandatory use of biofuels to reduce fuel consumption and toxic vehicular emissions in the country while simultaneously improving engine efficiency and combustion leading to increased mileage in vehicles.

About 25 seminar-workshops on energy conservation were held across the country in 2006 until the first quarter of 2007 with audiences from the sectors in government, business and transport, as well as the academe, specifically elementary and high school students and teachers.

Television ads under the theme *"Kuryente"* were aired over Channels 4, 9, 13 and 25 as well as radio ads titled *"Gasolina"* in 98 KBP member-radio stations to reach a wider consumer base in residential and transport sectors.

Voluntary Agreements Program. Activities under this program include, among others, the promotion of the car-less day, carpooling and anti-idling campaigns. The aim is to promote fuel conservation and reduce pollution and traffic congestion in the country in partnership with various transport groups, local government units (LGUs), schools and shopping malls as well as with private individuals. A voluntary agreement is arranged between the DOE and the industrial establishments under the so called Partnership for Energy Responsive Companies/Ecozones.

Energy Efficiency Standards and Labeling Program. As part of its continuing effort to promote the welfare of consumers, the DOE has been closely collaborating with various organizations including active alliance with DTI, Philippine Appliance Industry Association and the Philippine Lighting Industry Association for the effective implementation of the government's energy efficiency standards and labeling for selected household appliances and lighting products. Significant benefits have been gained through this program such as the improved quality of locally-manufactured products, making them more competitive in the local market. Furthermore, as a result, it discourages the manufacturing and the importation of inefficient household appliances and lighting products sold in the market.

The program, which started in 1993, consists of energy labeling for room air conditioners, refrigerators, compact fluorescent lamps (CFLs) and fluorescent lamp ballasts.

In 2006, the labeling program generated an estimated energy savings of 2.03 MMBFOE (0.29 MTOE) which is over 100 percent increase from its 2005 performance of 0.98 MMBFOE (0.14 MTOE). CFL labeling was the biggest contributor, generating an estimated savings of 1.13 MMBFOE (0.16 MTOE).

The DOE aims to expand the coverage of the program within the planning period to include linear fluorescent lamps, luminaries, household electric fans, industrial fans and blowers, television sets and electric motors. Consumer education shall also be undertaken as complementary activity for the effective implementation of the program.

The Land Transportation Office earned 98.0 percent in a spot check inspection conducted by the DOE Team headed by Assistant Secretary Matanog Mapandi.

Government Energy Management Program (GEMP). The GEMP aims to integrate energy efficiency concepts into the operation of government agencies to realize the reduction target of ten percent in electricity and fuel consumption in compliance with the Presidential directive under A.O. 126. The major activities under this program include the conduct of monitoring and energy audit spot check in all government buildings and the conduct of seminars on energy efficiency and conservation for government employees.

In 2006, the DOE has been able to conduct spot checks in 150 government buildings nationwide. From

this activity, the monthly electricity and fuel consumption reports submitted by 110 government agencies in the National Capital Region (NCR) showed aggregate savings of 36,752.3 MW of electricity, 287,296 liters of gasoline and 1,433,016 liters of diesel, translated to monetary savings of PhP 346.0 million.

Moreover, the DOE has conducted spot check inspections in 147 government agencies during the first quarter of 2007.

Systems Loss Reduction Program. Under the umbrella of the Energy Management Program, the Systems Loss Reduction Program enables private utilities to decrease its systems losses through redesigning efforts made in transmission lines, improvement of substation equipment such as installation of capacitors and voltage regulators, and strict monitoring of electricity pilferers. This program reduced the systems loss from 40.8 percent in 2005 to 40.4 percent in 2006.

Recognition Programs. In recognition of the private sector's effort to promote and implement energy conservation programs, the Don Emilio Abello Energy Efficiency Awards are handed out to private companies that make significant improvements in their energy consumption patterns. On the other hand, the Government Energy Management Program Award is given to government agencies that exceeded the mandatory 10.0 percent reduction in energy consumption.

At the regional level, the Don Emilio Abello Award giving body recognizes Philippine companies that are recipients of the ASEAN Best Practices Competition for Energy Efficiency and Conservation in Buildings. Likewise, the award giving body also recognizes companies who are recipient of the ASEAN Energy Management Award for Major Building and Industries. The ASEAN award bestows international recognition to qualified ASEAN countries that are exemplary in the field of energy efficiency and conservation and energy management system application.

In 2006, some 33 establishments received the Don Emilio Abello Energy Efficiency Awards with two companies, Bristol-Myers Squibb (Phils.), Inc. and Toshiba Information Equipment, Philippines being elevated to the Hall of Fame for consistently being outstanding leaders in energy conservation. The total energy savings realized by these companies was equivalent to 72.4 million liters of oil equivalent, which was significantly higher by 59.0 percent from their energy savings of 29.6 million liters obtained in 2005.

The Philippine-Makati Stock Exchange Building garnered the second runner-up slot in the 2006 ASEAN Best Practices Competition Award for Energy Efficiency and Conservation in Buildings in ceremonies held on 25 July 2006 during the 24th AMEM-SOME in Lao PDR. The building showcased its passive ventilation and natural cooling features due to its structural design, as well as introduced retrofitting by upgrading the cooling equipment and implementing other energy-saving projects, which resulted in 941.3 MW average savings per year.

For the ASEAN Energy Management Award for Major Buildings and Industries, San Miguel Polo Brewery Plant and Republic Cement Corporation garnered the 1st and 2nd runner up recognitions during the awards night in 24 August 2007 held in Singapore.

Energy Audit. This technical service is being offered by the DOE to manufacturing plants, commercial buildings and other energy-intensive companies to evaluate the energy utilization efficiencies of equipment, processes and operations of these companies, and recommend appropriate energy efficiency and conservation measures.

In 2006, the DOE has conducted energy audits in 16 industrial and commercial companies nationwide. This activity is continuously being implemented in partnership with accredited energy service companies (ESCOs). To further enhance the energy management advisory services in the country, the Energy Service Company Association of the Philippines, Inc. or "ESCO Phil." was organized in 2004. This association intends to, among others, (a) organize the firms engaged in the energy service industry to provide a forum for the effective exchange of information about industry practices and introduce new technologies for the industry; and, (b) promote energy efficiency and demand reduction technologies thereby creating tangible economic values.

The energy audit services of the DOE seeks to determine the energy use patterns of companies and commercial establishments.

Philippine Efficient Lighting Market Transformation Project (PELMATP). Since the project's inception in 2005, the UNDP-GEF funded PELMATP has been aggressively addressing the barriers to the widespread use of energy-efficient lighting systems (EELS) in the country. The over-all aim

is to generate energy savings from the change-over to EELS which in turn would contribute to the reduction of GHG emissions in the energy sector. The project aims to achieve an aggregate energy savings of 29,000 GWh, equivalent to 2.0 percent reduction or translated to an equivalent GHG emission reduction of about 4,600 Gg of CO_2.

There are five core strategies or components to achieve these objectives, namely: (1) EEL Policies, Standards and Guidelines Enhancement Program; (2) EEL Applications Institutional and Technical Capacity Development Program; (3) EEL Applications Consumer Awareness Improvement Program; (4) EEL Initiatives Financing Assistance Program; and (5) EEL Systems Waste Management Program. The project targets an 11.0 percent GHG emission reduction by the end of the project in 2009.

Ground breaking ceremonies of the supply and construction of the building that will house the Goniophotometer test facility for light sources and luminaires led by former Undersecretaries Melinda Ocampo and Francisco Delfin, Jr. was held on 25 July 2007.

Measurable Sectoral Targets

In June 2006, the DOE together with PELMATP signed a MOA with Gawad Kalinga (GK), among the other entities, to promote EEL systems in the first 800 households of the GK Village in Baseco Compound, Tondo, Manila. Gawad Kalinga ("to give care"), which started in 1995, is an organization that aims to provide land and build houses for the poor communities in the Philippines. Through the replacement of incandescent bulbs to more energy-efficient CFLs, it is estimated that these households could generate savings of about 240,000 kWh of electricity per year, equivalent to about PhP 2.1 million in annual monetary savings.

For the energy labeling and efficiency standards program, the DOE will look into a minimum of 15 percent increase in the average efficiency ratings of new appliance models within the planning period. This program is also expected to generate the biggest contribution of energy savings from 6.7 MMBFOE (0.97 MTOE) in 2010 to reach 8.1 MMBFOE (1.17 MTOE) in 2014.

The activities under the Energy Management Program, on the other hand, will yield an estimated energy savings of 0.57 MMBFOE (0.08 MTOE) in 2010 up to 0.69 MMBFOE (0.10 MTOE) by the end of the planning period.

Development Challenges

- IEC campaign in regional government offices, state colleges and universities for government energy management program will be focused on their compliance to A.O. 126, particularly on the submission of monthly fuel and electricity consumption report to DOE for monitoring and evaluation.
- Policy formulation through a D.C. that would require energy industry sectors to submit energy consumption report to DOE for monitoring purposes.
- Re-filing and re-activation of advocacy works for the deliberation of the Energy Conservation Bill which would institutionalize energy efficiency and conservation in the country.

Action Plan

- Pursue the passage of the Energy Conservation Bill into law.
- Pursue the inclusion of standardized technical specification requirement in the procurement process of energy efficient lighting systems and other electrical equipment and devices in government offices e.g. the use of 36-watt instead of 40-watt CFLs and the use of energy-efficient LCD computer monitors. This shall be recommended to the Department of Budget and Management (DBM).
- Develop a benchmark in the commercial and government buildings including the manufacturing industry sector.
- To fill in the gap in the implementation of utility-based demand side management (DSM), market-based application under the Demand Reduction Program will instead be promoted. Meanwhile, existing policy framework for utility-driven DSM will be reviewed, as well as new set of recommendations will be submitted to concerned stakeholders for consultation to provide new policy directions.
- Evaluate the impact of IEC programs in the household sector through contracted survey services under the auspices of the National Statistics Office (NSO).

- Strengthen product testing and research through enhanced testing capability of DOE-Lighting and Appliance Testing Laboratory incuding the establishment of a luminaire testing facility using a goniophotometer. This testing apparatus, which is the first of its kind in the Philippines will be used in the testing of luminaires, directional lamps and street lamps to determine and recommend better efficient lighting designs for office buildings and street lighting.

- Conduct of inventory of legitimate and accredited testing laboratories to encourage the private sector to venture into setting up of independent and competent testing laboratories.

- Promote and establish accreditation of ESCOs.

- Intensify promotion of Heat Rate Improvement in power plants.

- Establish energy label for all brand-new vehicles relative to the fuel mileage rating.

- Expand promotion of the Energy Efficiency and Conservation Program and Energy Consumption Monitoring in large seaborne vehicles such as passenger and cargo ships, power generating plants and power distribution utilities.

IV. Power Sector Reforms

A. POWER AND TRANSMISSION DEVELOPMENT PLANS

The 2007 Power Development Plan (PDP) provides a comprehensive summary of current developments in the power sector considering the current fiscal and macroeconomic challenges. It also takes into account some key factors such as the commercial operation of the WESM, the priority infrastructure projects in the "Super-Regions" and the government's commitment to intensify global competitiveness through reasonable electricity rate.

With the sector's dynamic characteristic, industry players need to be guided on the policy and program direction towards the full implementation of the reform program that aims to establish more effective, competitive and responsive electricity market.

POWER DEVELOPMENT

Performance Assessment

Capacity Mix. The commissioning of the 210-MW Mindanao Coal by State Power Corporation in September (105 MW) and December (105 MW) 2006 brought the country's ***total installed capacity***[15] to 15,803 MW as of end-2006. This level was 1.2 percent higher than the previous year's level of 15,619 MW. In terms of capacity mix, fossil-based plants remain the dominant source with coal topping the list and contributing 26.4 percent share or 4,177 MW followed by oil with 22.7 percent (Table 13).

Table 13. EXISTING CAPACITY, as of December 2006 (MW)

Plant Type	Installed	% Share	Dependable	% Share	% Usage
Coal	4,177	26.4	3,638	26.7	87.1
Diesel	1,997	12.6	1,549	11.4	77.6
Natural Gas	2,763	17.5	2,703	19.8	97.8
Gas Turbine	955	6.0	680	5.0	71.2
Geothermal	1,978	12.5	1,684	12.3	85.1
Hydro	3,257	20.6	2,726	20.0	83.7
Oil Thermal	650	4.1	650	4.8	100.0
Wind	25	0.2	9	0.1	36.0
Solar	1	-	1	-	100.0
Total	**15,803**	**100**	**13,639**	**100**	

In terms of indigenous energy resources, hydroelectric power provided the highest share of 20.6 percent while natural gas and geothermal plants contributed a total of 17.5 percent and 12.5 percent, respectively. Wind and solar power on the other hand was able to contribute 0.2 percent in the mix. Table 13 shows the percentage utilization of each plant type.

Dependable Capacity. For 2006, the country's total dependable capacity was 13,639 MW or 86.0 percent of the 15,803 MW total installed power output. ***Dependable capacity*** is defined as the maximum output that a power plant can provide under adverse conditions for a specified period of time and taking into consideration the plant's wear and tear conditions. Wind-based plants can only provide approximately 36.0 percent of its maximum output. In the case of hydroelectric power plants, its operational capability is highly dependent on the availability of water. Thus, dependable capacity is expectedly high during rainy season and low in dry months.

Power Generation. In 2006, the country's self-sufficiency level went up to 66.0 percent from the 2005 level of 65.0 percent. Meanwhile, gross electricity generation in 2006 was recorded at 56,784 GWh, an increase of 0.4 percent from the previous year's level.

[15] Total Installed Capacity – the total generating units' capacities in a power plant or on a total utility system. The capacity can be based on the nameplate rating or the net dependable capacity.

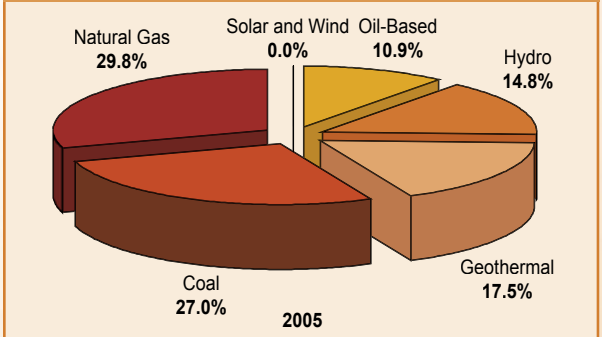
Table 14. 2006 POWER GENERATION (GWh)

	Actual	Forecast	% Change
Luzon	41,241	43,091	(4.29)
Visayas	8,129	6,587	23.41
Mindanao	7,414	7,439	(0.34)
Total	**56,784**	**57,117**	**(0.58)**

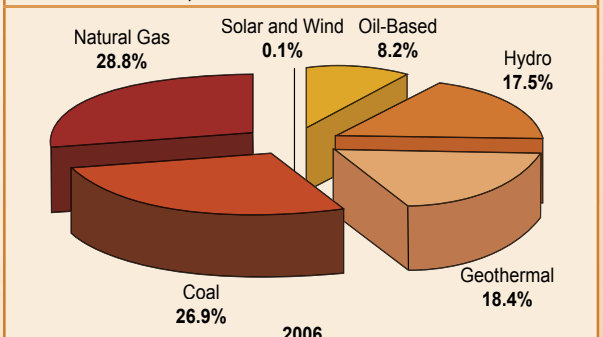
Natural gas, which has replaced coal as the country's dominant fuel since 2005, produced 16,366 GWh or 29.0 percent of the total electricity generated. However, this was lower by 2.9 percent from its 2005 level due to the 25-day maintenance schedule of the Malampaya Gas-to-Power project on 22 November to 14 December 2006. This resulted in the interruption of natural gas supply to the Ilijan, Sta Rita and San Lorenzo power plants. To meet the existing demand during said period, oil-based power plants (Malaya, Bauang Diesel, Subic and Limay) and hydropower (Binga and Pantabangan) were operated during peak hours. A block of Ilijan power plants using liquid fuel oil (LFO) was likewise put on standby reserve.

Electricity generation from coal-based plants was recorded at 15,294 GWh posting a 27.0 percent share in the mix and an increase of 0.2 percent from the previous year's level. The increase was due to the commercial operation of the 210-MW Mindanao coal during the 3rd quarter of 2006. The plant also contributed about 13.0 percent to the generation mix of Mindanao resulting to a decrease in its utilization levels of oil-based plants. In Luzon, electricity generation from coal-based plants decreased by 3.8 percent due to maintenance outages of Sual Units 1 and 2.

Figure 21. POWER GENERATION MIX



Total Generation: 56,568 GWh



Total Generation: 56,784 GWh

For geothermal, electricity generation was recorded at 10,465 GWh or 18.5 percent of the total electricity production while hydroelectric power plants provided a total of 9,938 GWh or 17.5 percent of the total. Meanwhile, electricity generation from oil-based power plants hit a low of 24.1 percent or 4,664 GWh from the 2005 level. The decline is due to the ongoing program of NPC to limit the utilization of oil-based plants in the light of the soaring prices of oil in the world market.

Meanwhile, the share of renewable energy like wind and solar in the generation mix was only 0.1 percent or 55 GWh.

In terms of ownership, electricity generation from NPC-owned power plants and NPC-Independent Power Producers (IPPs) totaled 40,472 GWh, an increase of 1.1 percent from previous year's level sharing 71.3 percent of the total electricity generation. The rest come from Manila Electric Company (Meralco)-IPP, Electric Cooperatives (ECs) and other IPPs.

For 2007 level, the country's electricity generation for the first half was recorded at 29, 214 GWh, 21,468 GWh in Luzon, 3,880 GWh in Visayas and 3,866 GWh in Mindanao. In terms of additional capacity, Northern Negros Geothermal with a rated capacity of 49 MW became operational in February 2007.

Actual vs. Forecast. In comparing the actual and forecast data for 2006, the actual generation was slightly lower than the forecasted data. This may be due to the dispatch decisions that were made to address unscheduled plant shutdown or operational problems. Significant discrepancy was noted in the Visayas with 23.4 percent difference. This is the result of the generation planning tool used in forecasting. The tool only reflects existing demand in the Visayas grid without considering demand for export to Luzon.

Electricity Sales. The country's total electricity sales slightly grew by 1.1 percent from 47,163 GWh level in 2005 to 47,678 GWh level in 2006. In terms of comparison between the actual and forecasted data, the 2006 actual electricity sales was 13.3 percent lower than the projections. This may be attributed to typhoons Reming, Milenyo and Lucas that hit the Southern Luzon areas during the last months of 2006 causing severe damages in infrastructures and resulting in inevitable power outages.

Table 15. ELECTRICITY SALES, Actual vs. Forecast (GWh)

	Actual	Forecast	% Change
Luzon	33,941	39,465	(14.00)
Visayas	5,551	5,992	(7.36)
Mindanao	6,179	7,250	(14.77)
Total	**45,671**	**52,707**	**(13.35)**

On a sectoral basis, the residential sector posted a negative electricity sales growth of 1.3 percent. This may be due to the households' conscious application of energy efficiency and conservation measures to effectively manage increases in electricity rates. On the other hand, the proliferation in the number of commercial establishments and small-scale industries indicating increased economic activities yielded substantial increase of 3.5 percent for commercial and 1.2 percent for the industrial sectors. Meanwhile, public buildings, street lights and other sector not included in the three major sectors rose by 8.3 percent to 1,275 GWh from 1,177 GWh in 2005.

Table 16. ELECTRICITY SALES BY SECTOR (GWh)

	2006	2005	% Change
Residential	15,830	16,031	(1.25)
Commercial	12,679	12,245	3.54
Industrial	15,888	15,705	1.17
Others	1,275	1,177	8.33
Total	**45,671**	**45,159**	**1.09**

During the first half of 2007, the country's total electricity sales was recorded at 23,420 GWh, 17,848 GWh in Luzon, 2,672 GWh in Visayas and 2,899 GWh in Mindanao.

Peak Demand. The country's highest demand was recorded at 8,760 MW, 1.5 percent higher than the 2005 level of 8,629 MW (Table 17). On a per grid basis, peak in Luzon, which occurred during the month of May was 0.4 percent higher than its 2005 level. Peak in Visayas and Mindanao, on the other hand, was up by 2.8 percent with 1,066 MW and 6.9 percent at 1,228 MW, respectively. The surge in these two grids, which occurred in the month of December, was due to increased economic and social activities brought about by festivities during Christmas season.

Table 17. PEAK DEMAND 2002-2006 (MW)

Grid	2002	2003	2004	2005	2006			Change	AAGR
					Actual	Forecast	% Change	2005 vs. 2006	
Luzon	5,823	6,149	6,323	6,443	6,466	6,728	(3.89)	0.36	2.67
Visayas *	903	995	1,025	1,037	1,066	1,154	(7.63)	2.80	4.29
Mindanao	995	1,131	1,177	1,149	1,228	1,293	(5.03)	6.88	5.56
Total	**7,721**	**8,275**	**8,525**	**8,629**	**8,760**	**9,175**	**(4.52)**	**1.51**	**3.23**

** Includes Panay Electric Company (PECO)*

In terms of comparison between the actual and forecast data, actual peak demand for 2006 was 4.5 percent short of the forecast data. Much of the discrepancy was in Visayas grid where actual peak demand was 7.6 percent lower than its forecasted value. Luzon grid, being the largest among the three main islands, registered the lowest but still significant discrepancy of 3.9 percent.

Despite the increases in peak demand for the past five years, annual growth rates from 2003 to 2006 showed a downward trend. This can be attributed to the economic performance of the country for the past five years. Much of the slow growth can be seen between 2003 and 2004 when the economy decelerated in 2004 due to adverse internal and external factors such as rising global oil and commodity prices, weak fiscal position and uncertainty on the outcome of the May 2004 elections.[16]

For the first half of 2007, the country's peak demand stood at 8,842 MW, broken down into: 6,619 MW in Luzon, 1,078 MW in Visayas and 1,145 MW in Mindanao.

Table 18. PEAK DEMAND GROWTH RATES (Percent)

Growth Rates	2003	2004	2005	2006	AAGR
Luzon	5.60	2.83	1.90	0.36	2.67
Visayas *	10.19	3.02	1.17	2.80	4.29
Mindanao	13.67	4.07	(2.38)	6.88	5.56
Philippines	**7.18**	**3.02**	**1.22**	**1.52**	**3.23**

**Includes demand of PECO*

Table 19. SYSTEMS LOSS

	2006	2005	% Change
Generation, GWh	56,784	56,568	0.4
Sales, GWh	45,672	45,159	1.1
Losses, GWh	11,112	11,408	(2.6)
Own-Use	4,227	4,591	(7.9)
Power Losses	6,885	6,817	1.0
System Losses, %	**12.1**	**12.1**	**0.1**

Systems Loss. Due to the government's continuing program to increase systems reliability and efficiency, the percentage share of losses in the total electricity cycle decreased by 2.6 percent from 11,408 GWh level in 2005 to 11,112 GWh level in 2006. Almost 60.0 percent of these figures or 6,885 GWh came from aggregate distribution losses which were heightened by damages in distribution lines due to the typhoons that hit some parts of the country during the year. The remaining 40.0 percent comprised the utilities own-use power for office and housing.

Measurable Sectoral Targets

System Capacity Addition. As projected in the PDP 2006 Update, about 1,989 MW of new generating capacities are still required in the Luzon

[16] NEDA's 2004 Socio-Economic Report

Table 20. SYSTEM CAPACITY ADDITION

Project Name	Capacity (MW)	Target Completion	Location
Luzon			
Committed	***608.25***		
Northwind Power Project, Phase 2	8.25	2008	Burgos, Ilocos Norte
Coal-Fired Power Plant	600.00	2011	Mariveles, Bataan
Indicative	***3,103.00***		
Burgos Wind Power Project Phase I (formerly Luzon Wind Power Project Phase I)	40.00	2009	Ilocos Norte
Ilijan CCGT expansion	300.00	2009	Ilijan, Batangas City
Bulacan Biomass-to-Energy Project	15.00	2009	Bocaue, Bulacan
Burgos Wind Power Project Phase II	46.00	2010	Ilocos Norte
2nd Phase CFB Coal-Fired Power Plant	50.00	2010	Mabalacat, Pampanga
Coal Fired Power	300.00	2010	Subic
San Gabriel Power Plant	550.00	2011	Sta. Rita, Batangas City
Kalayaan Pumped Storage Power Plant III (CBK Expansion)	360.00	2011	Kalayaan, Laguna
Tanawon Geothermal Project	40.00	2011	Sorsogon
Rangas Geothemal Project	40.00	2013	Sorsogon
Manito-Kayabon Geothemal Project	40.00	2013	Sorsogon
Balingtingon River Multi-purpose Project	44.00	2013	Nueva Ecija
Pagbilao Expansion	400.00		Pagbilao, Quezon
Pantabangan Expansion	78.00		Pantabangan, Nueva Ecija
2 x 150 MW CCGT Power Station	300.00		Quezon Province
Quezon Power Expansion Project	500.00		Mauban, Quezon
Visayas			
Committed	***220.00***		
Cebu Coal Fired Power Plant, Phils (formerly KEPCO Coal-Fired Power Plant)	200.00	2010	Naga, Cebu
Nasulo Geothermal	20.00	2010	Nasuji, Valencia, Negros Oriental
Indicative	***624.00***		
Coal-fired Plant	100.00	2010	Concepcion, Iloilo Panay Island
Toledo Coal Expansion	246.00	Phase I - 2010 Phase II - 2011	Toledo City, Cebu
Panay Biomass Power Project	25.00	2010	Panay Island
GBPC Coal-Fired Plant (2x82MW)	164.00	2011	Iloilo, Panay Island
Dauin Geothermal	40.00	2011	Dauin, Negros Oriental
Aklan Hydropower Project	41.00	2012	Libacao, Aklan
Villasiga HEP	8.00	2012	Sibalom, Antique
Mindanao			
Committed	***92.50***		
Mindanao 3 Geothermal	50.00	2010	North Cotabato
Sibulan Hydropower	42.50	2009	Sta. Cruz, Davao del Sur
Indicative	***745.50***		
Cabulig Hydro	8.00	2010	Plaridel, Jasaan Misamis Oriental
Tamugan AB, Panigan and Suawan Hydroelectric Power	34.50	2010	Hedcor Tamugan, Inc.
Cagayan de Oro Biomass Power Project	10.00	2010	Cagayan de Oro
Agus 3 Hydroelectric Plant	225.00	2011	Lanao Hydropower Development Corporation
SM 200 MW CFBB CFTPP	200.00	2011	Southern Mindanao
Sultan Kudarat Coal	200.00	2012	Sultan Kudarat
Tagoloan Hydropower	68.00	2012	Bukidnon
Total Committed	**920.75**		
Total Indicative	**4,472.50**		

Table 21. TRANSMISSION LINE PROJECTS

Name of Project	Capex Type *	Project Component	Status	Expected Time of Completion
Luzon				
Ongoing projects				
Batangas Transmission Reinforcement	T	New Batangas-New Makban A	Contract time suspended as of 15 June 2007 due to construction problem.	Dec 2009
		New Makban A-Calamba Tower 50	Some portion already energized; Work suspended due to ROW problem.	
		Calamba Tower 50-Binan S/S	L/C processing	
		Batangas Substation Upgrade/Expansions	Completed 31 March 2007	
		Makban A Switchyard	88 percent completed. Activities suspended due to shutdown schedule problem.	
		Biñan S/S	On-going civil works activities.	
Biñan-Sucat 230 kV Transmission Line	T	Construction of fourth Biñan-Sucat 230 kV T/L.	Eligibility criteria for approval by the Bids and Award Committee.	Dec 2009
Hermosa-Balintawak T/L Relocation	T	Relocation of a portion of Hermosa-Balintawak 230 kV TL	Advertised on 23 July 2007.	Dec 2008
Luzon Substation Expansion -1	T	Expansion of four substations with a total capacity of 1200 MVA. Bauang Biñan, Cabanatuan, Cruz-na-Daan, Currimao, Daraga, Laoag, Mexico and Naga.	Approved by NEDA ICC on 11 July 2007; by the NEDA Board on 24 July 2007 Preparation of tender documents delayed in favor of more urgent projects, which will utilize the same manpower	Dec 2009
Luzon (North) T/L Upgrading -1	T	San Manuel – Concepcion 230 kV T/L	Ongoing construction	Oct 2008
		Concepcion-Mexico 230 kV T/L.	Ongoing construction	
		San Manuel, Concepcion, Mexico Substation Upgrade/Expansions	On-going construction	Jul 2008
		Dasmarinas S/S Transformer Expansion	For rebidding	Jun 2010
New Gamu Substation	C	230 kV Gamu substation	Energized on 31 August 2007	2007
Tap Hermosa-Balintawak Transmission	T	230 kV TL segment of Balintawak-Duhat-Hermosa	Awaiting the approval of construction by the Toll Regulatory Board.	Jun 2008
Transmission Line and Substation – Package 2	C	Upgrading of 69 kV substransmission lines in Santiago and Alicia (Isabela province) and additional transformer in Daraga Substation	Completed Dec 2007	2007
Projects for Implementation				
Binga-San Manuel 230 kV T/L	T	Construction of a new double cuircuit Binga-San Manuel 230 kV TL		2010
Dasmariñas-Rosario 115 kV T/L	T	Construction of 115 kV T/L and expansion of Dasmariñas-Rosario substation		2009
Luzon Mindoro Interconnection	T	Construction of 230 kV Overhead lines		2013
Luzon Power Circuit Breaker Replacement Program	T	Replacement of 9 -230kV PCB in Malaya and Naga substation		2011

* *T – Transmission Asset*
ST – Sub-transmission Asset
C – Connection Asset

grid for the entire planning period. Total committed projects reached 608.3 MW comprising of 8-MW Northwind Power Project Phase 2 and 600-MW Coal Fired Plant in Mariveles, Bataan. In terms of indicative capacity addition, a total of 16 projects with an aggregate capacity of 3,103 MW are lined-up in the entire Luzon grid. For Visayas, total committed projects reached 220 MW comprising of 200-MW Cebu coal and 20-MW Nasulo geothermal. There are also seven indicative projects in the Visayas totaling 624 MW which are still open for private sector participation. For Mindanao, the 42.5 MW Sibulan Hydro and 50.0 MW Mindanao 3 Geothermal are committed by 2009 and 2010, respectively. In terms of indicative capacity, a total of seven projects with a total capacity of 745.5 MW are still open for private sector (Table 20).

TRANSMISSION DEVELOPMENT

The Transmission Development Plan (TDP) embodies the infrastructure projects necessary to meet customer demands and ensure the reliability, adequacy and

Table 21. TRANSMISSION LINE PROJECTS

Name of Project	Capex Type *	Project Component	Status	Expected Time of Completion
Luzon				
Ongoing projects				
Luzon Substation Expansion -2	T	Replacement of existing 75 MVA transformer in La Trinidad substation		2011
Luzon Substation Expansion -3	T	Installation of additional 75 MVA transformer capacity in Tuguegarao Substation		2013
Luzon Transmission Equipment Upgrade	T	Installation of second tie-line for the Labrador-Kadampat, Reconductorin of Bauang-BPPC line with high ampacity conductor; Installation of reactors in Kadampat (2x90MVAR), Concepcion (25 MVAR), Hermosa (25 MVAR) and Naga (25 MVAR); Installation of capacitor (2x50MVAR) at Balintawak.		2009
Luzon Voltage Improvement-1	ST	Installation of reactor and capacitor banks in nine substations.		2009
Luzon Voltage Improvement-2	T	Installation of 430 MVAR capacitor banks at four substations in Luzon.		2011
San Jose 500 kV reconfiguration	T	Increase reliability of San Jose 500kV substation		2013
San Jose-Balintawak Line 3	T	Construction of the third line of the 18. 5km San Jose-Balintawak 230 kV T/L.		2013
Visayas				
Ongoing Projects				
Cebu-Negros Interconnection Uprating (Turnkey)	T	138 kV Submarine Cable, Oil-filled Suba CTS-Pondol CTS 138 kV ACSR/AS Transmission Line Naga Substation-Ginatilan, Ginatilan-Suba CTS, Amlan-Pundol CTS 69 kV ACSR/AS Transmission Line Suba CTS-Alcoy CTS, Amlan (Expansion), Old Naga (Salcon), New Suba and New Pundol CTS	Substantially completed. Final T&C of the SC and CTS could only be done in time for the energization of Sched II-T/L & S/S portion On-going 58.5% completed	Apr 2008
Cebu III Transmission (100 MVA Quiot SS)	T	Bus-in (Naga-Banilad) Pardo and Quiot S/S	Energized 9 Nov. 2007	Dec 2007
Leyte-Samar Reinforcement Project	T	Ormoc Substation	ETC: Nov. 2007	Nov 2007
Negros V Transmission Line	T	San Carlos Guihulngan	On-gong preparation of Tender Documents for erection contract	Dec 2008
Negros-Panay Interconnection Uprating	T	Bacolod-Talisay Talisay-E.B. Magalona CTS San Juan CTS-Dingle S/S San Juan-Tap Dingle Barotac Viejo Bacolod (Expansion) Dingle (Expansion) E.B. Magalona Switching Station San Juan Substation (New) San Juan – E.B. Magalona CTS	Technical Evaluation Report for BAC Review	Jun 2008

** T – Transmission Asset*
ST – Sub-transmission Asset
C – Connection Asset

Table 21. TRANSMISSION LINE PROJECTS

Name of Project	Capex Type *	Project Component	Status	Expected Time of Completion
Visayas				
Ongoing projects				
Northern Panay Backbone Project	T	Panitan-Nabas Nabas S/S Cut-in to Nabas-Culasi 69 kV T/L Nabas S/S (New) Panitan S/S (exp)		Jun 2009
Visayas Capacitor Project-1	C	Installation of 138 kV Capacitors banks in Sibonga, Alcoy, Medellin, Hamtic, Guilhungan, Binalbagan, San Enrique, Sibalom, Tolosa, MacArthur, Catarman, Taft and Borongan	L/C effective 13 Sept. 2007. Completion of S&D June 2008	Dec 2008
Wright-Calbayog Transmission Line	T	Wright-Calbayog 69 kV tie line Wright S/S Calbayog S/S Ormoc-Babangon-Wright	For re-bid. Change of source of fund	Dec 2008
Projects for Implementation				
Bohol Backbone Transmission Project	T	Installation/construction of 110 km of 138 kV overhead T/L and installation of 150 MVA power transformers in two new substations: Corella and Tubigon.		Jan 2010
New Naga Substation	T	Termination point for Cebu-Negros uprating.		Jan 2010
Visayas Power Circuit Breaker Replacement Program	T	Replacement of old PCBs.		Jul 2010
Southern Panay Backbone Transmission Project	T	Installation/construction of 112 km of 138 kV and 69 kV overhead TL.		Mar 2010
MINDANAO				
Ongoing Projects				
Abaga-Kirahon 230 kV Transmission Line	T	Abaga-Kirahon Kirahon Substation (new) Abaga Substation Kirahon Control Center	For re-bid. Change of source of fund	Jun 2008
Gen. Santos-Tacurong Transmission	T	Gen. Santos-Tacurong Gen. Santos-Substation Tacurong Substation	For re-bid. Change of source of fund	Jun 2008
Kirahon-Maramag 230 kV Transmission Line	T	108-km. 230 kV, double circuit, steel tower, 2-795 MCM transmission project		Jun 2009
Maramag-Bunawan 230 kV Transmission Line	T	Maramag-Bunawan Maramag 69 kV Tie Line Maramag S/S (new) Bunawan S/S (exp) Tagoloan S/S (exp)		Jun 2009
Mindanao Substation Expansion 2005	T	Installation of additional transformers at Sta. Clara, Kibawe S/S, Butuan S/S, Buslig S/S, New Loon S/S and Tindalo S/S	Delivery of materials in progress	15 Nov 2008

* *T – Transmission Asset*
ST – Sub-transmission Asset
C – Connection Asset

stability of the nationwide transmission system, in accordance with the requirements of the Philippine Grid Code. Adopting the overall energy demand supply outlook as contained in the Reference Plan (2006 PEP Update), this year's TDP will only focus on updates of the projects identified in the ERC's Final Determination of the list of projects that will fall within the capital expenditure (CAPEX) forecast.

It can be noted that on 13 June 2006, the ERC issued the Final Determination on TransCo Regulatory Reset for 2006-2010. It resolved the applications of TransCo and PSALM, in accordance with the Transmission Wheeling Rate Guidelines (TWRG), the proposed Maximum Allowable Revenue (MAR) for the Second Regulatory Period. A significant portion of the MAR consists of the CAPEX projects based on the 2005 TDP.

Table 21. TRANSMISSION LINE PROJECTS

Name of Project	Capex Type *	Project Component	Status	Expected Time of Completion
Mindanao				
Ongoing Projects				
Mindanao Subtransmission Line	ST	69 kV lines Maco-Tap (Maco-Mati) and KM 13-Surigao City		Dec 2007
San Francisco 138 kV Substation Project	T	138 kV San Francisco Substation Cut-In point (Butuan-Bislig line) 69 kV San Francisco Substation-San Francisco Load end San Francisco Substation (new)		May 2008
Zamboanga City 138 kV Transmission Line	T	Sangali-Pitogo Pitogo Substation (new) Sangali Substation	Failed bidding Construction on-going ETC: Jan 2008	Aug 2008
Projects for Implementation				
Aurora-Polanco 138 kV Transmission Line	T	Construction of 138 kV Aurora-Polanco line.		Jun 2009
Mindanao Mobile Transformer Project	T	Provision of mobile N-1 contingency.		Jul 2009
Mindanao Reliability Compliance Project (Phase 1)	T	Provision of N-1 security to Mindanao substations.		Jul 2012
Mindanao Power Circuit Breaker Replacement Program	T	Replacement of old PCBs		Jul 2010

** T – Transmission Asset*
ST – Sub-transmission Asset
C – Connection Asset

Performance Assessment

Several transmission projects were completed in 2006 to include the San Roque Associated Transmission Line and Substation Project and Panay-Boracay 69 kV Interconnection Project. The San Roque Project which will transport power from San Roque Hydro Power Plant to San Manuel Substation involves the construction of approximately 10 kms, 230 kV, 2 x 795 MCM ACSR steel tower, double circuit transmission line. The Panay-Boracay project, on the other hand, is an additional submarine cable with higher capacity to link Boracay to Panay Island. This project is Phase 1 of the Small Island Submarine Interconnection Development (SISID) Project. It is also considered the initial groundwork of the Boracay-Tablas-Romblon-Interconnection Project, another phase of the SISID Program. In addition, the Batangas S/S (Upgrade) component of the Batangas Transmission Reinforcement Project was also completed in May 2006.

Measurable Sectoral Targets

Several projects, as shown in Table 21, are lined-up for implementation to boost the system's efficiency and reliability.

B. EPIRA DEVELOPMENTS

Six years after the enactment of EPIRA, the energy sector achieved appreciable gains in its implementation in terms of the objectives set out in the law. The privatization process of the NPC assets has gained momentum. The DOE and its attached agencies were able to complete major reforms from the separation of the generation, transmission, distribution and supply functions to the establishment of the WESM.

To date, the remaining task that will redound to full benefits of the EPIRA is the implementation of Open Access and Retail Competition, which is still subject to the privatization condition under Section 31 of the Act.

PRIVATIZATION OF NPC ASSETS

Privatization of Generation Assets

As of July 2007, the government has successfully bid out and turned over eight hydroelectric plants to private owners and one large coal power plant for a total of nine generating plants. Six of the plants sold were in Luzon and Visayas with a combined capacity of 1,075.4 MW, which put the privatization level at 24.8 percent.

Meanwhile, the government is determined to further raise the level of privatization and immediately implement open access and retail competition. The target is to reach 50.0 percent level of privatization by end of 2007 with the scheduled bidding of Calaca Coal Fired Power Plant in October and Ambuklao-

Table 22. PRIVATIZED NPC ASSETS

Power Plant	Location	Capacity (MW)	Date of Bidding	Winning Price (in Million USD)	Winning Bidder
*Talomo Hydro**	*Davao del Sur*	*3.5*	*25 Mar 2004*	*1,370*	*HEDCOR*
*Agusan Hydro**	*Bukidnon*	*1.6*	*04 Jun 2004*	*1,528*	*First General Holdings*
Barit Hydro	Camarines Sur	1.8	25 Jun 2004	480	Atty Ramon I. Constancio
Cawayan Hydro	Sorsogon	0.4	30 Sep 2004	410	Sorsogon Electric Cooperative II (SORECO II)
Loboc Hydro	Bohol	1.2	10 Nov 2004	1,420	Sta. Clara International Corporation
Pantabangan-Masiway	Nueva Ecija	112.0	09 Nov 2006	129,000	First Gas Hydropower Corporation
Magat	Isabela	360.0	14 Dec 2006	530,000	SN Aboitiz Power Corporation
Masinloc	Zambales	600.0	26 Jul 2007	930,000	Masinloc Power AES
Total		**1,075.4**	**24.8%**	**1,594,210**	

** Not included in the 70.0 percent privatization level target as a requirement to implement open access and retail competition*
Source: PSALM

Binga Hydro Power Plants in November.[17] Other power plants are also scheduled for bidding, namely: Manila Thermal Plant, the Palinpinon Geothermal Plant in Negros and the Panay Diesel Plant in Dingle, Iloilo. Table 22 shows the privatized NPC power plants.

Privatization of Transmission Assets

After two unsuccessful bids in 2003, PSALM issued a public notice for the third round of bid for the TransCo business on 28 May 2006. The government declared the bidding for the TransCo 25-year concession a failure after only one investor group submitted a bid.

The government carefully studied the concerns raised by investors and considered these in the review of the privatization structure. In June 2007, the government, through the PSALM Board, approved the structure and bidding package of TransCo.

To promote greater investors' interest in TransCo, the government embarked on a series of international road shows in July participated in by officials of PSALM, DOE, DOF, ERC and TransCo.

The Invitation to Bid for TransCo was published on 23-25 July 2007 in major newspapers, in time for the fourth round of bidding targeted on 12 December 2007. In August 2007, 21 parties had shown interest to bid for the transmission business.[18]

Review and Renegotiation of the IPP Contracts

PSALM was mandated under the EPIRA to competitively select and appoint qualified independent entities called the Independent Power Producer Administrators (IPPAs) to administer and manage the contracted energy output of NPC/PSALM IPP contracts. The IPPA process is part of a broader plan to privatize both the generation and transmission assets, and to bring competition into the supply market through an *"Open Access"* mechanism.

Since the WESM commenced its operation in June 2006, PSALM has effectively been acting as the interim IPPA by bidding out the NPC/PSALM IPPs' energy output in the spot market on a day-to-day basis. PSALM initially split the IPPs into four trading teams to manage them, but were subsequently reduced to three teams. Although the total megawatt capacity of the portfolios of said trading teams has increased, it is still below the 30.0 percent threshold capacity of the Luzon grid as stipulated in the EPIRA.

The World Bank grant, through the Policy on Human Resources and Development (PHRD), has enabled the DOE to facilitate the Technical Assistance (TA) on the Appointment of IPPAs and Energy Trading for both NPC and PSALM.

The objective of the TA is to advise the IPPA-Technical Working Group (IPPA-TWG) on the structure, contract terms and the process on the appointment of IPPAs. The IPPA-TWG was created by the DOE with NPC and PSALM as members.

The IPPA Advisor has commenced work for the IPPA in April 2007. Its task is to review the following proposed approaches for the administration and management of the contracted energy by the IPPA:

- ***Agency Approach***
  This specifies that payment and financial risks remain with the NPC/ PSALM while NPC remains the contract party.

- ***Ownership Approach***
  This purports to create integrated supply companies to compete with current players in the energy market.

[17] Calaca and Ambuklao-Binga power plants were bid out on 16 October and 28 November 2007, respectively, increasing the privatization level as of end-2007 to 42.7 percent.
[18] TransCo concession was awarded to Monte Oro Grid on 12 December 2007

TRANSPARENCY OF ELECTRICITY RATES

Universal Charge (UC)

Pursuant to Section 34 of the EPIRA, PSALM administers the fund collections from the UC, which should be disbursed in an open and transparent manner and for the purposes specified in the law. The UC is a non-by-passable charge collected from all end-users every month by the distribution utilities, TransCo, and supplier based on the approval made by the ERC.

Total collections/remittances as of September 2007 amounted to PhP 7.43 billion, out of which PSALM disbursed PhP 7.15 billion from the Special Trust Fund (STF) for the environmental charges of NPC and for the missionary electrification of NPC-Strategic Power Utilities Group (SPUG) in accordance with the provisions of EPIRA. Table 23 shows the UC remittances and disbursements.

Removal of cross-subsidies. To date, all 120 ECs have already implemented cross-subsidy removal in electricity pricing in various phases: 50.0 percent-60.0 percent removal, 40.0 percent-60.0 percent removal, complete removal, 2/3 removal, 1/3 removal and 1/4 removal. There are 51 ECs that have completely removed inter-class cross subsidy, while the remaining 69 ECs are still in various phases of cross-subsidy removal schemes.

Provision of Lifeline Rates. As a socialized pricing mechanism, lifeline rate is given to low-income captive electricity end-users. The rate is largely based on the consumer profile of EC coverage area and the efficiency of operations of the concerned distribution utilities (DUs). ERC has approved the lifeline rates for 127 of the 139 DUs in March 2007.

Table 23. STATUS OF UNIVERSAL CHARGE REMITTANCES & DISBURSEMENTS, as of 30 September 2007 (Million PhP)

Particulars	Remittances	Disbursements	Balances
Special Trust Fund- Missionary Electrification	6,955.67	6,901.70	53.97
Special Trust Fund-Environmental Charge	469.23	251.92	217.31
Main Trust Account Universal Charge	3.20		3.19
Total	**7,428.01**	**7,153.62**	**274.46**

Source: PSALM

Table 24. STATUS OF LOAN CONDONATION, as of 31 March 2007

Type of Creditor	Amount Condoned (In Million PhP)	Total Payment (In Million PhP)	Outstanding Balance (In Million PhP)	Percent of loans paid
NEA	17,977.95	6,067.78*	11,910.17	34
LGU/OGA Creditor	85.21	76.57*	4.92	90
Total	**18,063.16**	**6,144.35**	**11,915.09**	**34**

** Includes the discount by Palawan Provincial Government in the amount of PhP 3,725,000.97*
Source: PSALM

Condonation of Loans of Electric Cooperatives. As of March 2007, PSALM has paid a total of PhP 6.14 billion worth of financial obligations of ECs to NEA, local government units and other government agencies (Table 24). Of the PhP 6.07 billion total payments to NEA, about PhP 4.56 billion, or 75.0 percent, was used to pay for the rural electrification loans incurred by the ECs.

On the other hand, 15.6 percent was utilized to pay for the mini-hydro projects, 9.2 percent for the dendro thermal project and 0.1 percent paid for house wiring services.

WESM

Implementation of WESM in Luzon

WESM's first year of operation in Luzon went through smoothly albeit some market flaws, which revealed what needs to be done in order to achieve the very purpose of its establishment, i.e. promote competition, improve the performance of the electricity spot market, particularly on the aspect of fair competition and prevent any market power exercise.

As of October 2007, the participants that have registered in WESM-Luzon are listed in Table 25.

Those customers that have not yet registered in the WESM are supplied either through bilateral power supply contracts with generators, or through the default wholesale supply arrangement with NPC and PSALM.

Highlights of Luzon Commercial Operations

Highest peak demand was registered in May 2007 at 6,590 MW while average demand was at the lowest in November 2006 at 3,242 MW. As for the energy offered by participating generators to WESM, average energy offers were at their lowest in January and March 2007. Tight supply condition during these months was due to outages of generating plants, unavailability of certain generating plants because of fuel constraints, line limitations and declining offers from hydro-electric plants caused by low water levels. With tight supply margin, actual manual load dropping was experienced in April 2007.

Effective Settlement Prices in the WESM were relatively high from April to June 2007 as high levels of demand coupled with thin supply margins were likewise experienced. In addition, the dispatch of more expensive diesel and oil generating plants increased during those months to make up for the unavailability of some coal-fired plants and low hydro levels, which

triggered the spot prices to escalate. The highest effective settlement price was recorded in December 2006 (Table 26).

Power supply in Luzon is mostly covered by bilateral power supply contracts quantities (the "BCQ"), with spot market purchases accounting for only about 15.0 to 20.0 percent of the total energy consumption.

Visayas Trial Operations Program

The Philippine Electricity Market Corp. (PEMC) plans to integrate the WESM in Luzon with its Visayas counterpart within the first half of 2007. As of November 2007, PEMC had registered a total of 37 trading participants. Of these, 14 are generators, while 23 are customers classified into distribution utilities, rural electric cooperatives, and industrial and commercial customers.

Since March 2006, PEMC has been conducting a series of Trial Operation Program (TOP) among the trading participants in the Visayas. This is a series of high-level Market Operations Scenario Tests (MOST) that are performed in different phases and are intended to fully test the functionality of Market Management System (MMS) in the region. TOP aims to assess the capabilities and readiness of power industry stakeholders in terms of the electricity market rules, procedures and processes through their participation in a "live" environment prior to the commencement of WESM commercial operations in the Visayas region.

The integration of Visayas market has been envisioned to help find a solution to an impending power supply problem in the region. It is anticipated that investors would come in to build new power plants and add new capacity to the Visayas grid. PEMC will conduct live dispatch operation from 11 January 2008 to test submission of offers, processing of offers, demand forecasting, system status reporting, dispatch implementation and dispatch reporting.

Table 25. WESM REGISTRATION (PhP/MWh)

Participant Classification	Number	Registered	MW
Registration Status in Luzon			
Generators	**22**	**22**	**11,546.00**
1. NPC -Owned (Trading Teams)	7	7	2,546.00
2. PSALM (NPC-IPPs) (Trading Teams)	3	3	6,231.00
3.First Gas Power Corporation	1	1	1,038.00
4. FGP Corp	1	1	504.00
5. Quezon Power Philippines (Limited) Company	1	1	460.00
6.First Gen Hydro Power Corporation	1	1	112.00
7. SN Aboitiz Power Corp. Inc	1	1	360.00
8.Other IPPs	7	7	295.00
Customers			
1. Private Distribution Utilities	11	3	4684.90
2. Rural Electric Cooperatives - direct members	45	3	136.64
3. Other Utilities	108	0	-
Registration Status in the Visayas			
Generators	**13**	**11**	**1,695.00**
1. Global Business Power Corp.	1	1	136.00
2. National Power Corporation	10	8	919.20
3. PSALM (Unified Leyte)	1	1	590.60
4. PNOC-EDC	1	1	49.00
Customers			
1. Private Distribution Utilities	4	4	388.92
2. Rural Electric Cooperatives	31	15	388.78

Source: PEMC

Table 26. EFFECTIVE SETTLEMENT PRICES (PhP/MWh)

Billing Month	Effective Settlement Prices		
	With Surplus	Without Surplus	Cumulative Average
Jul 2006	3,164.75	3,094.12	3,152
Aug 2006	3,647.75	3,577.67	3,373
Sep 2006	4,129.05 (5,878)*	4,129.05	3,624
Oct 2006	4,159.09 (7,835)*	4,159.09	3,750
Nov 2006	5,860.99	5,746.92	4,115
Dec 2006	8,760.88	8,731.92	4,542
Jan 2006	3,828.58	3,791.67	4,481
Feb 2006	4,830.51	4,810.36	4,501
Mar 2006	5,472.20	5,370.34	4,560
Apr 2007	8,622.85	8,592.97	4,871
May 2007	6,640.40	6,484.51	4,962
Jun 2007	6,287.75	6.031.63	5,062

Source: PEMC – Market Operation (MO)
** Unadjusted Prices*

ERC Regulatory Filings

Approval of the Pricing and Cost Recovery Mechanism for Reserves in the Philippine Wholesale Electricity Spot Market. PEMC has already filed its application to ERC for the approval of the pricing and cost recovery mechanism (PCRM) for reserves. PCRM provides details of the formulation and procedures by which reserve dispatch schedules and zonal reserve prices for each reserve region are calculated in the Market Dispatch Optimization Model and which are already set forth in the approved WESM Price Determination Methodology (PDM). On 24 May 2007, PEMC submitted its "Formal Offer of Evidence" for such pricing and cost recovery mechanism. The decision on this application is still pending with ERC for consideration.

Table 27. METERED QUANTITIES: ENERGY CONSUMPTION

Billing Month	Metered Quantity (Load), MWh	Spot Quantity, MWh	%	Bilateral Contract Quantity (BCQ), MWh	%
Jul 2006	3,094,164.95	1,355,434.37	44	1,738,730.58	56
Aug 2006	3,147,800.36	1,159,428.23	37	1,988,372.13	63
Sep 2006	3,314,855.13	1,291,334.84	39	2,023,520.30	61
Oct 2006	2,873,285.25	1,224,467.60	43	1,648,817.65	57
Nov 2006	3,234,958.03	1,069,288.10	35	2,165,669.93	65
Dec 2006	2,972,091.65	519,152.06	18	2,452,939.59	82
Jan 2006	3,035,805.04	589,925.05	19	2,445,879.99	81
Feb 2006	3,102,610.89	510,281.30	16	2,592,329.59	84
Mar 2006	2,980,658.77	536,155.65	18	2,444,503.12	82
Apr 2007	3,407,504.68	698,602.96	21	2,708,901.72	79
May 2007	3,460,944.49	503,878.03	15	2,957,066.46	85
Jun 2007	3,561,655.99	805,535.91	23	2,756,120.08	77

Source: PEMC-MO

Table 28. AVERAGE ENERGY OFFERS (MW)

Billing Month	Peak Demand	Coincidental Energy Offers	Average Demand	Average Energy Offers	Capacity on Outage
Jul 2006	6,111	7,185	4,743	5,757	2,634
Aug 2006	5,888	5,950	4,604	5,832	2,094
Sep 2006	6,113	6,705	4,882	6,407	1,743
Oct 2006	5,895	6,653	4,624	5,527	1,866
Nov 2006	5,894	5,808	3,242	5,526	2,223
Dec 2006	5,869	5,925	4,467	5,092	3,188
Jan 2006	5,739	5,794	4,412	5,211	1,815
Feb 2006	6,021	5,965	4,513	5,333	1,737
Mar 2006	6,108	5,747	4,848	5,294	1,846
Apr 2007	6,559	6,268	4,991	5,284	1,769
May 2007	6,590	6,831	5,249	5,766	770
Jun 2007	6,547	6,308	5,187	5,631	1,137

Source: PEMC

Table 29. WESM GOVERNANCE COMMITTEES

WESM Committees	Number of Members Required	Current Number of Members
Market Surveillance Committee (MSC)	5	4
Rules Change Committee	15	12
Dispute Resolution Group / Dispute Resolution Administrator	8	5
Technical Committee	5	4
Philippine Electricity Market (PEM) Audit	3	2

Source: PEMC

Price Determination Methodology Compliances and Other Directives. In relation to PDM, which was approved in June 2006, the ERC has directed PEMC and other WESM participants to submit their proposed methodology for compensation and settlement of generators whose plants are dispatched by the System Operator as must-run units (MRUs). MRUs are dispatched by the System Operator to address various system security and reliability considerations. PDM intends to provide the market participants with specific principles by which energy in WESM will be priced including the computational formula to enable them to verify the correctness of the charges being imposed.

PEMC Governance. The WESM rules provide for the creation of five WESM Committees as shown in Table 29.

All committees under WESM were established with the latest appointments of new members in April 2007: MSC with one, Technical Committee with four and the PEM Audit with two.

Aside from said committees, the Market Assessment Group (MAG) and the Enforcement and Compliance Offices (ECO) of PEMC were likewise established to be directly involved in the WESM governance. MAG, together with ECO and MSC, undertakes the monitoring and assessment of market outcomes and behaviors pursuant to the WESM Rules and the Market Surveillance, Enforcement and Compliance Market Manual.

Way Forward

The DOE is working on the most facilitative institutional arrangement among the energy sector agencies to address the multi-challenges facing the implementation of the EPIRA. The ultimate objective is to harmonize efforts for a better electricity market that would effectively cater to various demand sectors, and at the same time achieve the overall national development goal of globally competitive power industry/market.

C. EXPANDED RURAL ELECTRIFICATION

Over the past two decades, rural electrification has always been one of the government's priority thrusts. As one of the Ten-Point Legacy Agenda of the Arroyo administration, the DOE has instituted the Expanded Rural Electrification (ER) Program to coordinate and integrate all efforts on rural electrification being undertaken by the government and

the private sector. The goal is to attain 100 percent barangay electrification by 2008.[19]

Performance Assessment

The country's total electrification level as of 31 July 2007 stood at 95.5 percent having electrified 40,086 out of the total 41,980 barangays.[20] This leaves a total of 1,894 barangays still to be energized until 2008.

Among the country's major islands, Luzon has the highest electrification level at 97.3 percent. The remaining 555 unelectrified barangays are mostly found in Regions II, IV-B and V.

The island of Visayas achieved 97.0 percent electrification level from 96.8 percent in 2006. The 338 remaining unelectrified barangays are mostly found in Region VIII, particularly in the province of Samar.

Meanwhile, the electrification level in Mindanao increased to 90.0 percent from 89.0 percent in 2006. The 1,001 remaining unelectrified barangays are located in Regions IX, X and ARMM.

Table 31 highlights the electrification level of the different regions in the country. NCR has achieved 100 percent electrification level while ARMM has only 76.0 percent electrification level, the lowest among the regions. Other regions with low electrification levels include IV-B, V, VIII, IX and XII.

In terms of franchise area, the ECs were able to energize an accumulated 95.0 percent of its coverage areas with a remaining balance of 1,795 barangays. On the other hand, Meralco which is the country's largest distribution utility, is only short of 63 barangays to energize within its franchise areas registering an accumulated total of 98.5 percent as of end of 31 July 2007. Meanwhile, the private-investor owned utilities as well as local government units have 36 remaining barangays to be energized.

On the other hand, around 3,200.46 ckt.-kms of distribution lines and 10 MVA of substation capacities were installed in 2006. A total of 550.67 ckt.-kms of distribution lines were also rehabilitated and upgraded to enhance the delivery of electricity particularly in remote areas nationwide.

ER Program. The reconstituted ER Program is an integration of efforts of both government and the private sector on rural electrification. The Program also aims to develop innovative and sustainable policies and strategies on rural electrification consistent with the EPIRA provisions. From the public sector, the implementers include the DOE and its attached agencies primarily NEA, NPC-SPUG, PNOC and its Energy Development Corporation subsidiary. Among the private sector partners are Mirant Philippines, KEPCO, PowerSource, CalEn, Luzon Hydro, San Roque Power Corporation and other IPPs and donor agencies such as the World Bank, USAID, Spanish Protocol and Filipino-French Protocol.

Public Sector Initiative. The public sector efforts in attaining 100 percent barangay electrification by 2008 are consolidated and integrated under the ER Program.

Table 30. STATUS OF ELECTRIFICATION BY ISLAND GRID, as of 31 July 2007

	Target	Energized	% Energization	Balance
Luzon	20,488	19,933	97.29	555
Visayas	11,443	11,105	97.05	338
Mindanao	10,049	9,048	90.04	1,001
Total	**41,980**	**40,086**	**95.49**	**1,894**

Note: Total number of barangays is based on 2005 NCSO

Table 31. ELECTRIFICATION LEVEL BY REGION, as of 31 July 2007

Region	Potential Barangays	Electrified/ Completed Barangays	Unelectrified Barangays	Electrification Level (%)
NCR	1,694	1,694	-	100.00
North Luzon Agribusiness				
CAR	1,176	1,122	54	95.41
I	3,265	3,264	1	99.97
II	2,311	2,219	92	96.02
Metro Luzon Urban Beltway				
III	3,102	3,092	10	99.68
IV-A	4,012	3,946	66	98.35
IV-B	1,457	1,350	107	92.66
Central Philippines				
V	3,471	3,246	225	93.52
VI	4,050	4,008	42	98.96
VII	3,003	2,999	4	99.87
VIII	4,390	4,098	292	93.35
Mindanao Agribusiness				
IX	1,904	1,724	180	90.55
X	2,020	1,918	102	94.95
XI	1,160	1,155	5	99.57
XII	1,194	1,103	91	92.38
ARMM	2,461	1,869	592	75.94
CARAGA	1,310	1,279	31	97.63
Total	**41,980**	**40,086**	**1,894**	**95.49**

Note: Total number of barangays is based on 2005 NCSO

Table 32. ELECTRIFICATION BY FRANCHISE HOLDER, as of 31 July 2007

Francise Holder	Coverage	Energized	% Energization	Balance
ECs	36,030	34,235	95.02	1,795
MERALCO	4,322	4,259	98.54	63
PIOUs/LGUs/ Others	1,628	1,592	97.79	36
Total	**41,980**	**40,086**	**95.49**	**1,894**

Note: Total number of barangays is based on 2005 NCSO

[19] In the "Talakayang Barangay" held in Bohol last 23 August 2007, President Gloria Macapagal Arroyo announced that the target of 100 percent barangay electrification has been moved to 2009.

[20] As of end-2007, total barangay electrification level stood at 96.6 percent

The DOE is using the electrification fund component of E.R. 1-94 (financial benefits to host communities following the radiating order i.e. based on proximity to the contributing power plant/s) for on-grid and off-grid electrification to make electricity accessible to more communities. Government subsidy is also being offered especially on the use of renewable energy-based facility to electrify communities in remote areas. Further, to augment the ER Program, the DOE is currently pursuing the energization of the 211 priority barangays of President Gloria Macapagal-Arroyo.

Meanwhile, the NEA has been mandated to extend technical, financial and institutional assistance to the ECs to improve the delivery of electricity in their respective franchise areas. The PNOC-EDC, on the other hand, has been offering advanced financial assistance for electrification in areas where their geothermal fields are located such as in Negros Island and the Bicol Region.

Private Sector Initiative. The IPPs are also committed to assist the DOE in its electrification program. The IPPs support the program through the provision of advance financing for electrification projects and the *"Adopt-a-Barangay"* scheme. Mirant and KEPCO both committed to energize a number of barangays throughout the country. To date, Mirant has 184 remaining barangays to be electrified in 2007, from the total commitment of 1,500 barangays since 2000. On the other hand, KEPCO has a total commitment of 500 barangays to be energized. Of the total, 200 barangays will be energized in 2007, of which not less than 40 sitios or 20 barangays in Cebu have been energized.

The participation of Qualified Third Party (QTP) in the electrification program is stipulated in the EPIRA under Section 59 and Rule 14 of its IRR, which requires the QTP to engage in providing electricity service to unviable and remote areas that are not covered and reached by franchise utilities. To complement the D.C.s – D.C. 2004-06-006 and D.C. 2005-012-011 – which prescribe the qualification criteria and guidelines for QTP participation issued by DOE, the ERC through its Resolution No. 22, Series of 2006, has set the rules for the regulation of QTPs performing missionary electrification in areas declared unviable by DOE. To date, the two pilot QTPs involved in the rural electrification program are PowerSource Philippines in Palawan and Paris-Manila Technology Corporation, Inc. (PAMATEC) in Masbate. The DOE is also assisting both firms in filing its application as QTP to ERC.

The Philippine Rural Electrification Service (PRES) Project, which commenced in January 2007, is directed towards providing the residents of Masbate adequate and reliable energy services. Around 18,000 households in 128 barangays will benefit from the said project which is being proposed for possible funding under the French-Filipino Loan Protocol. The project financing amounts to around Euro 17.5 million. Other concerns of the project include: lighting for barangay halls and school buildings, provision of vaccine refrigerators, lighting for rural health units, and provision of streetlights to major thoroughfares. Marketing activities to identify the potential 18,000 households was done in the first half of 2007. Ongoing activities are the survey on the socio-economic profile of households and the staking of the barangays for the mini-grid system.

The Sustainable Solar Market Package (SSMP) under the Rural Power Project (RPP) was designed to solicit private sector participation in the government's electrification program. It is also being used in Project ACCESS or Accelerating Community Energy Systems Using Solar, a new component of RPP. The SSMP, which clusters barangays into viable packages, is an ingenious approach towards addressing the availability of electricity in remote rural areas. Under the SSMP, PV systems will be supplied and installed in key public facilities and commercially marketed to a limited number of households within a given period (e.g. 30 systems or 25.0 percent of barangay households, whichever is larger within 12 months). To ensure the installation of PV systems in public facilities, funds would be made available through DOE and NPC-SPUG, as well as from the IPPs and donor agencies.

Currently, the SSMP is being pursued in 76 barangays in Aklan, Masbate, Northern Samar, Palawan, Zamboanga del Norte, Zamboanga del Sur and Iligan City. To date, the installation of solar PV systems in 21 barangays in Zamboanga del Norte and Zamboanga del Sur and two barangays in Iligan City have been completed. The SSMP Operator is expected to complete the marketing activities for household sales by June 2008 in subject barangays. Also, the DOE – in partnership with the private sector – has undertaken preparatory activities for the scale up of SSMP projects, which is expected to energize around 500 barangays nationwide.

Ceremonial switch-on of Masbate PRES Project held on 03 May 2007 in Malacañang Palace. Present in the photo are (R to L): DOE Undersecretary Melinda L. Ocampo, PAMATEC President and CEO Hubert d'Aboville, Former DOE Secretary Raphael PM. Lotilla, ETDE's Philip Sauvier and the representatives from the French Embassy.

Aside from the SSMP, the New Power Provider (NPP) Program will also encourage private sector participation in NPC-SPUG areas. The NPP program enables the private sector to take over the supply of electricity to any existing NPC-SPUG area, either through outright purchase or lease of existing NPC-SPUG assets, and/or installation of new power generating facilities including associated power delivery systems. At present, there are 74 NPC-SPUG areas in the country. Of the 74 NPC-SPUG areas, 14 were offered to the private sector under the NPP Program. Eight out of the 14 offered areas were already awarded with their respective NPPs. These areas are in Mindoro, Marinduque, Palawan, Catanduanes, Masbate, Tablas, Romblon and Bantayan.

Foreign-Assisted Projects. The RPP is a 14-year project financed by the World Bank-Global Environment Facility (WB-GEF). The project, which has four phases, aims to increase access to electricity services and transform ECs into more viable and competitive commercial entities. The first phase of the project, which commenced in June 2004 to end in 2009 will have additional target of 10,000 new household connections. The DOE has accredited eight PV companies and a MOA has been executed with the said companies. Establishment of tie-ups with micro-finance institutions (MFIs) and rural banks has also been carried out. Technical assistance is also being offered to support the private companies and MFIs.

The Solar Power Technology Support (SPOTS) Project, which supports agrarian reform communities (ARCs), is a joint undertaking of DAR and DOE that started in 2003. It is a three year project funded by the Spanish government. The project introduced PV applications for agricultural and rural enterprises expecting to address poverty in unenergized and off-grid ARCs. The project is now on its second phase targeting 44 ARCs situated in far-flung unenergized barangays in Mindanao.

The Alliance for Mindanao Off-Grid Renewable Energy (AMORE) Program - a joint undertaking of USAID, Mirant Philippines, ARMM, Winrock International and DOE - intends to energize conflict-affected and off-grid areas in Mindanao. To date, the project has energized 227 barangays using renewable energy systems. These are located in Sulu, Basilan, Tawi-Tawi, Maguindanao, Zamboanga Sibugay, Zamboanga del Sur, Sultan Kudarat, Davao City, and Zamboanga City. AMORE is completing the solar energy electrification in 148 conflict-affected areas in ARMM. Other activities/initiatives were likewise undertaken for the energized barangays under the said project, as follows:

- Demonstrations and training projects on the productive and social uses of renewable energy systems (i.e., crop drying, milling of agricultural products, seaweeds processing, drip irrigation for high value crops) to ensure sustainability of the installed renewable energy systems;
- Distance and computer-aided education were made available to beneficiaries through partnership with other private companies; and
- Conducted organization and capacity-building training for members of the *"Barangay Renewable Energy and Community Development Associations" (BRECDAs)* to operate and maintain the systems, as well as sustain the socio-economic benefits extended to the community by the project.

Measurable Sectoral Targets

The DOE, together with its attached agencies and private institutions is committed to energize 892 barangays in 2007 and 1,162 barangays in 2008 to attain the 100 percent total barangay electrification (Table 33).

Table 33. TIMETABLE OF ELECTRIFICATION REQUIREMENTS

Agency/Office	2007	2008	Total
NEA/ECs	301	160	461
DOE	125	556	681
DAR-SPOTS	9	12	21
PNOC-EDC	29	38	67
IPPs	395	300	695
PRES	32	96	128
PIOUs	1		1
Total	**892**	**1,162**	**2,054**
Energization Level, %	**98.00**	**100.00**	

For the energy sector to achieve total barangay electrification in 2008, it would require setting up of renewable energy systems in off-grid areas and expanding 4,548 ckt.-kms. of distribution lines until 2008. Likewise, an additional 2,173 MVA of substation capacities are also needed in grid areas. Around 8,779 ckt.-kms. of distribution lines will be rehabilitated in order to deliver a reliable and efficient supply of electricity until the targeted year (Table 34).

As a way forward, the government's rural electrification program not only envisions total barangay electrification by 2008 but also intends to realize 90.0 percent household connections by 2017. Attaining the targeted 90.0 percent household connection would necessitate the expansion of 4,716 ckt.-kms of distribution lines from 2009 until the end of the planning period, as well as the putting up of 2,804 MVA of substation capacities. Meanwhile, about 10,126 ckt.-kms. of distribution lines will be

Table 34. PROJECTED INFRASTRUCTURE REQUIREMENTS			
Year	Expansion		Line Rehabilitation (ckt.-kms.)
	Distribution Lines (ckt.-kms)	Substations (MVA)	
2006	3,523	1,377	4,174
2007	2,484	864	4,372
2008	2,064	1,309	4,407
2009	1,206	512	4,420
2010	1,136	1,264	4,056
2011	501	260	409
2012	542	155	422
2013	460	248	301
2014	447	215	228
2015	424	150	290
Total	**12,788**	**6,354**	**23,080**

rehabilitated to ensure efficient and reliable supply of electricity to every household.

Development Challenges

- Encouraging more private sector participation in rural electrification, particularly in those areas/ barangays not covered by EC's electrification program.
- Cost of acquiring information and data on the geographic location of remaining unelectrified barangays. Such information will aid in determining appropriate electrification solutions to the target barangays.
- Exploring innovative strategies to deliver electricity services in the remote areas, in particular, areas that are untenable due to peace and order situation, inaccessibility, and low population density.

Action Plan

- Strengthen and establish more partnerships with other potential partners such as NGOs and private institutions to fast-track electrification activities in highly remote barangays.
- Address the issues on disbursements, funds availability and any legal impediments to a partnership or joint undertaking for rural electrification projects/programs.
- Formulate a special implementation strategy and subsidy scheme for the remaining unelectrified barangays in Mindanao. Such could be implemented through the inclusion of "social preparation fund" in the total project cost, as well as creating partnerships or linkages between and among the relevant government agencies including LGUs, NGOs, and private institutions.
- Strengthen DOE collaboration with the private sector in addressing the accessibility problem of those barangays located in remote areas. The SSMP is being considered by the private sector as another approach to energize inaccessible barangays.

D. BENEFITS TO HOST COMMUNITIES

The DOE has continuously extended benefits to communities hosting energy generating projects through E.R. 1-94 as provided in Section 5 (i) of R.A. 7638 or the Department of Energy Act of 1992. Under E.R. 1-94, host communities are entitled to both financial and non-financial benefits from energy generating companies to support their community development and livelihood programs, among others.

Table 35. SUMMARY OF APPROVED BENEFITS TO HOST COMMUNITIES PER PROJECT TYPE				
Fund Type	2006		2007 (as of July 31)	
	No. of projects	(Million PhP)	No. of projects	(Million PhP)
EF	297	229.67	99	118.23
DLF	80	175.70	41	46.62
RWMHEEF	77	129.55	56	88.96
Total	**454**	**534.92**	**196**	**253.81**

Host communities can draw funds from E.R. 1-94 upon submission of proposed projects in any of the following: electrification fund (EF), development and livelihood fund (DLF), and reforestation, watershed management, health, and/or environment enhancement fund (RWMHEEF).

Aside from financial benefits, the non-monetary entitlements include preference for employment, training and skills development, priority in load dispatch, procurement of local supplies, and environmental management.

Performance Assessment

As of December 2006, the DOE approved a total of 454 projects equivalent to PhP 534.92 million. From these projects, there were 297 financed under EF amounting to PhP 229.67 million. The EF projects benefited a total of 111 barangays, 239 sitios, and 60 enhancement projects particularly in the provinces of Quezon, Laguna, Rizal, Northern Samar, Bukidnon, Lanao del Norte and Lanao del Sur. On the other hand, around 80 projects were approved under DLF and 77 projects for RWMHEEF with total project funds amounting to PhP 175.70 million and PhP129.55 million, respectively. Some of the projects implemented include infrastructure works such as access roads, school buildings, street lighting, water system facilities

and the purchase of vehicles such as ambulances and dump trucks.

About 196 projects equivalent to PhP 253.81 million were approved under E.R. 1-94 as of 31 July 2007. Of the 196 projects, 99 were electrification projects amounting to PhP 118.23 million. Around 97 barangays and 81 sitios from the provinces of Batangas, Cavite, Davao City, Laguna, North Cotabato, Pangasinan, Romblon, Quezon, and Zambales benefited from EF. Forty-one projects were approved for DLF amounting to PhP 46.62 million while RWMHEEF had 56 approved projects amounting to PhP 88.96 million.

To ensure effective and timely implementation of projects, the DOE instituted project management measures such as the opening of trust funds for financial benefits accruing to host communities from the commercial operations of the various power plants nationwide. Initially, a total of 24 trust funds (EF, DLF, and RWMHEEF) covering eight power plants were opened in 2006.

Moreover, 44 completed projects were physically inspected and assessed in 2006. Twenty of these projects are under DLF while the remaining 24 are under RWMHEEF. The DOE also conducted various IECs/consultations/briefings to host communities, including the new stakeholders/players under the E.R. 1-94 program.

Development Challenges

The effective implementation of E.R. 1-94 program is still constrained by the need to strengthen capacities of LGUs, particularly in the areas of project development planning, monitoring and evaluation. They also need to be equipped with skills on social preparedness and community organization. Meanwhile, frequent turnover in LGU leadership could also be mitigated with the continuing conduct of information dissemination on the merits of the program and adherence to its guidelines and procedures.

Action Plan

Similarly, the action plans adopted in the reference plan are likewise considered in this Plan Update, as follows:

- Complete inventory of all generation facilities in the country to ensure that benefits under E.R. 1-94 are extended to the host communities.
- Facilitate the establishment of the required trust funds through the execution of agreements between the DOE and generation facilities.
- Develop and adopt appropriate measures and guidelines to effectively ensure the provision of financial benefits to communities hosting small generation facilities.
- Conduct regular public consultations, IEC campaigns and workshops with concerned stakeholders for the review of the amended E.R. 1-94 procedures and project implementation.
- Facilitate evaluation of LGU project proposals and releases of funds for project implementation.
- Conduct of seminar/workshop to enhance LGUs capability in the preparation of project proposals, project implementation and monitoring in collaboration with the power plant proponents/ owners.
- Review Rule 29 (A)[21] of the EPIRA-IRR and institute corresponding amendments to make the program more responsive.

[21] Rules for the Benefits to Host Communities Pursuant to Section 5 (i) of R.A. 7638 *"specifies the obligations of generation companies and energy resource developers to communities hosting energy generating projects."*

V. Downstream Energy Industry

A. OIL INDUSTRY DEREGULATION

R.A. 8479 or the *Downstream Oil Industry Deregulation Act of 1998* provides that the government liberalize and deregulate its downstream oil industry to ensure a truly competitive market under a regime of fair prices, level playing field, adequate and continuous supply of environmentally-clean and high-quality petroleum products. To this end, the government shall promote and encourage the entry of new participants in the downstream oil industry and introduce adequate measures to ensure the attainment of these goals. This is also within the Arroyo Administration's goal of leaving a legacy of successful government plans and programs to win the war against poverty.

On the other hand, the DOE continually carries out close monitoring of oil industry activities, as well as the compliance of industry players to quality standards.

Performance Assessment

Eight years after the implementation of R.A. 8479, a total of 627 players (1st half of 2007) are engaged in various activities in the oil industry such as marketing, distribution and storage of petroleum products. Total accumulated investment reached PhP 30.74 billion as of end 2006. Such investment has increased to PhP 31.69 billion in the first half of 2007. Improved investment is seen to provide additional jobs and greater accessibility to quality petroleum products.

Supply

Inventory. In 2006, actual industry inventory inclusive of stocks in-transit from the import sources averaged at a 59-day supply equivalent. This was eight percent lower than the 64-day average supply in 2005. Nonetheless, this was in conformance with *DOE Circular No. 2003-03-002* which requires for a Minimum Inventory Requirement (MIR) of in-country stocks by the oil companies equivalent to 15 days for refiners and seven days for both bulk suppliers and LPG players.

Importation. For 2006, crude import volume increased by only 0.5 percent vis-à-vis 2005 figure due to high levels of stocks and not much improvement in the country's oil requirements. On the other hand, importation of finished petroleum products is almost at the same level with 2005. Forty-one percent of the country's demand is imported as finished product.

Refinery Production. Total crude oil processed by local refiners in 2006 was 2.6 percent lower compared to the previous year's level. This may be attributed to the maintenance shutdown of several process units of refinery sometime within that year.

Likewise, other process units were also closed due to power outages brought about by several typhoons that hit the country resulting in a decline of 1.8 percent in the local refinery capacity utilization.

Further, 2006 local refinery production output slightly fell by 0.6 percent compared with the previous year.

Competition

The downstream oil industry has been experiencing a steady growth after its deregulation. New industry

Table 36. TOTAL NUMBER OF NEW PLAYERS PER ACTIVITY, 2006

Activity	No. of New Players
Liquid Fuel Bulk Marketing	83
LPG Bulk Marketing	10
Liquid Fuel Retail Marketing	506
Bunkering	18
Terminalling	5
Total	**622**

players engaged in different activities increased by 2.9 percent from 604 in 2005 to 622 in 2006. Likewise, total investments of independent players went up by 8.2 percent from the 2005 level of PhP 28.4 billion to PhP 30.74 billion in 2006. This is notwithstanding the decrease in their over-all market share from 15.2 Million Barrels (MMB) in 2005 to 13.6 MMB as of 2006. Similarly, their market share to total demand in the LPG sector also dropped from 44.5 percent in 2005 to 40.7 percent in 2006. This is due to the temporary shut down of operation of Nation Corporation, one of the LPG independent players, during the last quarter of 2006.

In 2006, the industry recorded a total of 3,472 gasoline stations. This represents an additional 103 stations, which is equivalent to 3.0 percent increase from previous year's 3,369. Among the Philippines' three main island grids, Luzon has the most number of gasoline stations constructed by the new players. Table 37 shows the breakdown by three main island groups.

Table 37. NUMBER OF GASOLINE STATIONS, 2006

Region	No. of New Players	Total Industry
Luzon	277	2,321
Visayas	8	532
Mindanao	61	619
Total	**346**	**3,472**

Meanwhile, the country has a total storage capacity of 28.3 MMB (Table 38).

To assist prospective investors, several big projects of the different players in the industry have been endorsed for registration and incentives availment with the Board of Investments (BOI).

Table 38. TOTAL COUNTRY STORAGE, 2006

Depots	Number	Capacity (MB)
Majors	72	7,751
Others	59	2,625
Total	**131**	**10,376**
Import/Export Terminals		
Subic-Olongapo*	1	2,445
Clark-Pampanga	1	386
SGEI-Tabangao, Batangas	1	290
Total	**3**	**3,121**
Refinery (Crudes & Product)		
Petron-Limay, Bataan		9,338
Shell-Tabangao, Batangas		5,466
Total		**14, 804**
Total Storage		**28,301**

** Includes the available capacity*

Price

The DOE ensures the reasonableness of domestic prices of petroleum products through international price monitoring benchmarks, such as Dubai, Brent and West Texas Intermediate (WTI) for crude and Mean of Platts Singapore (MOPS) for petroleum products. Corresponding adjustments in domestic prices are estimated considering the movements in international benchmarks and the foreign exchange. The DOE-DOJ Task Force is convened as necessary to determine and rule on reports of suspicions on unreasonable rise in the domestic prices.

In May 2006, as crude oil and petroleum products reached new record highs, E.O. No. 527 *"Temporarily Modifying the Rates of Import Duty on Crude Petroleum Oils and Refined Petroleum Products Under Section 104 of the Tariff and Custom Code of 1978 as Amended"* was issued to serve as a safety net against the volatility of the international market price of oil. The said E.O. provided for an automatic tariff cut based on international trigger price levels as agreed upon by the DOE, DOF/BOC and NEDA. On the basis of this E.O. likewise, the oil companies had reflected tarrif reduction for crude and finished petroleum products in the pump prices of diesel fuel sold to the public from June to November 2006.

With the country's strong currency, coupled with persuasion against one-time price changes, oil companies effected small incremental price adjustments. Further reductions were offered in 605 gasoline stations nationwide giving price discounts on diesel for public transport. In Metro Manila alone, there were 253 stations offering diesel price discount, while there were 278 stations in Luzon, 33 in the Visayas, and 41 in Mindanao.

Standards Formulation and Enforcement

Petroleum Products, Biofuels and Other Fuel Related Products. The DOE, through the Technical Committee on Petroleum Products and Additives (TCPPA), continues its standards-setting activities guided further by international/regional standards and trends on fuel and fuel-related products. The TCCPA was created pursuant to R.A. 8749 or the Clean Air Act (CAA) of 1999 to set quality standard for petroleum and other fuel-related products as mandated under the CAA, as well as for alternative fuels. Similarly, the Department spearheaded the development and formulation of quality specifications for alternative fuels from indigenous and renewable energy sources consistent with the country's energy independence agenda and sustainable development.

The following PNS were reviewed/formulated/ enforced:

Conventional Fuels and other Fuel-Related Products:

- ***PNS/DOE QS 001:2005 – Unleaded Motor Gasoline Specifications.*** This standard replaced PNS 1131:2002 (DOE 001:2002) which highlighted quality improvements such as the reduction of maximum sulfur content from 0.1percent for premium and 0.2 percent for regular grade to 0.005 percent mass for all grades in conformance with the sulfur limit of Euro II standard.

- ***PNS/DOE QS 006: 2005 – Fuel Oils (Bunker) Specifications.*** This standard updated/reviewed PNS 21:1997 with no major revision made except on the test methods. Said standard retained the three grades based on sulfur content: BFO1, BFO2 and BFO 3.

- ***PNS/DOE QS 005:2005 – Liquefied Petroleum (LP) Gases Specifications.*** This standard amended PNS 22:1990 to cover the use of LPG as a motor fuel in support of the government's effort to promote the utilization of alternative and clean technologies for the transport sector. Likewise, the standard improved the properties of LPG, not only as fuel but also for its other uses.

- ***DPNS/DOE QS 011:2006 – Kerosene Specification (in progress).*** This draft standard is a proposed revision of PNS 32:1991 (kerosene specification).

Biofuels and its Blends:

- ***PNS/DOE QS 008:2006 E-Gasoline (10.0 percent Ethanol-Gasoline Blend) Specification.*** This standard specified the chemical and physical requirements for bioethanol-blended gasoline (E-Gasoline) with emphasis on the ethanol content at 9.5-10.0 percent volume ethanol blend and 3.5 percent oxygen content, maximum.

- ***PNS/DOE QS 007:2005 Anhydrous Bioethanol Fuel.*** This is a quality standard for fuel grade ethanol both pure (bioethanol with 99.3 percent purity), and denatured grade (fuel bioethanol with 96.9 percent purity at 2.0 percent ULG denaturant) for blending with gasoline for use as automotive spark-ignition engine fuel.

- ***DPNS/DOE QS 004:2007 Fatty Acid Methyl Ester (FAME)-Blended Diesel Oils.*** This standard will harmonize with quality improvements of conventional diesel and enactment of the "Biofuels Act of 2006" which mandates the blending of 1.0 percent volume biodiesel into all diesel oil sold in the country.

- ***PNS/DOE QS 002:2007 Coconut Methyl Ester (B100) Specification (Completed on the 2nd Quarter of 2007).*** This standard will supersede the first CME (PNS 2020:2003, B100) biodiesel specification. As an improvement to the previous standard, current specifications are harmonized with the European Standard for Biodiesel (EN 14214) and American Standard for Biodiesel (ASTM D6751). The standard is likewise harmonized with the recent biodiesel specification assessments conducted by Japan Automobile Manufacturers Association (JAMA) and the current Philippine studies and actual experiences on coco-biodiesel use.

- ***DPNS/DOE QS 010:2006 Jatropha (in progress).*** Still in the development stage, this will cover the use of jatropha as a potential biodiesel source.

Petroleum Processes and Facilities:

- ***PNS/DOE FS 2:2006 – LPG Refilling Plant Specifications.*** This standard covered the requirements for the construction, installation and operation of an LPG refilling plant including the associated bulk storage and tank farm facility with the exclusion of refrigerated storage tanks.

- ***PNS/DOE FS 3:2006 – Auto-LPG Dispensing Stations.*** This standard is developed to address the emerging business of LPG used as an automotive fuel. This covers the requirements in the installation of an auto-LPG dispensing station for retail operation and garage-based sites, for on-vehicle dispensing of LPG as automotive fuel for vehicles of any type.

- ***PNS/DOE FS 4:2007 – Liquid Petroleum Product Depot (completed on the 1st Quarter 2007).*** The standard will address the technical requirements for facilities involved in the marketing and distribution of refined oils such as gasoline, diesel, kerosene and bunker fuel, to ensure product integrity. This will also provide for the safety of the workers, the community and protection of the environment.

Level of Compliance / Enforcement

Quality and Quantity Monitoring

Inspection of Facilities. The strict compliance of industry players to quality standards is consistently being monitored by the DOE through the conduct of regular/routine or on-the-spot and complaint-initiated

inspections and product sampling at the refineries, refilling plants, depots/terminals and gasoline stations nationwide. On-the-spot tests and other confirmatory examinations are also being performed to detect any form of adulteration.

Fuel Bioethanol Program – Product Denaturing. This program is a joint undertaking of the DOE and the BIR on bioethanol importation of the oil companies. Said program is based on the DOE's D.C. No. 2006-08-001 *"Interim Guidelines for the Accreditation of Oil Industry Participants in the Fuel Bioethanol Program"* and BIR Revenue Regulations No.8-2006 *"Prescribing the Implementing Guidelines on the Taxation and Monitoring of the Raw Materials Used and the Bioethanol-Blended Gasoline (E-Gasoline) Produced under the Fuel Bioethanol Program of the Department of Energy (DOE)."* Under the DOE regulation, oil companies shall undergo an accreditation process prior to their actual participation in the program. This will also qualify them to avail of certain tax privileges as stipulated in the BIR issuance.

Development Challenges

- Institution of safety nets to cushion the impact of intermittent increase in oil prices in the world market.
- Improvement in the quality and safety of LPG cylinders in circulation.
- Need for policy direction on oil stockpiling and oil reserve supply to ensure continuous and adequate supply.
- Enabling policy that will require the inclusion of household LPG pipelines in the development plan of new areas and emerging communities.

Action Plan

- Develop the Malampaya oil rim for the country's national reserve as a contingent measure in the event of oil crises or supply disruption.
- Diversify supply sources by strengthening bilateral supply agreements with non-traditional suppliers to avert over dependence on major suppliers.
- Encourage infrastructure development through the provision of Gasoline Station Lending and Financial Assistance Program (GSLFAP) to new players in the liquid fuels sector and consequently promote healthy retail competition. The Program is being implemented in cooperation with the Philippine Amusement and Gaming Corporation (PAGCOR) and the Development Bank of the Philippines (DBP). PAGCOR ensures the availability of funds to prospective oil players interested to avail of the Program through the DOE while DBP-Trust Services administers the loan fund.
- Enhance consumer safety and welfare through the development of an LPG Cylinder Exchange Program to address the growing proliferation of sub-standard and dilapidated LPG cylinders in the market. This is to promote accountability and responsibility on the part of the brand owners to maintain their own cylinders in accordance with set standards. The Program will likewise enforce standards/rules and regulation through appropriate policy interventions such as the Retail Rules for LPG and the proposed LPG Bill.
- Study the feasibility of establishing a National Petroleum Strategic Reserve in 2010 by putting in place the necessary fuel stockpile infrastructures and the actualization of oil discovery prospects.
- Develop and improve standards for products and facilities and enhance monitoring/enforcement of compliance with the standards to ensure adherence of industry players to the Retail Rules.
- Establish quality standards and an inspection/sampling mechanism for diesel/gasoline pre-blended with bio-fuels.
- Formulate appropriate policy intervention to promote the use of pipeline for household LPG in the development plan of new areas and emerging communities.

B. NATURAL GAS INDUSTRY DEVELOPMENT

Natural gas is the strategic fuel of the future for the Philippines. It is internationally recognized as the cleanest and most cost-efficient among the hydro carbon fuels.

Natural gas will provide for a structural change in the country's energy mix and strengthen the country's fuel diversification program. It will also add to energy security position and sustainable development as the country moves away from oil.

Barely five years after the commercial operation of the Malampaya gas field, natural gas has become the country's major fuel for power generation. With the long-term goal of tapping this clean energy for other uses, the government will provide an enabling environment to encourage greater private sector involvement in its development.

Performance Assessment

In 2006, natural gas continued to gain momentum and contributed the biggest share of 29.0 percent in the country's power generation mix. This occurred despite the damages wrought by typhoon "Caloy" to some of the gas-fired facilities and the conduct of the first ever 25-day scheduled maintenance shutdown of the Malampaya platform.

In Luzon, 40.0 percent of total electricity generation came from natural gas-fired power plants, i.e. the 1,200-MW Ilijan Power Plant, the 1,000-MW Sta. Rita Power Plant and the 500-MW San Lorenzo Power Plant, all of which are located in the province of Batangas and the 3-MW San Antonio Power Plant in the Province of Isabela. The combined generation amounted to 16,366 GWh and utilized 99,527 MMSCF of natural gas in 2006 to run these power plants.

Natural gas is also being used by the Pilipinas Shell Refinery for its on-site process energy requirements since the last quarter of 2005. For the refinery's own steam and power use in 2006, the refinery consumed a total of 2,257 MMSCF.

On the other hand, the demonstration program promoting the use of CNG in public utility buses consumed an estimated volume of 13,780 SCF of gas. This was mainly sourced from the San Antonio gas field in Echague, Isabela, which is about 370 kilometers from Manila.

As of end–2006, the refurbishment of the country's first mother-daughter station continued to be pursued to address the technical and safety requirements prior to its commercial operation. The system is expected to be fully operational before the end of 2007. Twenty-two units of public utility buses plying the routes of Laguna and Batangas going to Metro Manila will kick off this pilot project.

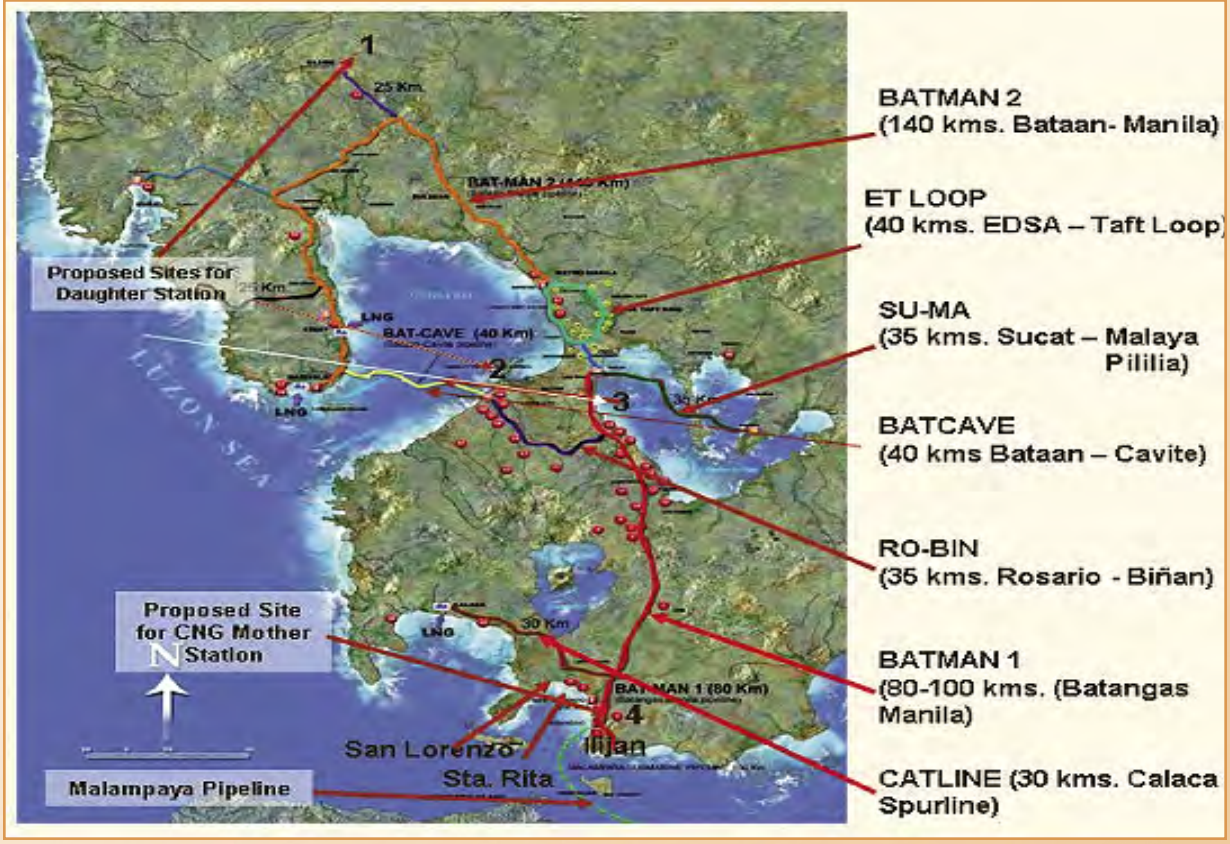
Development Challenges

- Putting up of strategic infrastructure facilities for the downstream natural gas industry, primarily the network of high and low pressure gas pipelines, receiving terminals and pumping stations to ensure that natural gas is delivered continuously to all demand sectors.
- Need for an integrated set of laws, regulations and incentives to encourage private sector support on the required investments while at the same time, ensuring public safety and protection.
- Need for highly-skilled and highly-trained manpower for the natural gas industry.

Action Plan

To increase the utilization of natural gas, the Philippines is vigorously promoting its use in the

Figure 22. NATURAL GAS INFRASTRUCTURE PROJECTS



transportation, commercial and residential sectors, and is developing critical infrastructure that will efficiently deliver gas to the demand centers. In addition, the DOE is intensifying exploration for indigenous gas deposits and studying options for economically using imported LNG. The private sector is also encouraged to assist government in developing the natural gas industry

Developing the country's natural gas industry entails strategic plans and programs to be carried out in short, medium and long terms to leapfrog its development and ensure competitiveness. The energy sector will therefore pursue the following activities, plans and programs:

Infrastructure Facilities Network

- Form strong public-private partnerships for the development of the natural gas industry, particularly on the identified infrastructure projects as follows (with corresponding indicative year of completion and operation):
  - Pilot CNG mother-daughter station (2007);
  - Batangas-Manila (Batman 1) Pipeline (2010);
  - CNG Refilling Stations for Metro Manila (2010);
  - Sucat-Fort Bonifacio pipeline (2011);
  - Bataan-Manila (Batman 2) Pipeline (2012);
  - LNG terminal in Limay (2012);
  - Metro Manila Gas Loop (EDSA-Taft Loop) (2015); and
  - Connection to Trans-ASEAN Gas Pipeline (TAGP) via Mindanao (2015).

Market Development

- Prioritize the use of natural gas to fuel the additional capacity requirements in the power sector starting in 2010 for Luzon, as well as mandate the conversion of oil-thermal plants such as Sucat and Limay to be fueled by natural gas.
- Promote the expanded use of natural gas in transport, industry, buildings and agriculture in 2010.

Manpower Capability Building

- Establish a Philippine Natural Gas Institute to serve as a policy think-tank center for natural gas. However, it could start as the national training center and venue for workshops, conferences and trainings on the operation of natural gas facilities. The Institute shall supply the manpower requirement for the industry.
- Introduce courses including a Bachelor of Science in Natural Gas Engineering in 2010.

IEC Campaign

- Harness multimedia technology and strategy e.g. television, radio and print ads, for faster and wider circulation of information on the natural gas program of the government.

VI. Other Energy Programs

A. ENVIRONMENTAL MANAGEMENT AND PROTECTION

The sector's conscious efforts to address environmental sustainability is never more apparent in its policy thrusts to promote the development and use of environment-friendly fuels such as renewable and alternative energy sources and intensify its energy efficiency and conservation programs, among others. Likewise, cognizant of the consequent effects of energy development to the environment, the DOE continues to implement various intervention programs to ensure ecologically-sound energy project implementation. It is actively engaged in various inter-agency initiatives to address environment-related issues and concerns. In August 2007, the DOE was tasked to take the lead in the country's over-all campaign to mitigate the impact of climate change.

INTER-AGENCY INITIATIVES

Multi-partite Monitoring Team (MMT). To ensure compliance of energy/power projects to environmental regulations and standards, and to the Environmental Management and Monitoring Plans (EMMP) as stipulated in the Environmental Compliance Certificate (ECC) issued to proponents, the DOE actively participates in MMT activities that include regular monitoring of air and water quality within the project vicinity and the socio-economic and livelihood projects implemented in the host communities in line with their Corporate Social Responsibility. Further to its mandate in the MMT, the DOE ensures the project's sound environmental stewardship. It assists in the settlement of possible disputes that may arise in the project implementation and promotes cooperation and harmony among the stakeholders. It also sees to it that samples and observations are collected with integrity so as to provide rightful technical advice and recommendations.

Some of the power plants being monitored are as follows: First Gas' Santa Rita and San Lorenzo Natural Gas-Fired Power Plant in Batangas City, Keilco-Ilijan Natural Gas-Fired Power Plant in Ilijan, Batangas, Malampaya On-Shore Gas Plant in Batangas City, Bauang Diesel-Fired Power Plant in La Union, Pagbilao Coal-Fired Power Plant in Quezon, Mauban Coal-Fired Power Plant in Quezon, Calaca Coal-Fired Power Plant in Batangas and Masinloc Coal-Fired Power Plant in Zambales.

Environmental Impact Assessment Review Committee (EIARC). Under the framework of the Philippine Environmental Impact Statement System (PEISS), the DOE provides technical support and advice to the EIARC in the evaluation of energy projects. The PEISS is a process that determines the environmental impact of a given project and the corresponding monitoring and mitigating measures that have to be implemented by the project proponent.

In 2007, the DOE participated and completed the review of the environmental impact analysis for the PNOC-EDC's 50 to 120-MW Mindanao Geothermal Power Project. In process is the review of the Brixton's Coal Mine Project in Zamboanga Sibugay and Philsystems Coal Mine Project in Bulalacao, Mindoro.

Metro Manila Air Shed Governing Board (MMASGB). The DOE has been involved in the activities of the Metro Manila Air Shed Governing Board in support to the objectives of the Clean Air Act. The MMASGB formulates policies and action plans, ensures implementation of programs, and monitors and evaluates the performance and compliance of partners in achieving cleaner air in the Metro Manila air shed. The proposed geo-political coverage of the air shed includes 25 cities and 83 municipalities from the NCR, Region III and Region IV-A. The MMASGB serves as a geo-political regional territorial body with recommendatory functions in policy and implementation of actions decided upon by the Board.

The MMASGB is composed of government agencies, NGO's/people's organizations (POs), and private/business organizations. Representatives from NGOs and business sector include the Partnership for Clean Air, Transport Organization for Clean Air, Archdiocese of Manila, Ecology Desk, Concerned Citizens Against Pollution, Manila Observatory, Pollution Control Association of the Philippines, Inc., Philippine Institute of Chemical Engineers, Lingkod Tao Kalikasan, Youth for Sustainable Development Assembly, Inc. (YSDA Pilipinas, Inc.), Association of Environmental Third Party Service Providers, Inc., Centra2007, Azucarera de Don Pedro, Philippine Chamber of Commerce and Industry, Bayer Crop Science, Inc., Philippine Exporters Confederation, Inc., Philippine Institute of Petroleum, and Petron Corp.

National Disaster Coordinating Council (NDCC). The establishment of the NDCC is embodied in Section 2 of Presidential Decree 1566. The DOE is one of the 18 member agencies of the NDCC, which is headed by the Secretary of National Defense. It is tasked to ensure the safety and immediate restoration of power installations in affected areas during times of calamities such as typhoons and floods.

The NDCC implements a Four-Point Action Plan to promote disaster preparedness, to wit: (1) mechanisms for government and private sector partnership in relief and rehabilitation; (2) public information campaign on disaster preparedness; (3) capacity building for LGUs in identified vulnerable areas; and, (4) forecasting capability upgrading for PAGASA and PHILVOLCS.

Committee on Energy Projects in NIPAS Areas (CEPNA). The objective of CEPNA is to identify and delineate all energy projects within the NIPAS coverage and formulate measures that will create or develop resource use complementation and harmonization towards sustainable development principles. The Committee undertakes the identification and reconciliation of its programs with overlapping location with respect to protected areas. Mapping of identified potential energy resources located in proclaimed or proposed protected areas is being undertaken by the DOE to assist prospective investors in identifying possible energy projects and to expedite the process of providing accurate and complete information.

CLIMATE CHANGE INITIATIVES

The energy sector is committed to ensure that the country's environment is not jeopardized by energy undertakings. To this end, various climate change mitigation initiatives will be put in place for the planning horizon. These include renewable energy resource development, energy efficiency projects and shift to less carbon emitting fuels in the transportation and industrial sectors.

Qualifying Projects for Clean Development Mechanism (CDM). The CDM is one of the mechanisms or systems established under the Kyoto Protocol to reduce greenhouse gas emissions. The others, which are for developed or Annex I parties under the Convention are the Joint Implementation and Emissions Trading. The CDM aims to provide investments in more efficient and less GHG generating projects and activities in exchange for the countries' contribution to the reduction of greenhouse gas emissions. President Arroyo signed E.O. No. 320 on 25 June 2004 designating the DENR as the Designated National Authority (DNA) for CDM. On the other hand, the DOE takes the lead role in the evaluation of energy-related projects.

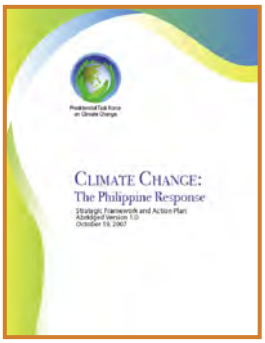
As of April 2007, the DNA has approved a total of 36 CDM projects and nine of which have been registered with the CDM Executive Board. However, only one project activity, the wind project, has so far requested Certified Emission Reductions (CERs) from the CDM Executive Board. Examples of these projects are other renewable energy power projects like geothermal, biomass and other wastes-to-energy projects.

Table 39. PHILIPPINE CDM PROJECT ACTIVITIES

Category	No. of Projects	Estimated CERs per year (tCO2e/year)
Waste Management/Waste to Energy	27	455,430
Energy-related Project Activities	9	830,248
Total	**36**	**1,285,678**
No. of Registered Project Activities	9	
Projects Requesting Registration	1	
Total CERs of Registered CDM Projects	283,995	
Project Requesting Issuance of CERs	1	
Total CERs Requested	**27,807**	

Operationalization of the Presidential Task Force on Climate Change (PTFCC). In response to the country's vulnerability to the impact of climate change, which is compounded by the location of the Philippines being both in the typhoon belt and the ring of fire, President G. M. Arroyo signed A.O. No. 171 *Creating the Presidential Task Force on Climate Change (PTFCC)* on 20 February 2007. The PTFCC is composed of the Cabinet Secretaries of the following government agencies – DENR, DOE, DOST, DA and DILG and representatives from the private sector/civil society with the Inter-Agency Committee on Climate Change acting as the technical arm.

In August 2007, A.O. 171 was amended to A.O. 171-A designating the DOE Secretary as the Chairman and the DENR Secretary as the Vice-Chairman of the PTFCC, respectively. The amendment also included new members such as the Department of Education and the Commission on Higher Education. This is consistent with the international trend of focusing the integration of programs, policies and projects into the sectors responsible for the generation of GHG and/or those significantly affected by climate change, and in the case of the Philippines, it is the energy sector.



The Task Force is mandated to do the following:

- Conduct rapid assessment on the impacts of climate change, particularly on the most vulnerable sectors/areas of water resources, agriculture, coastal areas, terrestrial and marine ecosystems, among others;
- Ensure strict compliance to air emission standards and act with urgency to combat deforestation and environmental degradation and apprehend violators;
- Undertake/initiate strategic approaches and measures to prevent or reduce GHG emissions including fuel efficiency, energy conservation, use of renewable energy, waste management, etc;
- Conduct a massive and comprehensive public information and awareness campaign nationwide to educate the public on the climate change situation and its adverse impacts and mobilize multi-sectoral action;
- Design concrete risk reduction and mitigation measures and adaptation responses, especially to address short-term vulnerabilities, on sectors and areas where climate change will have the greatest impact;
- Collaborate with international partners at the bilateral, regional and multilateral levels to support a global front to stabilize GHG emissions and institute mitigating and adaptive measures, especially for developing countries; and
- Integrate and mainstream climate risk management in the development policies, plans and programs of government.

As an initial activity, the PTFCC under the leadership of DOE formulated the ***Climate Change: The Philippine Response*** which outlines the country's climate change response framework and includes all the current and proposed projects of member agencies and private sector initiatives on climate change. This was presented to President G. M. Arroyo during the First National Conference on Climate Change held in Albay in November 2007.

The response framework is consistent with the global action agenda on climate change. It is both comprehensive and holistic, synchronizes disparate efforts across disciplines, agencies and sectors under one common strategy for maximum impact and has a strong bias for local efforts and interventions. The Framework also hinges on the mitigation and adaptation responses through technological advances and financial resources in cooperation with all sectors of society and the international community.

The PTFCC also participated in the Bali Climate Change Conference of the UNFCCC in December 2007. Among the major decisions that will affect the non-Annex countries including the Philippines include the Transfer of Technology and Financing Mechanisms under the Convention and the grouping of small scale CDM projects as well as increasing the sequestration limit for small scale afforestation and reforestation projects under the Protocol.

CARBON DIOXIDE EMISSIONS IN THE ENERGY SECTOR

To bring climate change to a halt, global greenhouse gas emissions particularly from the burning of fossil fuels must be reduced significantly.

Total CO_2 emissions from the use of fossil fuels consisting of oil, coal and natural gas decreased by 2.15 percent from the 71.40 MMMT in 2005 to 69.87 MMMT in 2006. Specifically, CO_2 emissions from the use of oil and oil products dropped by 3.31 percent from 44.62 MMMT in 2005 to 43.14 MMMT in 2006, while emissions from natural gas also decreased by 6.32 percent from 6.28 MMMT to 5.88 MMMT for the periods in review. However, there was a slight increase of CO_2 emissions from the use of coal by 1.66 percent from 20.51 MMMT in 2005 to 20.85 MMMT in 2006.

In terms of power generation, total CO_2 emissions from fossil fuel-based power plants decreased by 12.68 percent from 26.23 MMMT in 2005 to 22.90 MMMT in 2006. Oil-fired power plants' CO_2 emissions went down by 26.7 percent from 2005 level of 4.15 MMMT to 3.04 MMMT in 2006. Meanwhile, emission levels generated from coal-fired and natural gas power plants fell by 10.2 percent and 9.5 percent, respectively.

The slight reduction of CO_2 emissions in energy use are attributable to the following: (1) decreased use of oil and oil products; (2) increased use of renewable energy sources (hydro, geothermal, solar and wind); (3) implementation of energy efficiency and conservation measures; (4) installation of pollution control technologies to comply with air quality standards; (5) use of advanced energy technologies such as combined-cycle units and combined heat and power (CHP) systems; and, (6) carbon sequestration projects (e.g. reforestation projects) implemented by power plants and other manufacturing industries.

Development Challenges

- Need to promote and sustain social acceptability of energy projects due to associated environmental concerns, which cause delays in project implementation.
- Need to integrate, align and merge climate change objectives with the challenge of providing affordable and sustainable energy to the country.

Action Plan

The following courses of actions are identified to further strengthen the initiatives on environmental management program:

- Continue to collaborate with energy project proponents and concerned local government units to address social acceptability issues of energy projects.
- Strengthen participation in various inter-agency activities on environmental issues.
- Pursue the development of an energy-environment database system of power projects to serve as DOE's monitoring and policy decision-making tool on energy-environment issues.
- Implement climate change programs, projects and activities like mitigation mechanisms, vulnerability assessment of energy projects and facilities, energy efficiency projects and IEC campaigns, among others.

Table 40. CO_2 EMISSIONS FROM ENERGY USE (MMMT)

	2005	2006	Change	
			MMMT	%
Oil and Oil Products	44.62	43.14	(1.48)	(3.31)
Coal	20.51	20.85	0.34	1.66
Gas	6.28	5.88	(0.40)	(6.32)
Total	**71.40**	**69.87**	**(1.53)**	**(2.15)**

B. FOSTERING STRATEGIC ALLIANCES WITH OTHER COUNTRIES

International energy cooperation is seen as vital in pursuing collaborative activities with other countries to realize our goal of achieving greater energy self-sufficiency level, energy security and sustainability. Having limited energy resources and insufficient infrastructure support, forging strategic alliances through bilateral, regional and multilateral agreements is a potent option in advancing the country's energy agenda. To date, the government continuously participates in international fora and dialogues like the ASEAN Ministers on Energy Meeting-Senior Officials' Meeting on Energy (AMEM-SOME), the APEC Energy Ministers Meeting (APEC-EMM) and APEC-Energy Working Group Meeting (APEC-EMM), the International Energy Forum (IEF), and more recently, the Asia Cooperation Dialogue (ACD).

In the planning horizon, the Philippines will remain an energy importing country and thus, international energy cooperation engagement will provide a window for diversifying energy sources, attracting foreign investments, promoting transfer of technology and exchanging information and expertise.

BILATERAL COOPERATION

There are several bilateral agreements that the Philippines entered into with foreign countries, agencies and institutions through MOA, MOU, Memoranda of Intent, Memoranda of Cooperation and other instruments. Such agreements could facilitate investment, energy supply arrangement/ agreement, and joint ventures on energy exploration and development, among others. Following are the bilateral agreements with other countries:

RP-US

In March 2007, the DOE and the United States Geological Services (USGS) signed an MOU on *Scientific and Technical Cooperation in the Earth Sciences*. The Agreement provides the framework for the exchange of scientific and technical knowledge between the two countries in the energy sector.

As an initial collaborative undertaking, the USGS and the DOE are currently undertaking the *"Joint Assessment of Coal-bed Methane and Coal Resources in the Coalfields in the Philippines"*. Under this activity, the Philippines shall acquire new knowledge and technology in coal resource assessment including undiscovered gas resources in the coal beds such as coal-bed methane, which can be tapped as an alternative fuel source.

RP-China

Guided by the ASEAN institutions and frameworks to manage disputes and develop friendly relations between ASEAN member countries and China, the Tripartite Agreement for Joint Marine Seismic Undertaking (JMSU) among China National Offshore Oil Corporation (CNOOC), Vietnam Oil and Gas Corporation (PETROVIETNAM) and the PNOC has already proceeded with Phase II of its work program.

The JSMU covers an area of 142,866 sq. km. in the South China Sea with a three-year term that commenced on 14 March 2005. Under Phase I of the agreement, 2D seismic acquisition was undertaken in September to mid November 2005. Meanwhile, processing and reprocessing of new and vintage seismic data were also carried out from December 2005 until December 2006.

The JMSU in the South China Sea has progressed very well and demonstrated the way forward in transforming the South China Sea into an area of friendship and cooperation. Survey results showed valid economic reasons why the Tripartite Agreement is being pursued for the second phase.

The Philippines is keen on advancing the Agreement and will explore the possibility of pursuing Joint Development Agreement (JDA) with the parties involved should results of the seismic interpretation turn out to be highly prospective in terms of oil and gas reserves in the covered area.

RP-Russia

Russia holds the world's largest natural gas reserves with 1,680 trillion cubic feet (TCF) of gas, and the second largest coal reserves with 173 billion tons of recoverable reserves. In addition, Russia has also proven oil reserves of 60 billion barrels. Russia is the world's largest exporter of natural gas and the second largest oil exporter. In 2006, Russia announced its intention to supply about 30.0 percent of Asia's oil requirement in the next 10-15 years.

The Philippines has previously sourced oil from Russia and thus, the intention is to resume negotiations between the two countries for supply of oil (a number of meetings had taken place between government officials and an invitation was extended to the Russians to visit the Philippines). An energy experts' meeting may be convened as a venue to discuss possible areas of cooperation between the two countries, such as the establishment of an oil refinery, construction of an LNG receiving and re-gasification terminal with an appurtenant pipeline system and power plant, and joint exploration and production projects in low-risk and promising areas.

RP-Indonesia

Indonesia is a major source of the country's energy requirements having vast reserves of oil, gas and coal. A number of agreements had been signed between the two countries to ensure supply as well as to find opportunities for collaboration in energy exploration and development.

In early 2006, the Philippines within the purview of the BIMP-EAGA, initiated discussions with Indonesia to pursue further collaboration in the energy sector especially in the areas of coal supply to the Philippines. Initially, Indonesian President Yodhoyono agreed to explore discussions on long-term coal supply to the Philippines and geothermal development in Indonesia. Proposed draft agreements were exchanged and discussions between energy missions of the two countries had taken place. Currently, the two countries are exerting efforts to sign a formal agreement.

MULTILATERAL COOPERATION

The Philippines is also actively participating in regional energy cooperation. Over the years, it has aggressively taken bold initiatives in ASEAN, APEC, ACD, ASEM and East Asia Summit, among others.

The Association of Southeast Asian Nations (ASEAN)

Member countries of ASEAN have undertaken energy cooperation activities since the group's formation in 1967. Currently, the regional projects that have been carried out and continued to be implemented are under the framework of the ASEAN Plan of Action on Energy Cooperation (APAEC) 2004-2009. Among the major cross-border projects of the ASEAN are the ASEAN Power Grid and the Trans-ASEAN Gas Pipeline. The other cooperation activities are in the areas of coal, renewable energy, energy efficiency and regional energy planning.

A major initiative in the region is the ASEAN Petroleum Security Agreement (APSA). The agreement provides for the sharing of oil supply among member countries in times of shortages. The Philippines initiated a review of this Agreement in 1999 and it is expected that the new draft of the APSA will be signed by the Energy Ministers.

Likewise, under the ASEAN + 3 (China, Japan, Korea) Energy Partnership, the common goal for greater energy security and sustainability in the region is given great emphasis amidst projection that the region would become the largest energy consuming region in the world. The member countries are committed to enhance energy exploration and wider utilization of indigenous energy resources.

The Asia-Pacific Economic Cooperation (APEC)

The Philippines is a member of APEC and actively participates in the initiatives of the APEC EWG, which facilitates energy trade and investment. In 2001, the APEC Economic Leaders endorsed the Energy Security Initiative (ESI). The Initiative includes short-term measures to respond to temporary energy supply disruptions, as well as long-term policy responses to energy security concerns. Being a member economy of the APEC, the Philippines is involved in the following key areas of the ESI:

1. Joint Oil Data Initiative (JODI)
2. Sea-Lane Security
3. Real-Time Emergency Information Sharing
4. Oil Supply Emergency Response
5. Non-Petroleum and Long Term Measures

Asia Cooperation Dialogue (ACD)

The ACD was created in 2002 to promote Asian cooperation at the continental level with the aim of integrating member countries of previously separate political or economic regional organizations such as ASEAN, South Asian Association for Regional Cooperation (SAARC) or the Gulf Cooperation Council. The Dialogue serves as a platform to discuss Asia-wide cooperation.

The Philippines is one of the co-prime movers on energy together with Bahrain, China, Indonesia, Iran and Qatar. Likewise, the Philippines is principally involved in the drafting of the ACD Action Plan in collaboration with Indonesia to further advance energy cooperation in the region. The Philippines will host a key ACD conference on energy that will focus on developing alternative and renewable energy sources.

East Asia Summit (EAS)

Following the signing of the Cebu Declaration on East Asia Energy Security by the Heads of State/Government of the Member Countries of ASEAN and its dialogue partners during the 2nd EAS held in January 2007 in Cebu, the Leaders endorsed the establishment of a working group to study possible areas of cooperation among EAS members to enhance energy security. Following this directive, the EAS-Energy Cooperation Task Force (ECTF) was established with three identified areas of cooperation namely: biofuels for transport and other uses, market integration, and energy efficiency. The Philippines is designated as the lead country for the working group on biofuels for transport and other uses. The working group has already drafted the regional program for biofuels development.

International Energy Forum (IEF)

The IEF is a venue where major producers and consumers meet to discuss issues on production, demand outlook and regional prospects as well as the energy and economic Interdependence between energy producing and consuming countries.

During its most recent meeting in Riyadh in May 2007, the Kingdom of Saudi Arabia – major supplier of crude oil – has committed to continue in providing oil supply requirement of the country as well as fill in any shortages of supply from other sources.

The Energy Charter Treaty (ECT)

The Philippines' application for observer status in conferences in the Energy Charter Treaty has already been approved and is due for formal signing. The ECT is an international agreement signed in Lisbon in December 1994. It is a legally-binding multilateral framework for energy cooperation in the context of establishing a legal foundation for global energy security and open, competitive markets and sustainable development. Among its fundamental aims is the creation of a level playing field to be observed by all participating governments, thereby promoting energy-related investments and trade.

As observer, the Philippines may participate in the ECT conference, in the working groups as well as in its activities. The country may also gain access to the Charter's pool of knowledge and documents. The ultimate full membership to the Conference and the adoption of the Treaty by the Philippines is foreseen to increase trade and investments in the energy sector.

C. CONSUMER WELFARE AND PROTECTION

The government aims to build a broad base of well-informed, responsible and vigilant consumers. It also encourages consumers to play a more active role in policy formulation and decision-making, which will impact on future energy choices and consumption patterns.

Performance Assessment

The DOE, through its Consumer Welfare and Promotion Office (CWPO), is gaining headway in empowering energy consumers to effect long-term socio-economic change and improved environmental sustainability. An empowered consumer is said to be an educated consumer who knows his rights and responsibilities. This precept is an integral component of seminar topics concerning energy conservation, safety practices, and reforms in both the oil and power sectors, which constitute the government's

nationwide IEC campaign and where more than 6,000 stakeholders have been reached.

The conduct of IEC also extends to foreign-funded projects such as the UNDP-GEF PELMATP focusing on the use of energy-efficient lighting systems, CBRED and other programs supporting the use of clean fuels such as natural gas, autoLPG, bioethanol, and biodiesel.

Another empowering mechanism involves broadening networks with consumer groups, government agencies, and forging partnership with academic institutions, such as the University of the Philippines-Los Baños and agencies such as the Department of Trade and Industry for the establishment of Energy Watch Teams in City/Municipal Consumer Protection Centers. The Team is intended to promptly address the energy issues at the grassroots level. The DOE-DTI-LGU collaboration has been found to be an effective vehicle in curbing unscrupulous energy trade practices through vigilant monitoring and inspection.

Likewise, in response to the call of President Gloria Macapagal-Arroyo to bring the government's program closer to the people, the energy *"Common Folk's Day"* was institutionalized. It has also been integrated with the *"Serbisyo Muna Caravan"* with the objective of responding to the consumer concerns in real time. The DOE's Gender and Development Program has likewise addressed specific gender issues attributable to energy activities.

In the area of research, the CWPO has initiated a program called Academic Research Assistance Program (or DOE-AREA) with the De La Salle College of Engineering as its first beneficiary. This is to support the research activities of the government and subsequently, enhance the capabilities of students. Thesis counseling has been part of the ongoing efforts to align researches with the needs of the energy sector.

The DOE continues to address specific consumer needs and offers consumer assistance through the Enertxt, e-mail, phone-in, and walk-in services and assists in student researches, verification of household energy bills, and other consumer requirements.

Development Challenges

- Intensifying IEC campaign to address issues on renewable energy, implementation of the Biofuels Act of 2006 and other energy policies.
- Continuing and sustaining the education and awareness program on consumer protection and energy-related issues.
- Establishing an energy sector research database in support of the policy making mandate of the DOE

Action Plan

- Develop continuous networking with the academe, professional organizations and civil society to strengthen consumer advocacy programs.
- Institutionalize Energy Watch Team in city/municipality levels in key provinces/cities such as Palawan, Ilocos Norte, Bicol, Quezon, and Subic
- Create a database of energy researches and technical papers to provide ready reference for literature reviews and pursue efforts in the energy fields found viable, and avoid any research or project duplication
- Maintain partnership with educational institutions and private sector in undertaking energy-related researches and activities. Aside from the De La Salle University, other universities will also be tapped for DOE-AREA program, namely: University of Santo Tomas, Mapua Institute of Technology, Adamson University, Polytechnic University of the Philippines, University of the Philippines-Los Baños, Miriam College, St. Paul's College, among others.

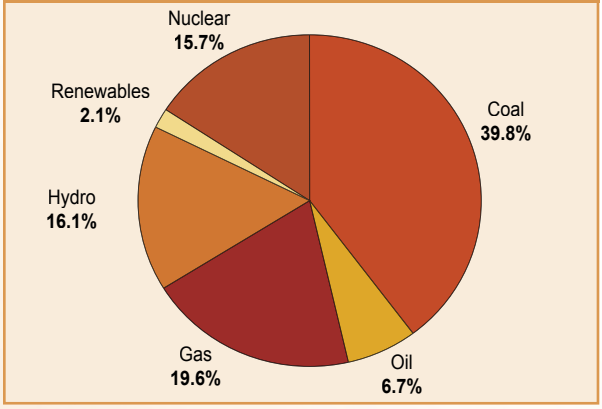
D. NUCLEAR POWER AS A LONG-TERM ENERGY OPTION

The continuing volatility of oil prices in the world market, the concern about global warming due to greenhouse gas emissions, and the growing emphasis on energy security has resurrected nuclear power as one of the most viable energy sources. This new wave of interest on nuclear power in the international energy circles has led to what may aptly be called the *"nuclear renaissance."* As a net energy importer, the Philippines is once again looking into the prospects of developing a nuclear power program to support its own development needs. It has considered nuclear as a long-term energy option.

INTERNATIONAL AND REGIONAL DEVELOPMENTS ON NUCLEAR POWER

As of April 2006, there were 443 nuclear power reactors in operation in 30 countries, an aggregate capacity of 370 GW and supplies about 16.0 percent of the world's electricity requirement (Figure 23). Of this total, 405 nuclear reactors or about 91.0 percent are installed in either the Organization for Economic Cooperation and Development (OECD) countries or those with economies in transition. Expansion pattern, on the other hand, is largely happening in developing countries, mainly focusing in Asia.

Figure 23. SHARE OF NUCLEAR IN GLOBAL ELECTRICITY GENERATION, 2006

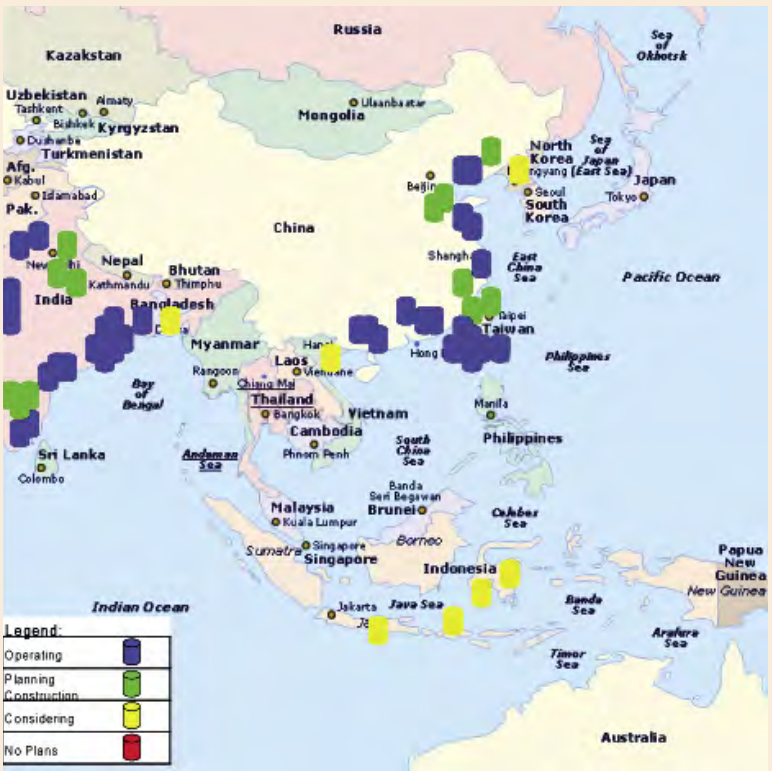


Among the countries in Asia, Japan has the largest nuclear power program, with 56 reactors currently in operation, followed by the Republic of Korea with 20 units in operation, providing about 45.0 percent of the country's power requirement. While Asia's absolute and relative contribution to nuclear power is still small, significant developments are expected to happen within the region especially with the aggressive expansion plans of both India and China (Figure 24). Currently, India has 15 operating reactors with eight additional units under construction. Meanwhile, China has nine reactors in operation and three more units under construction.

For its part, the ASEAN region is slowly making headway into the prospects of nuclear energy as a subject of further regional cooperation. In fact, at the recently concluded SOME of the 25th AMEM held on 20 August 2007, the proposal of host country Singapore for the establishment of a regional sub-sector network on nuclear energy was among the important topics discussed. The said sub-sector network will be tasked to explore issues relating to nuclear energy and develop an ASEAN-wide cooperation and programmes in this area.

To date, three ASEAN-member countries have made pronouncements on their plans of mainstreaming nuclear in their respective power generation mix. Indonesia has confirmed its plan of building a 4,000-MW nuclear power plant in Mt. Muria in Central Java and expected to be operational between 2016 to 2018. Vietnam on the other hand, has been working closely with the Japanese government in the last five years for the conduct of feasibility studies on building nuclear power plants in specific sites. It plans to operate its first nuclear power facility before 2018 with an initial capacity of around 2,000 MW. Currently, about 20 Vietnamese nationals are undergoing training under the support of Japan's Ministry of Energy, Trade and Industry (METI). Meanwhile, Thailand has indicated that 16.0 percent of its generating capacities to be built between 2012 and 2021 will come from nuclear sources as laid down in its recently approved 15-year PDP. An integral part of the Plan is an intensive IEC campaign on the possible entry of nuclear.

Figure 24. STATUS OF NUCLEAR DEVELOPMENT IN EAST ASIA



THE PHILIPPINE APPROACH

Long-Term Need

Since the creation of the DOE in 1992, only the PEP covering the planning period 1998-2035 incorporated nuclear as a long-term energy supply option. The 1998 Plan forecast developed four scenarios to determine its sensitivity to different energy policy alternatives and the impact of regional cooperation programs. Under the said Plan, a 600-MW nuclear plant which will be operational by 2025 will contribute an initial volume of 0.885 MTOE to the projected energy mix and reach up to 3.54 MTOE by 2035. Additional nuclear capacities of 600 MW were simulated to be in place by 2027, 2030 and 2034. Thus, total capacity from nuclear under the PEP 1998-2035 was projected to reach 2,400 MW by end of the planning period.

Human Resource Capability Building

The Arroyo administration is putting premium on human resource capability building and enhancement as a necessary prelude in considering nuclear power as a long-term energy option. Capability building and enhancement on the various aspects of nuclear energy will involve training of local manpower for the possible introduction of nuclear into the country's energy system.

The decision to mothball the Philippine Nuclear Power Plant (PNPP) in 1986 left a void in harnessing and further developing local expertise on nuclear. The report of the Nuclear Power Steering Committee (NPSC) completed in 1998, cited that *"there is a need for a slow but calculated build-up of the manpower base using young engineers and technologists."* Former President Fidel V. Ramos created the NPSC in 1995 by virtue of E.O. No. 243 to provide policies, direction, monitoring, evaluation, and other functions necessary and appropriate to attain the objectives of the overall Nuclear Power Program of the country.

Currently, the DOE is leading an inter-agency discussion among concerned government agencies, the academe and private sector to thresh-out possibilities on re-building local technical capability in nuclear sciences and engineering. At present the manpower capability of NPC in nuclear engineering has declined from the original number of 710 engineers who were trained by Westinghouse and EBASCO Overseas Corporation in the 1980's to 106 many of whom are now bound for retirement in the next five to ten years.

Options for Philippine Nuclear Power Plant-1 (PNPP-1)

Planning for the introduction of nuclear energy in the country will alternately need to settle the question of what to do with the mothballed PNPP-1 in Morong, Bataan. Two broad options can be considered: rehabilitation and conversion.

The Bataan Nuclear Power Plant was declared unsafe and inoperable by a team of international inspectors in 1986. (Courtesy of philnews.com)

Rehabilitating PNPP-1 to generate nuclear energy, despite being mothballed for 20 years is an option that remains to be explored. Such option is consistent with experience in countries such as USA, Romania, Argentina, among others where nuclear plants that were similarly mothballed in 1985 are now being rehabilitated. The feasibility of rehabilitating the plant should be referred to the International Atomic Energy Agency (IAEA) for technical assistance. Whether the actual rehabilitation of PNPP-1 should be done by the government or contracted to the private sector is a policy issue that will be addressed later.

Although many studies were conducted in the past on converting PNPP-1 for other fuel, there is a need to update these studies to current economic and technical conditions. This study can be conducted in parallel with the rehabilitation study that can be entirely done by the NPC.

VII. Investment Portfolio

In pursuit of the energy sector's agenda to attain energy independence and promote a competitive energy sector, Table 41 summarizes the country's energy investment requirements amounting to PhP 1,420.41 billion from 2007 to 2014. The infusion of fresh capital and the firming up of financial commitment from the industry players and stakeholders are the essential factors in realizing the energy sector goals. In line with this, the Department will intensify efforts to encourage active participation of the private sector in the different energy business opportunities.

Table 41. SECTORAL INVESTMENT REQUIREMENTS, 2007 – 2014 (Billion PhP)

Sector	Amount	Government	Private
Fossil Fuel Resources	**517.10**	**-**	**517.10**
Oil and Gas	398.51	-	398.51
Coal*	118.59	-	118.59
Renewable Energy Resources	**137.45**	**18.08**	**119.37**
Geothermal*	52.75	11.29	41.46
Hydropower*	17.75	1.19	16.56
Biomass*	14.25	-	14.25
Wind*	52.70	5.60	47.10
Alternative Transport Fuels	**83.22**	**3.51**	**79.71**
Energy Efficiency and Conservation	**48.69**	**4.92**	**43.77**
Power and Transmission Development	**420.07**	**39.08**	**380.98**
Power Generation	399.49	18.50	380.98
Transmission	20.58	20.58	-
Expanded Rural Electrification	**4.23**	**2.13**	**2.10**
Downstream	**209.65**	**-**	**209.65**
Oil	10.39	-	10.39
Natural Gas	199.26	-	199.26
Total	**1,420.41**	**67.72**	**1,352.68**

* *Cost of Power Plant Construction amounting to PhP 140.40 billion is incorporated in the investment cost of power generation:*

- *Coal: Sultan Kudarat – PhP 20.57 billion*
- *Geothermal (PhP 8.88): Tanawon Geothermal Plant, Rangas Geothermal Plant, Kayabon-Manito Geothermal Plant, and Dauin Geothermal Plant at PhP 2.22 billion for each plant*
- *Hydropower (PhP 97.06): Kalayaan Pumped Storage Power Plant III – PhP 40.32 billion; Balingtingon River Multi-Purpose Project – PhP 4.93 billion; Pantabangan Expansion – PhP 8.74 billion; Aklan Hydropower Project – PhP 4.59 billion; Villasiga HEP – PhP 0.90 billion; Cabulig Hydro – PhP 0.90 billion; Tamugan AB, Panigan and Suawan Hydroelectric Power – PhP 3.86 billion; Agus 3 Hydroelectric – PhP 25.20 billion; and Tagoloan Hydropower – PhP 7.62 billion.*
- *Biomass (PhP 5.32): Bulacan Biomass-to-Energy Project – PhP 1.60 billion; Panay Biomass Power Project – PhP 2.66 billion; and Cagayan de Oro Biomass Power Project – PhP 1.06 billion.*
- *Wind (PhP 9.63): Burgos Wind Power Project Phase 1 – PhP 4.48 billion; and Burgos Wind Power Project Phase 2 – PhP 5.15 billion.*

FOSSIL FUEL RESOURCES

Oil and Gas

The PECR, which also covers the geothermal and coal sectors, continuously encouraged local and international investors in the exploration, development and production of petroleum resources in the country. In the 2005 PECR, four petroleum contract areas were offered to the stakeholders. As a result, the following contracts were awarded in 2006 to the following: (i) PNOC-EC/Nido Petroleum, Pty. Ltd for Area 1 in Southwest Palawan; (ii) Burgundy Global Exploration Corporation for Area 2 in Northeast Palawan and Area 3 in Southeast Palawan; and, (iii) the joint venture of Ranhill Berhad and Phil-Mal Petroenergy Corporation for Area 4 in the Sulu Sea basin. These four contracts provided financial commitment worth US$ 155.10 million. Further, it is estimated that US$ 46.20 million in investments will be raised from contracts in West Calamian, West Balabac and Northeast Palawan. On the other hand, in the 2006 PECR, nine petroleum contract areas were offered covering 72,639 sq. kms.

Table 42. OIL AND GAS INVESTMENT REQUIREMENTS (Billion PhP)

Program/Projects	2007	2008	2010	2014
Geophysical Data Acquisition	**0.735**	**0.396**	**0.396**	**0.396**
A. 2D Seismic	0.170	0.113	0.113	0.113
B. 3D Seismic	0.565	0.283	0.283	0.283
Exploration Well Drilling	**4.916**	**7.289**	**10.170**	**3.390**
A. Onshore	0.848	1.187	1.356	0.678
B. Offshore	4.068	6.102	8.814	2.712
Oil and Gas (Including Condensate) Production	**37.322**	**35.561**	**47.271**	**43.158**
A. Oil	6.876	5.213	10.252	6.401
B. Gas	27.492	27.492	34.360	34.788
C. Condensate	2.954	2.856	2.659	1.969
Total	**42.973**	**43.246**	**57.837**	**46.944**

Table 43. COAL INVESTMENT REQUIREMENTS (Billion PhP)

Region	Capacity (MW)	Location	Year Available	2007	2008	2010	2014
Luzon	**200**				**2.571**	**2.571**	
II	50	Cauayan, Isabela	2009		2.571		
	50	Cauayan, Isabela	2012				
	50	Iguig, Cagayan	2010			2.571	
	50	Iguig, Cagayan	2013				
Visayas	**500**				**3.428**	**8.571**	**5.143**
VI	100	Antique	2010		3.428	8.571	
	200	Antique	2012				
	200	Antique	2014				5.143
Mindanao	**300**					**10.285**	
XII	200	Sultan Kudarat	2009			6.857	
XIII	100	Surigao	2011			3.428	
Mine Investment				**3.318**	**3.514**	**4.322**	**5.976**
Total	**1,000**			**3.318**	**9.513**	**25.749**	**11.119**

in shallow to deep waters within the prospective basins of East Palawan and Mindoro-Cuyo as well as in the promising basins of Cagayan, Central Luzon, Visayas and Agusan-Davao. These contract areas are projected to bring in at least US$ 165 million investments. The bids are undergoing technical, financial and legal evaluation and awarding will be done within the year. Aside from these investments, US$ 136 million were generated from the existing petroleum SCs and geophysical survey and exploration contracts in 2006.

Table 42 (Annex A.1.19) shows that the acquisition program on 2D and 3D seismic data will entail PhP 0.96 billion and PhP 2.55 billion, respectively within the planning period. In addition,PhP 8.31 billion is needed for onshore exploratory drilling while offshore well drilling will require PhP 45.43 billion in capital investments. Meanwhile, the development and production of domestic oil, gas and condensate will entail PhP 341.27 billion. The requirement of PhP 398.51 billion for the entire petroleum sector is expected to be provided by the private sector. In 2007, four petroleum service contractors have committed to pour in investments of at least US$ 153.0 million for offshore drilling of five exploration wells. Malaysia's Petronas Carigali Overseas Bhd. has started drilling one exploration well in Mindoro with a total investment of US$ 23.0 million; Galoc Production Company will drill two production wells in Northwest Palawan and allocated US$ 86.4 million; Japan Petroleum Exploration Company will drill one exploration well in Tañon Strait with an investment of at least US$ 37.0 million; and the Singapore-based Premier Oil will drill one exploration well in Ragay Gulf in the Bicol Region at a projected cost of US$ 6.8 million.

Coal

In the 2005 PECR, seven areas were offered but the bids tendered did not meet the technical criteria. Notwithstanding, 15 coal operating contracts were carried out by 11 companies in areas in Luzon, Visayas and Mindanao that generated about PhP 290.00 million in 2005. In the 2006 PECR, 14 coal prospects were offered for the exploration, development and production in Quezon, Negros Occidental, Cebu, Surigao del Norte, Surigao del Sur, Agusan del Sur, Davao Oriental and Zamboanga Sibugay. The bids submitted are estimated to bring in PhP 91.97 million worth of investments. Further, the existing COCs in 2006 yielded PhP 5,759.0 billion for the exploration, development and production of indigenous coal.

The total investment requirement for the coal sector in the planning period is estimated at PhP 139.16 billion for 1,000 MW as shown in Table 43 (Annex A.1.20). From the said amount, PhP 20.57 billion will be used to develop potential areas in Luzon, PhP 51.43 billion for Visayas and PhP 30.86 billion for Mindanao. In addition, the mine investment, which includes capital outlay, operating cost among others, will require PhP 36.31 billion.

RENEWABLE ENERGY

The Department is continuously promoting the use of indigenous and renewable energy resources. As a result, a number of projects had been initiated and implemented by the private sector. With this trend, it is projected that a total investment of PhP 258.34 billion will be required in the entire planning period for the development and promotion of renewable energy resources.

Geothermal

In the 2005 PECR, there were no contracts awarded from the 11 areas offered for exploration, development and direct utilization.

Table 44. GEOTHERMAL INVESTMENT REQUIREMENTS (Billion PhP)

Region	Program/ Projects	Location	Capacity (MW)	Year Available	2007		2008		2010		2014	
					Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private
Luzon			**380.00**		**0.012**	**0.066**	**1.808**	**1.717**	**1.994**	**4.643**	**0.026**	**2.071**
	Batong Buhay	Batong Buhay, Kalinga	60.00	2013						1.045		0.006
CAR	Buguias-Tinoc	Tinoc, Ifugao	60.00	2014						0.801		0.561
	Daklan	Daklan, Benguet	20.00	2014								0.281
II	Baua	Baua, Cagayan	20.00	2014								0.281
III	Natib	Natib, Bataan	40.00	2012						0.919		0.130
IV-A	Mabini	Mabini, Batangas	20.00	2012						0.405		0.003
IV-B	Montelago	Montelago, Mindoro Or.	40.00	2012						0.919		0.130
V	Tanawon	Albay & Sorsogon	40.00	2011			0.809		0.683		0.004	
	Rangas	Albay & Sorsogon	40.00	2013			0.624		0.608		0.004	
	Manito-Kayabon	Manito, Albay	40.00	2013					0.565		0.005	
	Maintenance of Existing Plants				0.012	0.066	0.375	0.790	0.138	0.554	0.012	0.679
Visayas			**80.00**		**1.925**		**1.491**		**1.247**	**0.405**	**0.812**	**0.283**
VI	Mandalagan	Mandalagan, Negros Occidental	20.00	2014								0.281
VII	Dauin	Dauin, Negros Oriental	40.00	2011	0.580		0.690		0.690		0.130	
VIII	Biliran	Biliran, Leyte	20.00	2012						0.405		0.003
	Maintenance of Existing Plants				1.345		0.801		0.557		0.682	
Mindanao			**120.00**		**0.251**		**0.186**		**0.007**	**1.974**	**0.259**	**0.703**
IX	Lakewood	Lakewood, Zamboanga del Sur	40.00	2012						0.919		0.130
XI	Amacan	Amacan, North Davao	20.00	2013						0.649		0.011
	SE Apo	Kapatagan, Davao del Sur	40.00	2014								0.560
XII	NW Apo	Tiko, North Cotabato	20.00	2012						0.405		0.003
	Maintenance of Existing Plants				0.251		0.186		0.007		0.259	
Government - Private			**580.00**		**2.188**	**0.066**	**3.485**	**1.717**	**3.248**	**7.021**	**1.097**	**3.057**
Total					**2,254**		**5,202**		**10,269**		**4,154**	

Note: Government investment in geothermal are commitments of PNOC-EDC, which was privatized in November 2007.

In the 2006 PECR, on the other hand, three prospective areas were offered in Batangas, Biliran and Compostela Valley. The bids submitted are expected to generate US$ 3.15 million. For the planning period, a total of PhP 61.63 billion in investments is required for the operation of geothermal areas including the exploration and development of 580-MW potential capacity all over the country. From this total amount, PhP 20.17 billion will come from the government and PhP 41.46 billion from the private sector. Table 44 (Annex A.1.21) indicates that the projects in Luzon will entail PhP 37.82 billion in which PhP 10.39 billion will be provided by the government and PhP 27.43 billion by the private sector. The Visayas area will need PhP 11.50 billion, with PhP 8.25 billion to be provided by the government and PhP 3.25 billion to be sourced from the private sector. Lastly, the Mindanao area will require PhP 12.31 billion in capital investment with PhP 1.53 billion coming from the government sector and PhP 10.78 billion from the private investors.

Hydropower

To further increase the share of hydropower in the energy mix, there are still 41 potential hydropower sites with a total capacity of 1,025.10 MW that could be tapped. Development of these sites would require PhP 114.81 billion in capital investments over the entire planning period. Table 45 (Annex A.1.22) shows that in Luzon, the capital requirement is PhP 57.97 billion, while Visayas and Mindanao need capital infusion of PhP 15.42 billion and PhP 41.42 billion, respectively.

Biomass

The private sector has been very active in the implementation of biomass projects. Listed in Table 46 (Annex A.1.23) are the biomass projects that could generate a potential capacity of 183.90 MW with a total investment requirement estimated at PhP 19.57 billion. These projects are mostly situated in Luzon and in the Visayas region.

Wind

As an offshoot of the Northwind Project in Ilocos Norte, the private sector has been gaining grounds in the development of wind energy. Additional sites have been identified which increased the potential capacity to 556 MW. The total investment requirement detailed in Table 47 (Annex A.1.24) amounts to PhP 62.33 billion.

ALTERNATIVE TRANSPORT FUELS

In line with the Government's goal to reduce dependence from fossil fuels, the DOE is continuously promoting the utilization of alternative fuels for transport such as biodiesel (CME), bioethanol, CNG and autogas (autoLPG). The Biofuels Act is expected to further spur investments on the production of biodiesel and bioethanol. In addition, jatropha curcass is gaining popularity as a potential source of biodiesel. The PNOC's Alternative Fuel Corporation is currently conducting studies in the determination of the best variety to be planted, cost effectiveness, efficient processing to biodiesel, etc. Table 48 (Annex A.1.25) indicates that the implementation of the alternative fuels program including jatropha would entail PhP 83.22 billion.

Table 45. HYDROPOWER INVESTMENT REQUIREMENTS (Billion PhP)

Super Region	Project	Location	Potential Capacity (MW)	Year Available	2007		2008		2010		2014	
					Gov't	Priv	Gov't	Priv	Gov't	Priv	Gov't	Priv
Northern Luzon Agribusiness Quadrangle			**126.40**				**0.013**	**0.184**		**5.242**		
CAR	Ibulao MHP	Lagawe, Ifugao	1.50	2010				0.067				
	Bulanao RIS	Tabuk, Kalinga	0.30	2010			0.013					
	Atok 4 MHP	Atok, Benguet	0.30	2010				0.013				
	Buguias 1 MHP	Benguet	0.60	2010				0.027				
I	Pansian River MHP	Pagudpod, Ilocos Norte	0.70	2010				0.031				
II	Uddiawan MHP	Solano, Nueva Vizcaya	1.00	2010				0.045				
III	Pantabangan Expansion	Pantabangan, Nueva Ecija	78.00	2011						5.242		
	Balintingon River	Nueva Ecija	44.00	2013								
Metro Luzon Urban Beltway			**368.00**							**24.730**		
IV-A	Multi-purpose Project Kalayaan Pumped Storage Power Plant III (CBK Expansion)	Kalayaan, Laguna	360.00	2011						24.192		
IV-B	Catuiran MHP	Naujan, Mindoro Oriental	8.00	2011						0.538		
Central Philippines			**160.90**					**0.542**	**0.457**	**3.248**		
IV-B	Langogan MHP	Puerto Princesa, Palawan	6.80	2011					0.457			
	Batang Batang MHP	Palawan	3.50	2014								
	Cabinbin MHP	Palawan	0.80	2014								
	Vera Falls	Malinao, Albay	0.20	2010				0.009				
V	Palali Falls	Malinao, Albay	0.10	2010				0.004				
	Cumaginking	Malinao, Albay	0.20	2010				0.009				
	Lower Dugui MHP	Virac, Catanduanes	3.20	2010				0.143				
	Hitoma 1 MHP	Caramoran, Catanduanes	1.50	2010				0.067				
	Hitoma 2 MHP	Caramoran, Catanduanes	1.60	2010				0.072				
	Solong Falls MHP	San Miguel, Catanduanes	2.30	2010				0.103				
	Kapipian MHP	Catanduanes	3.00	2010				0.134				
VI	Villasiga HEP	Antique	8.00	2012						0.358		
	Timbaban HEP	Madalag, Aklan	23.50	2012						1.053		
	Aklan Hydropower Project	Libacao, Aklan	41.00	2012						1.837		
	Igbolo MHP	Igbaras, Iloilo	4.00	2013								
VII	Sicopong HEP	Negros Oriental	17.80	2013								
	Siaton MHP	Negros Oriental	5.40	2013								
	Pacuan HEP	Negros Oriental	33.00	2013								
VIII	Bugtong MHP	Samar	1.00	2014								
	Amandaraga MHP	Eastern Samar	4.00	2014								
Mindanao Agribusiness			**369.80**					**2.173**		**19.029**		
IX	Salug Daku MHP	Josefina, Zamboanga del Sur	6.00	2010				0.269				
	Lower Dapitan MHP	Zamboanga del Norte	3.80	2013								
	Upper Dapitan MHP	Zamboanga del Norte	3.60	2013								
	Middle Dapitan MHP	Zamboanga del Norte	4.40	2013								
X	Agus 3 Hydroelectric Plant	Saguiaran, Lanao del Norte	225.00	2011						15.120		
	Tagoloan Hydropower	Sumilao, Bukidnon	68.00	2012						3.046		
	Cabulig MHP	Claveria, Misamis Oriental	8.00	2010				0.358				
XI	Suwawan MHP	Davao City	5.50	2011						0.370		
	Tamugan AB, Panigan and Suawan Hydroelectric Power	Davao City	34.50	2010				1.546				
	Talaingod MHP	Talaingod, Davao del Norte	1.00	2012						0.045		
XII	Magpet MHP	Magpet, North Cotabato	10.00	2012						0.448		
Government - Private			**1,025.10**				**0.013**	**2.899**	**0.457**	**52.248**		
Total							**2.912**		**52.705**			

The implementation of the NGVPPT requires a total investment of PhP 14.34 billion for the acquisition of CNG buses for the period 2007-2014. Under the pilot phase implementation program, four out of seven accredited bus companies have acquired CNG-fuelled units while the Shell Group of Companies has already put up the CNG mother and daughter refueling stations in Tabangao, Batangas and along South Expressway (northbound) in Brgy. Sto. Tomas, Biñan, Laguna, respectively. Meanwhile, the total investments for biodiesel requires PhP 2.60 billion primarily for the expansion or construction of biodiesel facilities and the establishment of CME blend refueling stations. Investment in the bioethanol sector requires a total of PhP 19.84 billion from 2007 to 2014. At present, San Carlos Bio-energy in San Carlos City, Negros Occidental is taking the lead in ethanol production. In addition, several companies such as JG Summit Holdings, Inc., Biofuels 88 Corporation, Leyte Agri Corporation and South Bukidnon Bioenergy, Inc. are expected to come on stream within the planning period. On the other hand, jatropha facilities such as nursery, plantation and refinery would entail a total of PhP 46.44 billion.

Table 46. BIOMASS INVESTMENT REQUIREMENTS (Billion PhP)

Region	Project	Location	Potential Capacity (MW)	Year Available	2007	2008	2010	2014
Northern Luzon Agribusiness Quadrangle			**38.00**					
I	Ricehull Cogeneration	Calasiao, Pangasinan	9.90	2014				
II	Ricehull Cogeneration	Gamu, Isabela	0.80	2014				
	Ricehull Cogeneration	Isabela	9.90	2014				
III	Ricehull Cogeneration	San Jose City, Nueva Ecija	9.90	2014				
	Ricehull Cogeneration	Quezon, Nueva Ecija	2.50	2014				
	Ricehull Cogeneration	Talavera, Nueva Ecija	2.50	2014				
	Ricehull Cogeneration	Muñoz, Nueva Ecija	2.50	2014				
Metro Luzon Urban Beltway			**28.70**		**0.638**	**1.384**		
III	Ricehull Cogeneration	Bocaue, Bulacan	15.00	2009	0.638	0.958		
IV-B	Ricehull Cogeneration	Mindoro Occidental	3.70	2014				
	Ricehull Cogeneration	Mindoro Oriental	10.00	2010		0.426		
Central Philippines			**102.00**			**1.575**		
IV-B	Ricehull Cogeneration	Narra, Palawan	2.50	2014				
V	Ricehull Cogeneration	Pili, Camarines Sur	5.00	2014				
VI	Ricehull Cogeneration	Panay	25.00	2010		1.064		
	Bagasse Cogeneration	Kabangkalan, Negros Occidental	12.00	2010		0.511		
	Bagasse Cogeneration	Victorias, Negros Occidental	50.00	2013				
	Ricehull Cogeneration	Pototan, Iloilo	5.00	2014				
VII	Ricehull Cogeneration	Bohol	2.50	2014				
Mindanao Agribusiness			**15.20**			**0.426**		
X	Ricehull Cogeneration	Cagayan de Oro City	10.00	2010		0.426		
XII	Ricehull Cogeneration	Surallah, South Cotabato	5.20	2014				
Total			**183.90**		**0.638**	**3.385**		

Table 47. WIND INVESTMENT REQUIREMENTS (Billion PhP)

Region	Location	Potential Capacity (MW)	Year Available	2007	2008	2010	2014
Northern Luzon Agribusiness Quadrangle		**333.00**		**1.792**	**2.688**	**3.091**	**16.598**
I	Burgos Ilocos Norte (Phase 1)	40.00	2009	1.792	2.688		
	Burgos Ilocos Norte (Phase 2)	46.00	2010			3.091	
	Pagudpod, Ilocos Norte	40.00	2014				2.688
	Pasuquin, Ilocos Norte	57.00	2014				3.830
	Suyo, Ilocos Sur	40.00	2014				2.688
	Western Pangasinan	25.00	2014				1.680
	Eastern Pangasinan	35.00	2014				2.352
III	Carranglan, Nueva Ecija	50.00	2014				3.360
Metro Luzon Urban Beltway		**113.40**			**0.152**		**0.672**
IV-A	Mauban, Quezon	50.00	2013				
	Caliraya, Laguna	25.00	2013				
IV-B	Sta. Cruz, Marinduque	5.00	2013				
	Marinduque	3.40	2009		0.152		
	Abra de Ilog, Occidental Mindoro	10.00	2014				0.672
	Puerto Galera, Oriental Mindoro	20.00	2013				
Central Philippines		**95.10**			**0.452**	**4.704**	
IV-B	Romblon	1.70	2009		0.076		
	Tablas Island, Romblon	3.40	2009		0.152		
	Tablas Island, Romblon	5.00	2012				
V	Baleno, Masbate	5.00	2009		0.224		
VI	San Carlos, Negros Occidental	30.00	2010			2.016	
	Pandan, Antique	20.00	2010			1.344	
	San Remigio, Antique	20.00	2010			1.344	
	Manoc-manoc, Aklan	10.00	2012				
Mindanao Agribusiness		**15.00**				**1.008**	
CARAGA	Nuventa, Surigao del Sur	15.00	2011			1.008	
Total		**556.50**		**1.792**	**3.293**	**8.803**	**17.270**

Note: Government investment for wind is a commitment of PNOC-EDC, which was privatized in November 2007.

Table 48. ALTERNATIVE FUELS INVESTMENT REQUIREMENTS (Billion PhP)

Project	Location	Year Available	2007		2008		2010		2014	
			Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private
Compressed Natural Gas				**0.099**		**0.215**		**1.344**		**4.480**
Natural Gas Vehicle Program for Public Transport (NGVPPT)	Metro Manila,									
Acquisition of OEM CNG-fed buses	Batangas, Laguna	2007		0.099		0.215		1.344		4.480
Biodiesel				**0.650**		**1.300**				**0.650**
Expansion/construction of biodiesel facilities	Metro Manila	2006		0.650		1.300				0.650
Establishment of CME blend refuelling station	Nationwide									
Bioethanol				**0.945**						**1.890**
Establishment of bioethanol facilities	Nationwide	2006		0.945						1.890
Jatropha			**0.760**	**1.586**	**0.705**	**8.586**	**0.680**	**17.086**		
Nursery	Nationwide	2007	0.080		0.025					
Plantation	Nationwide					7.000		15.500		
Refinery	Nationwide		0.680	1.586	0.680	1.586	0.680	1.586		
Government-Private			**0.760**	**3.280**	**0.705**	**10.101**	**0.680**	**18.430**		**7.020**
Total			**4.040**		**10.806**		**19.110**		**7.020**	

ENERGY EFFICIENCY AND CONSERVATION

The energy sector will continue to undertake an aggressive campaign to promote energy efficiency and conservation. The DOE has lined up several activities which will require PhP 48.69 billion in capital investments as shown in Table 49 (Annex A.1.29). From this amount, PhP 43.77 billion will be sourced from private investors while the remaining PhP 4.92 billion will come from the government. Activities on energy labeling and efficiency standards will constitute the biggest share at PhP 29.72 billion, followed by the energy management programs at PhP 16.10 billion. Meanwhile, the continuing IEC campaign will entail PhP 622.0 million. On the other hand, the government enercon program will need PhP 2.25 billion while the voluntary agreement program will require PhP 1.40 million.

POWER AND TRANSMISSION DEVELOPMENT

In line with the power sector's objective to provide reliable, adequate and quality supply of electricity in the main grid, a total investment of PhP 505.63 billion, which includes committed power generation projects, will be required from both the government and private sectors.

Power Generation

Based on the demand forecasts, a total of 4,472.50 MW indicative generation projects for the main grid will require a total investment of PhP 399.49 billion for the entire planning period. Table 50 (Annex A.1. 27) shows the investment requirements for the indicative power plants to be distributed as follows: for Luzon PhP 246.39 billion, for Visayas PhP 71.49 billion and for Mindanao,PhP 81.61 billion. On the other hand, PhP 85.56 billion would be infused for committed projects disaggregated as follows: PhP 49.64 billion for Luzon, PhP 20.49 billion for Visayas and PhP 15.42 billion for Mindanao.

Transmission Development

Table 51 (Annex A.1. 28) indicates that transmission projects require a total capital investment of PhP 20.58 billion. Of this amount, about PhP 8.15 billion will be utilized for the Luzon grid, while PhP 4.27 billion and PhP 8.16 billion are needed for the Visayas and Mindanao grids, respectively. The total investment will cover the expansion of sub-transmission lines, transmission projects associated with generating plants and other projects.

EXPANDED RURAL ELECTRIFICATION

The attainment of the government's target of 100 percent level barangay electrification by 2009 would entail PhP 4.23 billion as indicated in Table 52 (Annex A.1. 30). The electrification of the remaining 2,054 unenergized barangays in the country will be implemented by the DOE and its partners coming from other line agencies, NGOs and private companies. Of the total investment required, the private sector has committed to provide PhP 2.10 billion and the remaining amount of about PhP 2.13 billion will be borne by the government. The energization of 892 barangays in 2007 will require PhP 1.60 billion, and PhP 2.64 billion will be needed for the electrification of the remaining 1,162 unenergized barangays in the ensuing years of the planning horizon.

DOWNSTREAM

The total investment requirement for the downstream sector stands at PhP 209.65 billion for the planning period (Please refer to Annex A.1.31).

Oil

Based on the activities undertaken by the oil companies, it is projected that the total investment required for the downstream oil would require PhP 10.39 billion. These activities include refining, liquefied fuel bulk marketing, LPG bulk marketing, bunkering,

Table 49. ENERGY EFFICIENCY AND CONSERVATION INVESTMENT REQUIREMENTS (Billion PhP)

Efficiency Programs	2007		2008		2010		2014	
	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private
Information, Education And Communication Campaign	**0.016**	**0.050**	**0.026**	**0.050**	**0.030**	**0.050**	**0.030**	**0.050**
Road Transport Patrol	0.003		0.011		0.015		0.015	
Fuel Economy Run and Seminars	0.001	0.050	0.001	0.050	0.001	0.050	0.001	0.050
Infocommercials/Publications/Collaterals for Fuel Efficiency and Conservation	0.008		0.010		0.010		0.010	
Power Patrol	0.004		0.004		0.004		0.004	
Voluntary Agreements Program			**0.000**		**0.000**		**0.000**	
Carless Day Program			0.000		0.000		0.000	
Carpooling Program			0.000		0.000		0.000	
Park and Wait Program			0.000		0.000		0.000	
Park and Ride Program			0.000		0.000		0.000	
Energy Labeling And Efficiency Standards	**0.059**	**1.636**	**0.080**	**2.206**	**0.116**	**3.203**	**0.204**	**5.635**
Efficiency Standard and Labeling for RACs	0.011	0.307	0.012	0.335	0.016	0.436	0.019	0.537
Energy Labeling Program for Refrigerators and Freezers	0.006	0.158	0.007	0.198	0.009	0.252	0.012	0.334
Labeling for CFLs	0.034	0.934	0.045	1.253	0.069	1.908	0.128	3.517
Ballast loss std. and Labeling for Flourescent Lamp Ballast	0.003	0.076	0.003	0.079	0.006	0.175	0.012	0.319
Luminaire Installation	0.001	0.015	0.001	0.020	0.001	0.034	0.002	0.068
Linear Flourescent Lamp	0.002	0.061	0.003	0.081	0.005	0.129	0.012	0.335
Household Electric Fans	0.001	0.037	0.001	0.039	0.002	0.043	0.002	0.052
Television Stand-by Power Reduction			0.004	0.119	0.005	0.139	0.013	0.371
Performance Certification of Fans and Blowers	0.002	0.049	0.002	0.050	0.002	0.053	0.002	0.060
Labeling of Electric Motors			0.001	0.031	0.001	0.034	0.002	0.042
Government Enercon Program	**0.282**		**0.282**		**0.282**		**0.282**	
Fuel Conservation	0.107		0.107		0.107		0.107	
Electricity Conservation	0.174		0.174		0.174		0.174	
Energy Management Program	**0.100**	**1.400**	**0.100**	**1.500**	**0.200**	**1.950**	**0.200**	**2.000**
Energy Audit Program		**1.000**		**1.000**		**1.000**		**1.000**
Cement		0.200		0.200		0.200		0.200
Sugar		0.200		0.200		0.200		0.200
Steel Industry		0.100		0.100		0.100		0.100
Chemical		0.025		0.025		0.025		0.025
Semiconductor		0.025		0.025		0.025		0.025
Pulp and Paper		0.100		0.100		0.100		0.100
Glass		0.050		0.050		0.050		0.050
Commercial/Institutional		0.100		0.100		0.100		0.100
Food Industry		0.050		0.050		0.050		0.050
Mining Industry		0.150		0.150		0.150		0.150
Heat Rate Improvement of Power Plants					**0.100**	**0.400**	**0.100**	**0.400**
System Loss Reductiion Program	**0.100**	**0.400**	**0.100**	**0.400**	**0.100**	**0.400**	**0.100**	**0.400**
Private Utilities (PU's and LGU owned)		0.400		0.400		0.400		0.400
Electric Cooperatives (REC's)	0.100		0.100		0.100		0.100	
Demand Side Management				**0.100**		**0.150**		**0.200**
Government - Private	**0.457**	**3.086**	**0.488**	**3.756**	**0.628**	**5.203**	**0.716**	**7.685**
Total	**3.543**		**4.244**		**5.831**		**8.401**	

and retail marketing of petroleum products, alternative fuels and lubes.

Natural Gas

The PhP 199.26 billion investment in the natural gas industry is required for the establishment of the infrastructure and related facilities. Significant portion of the investment amounting to PhP 147.26 billion will be required in the construction of power plants while the construction of LNG receiving terminals for the bulk receipt and storage of liquefied natural gas will require PhP 35.28 billion. Another major component is the installation of distribution pipelines which would entail PhP 16.64 billion. On the other hand, installation of refilling stations would need Php 0.08 billion.

Specific Guidelines on the Implementation of the 2007 Investment Priorities Plan in the Energy Sector

Generally, under Book I of E.O. 226 or the *Omnibus Investments Code of 1987*, a qualified enterprise may enjoy certain benefits and incentives provided it invests in preferred areas of investments enumerated in the Investment Priorities Plan (IPP). The

Table 50. POWER GENERATION INVESTMENT REQUIREMENTS (Billion PhP)

Project	Location	Capacity (MW)	Year Available	2007	2008	2010	2014
Luzon		**3103.00**		**7.806**	**24.775**	**55.558**	**60.648**
Bulacan Biomass-to-energy Project	Bocaue, Bulacan	15.00	2009	0.638	0.958		
Burgos Wind Power Project Phase I (formerly Northern Luzon Wind Power Project Phase I)	Saoit, Burgos, Ilocos Norte	40.00	2009	1.792	2.688		
Ilijan CCGT Expansion	Ilijan, Batangas City	300.00	2009	5.376	8.064		
Burgos Wind Power Project Phase II	Nagsurot, Burgos, Ilocos Norte	46.00	2010			3.091	
2nd Phase CFB Coal-Fired Power Plant	Mabalacat, Pampanga	50.00	2010		2.397		
2 x 150 MW Coal Fired Power Plant	Subic	300.00	2010		9.744		
San Gabriel Power Plant	Sta. Rita, Batangas	550.00	2011			26.796	
Kalayaan Pumped Storage Power Plant III (CBK Expansion)	Kalayaan, Laguna	360.00	2011			24.192	
Tanawon Geothermal Project	Bacman Geothermal Field, Sorsogon	40.00	2011		0.555	0.555	
Rangas Geothermal Project	Bacman Geothermal Field, Sorsogon	40.00	2013		0.370	0.370	
Manito-Kayabon Geothermal Project	Bacman Geothermal Field, Sorsogon	40.00	2013			0.555	
Balintingon River Multi-Purpose Project	General Tinio, Nueva Ecija	44.00	2013				
Pagbilao Expansion	Pagbilao, Quezon	400.00	2014				19.488
Pantabangan Expansion	Pantabangan, Nueva Ecija	78.00	2014				8.736
2 x 150 MW CCGT Power Station	Quezon Province	300.00	2014				8.064
Quezon Power Expansion Project	Mauban, Quezon	500.00	2014				24.360
Visayas		**624.00**		**0.444**	**14.163**	**19.969**	
Panay Biomass Power Project	Panay	25.00	2010		1.064		
Coal-Fired Plant	Brgy. Nipa, Concepcion, Iloilo	100.00	2010		4.794		
Toledo Expansion Project Phase I - 2 x 82 MW	Toledo City, Cebu	164.00	2010		7.862		
Toledo Expansion Project Phase II - 1 x 82 MW	Toledo City, Cebu	82.00	2011			5.896	
GBPC Coal-Fired Plant (Panay Power Corp.) 2 x 82	Iloilo, Panay Island	164.00	2011			11.792	
Dauin Geothermal	Dauin, Negros Oriental	40.00	2011	0.444	0.444	0.444	
Aklan Hydropower Project	Libacao, Aklan	41.00	2012			1.837	
Villasiga HEP	Sibalom, Antique	8.00	2012				
Mindanao		**745.50**			**2.330**	**43.948**	
Cagayan de Oro Biomass Power Project	Cagayan de Oro City	10.00	2010		0.426		
Cabulig Hydro	Plaridel, Jasaan, Misamis Oriental	8.00	2010		0.358		
Tamugan AB, Panigan and Suawan Hydroelectric Power	Baguio District, Davao City	34.50	2010		1.546		
Agus 3 Hydroelectric	Lanao del Norte	225.00	2011			15.120	
SM 200 MW CFBB CFTPP	Southern Mindanao	200.00	2011			13.440	
Sultan Kudarat Coal	Sultan Kudarat	200.00	2011			12.342	
Tagoloan Hydropower	Bukidnon	68.00	2012			3.046	
Total		**4472.50**		**8.250**	**41.267**	**119.475**	**60.648**

IPP is issued annually by the Board of Investments (BOI) and contains the list of areas of investments eligible for government incentives. The 2007 IPP was approved under Memorandum Order No. 247 and signed by President G.M. Arroyo on 13 June 2007.

Energy is listed as one of the preferred activities and covers power generation using renewable and other energy source employing environmentally-friendly technologies (except oil-fired power generating plants), power transmission, and activities using energy technologies leading to energy efficiency and conservation such as production, blending, storage, and handling of biofuels, CNG vehicle conversion shops, and CNG refueling stations.

Specific Guidelines

1. Power generation projects as specified in the Power Development Plan that may qualify for registration are:
   a. Those utilizing indigenous, and renewable energy such as biomass, waste-to-energy conversion, solar, wind, hydro and tidal;
   b. Geothermal power plants;
   c. Those listed under the NPC privatization plan;
   d. Coal-fired power plant using environment-friendly technology;
   e. Those using CNG/LNG;
   f. Cogeneration (CHP) plants involving waste to

Table 51. TRANSMISSION DEVELOPMENT INVESTMENT REQUIREMENTS (Billion PhP)

Project	Expected Time of Completion	2007	2008	2010	2014
Luzon Grid		**2.56**	**2.73**	**1.72**	**-**
ON-GOING PROJECTS					
Batangas Transmission Reinforcement Project	2009	0.4288	0.1366	0.0002	-
Biñan - Sucat 230 kV T/L	2009	0.3686	0.0561	0.0022	-
Hermosa - Balintawak 230 kV T/L Relocation	2008	0.1006			-
Luzon S/S Expansion Project - 1	2009		0.0099	1.3020	-
Luzon (North) T/L Upgrading Projects - 1		1.0153	0.5244	0.0045	-
New Gamu 230 kV S/S Project	2007	0.1145	0.0163		-
Tap Hermosa - Balintawak	2008	0.0202			-
T/L & S/S Projects (Package 1 & 2)	2007	0.0029	0.0009		-
PROJECTS FOR IMPLEMENTATION					-
Binga - San Manuel 230 kV T/L Project	2010	0.0080	0.6730	0.3425	-
Dasmariñas - Rosario 230 kV T/L	2009	0.0480	0.2053	0.0006	-
Luzon Mindoro Interconnection	2013			0.0016	-
Luzon Power Circuit Breaker Replacement Project	2011		0.0003	0.0462	-
Luzon Substation Expansion Project - 2	2011			0.0020	-
Luzon Substation Expansion Project - 3	2013				-
Luzon Transmission Equipment Upgrade	2009	0.3096	0.7295		-
Luzon Voltage Improvement Project - 1	2009	0.1454	0.3737		-
Luzon Voltage Improvement Project - 2	2011		0.0001	0.0200	-
San Jose 500 kV Reconfiguration	2013			0.0014	-
San Jose - Balintawak Line 3	2013			0.0005	-
Visayas Grid		**2.50**	**0.93**	**0.58**	**-**
ON-GOING PROJECTS					
Cebu - Negros Interconnection Uprating Project	2008	0.4430	0.1449	0.0008	-
Cebu III Transmission (100 MVA Quiot SS)	2007	0.0778	0.0213	0.0008	-
Leyte - Samar Reinforcement Project	2007	0.0063	0.005	0.0001	-
Negros V Transmission Project	2008	0.0394	0.0400		-
Negros - Panay Interconnection Uprating Project	2008	0.5135	0.1586	0.0027	-
Northern Panay Backbone Project	2009	0.7321	0.3977	0.0047	-
Visayas Capacitor Project -1	2008	0.1517	0.0252		-
Wright - Calbayog 138 kV Transmission Line Project	2008	0.5336	0.1058	0.0040	-
PROJECTS FOR IMPLEMENTATION					-
Bohol Backbone Project	2010		0.0200	0.0681	-
New Naga S/S Project	2010		0.0064	0.3030	-
Visayas Power Circuit Breaker Replacement Program	2010		0.0055	0.1453	-
Southern Panay Backbone Transmission Project	2010		0.0008	0.0536	-
Mindanao Grid		**4.31**	**2.00**	**0.25**	**-**
ON-GOING PROJECTS					
Abaga – Kirahon 230 kV T/L Project	2008	1.6546	0.0491	0.0030	-
Gen. Santos - Tacurong Trans. Project	2008	0.4460	0.0308	0.0015	-
Kirahon - Pulangui (Maramag) 230 kV T/L	2009	0.1868	0.7234	0.0104	-
Pulangui (Maramag) - Bunawan 230 kV T/L	2009	1.2464	0.0809	0.0054	-
Mindanao Sub-station Expansion - 2005	2008	0.1161			-
Mindanao Substransmission Line	2007	0.0032	0.0022		-
San Francisco 138 kV S/S Project	2008	0.0618	0.0090		-
Zamboanga City Area 138 kV T/L	2008	0.3967	0.3684	0.0001	-
PROJECTS FOR IMPLEMENTATION					-
Aurora - Pulanco 138 kV T/L	2009	0.1995	0.7006	0.0063	-
Mindanao Mobile Transformer Project	2009				-
Mindanao Reliability Compliance Project - Phase 1	2012		0.0147	0.0662	-
Mindanao Power Circuit Breaker Replacement Program	2010		0.0163	0.1548	-
Total		**9.37**	**5.65**	**2.55**	**-**

Table 52. BARANGAY ELECTRIFICATION INVESTMENT REQUIREMENTS (Billion PhP)

Fund Source/ Implementing Agency	2007			2008			Total		Total
	No. of Brgys	Gov't.	Private	No. of Brgys	Gov't.	Private	Gov't.	Private	
NEA/ECs	**301**	**0.500**		**160**	**0.320**		**0.820**		**0.820**
DOE	**125**	**0.179**	**0.022**	**556**	**1.112**		**1.291**	**0.022**	**1.313**
Barangay Electrification Program	48	0.048		20	0.040				
Energy Regulation 1-94	28	0.056		22	0.044				
Remote Area Electrification (inc. SPUG)	2	0.004		118	0.236				
PGMA Priority Areas (SC 38)	25	0.050		186	0.372				
DOE-Winrock	21	0.021	0.021						
AMORE Solar Energy for Rural	1		0.001						
Electrification and Development (SERED)									
DOE-NEA				210	0.420				
DAR/Solar Power Technology Support (SPOTS)	**9**	**0.009**		**12**	**0.012**		**0.021**		**0.021**
PNOC-EDC	**29**		**0.058**	**38**		**0.076**		**0.134**	**0.134**
IPPs	**395**		**0.556**	**300**		**0.300**		**0.856**	**0.856**
MIRANT									
- Grid (next 500)	106		0.212					0.212	
- Grid (Beacon)	1		0.002					0.002	
- Mirant/Amore 2	54		0.108					0.108	
- Mirant/DOE - Sustainable Solar Market Package (SSMS)	53		0.053					0.053	
KEPCO	180		0.180	300		0.300		0.480	
Luzon Hydro	1		0.001					0.001	
Philippine Rural Electricity Services (PRES)	**32**		**0.272**	**96**		**0.816**		**1.088**	**1.088**
Private Investor-Owned Utilities (PIOUs)	**1**		**0.002**					**0.002**	**0.002**
Cotabato Light & Power	1		0.002					0.002	
Government – Private	**892**	**0.688**	**0.910**	**1,162**	**1.444**	**1.192**	**2.132**	**2.102**	**4.234**
Total	**892**	**1.598**		**1,162**	**2.636**		**4.234**		

heat recovery producing electrical energy and other forms of useful thermal energy such as heat or steam used for industrial, commercial, heating or cooling purposes; or,

g. Power plants using other energy sources (except oil-fired power generating plants) using environment-friendly technologies.

2. Activities using energy technologies leading to energy efficiency and conservation such as:
   a. Production of biofuels. Production may be integrated with blending, storage and handling. Activities involving either or a combination of blending, storage, handling and/or distribution of biofuels are not entitled to income tax holiday (ITH).
   b. Conversion shops providing all of the following services: converting, retrofitting, repairing and maintaining CNG Vehicles in accordance with relevant PNS and shall provide warranties to clients; Projects costing at least the PhP equivalent of US$200,000 may qualify for registration.
   c. Installation and operation of CNG refueling stations and related infrastructures and facilities as endorsed by the DOE.

Foreign-owned corporations must comply with the Retail Trade Law (R.A.8762).

Table 53. NATURAL GAS INDUSTRY INVESTMENT REQUIREMENTS (Billion PhP)

Activities	2007	2008	2010	2014
Power Plant			13.83	16.60
LNG Terminal				
Pipelines			4.56	
Refilling Stations				0.02
Total			**18.39**	**16.62**

Applications for registration endorsed by the DOE shall include the projects' compliance with existing environmental standards.

Exploration, development and utilization of energy sources including coal are covered under the Industry Cluster of the IPP. If availing of incentives under P.D. 972, the project is not entitled to ITH.

The following may qualify for pioneer status:

- Power generation projects using renewable energy sources; or
- Power projects that cost at least the PhP equivalent of US$ 1 million per megawatt.

Other Guidelines Related to the Energy Sector

Aside from the specific guidelines under the energy sector, the 2007 IPP also includes the following energy-related provisions that are covered by other priority areas:

- **Motor Vehicle Products**

  Manufacture of Alternative Fuel Vehicle (item if under Motor Vehicle Products)

  Alternative fuel vehicle covers the manufacture of the following brand new vehicles powered by alternative sources as classified accordingly under Section 1 of E.O. 156 (passenger cars, commercial vehicles and motorcycles):

  - Hybrid vehicles - vehicles that run on electric batteries and gasoline/diesel/other fuels;
  - Electric vehicles - vehicles that run solely on electric power;
  - Flexible-fuel vehicles-vehicles that run on gasoline /diesel in combination with alternative fuels such as but not limited to:
    - Bioethanol vehicles that run on gasoline and a minimum ethanol content/blend of at least 20.0 percent
    - Biodiesel vehicles that run on diesel and a minimum biodiesel blend/content at least 10.0 percent
  - CNG Vehicles - vehicles that run on CNG

- **Infrastructure**

  1. Physical infrastructure

  An agricultural business park should have a minimum contiguous area of 5 hectares for non-biofuel crops and 3,000 hectares for biofuel crops that takes the form of an agro-industrial estate wherein the locators will be agricultural producers, agribusiness enterprises and support service enterprises/institutions. The developer should provide basic facilities such as but not limited to roads and drainage system, water and sewerage system, power supply system, and telecommunications system.

  2. Logistics

  Pipeline Operations (item 3 under passenger and/or cargo terminals, and intermodal terminals) covers the establishment of infrastructure for transport of petroleum products, natural gas, petrochemicals, and similar products. Application must include proof of filing of an application for Authority to Operate Pipeline System with the DOE and/or appropriate government agency.

  3. Transport Systems

  This covers the operation of tourist buses, public utility buses, public utility articulated buses including buses using CNG/LPG.

  The following are the requirements for registration:

  - Buses must be brand new and suited to local conditions
  - Retrofitted/re-powered buses with brand new engines using CNG/LPG
  - Operators must have their own terminals and garage that can accommodate the total number of buses under their franchises
  - Operators must undertake to operate within the franchise routes

  For tourist buses operation, the company must be accredited with and correspondingly endorsed by the Department of Tourism (DOT).

Mandatory Inclusions

All projects covered under this category shall only be entitled to the incentives provided for under their respective laws. R.A. 8479, otherwise known as *Oil Industry Deregulation Law* is included under this category.

Refining, Storage, Marketing and Distribution of Petroleum Products under R.A. 8479

This covers activities under the downstream oil industry, specifically refining, storage, distribution and marketing of petroleum products.

1. **Refinery** refers to oil refining, oil processing and oil movements and storage within the refinery, defined as follows:

   - Oil refining refers and covers the manufacturing of local petroleum products through distillation, conversion and treatment of crude oil and other naturally occurring petroleum hydrocarbons.
   - Oil processing refers to and covers the activity of manufacturing local petroleum products with or without the use of the distillation process.
   - Oil movement and storage cover receiving/discharging and storing petroleum within the refinery intended for refining and/or processing and eventual distribution purposes.

Investments in oil refining and/or oil processing shall include expansion, modification and modernization of a refinery, resulting in an increase in existing volume of production, and/ or improvement in the quality of petroleum products in conformance with the PNS, the CAA, and other applicable laws and regulation.

Investments in oil movement and storage shall include expansion, modification and modernization of facilities in the refinery resulting in an increase in existing capacity for storage, handling and distribution in the refinery.

2. **Storage** refers to the business of receiving/ discharging and storing petroleum crudes and/or products of others for compensation or profit.

3. **Distribution** refers to the bunkering and fuels shipping and transport. Fuels shipping and transport cover shipping and transport land such as tank trucks, lorries and pipeline and tankers, and barges for the fuels to get to the points or areas where they are needed. Bunkering covers the activity of selling fuel for direct use by a vessel, usually for water and air transport, through the use of a smaller transport vessel.

   Distribution projects are limited to those utilizing brand new equipment and double-hulled vessels.

4. **Marketing** covers the following:

- Retailing of petroleum products which refers to selling of petroleum products or fuels in retail generally directed to the end users, through dispensing pumps in gasoline stations or in packaged containers such as drums for the liquid fuels or metal cylinders for LPG. This includes the establishment and operation of gasoline stations and LPG retailing.

  For gasoline retailing stations, except those locating in Less Developed Areas (LDAs) listed in the IPP, the applicant shall be required to invest a minimum capital of PhP10 million per station, excluding land, or such amount as may be determined jointly by BOI and DOE for augmentation purposes, as the need arises. Provided, that foreign retailers shall comply with the requirements provided under R.A. 8762, otherwise known as the Retail Trade Liberalization Law, and its implementing rules and regulations.

- Fuels bulk marketing covers the selling of petroleum products or fuels in wholesale through tank trucks, lorries, double-hulled vessels / tankers, barges or pipelines, which may be sourced from one's own storage facilities. Investment shall include underground tanks and other equipment intended for fuels retailing through outlets such as gasoline stations and LPG outlets.

- LPG refilling and marketing which is a combination of storage, distribution, and marketing activities may also be eligible for registration. For storage, marketing and distribution, only investments of new industry participants may be entitled to incentives. The applicant shall submit an endorsement from the DOE certifying that the applicant is a new industry participant with new investments.

  Except for availment of incentive on duty of 3.0 percent on imported capital equipment, a DOE certification on actual new investments of the registered enterprise shall be required in the application for incentives. Said investments shall be validated through an ocular inspection by the DOE.

  Incentives shall be available for a period of five years from the date of registration except ITH, which shall be reckoned from date of commercial operation. This date shall refer to the scheduled start of commercial operation as indicated in the firm's specific registration terms and conditions based on the following:

- For refineries, it will be the date when the registered enterprise actually first began production of the registered product for commercial purposes. In cases of expansion, modification and rehabilitation of refineries, the start of commercial operation shall be the date after the scheduled completion of the said activities.

- For storage, it will be the date when the registered enterprise actually first received the registered product for storage.

- For distribution, it will be the date when the registered enterprise actually first transferred the registered product for distribution.

- For marketing, it will be the date when the registered enterprise actually first sold the registered product.

- For combinations involving storage, distribution, and marketing, it will be the date referred to in "marketing;" provided no separate transactions for either storage or distribution is undertaken, otherwise, it will be the earliest date of commercial operation, as defined, among the combined registered activities.

  Activities covered under d.4. "Marketing" are entitled to capital equipment incentive only.

  ITH shall be applicable to income derived from the activity covered by the registration reckoned

five years from date of commercial operation; Provided that in case of gasoline retailing stations, except those locating in LDAs, the incentive shall be available only to those with minimum capital requirement, excluding land, of PhP 20 million or such amount as may be determined jointly by BOI and DOE for augmentation purposes, as the need arises.

Availment of ITH incentive shall be based on new investments made. New investments should account for at least 20.0 percent of the total investments (inclusive of equipment and plant facilities at acquisition cost) or a minimum of PhP equivalent of US$ 2 million, whichever is lower.

Annex A: ANNUAL TARGETS

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FROM 2007 - 2014

Annex A.1.1
OVERALL ENERGY BALANCE, 2007

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	17.13	13.64	12.95	64.79	14.59	0.61	48.20	0.35		172.27
Net Imports	95.85		33.02					0.01		128.88
Total Primary Supply	**112.97**	**13.64**	**45.96**	**64.79**	**14.59**	**0.61**	**48.20**	**0.38**		**301.16**
Share, in percent	**37.51**	**4.53**	**15.26**	**21.51**	**4.85**	**0.20**	**16.01**	**0.13**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(3.71)	(3.71)
Electricity Generation	(12.21)	(12.35)	(38.74)	(64.79)	(14.59)	(0.50)			36.73	(106.45)
Total Transformation	**(17.90)**	**(12.35)**	**(38.74)**	**(64.79)**	**(14.59)**	**(0.50)**			**33.02**	**(115.85)**
Industrial	13.53	0.39	8.41				9.21	0.01	10.29	41.84
Commercial	4.47						2.16	0.04	10.28	16.95
Transport	57.68							0.32	0.04	58.04
Residential	5.89						31.85		12.41	50.16
Agriculture	2.86							0.00	0.00	2.86
Final Energy Demand	**84.43**	**0.39**	**8.41**				**43.23**	**0.37**	**33.02**	**169.84**
Savings from Energy Efficiency and Conservation										6.10
Final Energy Demand with Savings										163.74
Self-sufficiency, in percent										**57.20**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	2,473.00	1,970.04	1,869.34	9,355.08	2,107.49	88.63	6,960.71	50.86		24,875.16
Net Imports	13,840.52		4,767.68					1.87		18,610.07
Total Primary Supply	**16,313.52**	**1,970.04**	**6,637.02**	**9,355.08**	**2,107.49**	**88.63**	**6,960.71**	**52.73**		**43,485.23**
Share, in percent	**37.52**	**4.53**	**15.26**	**21.51**	**4.85**	**0.20**	**16.01**	**0.12**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(535.29)	(535.29)
Electricity Generation	(1,762.92)	**(1,782.91)**	(5,594.17)	(9,355.08)	(2,107.49)	(72.29)			5,303.36	(15,371.50)
Total Transformation	**(2,584.56)**	**(1,782.91)**	**(5,594.17)**	**(9,355.08)**	**(2,107.49)**	**(72.29)**			**4,768.07**	**(16,728.43)**
Industrial	1,953.16	56.68	1,214.30				1,330.57	1.41	1,485.19	6,041.30
Commercial	645.75						311.74	5.40	1,484.11	2,447.01
Transport	8,328.70							45.73	6.17	8,380.61
Residential	850.91					0.00	4,599.77		1,792.18	7,242.86
Agriculture	413.07					0.00		0.18	0.41	413.66
Final Energy Demand	**12,191.59**	**56.68**	**1,214.30**				**6,242.08**	**52.72**	**4,768.06**	**24,525.44**
Savings from Energy Efficiency and Conservation										**880.84**
Final Energy Demand with Savings										23,644.60
Self-sufficiency, in percent										**57.20**

Annex A.1.1
OVERALL ENERGY BALANCE, 2008

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	14.06	14.52	13.71	66.98	14.95	0.62	48.69	0.34		173.86
Net Imports	101.97		34.53					0.04		136.54
Total Primary Supply	**116.03**	**14.52**	**48.24**	**66.98**	**14.95**	**0.62**	**48.69**	**0.38**		**310.40**
Share, in percent	**37.38**	**4.68**	**15.54**	**21.58**	**4.82**	**0.20**	**15.69**	**0.12**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution	-								(3.86)	(3.86)
Electricity Generation	(11.97)	(13.14)	(40.94)	(66.98)	(14.95)	(0.50)			38.26	(110.22)
Total Transformation	**(17.66)**	**(13.14)**	**(40.94)**	**(66.98)**	**(14.95)**	**(0.50)**			**34.40**	**(119.77)**
Industrial	14.08	0.44	8.51				9.76	0.01	10.63	43.44
Commercial	4.79						2.24	0.04	10.74	17.81
Transport	59.55							0.33	0.04	59.92
Residential	6.07						31.66		12.98	50.70
Agriculture	2.93							0.00	0.00	2.93
Final Energy Demand	**87.42**	**0.44**	**8.51**				**43.66**	**0.38**	**34.40**	**174.80**
Savings from Energy Efficiency and Conservation										6.77
Final Energy Demand with Savings										168.03
Self-sufficiency, in percent										**56.01**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	2,029.65	2,096.09	1,979.99	9,671.56	2,158.89	89.29	7,031.27	49.08		25,105.81
Net Imports	14,724.39		4,986.29					5.62		19,716.30
Total Primary Supply	**16,754.03**	**2,096.09**	**6,966.28**	**9,671.56**	**2,158.89**	**89.29**	**7,031.27**	**54.70**		**44,822.11**
Share, in percent	**37.38**	**4.68**	**15.54**	**21.58**	**4.82**	**0.20**	**15.69**	**0.12**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(557.03)	(557.03)
Electricity Generation	(1,728.07)	(1,897.36)	(5,911.09)	(9,671.56)	(2,158.89)	(72.58)			5,524.04	(15,915.51)
Total Transformation	**(2,549.71)**	**(1,897.36)**	**(5,911.09)**	**(9,671.56)**	**(2,158.89)**	**(72.58)**			**4,967.01**	**(17,294.18)**
Industrial	2,033.20	64.22	1,228.73				1,409.09	1.47	1,535.47	6,272.16
Commercial	691.69						323.34	5.79	1,550.58	2,571.40
Transport	8,598.87							47.25	6.48	8,652.61
Residential	875.92						4,571.68		1,874.05	7,321.65
Agriculture	423.14							0.19	0.44	423.76
Final Energy Demand	**12,622.83**	**64.22**	**1,228.73**				**6,304.11**	**54.70**	**4,967.01**	**25,241.59**
Savings from Energy Efficiency and Conservation										977.95
Final Energy Demand with Savings										24,263.64
Self-sufficiency, in percent										**56.01**

Annex A.1.1
OVERALL ENERGY BALANCE, 2009

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	11.96	15.37	15.12	69.79	15.72	0.62	49.22	1.91		179.72
Net Imports	108.24		35.51							143.75
Total Primary Supply	**120.20**	**15.37**	**50.63**	**69.79**	**15.72**	**0.62**	**49.22**	**1.91**		**323.47**
Share, in percent	**37.16**	**4.75**	**15.65**	**21.58**	**4.86**	**0.19**	**15.22**	**0.59**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(4.08)	(4.08)
Electricity Generation	(12.56)	(13.92)	(43.24)	(69.79)	(15.72)	(0.50)			40.42	(115.30)
Total Transformation	**(18.25)**	**(13.92)**	**(43.24)**	**(69.79)**	**(15.72)**	**(0.50)**			**36.34**	**(125.07)**
Industrial	14.65	0.50	8.61				10.33	0.02	11.12	45.23
Commercial	5.09						2.32	0.08	11.39	18.88
Transport	60.01							1.81	0.05	61.87
Residential	6.24						31.47		13.79	51.50
Agriculture	3.00							0.00	0.00	3.01
Final Energy Demand	**88.99**	**0.50**	**8.61**				**44.12**	**1.91**	**36.34**	**180.49**
Savings from Energy Efficiency and Conservation										7.11
Final Energy Demand with Savings										173.38
Self-sufficiency, in percent										**55.56**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	1,727.07	2,219.97	2,183.96	10,077.48	2,269.35	89.95	7,107.63	276.29		25,951.69
Net Imports	15,629.93		5,127.00							20,756.92
Total Primary Supply	**17,357.00**	**2,219.97**	**7,310.95**	**10,077.48**	**2,269.35**	**89.95**	**7,107.63**	**276.29**		**46,708.61**
Share, in percent	**37.16**	**4.75**	**15.65**	**21.58**	**4.86**	**0.19**	**15.22**	**0.59**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(589.20)	(589.20)
Electricity Generation	(1,814.28)	(2,009.38)	(6,243.25)	(10,077.48)	(2,269.35)	(72.87)			5,837.08	(16,649.53)
Total Transformation	**(2,635.92)**	**(2,009.38)**	**(6,243.25)**	**(10,077.48)**	**(2,269.35)**	**(72.87)**			**5,247.88**	**(18,060.37)**
Industrial	2,115.18	72.75	1,243.33				1,492.24	2.88	1,605.18	6,531.55
Commercial	735.47						335.37	11.64	1,644.34	2,726.82
Transport	8,665.29							261.35	6.78	8,933.43
Residential	901.66						4,543.77		1,991.10	7,436.53
Agriculture	433.23							0.42	0.47	434.12
Final Energy Demand	**12,850.82**	**72.75**	**1,243.33**				**6,371.38**	**276.29**	**5,247.87**	**26,062.45**
Savings from Energy Efficiency and Conservation										1,026.85
Final Energy Demand with Savings										25,035.60
Self-sufficiency, in percent										**55.56**

Annex A.1.1
OVERALL ENERGY BALANCE, 2010

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	22.49	18.47	16.86	71.10	15.86	0.63	49.79	2.00		197.21
Net Imports	98.68		37.29							135.97
Total Primary Supply	**121.17**	**18.47**	**54.16**	**71.10**	**15.86**	**0.63**	**49.79**	**2.00**		**333.18**
Share, in percent	**36.37**	**5.54**	**16.25**	**21.34**	**4.76**	**0.19**	**14.94**	**0.60**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(4.29)	(4.29)
Electricity Generation	(9.91)	(16.72)	(46.67)	(71.10)	(15.86)	(0.50)			42.45	(118.32)
Total Transformation	**(15.60)**	**(16.72)**	**(46.67)**	**(71.10)**	**(15.86)**	**(0.50)**			**38.16**	**(128.30)**
Industrial	15.25	0.57	8.71				10.94	0.02	11.56	47.06
Commercial	5.45						2.41	0.09	11.99	19.94
Transport	61.93							1.89	0.05	63.87
Residential	6.43						31.27		14.55	52.26
Agriculture	3.07							0.00	0.00	3.08
Final Energy Demand	**92.14**	**0.57**	**8.71**				**44.63**	**2.00**	**38.16**	**186.21**
Savings from Energy Efficiency and Conservation										7.47
Final Energy Demand with Savings										178.74
Self-sufficiency, in percent										**59.19**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	3,247.87	2,667.74	2,434.83	10,266.68	2,290.72	90.32	7,190.13	289.01		28,477.31
Net Imports	14,249.32		5,385.25							19,634.57
Total Primary Supply	**17,497.19**	**2,667.74**	**7,820.08**	**10,266.68**	**2,290.72**	**90.32**	**7,190.13**	**289.01**		**48,111.88**
Share, in percent	**36.37**	**5.54**	**16.25**	**21.34**	**4.76**	**0.19**	**14.94**	**0.60**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(619.53)	(619.53)
Electricity Generation	(1,430.80)	(2,414.32)	(6,739.71)	(10,266.68)	(2,290.72)	(72.87)			6,129.39	(17,085.71)
Total Transformation	**(2,252.44)**	**(2,414.32)**	**(6,739.71)**	**(10,266.68)**	**(2,290.72)**	**(72.87)**			**5,509.87**	**(18,526.87)**
Industrial	2,201.83	82.42	1,258.10				1,580.31	3.02	1,669.78	6,795.46
Commercial	787.64						347.84	12.63	1,730.79	2,878.90
Transport	8,943.33							272.93	7.09	9,223.35
Residential	928.16						4,516.03		2,101.71	7,545.89
Agriculture	443.78							0.43	0.50	444.72
Final Energy Demand	**13,304.74**	**82.42**	**1,258.10**				**6,444.18**	**289.01**	**5,509.87**	**26,888.33**
Savings from Energy Efficiency and Conservation										1,078.19
Final Energy Demand with Savings										25,810.14
Self-sufficiency, in percent										**59.19**

Annex A.1.1
OVERALL ENERGY BALANCE, 2011

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	22.70	20.99	18.14	72.26	15.89	0.63	50.41	3.34		204.36
Net Imports	102.86		37.30							140.16
Total Primary Supply	**125.55**	**20.99**	**55.45**	**72.26**	**15.89**	**0.63**	**50.41**	**3.34**		**344.52**
Share, in percent	**36.44**	**6.09**	**16.09**	**20.97**	**4.61**	**0.18**	**14.63**	**0.97**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(4.52)	(4.52)
Electricity Generation	(10.68)	(18.92)	(47.88)	(72.26)	(15.89)	(0.50)			44.63	(121.51)
Total Transformation	**(16.37)**	**(18.92)**	**(47.88)**	**(72.26)**	**(15.89)**	**(0.50)**			**40.12**	**(131.72)**
Industrial	15.87	0.65	8.82				11.59	0.02	12.05	49.00
Commercial	5.85						2.50	0.09	12.63	21.06
Transport	62.67							3.23	0.05	65.95
Residential	6.62						31.08		15.38	53.08
Agriculture	3.15							0.00	0.00	3.16
Final Energy Demand	**94.15**	**0.65**	**8.82**				**45.17**	**3.34**	**40.12**	**192.24**
Savings from Energy Efficiency and Conservation										7.84
Final Energy Demand with Savings										184.40
Self-sufficiency, in percent										**59.32**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	3,277.56	3,031.08	2,619.93	10,434.38	2,294.72	90.69	7,279.14	482.48		29,509.99
Net Imports	14,852.39		5,386.73							20,239.12
Total Primary Supply	**18,129.96**	**3,031.08**	**8,006.66**	**10,434.38**	**2,294.72**	**90.69**	**7,279.14**	**482.48**		**49,749.11**
Share, in percent	**36.44**	**6.09**	**16.09**	**20.97**	**4.61**	**0.18**	**14.63**	**0.97**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(652.27)	(652.27)
Electricity Generation	(1,542.88)	(2,732.46)	(6,913.43)	(10,434.38)	(2,294.72)	(72.87)			6,444.93	(17,545.81)
Total Transformation	**(2,364.52)**	**(2,732.46)**	**(6,913.43)**	**(10,434.38)**	**(2,294.72)**	**(72.87)**			**5,792.66**	**(19,019.72)**
Industrial	2,292.17	93.38	1,273.05				1,673.57	3.04	1,740.27	7,075.48
Commercial	844.13						360.78	13.08	1,823.67	3,041.66
Transport	9,049.40							465.87	7.39	9,522.66
Residential	955.43						4,488.45		2,220.79	7,664.68
Agriculture	454.55							0.50	0.54	455.59
Final Energy Demand	**13,595.68**	**93.38**	**1,273.05**				**6,522.80**	**482.48**	**5,792.66**	**27,760.06**
Savings from Energy Efficiency and Conservation										1,132.10
Final Energy Demand with Savings										26,627.96
Self-sufficiency, in percent										**59.32**

Annex A.1.1
OVERALL ENERGY BALANCE, 2012

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	24.36	23.71	20.49	73.28	15.92	0.63	51.07	3.50		212.97
Net Imports	105.49		36.65							142.15
Total Primary Supply	**129.85**	**23.71**	**57.15**	**73.28**	**15.92**	**0.63**	**51.07**	**3.50**		**355.12**
Share, in percent	**36.57**	**6.68**	**16.09**	**20.64**	**4.48**	**0.18**	**14.38**	**0.99**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(4.76)	(4.76)
Electricity Generation	(11.28)	(21.32)	(49.48)	(73.28)	(15.92)	(0.50)			47.01	(124.79)
Total Transformation	**(16.97)**	**(21.32)**	**(49.48)**	**(73.28)**	**(15.92)**	**(0.50)**			**42.25**	**(135.24)**
Industrial	16.52	0.73	8.92				12.27	0.02	12.57	51.04
Commercial	6.26						2.59	0.10	13.32	22.28
Transport	64.66							3.38	0.05	68.09
Residential	6.81						30.89		16.29	54.00
Agriculture	3.22							0.00	0.00	3.23
Final Energy Demand	**97.47**	**0.73**	**8.92**				**45.76**	**3.50**	**42.25**	**198.64**
Savings from Energy Efficiency and Conservation		**0.50**								8.23
Final Energy Demand with Savings										190.40
Self-sufficiency, in percent										**59.97**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	3,517.67	3,424.04	2,959.02	10,581.44	2,298.72	91.07	7,375.03	505.80		30,752.79
Net Imports	15,233.17		5,292.82							20,525.99
Total Primary Supply	**18,750.83**	**3,424.04**	**8,251.84**	**10,581.44**	**2,298.72**	**91.07**	**7,375.03**	**505.80**		**51,278.77**
Share, in percent	**36.57**	**6.68**	**16.09**	**20.64**	**4.48**	**0.18**	**14.38**	**0.99**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(687.99)	(687.99)
Electricity Generation	(1,629.55)	(3,079.30)	(7,145.59)	(10,581.44)	(2,298.72)	(72.87)			6,788.32	(18,019.15)
Total Transformation	**(2,451.19)**	**(3,079.30)**	**(7,145.59)**	**(10,581.44)**	**(2,298.72)**	**(72.87)**			**6,100.34**	**(19,528.77)**
Industrial	2,386.05	105.80	1,288.18				1,772.33	3.22	1,814.97	7,370.54
Commercial	903.89						374.21	14.31	1,924.11	3,216.52
Transport	9,336.23							487.75	7.70	9,831.68
Residential	983.51						4,461.04		2,352.98	7,797.54
Agriculture	465.62							0.52	0.58	466.72
Final Energy Demand	**14,075.30**	**105.80**	**1,288.18**				**6,607.58**	**505.80**	**6,100.34**	**28,682.99**
Savings from Energy Efficiency and Conservation										1,188.70
Final Energy Demand with Savings										27,494.29
Self-sufficiency, in percent										**59.97**

Annex A.1.1
OVERALL ENERGY BALANCE, 2013

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	21.96	27.19	21.07	74.20	15.92	0.63	51.79	3.67		216.42
Net Imports	111.99		37.56							149.55
Total Primary Supply	**133.95**	**27.19**	**58.63**	**74.20**	**15.92**	**0.63**	**51.79**	**3.67**		**365.98**
Share, in percent	**36.60**	**7.43**	**16.02**	**20.28**	**4.35**	**0.17**	**14.15**	**1.00**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(5.05)	(5.05)
Electricity Generation	(11.46)	(24.59)	(50.88)	(74.20)	(15.92)	(0.50)			49.69	(127.86)
Total Transformation	**(17.15)**	**(24.59)**	**(50.88)**	**(74.20)**	**(15.92)**	**(0.50)**			**44.64**	**(138.60)**
Industrial	17.20	0.83	9.03				13.00	0.02	13.18	53.26
Commercial	6.70						2.69	0.11	14.11	23.61
Transport	66.70							3.54	0.06	70.30
Residential	7.01						30.71		17.29	55.01
Agriculture	3.30							0.00	0.00	3.31
Final Energy Demand	**100.92**	**0.83**	**9.03**				**46.39**	**3.67**	**44.64**	**205.48**
Savings from Energy Efficiency and Conservation										8.64
Final Energy Demand with Savings										196.84
Self-sufficiency, in percent										**59.14**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	3,170.79	3,925.56	3,042.14	10,714.74	2,298.49	91.44	7,478.19	530.26		31,251.61
Net Imports	16,171.41		5,423.81							21,595.23
Total Primary Supply	**19,342.21**	**3,925.56**	**8,465.95**	**10,714.74**	**2,298.49**	**91.44**	**7,478.19**	**530.26**		**52,846.83**
Share, in percent	**36.60**	**7.43**	**16.02**	**20.28**	**4.35**	**0.17**	**14.15**	**1.00**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(728.88)	(728.88)
Electricity Generation	(1,654.29)	(3,551.03)	(7,346.50)	(10,714.74)	(2,298.49)	(72.87)			7,174.81	(18,463.11)
Total Transformation	**(2,475.92)**	**(3,551.03)**	**(7,346.50)**	**(10,714.74)**	**(2,298.49)**	**(72.87)**			**6,445.93**	**(20,013.63)**
Industrial	2,483.77	119.86	1,303.48				1,876.92	3.41	1,902.92	7,690.37
Commercial	967.90						388.13	15.64	2,037.83	3,409.49
Transport	9,632.03							510.68	8.00	10,150.71
Residential	1,012.42						4,433.81		2,496.55	7,942.77
Agriculture	476.96							0.54	0.63	478.13
Final Energy Demand	**14,573.08**	**119.86**	**1,303.48**				**6,698.85**	**530.26**	**6,445.93**	**29,671.47**
Savings from Energy Efficiency and Conservation										1,248.14
Final Energy Demand with Savings										28,423.33
Self-sufficiency, in percent										**59.14**

Annex A.1.1
OVERALL ENERGY BALANCE, 2014

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	14.58	30.08	23.32	74.76	15.94	0.64	52.56	3.85		215.72
Net Imports	124.20		37.32							161.52
Total Primary Supply	**138.78**	**30.08**	**60.64**	**74.76**	**15.94**	**0.64**	**52.56**	**3.85**		**377.24**
Share, in percent	**36.79**	**7.97**	**16.07**	**19.82**	**4.23**	**0.17**	**13.93**	**1.02**		**100.00**
Oil Refining	(5.69)									(5.69)
Transmission & Distribution									(5.32)	(5.32)
Electricity Generation	(12.28)	(27.34)	(52.79)	(74.76)	(15.94)	(0.50)			52.35	(131.27)
Total Transformation	**(17.97)**	**(27.34)**	**(52.79)**	**(74.76)**	**(15.94)**	**(0.50)**			**47.03**	**(142.28)**
Industrial	17.91	0.94	9.13				13.77	0.03	13.79	55.56
Commercial	7.18						2.79	0.12	14.90	24.98
Transport	68.82							3.70	0.06	72.58
Residential	7.22						30.52		18.28	56.01
Agriculture	3.38							0.00	0.00	3.39
Final Energy Demand	**104.50**	**0.94**	**9.13**				**47.07**	**3.85**	**47.03**	**212.52**
Savings from Energy Efficiency and Conservation										9.08
Final Energy Demand with Savings										203.45
Self-sufficiency, in percent										**57.18**

(In Thousand Tonnes of Oil Equivalent, kTOE)

	Oil and Oil Products	Natural Gas	Coal	Geothermal	Hydropower	Solar, Wind and Micro-hydro	Biomass	CME and Ethanol	Electricity	Total
Production	2,105.67	4,344.11	3,366.95	10,794.72	2,301.88	91.81	7,589.05	555.93		31,150.12
Net Imports	17,934.81		5,389.08							23,323.89
Total Primary Supply	**20,040.48**	**4,344.11**	**8,756.03**	**10,794.72**	**2,301.88**	**91.81**	**7,589.05**	**555.93**		**54,474.01**
Share, in percent	**36.79**	**7.97**	**16.07**	**19.82**	**4.23**	**0.17**	**13.93**	**1.02**		**100.00**
Oil Refining	(821.64)									(821.64)
Transmission & Distribution									(768.54)	(768.54)
Electricity Generation	(1,773.47)	(3,947.97)	(7,623.20)	(10,794.72)	(2,301.88)	(72.87)			7,559.14	(18,954.97)
Total Transformation	**(2,595.10)**	**(3,947.97)**	**(7,623.20)**	**(10,794.72)**	**(2,301.88)**	**(72.87)**			**6,790.60**	**(20,545.14)**
Industrial	2,585.49	135.80	1,318.97				1,987.69	3.62	1,991.14	8,022.70
Commercial	1,036.45						402.56	17.06	2,151.55	3,607.63
Transport	9,937.08							534.69	8.31	10,480.09
Residential	1,042.17						4,406.73		2,638.94	8,087.84
Agriculture	488.58							0.56	0.67	489.81
Final Energy Demand	**15,089.78**	**135.80**	**1,318.97**				**6,796.98**	**555.93**	**6,790.61**	**30,688.07**
Savings from Energy Efficiency and Conservation										1,310.55
Final Energy Demand with Savings										29,377.52
Self-sufficiency, in percent										**57.18**

Annex A.1.2a
OIL DEMAND OUTLOOK By Sector

(In Thousand Barrels, MB)								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Power Generation	12,389.00	12,130.00	12,747.00	10,133.00	10,936.00	11,565.00	11,768.00	12,634.00
Residential	11,292.48	11,688.57	12,092.14	12,502.08	12,916.91	13,336.70	13,763.53	14,194.89
Transport	66,487.67	68,952.55	71,417.44	73,796.31	76,142.84	78,541.24	80,994.53	83,524.04
Industrial	17,212.90	17,904.15	18,698.28	19,466.85	20,250.27	21,091.65	22,014.35	22,982.33
Commercial	5,986.12	6,408.95	6,877.79	7,402.70	7,922.80	8,479.76	9,076.22	9,714.99
Agriculture	2,861.76	2,935.02	3,008.29	3,081.56	3,154.83	3,228.10	3,301.38	3,374.66
Total	**116,229.94**	**120,019.24**	**124,840.95**	**126,382.50**	**131,323.66**	**136,242.46**	**140,918.00**	**146,424.90**

Annex A.1.2b
OIL DEMAND OUTLOOK By Product

(In Thousand Barrels, MB)

	2007	2008	2009	2010	2011	2012	2013	2014
Residential	**11,292.48**	**11,688.57**	**12,092.14**	**12,502.08**	**12,916.91**	**13,336.70**	**13,763.53**	**14,194.89**
LPG	9,590.12	10,091.69	10,593.26	11,094.83	11,596.40	12,097.98	12,599.55	13,101.12
Kerosene	1,702.37	1,596.88	1,498.88	1,407.25	1,320.51	1,238.73	1,163.98	1,093.77
Transport	**66,487.67**	**68,952.55**	**71,417.44**	**73,796.31**	**76,142.84**	**78,541.24**	**80,994.53**	**83,524.04**
Gasoline	25,670.44	26,823.31	27,976.17	29,117.40	30,270.26	31,423.12	32,564.35	33,717.21
Diesel	35,296.90	36,437.35	37,577.81	38,643.88	39,665.99	40,739.95	41,880.45	43,085.53
Fuel Oil	3,284.41	3,406.33	3,528.25	3,650.16	3,772.08	3,894.00	4,015.92	4,137.83
Aviation Fuel	2,235.92	2,285.57	2,335.22	2,384.87	2,434.52	2,484.17	2,533.82	2,583.47
Industrial	**17,212.90**	**17,904.15**	**18,698.28**	**19,466.85**	**20,250.27**	**21,091.65**	**22,014.35**	**22,982.33**
LPG	1,743.15	1,799.65	1,857.52	1,917.73	1,996.82	2,081.04	2,175.02	2,274.81
Kerosene	451.77	448.36	441.58	438.60	385.39	379.83	374.39	369.06
Diesel	5,060.60	5,351.58	5,677.79	6,009.17	6,363.43	6,726.42	7,121.56	7,537.81
Fuel Oil	9,957.38	10,304.56	10,721.39	11,101.35	11,504.63	11,904.37	12,343.38	12,800.65
Commercial	**5,986.12**	**6,408.95**	**6,877.79**	**7,402.70**	**7,922.80**	**8,479.76**	**9,076.22**	**9,714.99**
LPG	2,450.69	2,624.15	2,817.56	3,036.47	3,249.86	3,478.37	3,723.05	3,985.08
Diesel	1,838.56	1,968.09	2,111.64	2,271.93	2,431.66	2,602.73	2,785.96	2,982.21
Fuel Oil	1,696.87	1,816.71	1,948.60	2,094.29	2,241.27	2,398.66	2,567.20	2,747.70
Agriculture	**2,861.76**	**2,935.02**	**3,008.29**	**3,081.56**	**3,154.83**	**3,228.10**	**3,301.38**	**3,374.66**
Gasoline	58.11	59.33	60.56	61.79	63.01	64.25	65.48	66.72
Kerosene	21.89	21.48	21.07	20.66	20.25	19.84	19.43	19.02
Diesel	2,545.97	2,602.64	2,659.31	2,715.98	2,772.65	2,829.32	2,885.99	2,942.65
Fuel Oil	235.78	251.57	267.35	283.13	298.92	314.70	330.48	346.27
Power Generation	**12,389.41**	**12,130.36**	**12,747.25**	**10,133.25**	**10,935.70**	**11,565.30**	**11,768.30**	**12,634.42**
Fuel Oil	8,928.11	8,932.22	9,228.12	6,250.90	6,629.66	6,806.26	6,559.10	6,797.87
Diesel	3,461.30	3,198.14	3,519.13	3,882.35	4,306.04	4,759.04	5,209.20	5,836.55
Total	**116,230.35**	**120,019.60**	**124,841.20**	**126,382.75**	**131,323.36**	**136,242.76**	**140,918.30**	**146,425.32**
Diesel	48,203.33	49,557.79	51,545.68	53,523.32	55,539.76	57,657.46	59,883.16	62,384.75
Fuel Oil	24,102.56	24,711.39	25,693.70	23,379.84	24,446.56	25,317.99	25,816.08	26,830.31
Gasoline	25,728.55	26,882.64	28,036.73	29,179.18	30,333.27	31,487.37	32,629.83	33,783.93
LPG	13,783.96	14,515.49	15,268.34	16,049.03	16,843.09	17,657.38	18,497.62	19,361.01
Kerosene	2,176.03	2,066.72	1,961.53	1,866.51	1,726.15	1,638.40	1,557.80	1,481.85
Aviation Fuel	2,235.92	2,285.57	2,335.22	2,384.87	2,434.52	2,484.17	2,533.82	2,583.47

Annex A.1.3a
NATURAL GAS DEMAND OUTLOOK

(In Billion Cubic Feet, BCF)								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Power Generation	70.00	74.00	79.00	95.00	107.00	121.00	139.00	155.00
Transport	4.05	4.44	4.83	5.66	6.65	7.38	7.77	7.83
Industrial	3.05	3.10	3.16	3.96	4.68	5.70	6.44	7.19
Total	**77.10**	**81.54**	**86.99**	**104.62**	**118.33**	**134.08**	**153.21**	**170.02**

Annex A.1.3b
COAL DEMAND AND SUPPLY OUTLOOK

(In Thousand Metric Tons, MMT)								
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Industry	2,045.16	2,069.36	2,093.89	2,118.75	2,143.95	2,169.49	2,195.37	2,221.61
Power Generation	9,642.00	10,177.00	10,738.00	11,572.00	11,865.00	12,256.00	12,595.00	13,062.00
Total	**11,687.16**	**12,246.36**	**12,831.89**	**13,690.75**	**14,008.95**	**14,425.49**	**14,790.37**	**15,283.61**
Production	3,666.00	3,883.00	4,283.00	4,775.00	5,138.00	5,803.00	5,966.00	6,603.00
Imports	8,021.16	8,363.36	8,548.89	8,915.75	8,870.95	8,622.49	8,824.37	8,680.61

Annex A.1.4
BIOFUELS DEMAND

BIODIESEL (In Million Liters)

	Diesel Demand	Mandated Blend	Biodiesel Requirement
2006	5,985.29		
2007	6,209.74	1%	62.10
2008	6,442.60	1%	64.43
2009	6,684.20	2%	133.68
2010	6,934.86	2%	138.70
2011	7,194.92	2%	143.90
2012	7,464.73	2%	149.29
2013	7,744.65	2%	154.89
2014	8,035.08	2%	160.70

Notes
(1) Based on Actual 2006 OEB and 2005-2014 per fuel growth rate
(2) Based on 2006 average price of diesel, PhP 34.50/liter

BIOETHANOL (In Million Liters)

	Gasoline Demand	Mandated Blend	Bioethanol Requirement
2006	3,574.96		
2007	3,760.86		
2008	3,956.43		
2009	4,162.16	5%	208.11
2010	4,378.59	5%	218.93
2011	4,606.28	10%	460.63
2012	4,845.80	10%	484.58
2013	5,097.79	10%	509.78
2014	5,362.87	10%	536.29

Notes
(1) Based on Actual 2006 OEB and 2005-2014 per fuel growth rate
(2) Based on 2006 average price of diesel, PhP 39.30/liter

Annex A.1.5
OIL AND GAS SECTOR TARGETS

Field	2007	2008	2009	2010	2011	2012	2013	2014	Total
OIL (in MMB)									
Central Philippines									
Region IV-B									
Nido	0.12	0.07	0.02						0.20
Matinloc	0.07	0.06							0.13
Malampaya				8.76	8.03	6.57	4.38		27.74
Cadlao						0.62	0.59	0.56	1.77
Galoc			3.84	1.51	1.04	0.75	0.42		7.56
Total	**0.19**	**0.13**	**3.86**	**10.27**	**9.07**	**7.94**	**5.39**	**0.56**	**37.40**
GAS (in BCF)									
Central Philippines									
Region IV-B									
Malampaya	113.51	146.00	146.00	146.00	146.00	146.00	146.00	146.00	1,135.50
North Luzon Agribusiness Quadrangle									
Region II									
San Antonio	0.37	0.37	0.37	0.18					1.29
Central Philippines									
Region VII									
Libertad			0.11	0.12	0.12	0.12	0.12	0.12	0.71
Total	**113.88**	**146.37**	**146.48**	**146.30**	**146.12**	**146.12**	**146.12**	**146.12**	**1,137.50**
CONDENSATE (in MMB)									
Central Philippines									
Region IV-B									
Malampaya	5.15	5.11	5.11	4.93	4.75	4.58	4.39	4.22	38.23
Total	**5.15**	**5.11**	**5.11**	**4.93**	**4.75**	**4.58**	**4.39**	**4.22**	**38.23**

Assumptions:
a) Oil production in Malampaya oil leg is assumed to commence on 2010 until 2013
b) Malampaya gas production is even @ 400 MMSCF per day for 20 years.
c) Gas production at San Antonio @ 1 MMSCF per day for another 4 years, production will be enhanced due to the replacement of more efficient gas turbine.
d) Cadlao field will be reactivated and will resume production on the 1st quarter 2012 at a rate of 1,700 BOPD for 10 years (depletion rate at 5.0 percent per year).
e) Galoc field will be developed and will commenced production by the third quarter of 2009.
f) Libertad field will be developed and will commenced production in 2009.
g) San Martin field is assumed to be developed and commenced production in 2017.

Annex A.1.6
COAL SECTOR TARGETS

In Situ Reserves (MMMT @ 10,000 BTU)	2007	2008	2009	2010	2011	2012	2013	2014
North Luzon Agribusiness Quadrangle								
Region II	38.42	38.40	41.23	41.14	40.98	40.81	40.58	40.27
Metro Luzon Urban Beltway	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**
Region IVA	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Region IVB	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Central Philippines	**84.14**	**82.58**	**80.99**	**79.40**	**77.64**	**75.88**	**73.86**	**71.85**
Region V	3.10	3.07	3.05	3.02	3.00	2.97	2.94	2.91
Region VI	71.65	70.17	68.70	67.22	65.58	63.94	62.04	60.15
Region VII	5.41	5.34	5.26	5.17	5.07	4.98	4.89	4.80
Region VIII	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
Mindanao Super Region	**195.46**	**197.05**	**195.79**	**197.49**	**199.41**	**201.34**	**203.57**	**307.91**
Region IX	17.68	17.59	17.48	17.35	17.22	17.07	16.93	16.79
Region X	23.27	23.27	23.27	23.27	23.27	23.27	23.27	23.27
Region XI	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Region XII	111.86	113.58	112.48	114.35	116.45	118.71	121.27	225.94
Region XIII	32.51	32.47	32.42	32.38	32.33	32.15	31.96	31.77
ARMM	10.05	10.05	10.05	10.05	10.05	10.05	10.05	10.05
Total	**318.81**	**318.83**	**318.81**	**318.82**	**318.82**	**318.82**	**318.81**	**420.82**
Production (@ 10,000 BTU/lb MMMT)								
North Luzon Agribusiness Quadrangle								
Region II	0.02	0.07	0.20	0.31	0.34	0.46	0.62	0.67
Metro Luzon Urban Beltway								
Region IVA								
Region IVB								
Central Philippines	**3.36**	**3.41**	**3.41**	**3.79**	**3.79**	**4.33**	**4.33**	**4.92**
Region V	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06
Region VI	3.17	3.17	3.17	3.53	3.53	4.07	4.07	4.66
Region VII	0.14	0.19	0.19	0.20	0.20	0.20	0.20	0.20
Region VIII								
Mindanao Super Region	**0.28**	**0.41**	**0.67**	**0.68**	**1.01**	**1.01**	**1.01**	**1.01**
Region IX	0.19	0.25	0.28	0.28	0.31	0.31	0.31	0.31
Region X								
Region XI								
Region XII	0.00	0.06	0.30	0.30	0.30	0.30	0.30	0.30
Region XIII	0.10	0.10	0.10	0.10	0.40	0.40	0.40	0.40
ARMM								
Total	**3.67**	**3.88**	**4.28**	**4.78**	**5.14**	**5.80**	**5.97**	**6.60**

Annex A.1.7
GEOTHERMAL SECTOR TARGETS

	2007	2008	2009	2010	2011	2012	2013	2014
No. of Wells to be drilled								
Luzon	0	16	27	21	31	17	11	7
Visayas	4	8	7	7	7	2	5	7
Mindanao	4	7	12	7	11	6	7	5
Total	**8**	**31**	**46**	**35**	**49**	**25**	**23**	**19**
Steam Availability (Cum MW)								
Luzon	838.32	915.80	1,010.66	1,112.42	1,227.52	1,280.04	1,321.88	1,336.24
Visayas	1,040.00	1,053.93	1,070.29	1,086.26	1,097.21	1,087.70	1,094.23	1,113.15
Mindanao	130.79	163.75	215.99	243.57	288.91	319.10	343.16	363.49
Total	**2,009.11**	**2,132.76**	**2,296.95**	**2,442.25**	**2,613.64**	**2,686.84**	**2,759.27**	**2,812.88**

Annex A.1.8
POTENTIAL CUMULATIVE SAVINGS IN ENERGY EFFICIENCY PROGRAMS

(In Million Barrel of Fuel Oil Equivalent, MMBFOE)

Efficiency Programs	2007	2008	2009	2010	2011	2012	2013	2014
I. INFORMATION, EDUCATION AND COMMUNICATION CAMPAIGN								
II. VOLUNTARY AGREEEMENT								
I. ENERGY LABELING AND EFFICIENCY STANDARDS FOR HOUSEHOLD APPLIANCES	**5.41**	**6.05**	**6.35**	**6.67**	**7.00**	**7.35**	**7.72**	**8.10**
A. Fuel Economy Guide for Vehicles								
B. Energy Standards and Labeling Program for Room Air Conditioners	1.78	1.87	1.96	2.06	2.16	2.27	2.39	2.50
C. Energy Labeling Program for Refrigerators and Freezers	0.63	0.66	0.69	0.73	0.77	0.80	0.84	0.89
D. Labeling for Compact Fluorescent Lamps	2.38	2.50	2.62	2.76	2.89	3.04	3.19	3.35
E. Ballast Loss Standard and Labeling for Fluorescent Lamp Ballast	0.28	0.66	0.69	0.73	0.77	0.80	0.84	0.89
F. Luminaire Installation	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.06
G. Household Electric Fans	0.09	0.09	0.10	0.10	0.11	0.11	0.12	0.13
H. Television Stand-by Power Reduction	0.15	0.16	0.17	0.17	0.18	0.19	0.20	0.21
I. Performance Certification of Fans and Blowers	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.08
II. GOVERNMENT ENERGY MANAGEMENT PROGRAM	**0.20**	**0.21**	**0.22**	**0.23**	**0.24**	**0.26**	**0.27**	**0.28**
A. A. Fuel Conservation	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04
B. B. Electricity Conservation	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24
III. ENERGY MANAGEMENT PROGRAM	**0.49**	**0.51**	**0.54**	**0.57**	**0.60**	**0.63**	**0.66**	**0.69**
A. Energy Audits	0.09	0.09	0.10	0.10	0.11	0.11	0.12	0.13
B. Heat Rate Improvement of Power Plants								
C. System Loss Reduction Program	0.40	0.42	0.44	0.46	0.49	0.51	0.54	0.56
D. Demand-Side Management (Market Base)								
Total	**6.10**	**6.77**	**7.11**	**7.47**	**7.84**	**8.23**	**8.64**	**9.08**
Equivalent MW Deferred Capacity	**141.45**	**157.00**	**164.88**	**173.22**	**181.80**	**190.85**	**200.36**	**210.56**
Avoidance of GHG Emissions, Gg CO_2 Equivalent	**1,959.71**	**2,174.95**	**2,284.18**	**2,399.84**	**2,518.71**	**2,644.00**	**2,775.72**	**2,917.07**

Annex A.1.9
CUMULATIVE INSTALLED CAPACITY

(In Megawatts, MW)

Luzon	2007	2008	2009	2010	2011	2012	2013	2014
Oil-based	2,514.48	2,514.48	2,304.48	1,654.48	1,654.48	1,654.48	1,654.48	1,654.48
Diesel	964.48	964.48	964.48	964.48	964.48	964.48	964.48	964.48
Gas Turbine	900.00	900.00	690.00	690.00	690.00	690.00	690.00	690.00
Oil Thermal	650.00	650.00	650.00					
Coal	3,769.00	3,769.00	3,769.00	3,769.00	3,769.00	3,769.00	3,769.00	3,769.00
Natural Gas	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00
Geothermal	907.23	907.23	907.23	907.23	907.23	907.23	907.23	907.23
Hydropower	2,207.86	2,207.86	2,207.86	2,207.86	2,207.86	2,207.86	2,207.86	2,207.86
Renewables	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Wind	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Biomass								
Others				150.00	600.00	1,050.00	1,650.00	1,950.00
Baseload								
Midrange					300.00	600.00	1,200.00	1,500.00
Peaking				150.00	300.00	450.00	450.00	450.00
Total	**12,226.57**	**12,226.57**	**12,016.57**	**11,516.57**	**11,966.57**	**12,416.57**	**13,016.57**	**13,316.57**
Visayas								
Oil-based	705.53	705.53	705.53	705.53	705.53	705.53	705.53	705.53
Diesel	650.53	650.53	650.53	650.53	650.53	650.53	650.53	650.53
Gas Turbine	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00
Oil Thermal								
Coal	198.10	398.10	398.10	398.10	398.10	398.10	398.10	398.10
Natural Gas								
Geothermal	915.80	984.80	984.80	984.80	984.80	984.80	984.80	984.80
Hydropower	11.61	11.61	11.61	11.61	11.61	11.61	11.61	11.61
Renewables								
Wind								
Biomass								
Others					200.00	300.00	450.00	600.00
Baseload								100.00
Midrange								
Peaking					200.00	300.00	450.00	500.00
Total	**1,831.04**	**2,100.04**	**2,100.04**	**2,100.04**	**2,300.04**	**2,400.04**	**2,550.04**	**2,700.04**
Mindanao								
Oil-based	609.19	609.19	609.19	609.19	609.19	609.19	609.19	609.19
Diesel	609.19	609.19	609.19	609.19	609.19	609.19	609.19	609.19
Gas Turbine								
Oil Thermal								
Coal	210.00	210.00	210.00	210.00	210.00	210.00	210.00	210.00
Natural Gas								
Geothermal	108.48	108.48	128.48	128.48	128.48	128.48	128.48	128.48
Hydropower	997.65	997.65	997.65	997.65	997.65	997.65	997.65	997.65
Renewables								
Wind								
Biomass								
Others	250.00	300.00	350.00	400.00	500.00	550.00	650.00	800.00
Baseload	200.00	250.00	300.00	350.00	450.00	500.00	600.00	750.00
Midrange								
Peaking	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Total	**2,175.32**	**2,225.32**	**2,295.32**	**2,345.32**	**2,445.32**	**2,495.32**	**2,595.32**	**2,745.32**
Philippines								
Oil-based	3,829.20	3,829.20	3,619.20	2,969.20	2,969.20	2,969.20	2,969.20	2,969.20
Diesel	2,224.20	2,224.20	2,224.20	2,224.20	2,224.20	2,224.20	2,224.20	2,224.20
Gas Turbine	955.00	955.00	745.00	745.00	745.00	745.00	745.00	745.00
Oil Thermal	650.00	650.00	650.00					
Coal	4,177.10	4,377.10	4,377.10	4,377.10	4,377.10	4,377.10	4,377.10	4,377.10
Natural Gas	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00	2,763.00
Geothermal	1,931.51	2,000.51	2,020.51	2,020.51	2,020.51	2,020.51	2,020.51	2,020.51
Hydropower	3,217.12	3,217.12	3,217.12	3,217.12	3,217.12	3,217.12	3,217.12	3,217.12
Renewables	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Wind	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Biomass								
Others	250.00	300.00	350.00	550.00	1,300.00	1,900.00	2,750.00	3,350.00
Baseload	200.00	250.00	300.00	350.00	450.00	500.00	600.00	850.00
Midrange					300.00	600.00	1,200.00	1,500.00
Peaking	50.00	50.00	50.00	200.00	550.00	800.00	950.00	1,000.00
Total	**16,232.93**	**16,551.93**	**16,411.93**	**15,961.93**	**16,711.93**	**17,311.93**	**18,161.93**	**18,761.93**

Annex A.1.10
SYSTEM PEAK DEMAND, Main Grid

(In Megawatts MW)

Year	Philippines	Luzon	Visayas	Mindanao
2007	9,577	6,981	1,233	1,363
2008	9,996	7,252	1,304	1,440
2009	10,462	7,552	1,385	1,525
2010	10,973	7,878	1,476	1,620
2011	11,517	8,225	1,567	1,725
2012	12,103	8,596	1,666	1,841
2013	12,734	8,990	1,775	1,969
2014	13,401	9,397	1,892	2,112
AAGR(%) 2005-2014	**4.60**	**4.04**	**6.20**	**6.03**

Annex A.1.11
PEAK DEMAND, Small Island Grids

(In Kilowatts, kW)

	2007	2008	2009	2010	2011	2012	2013	2014
Luzon	**122,876**	**134,826**	**147,462**	**161,683**	**177,611**	**196,099**	**217,293**	**241,290**
Basco	1,247	1,401	1,543	1,699	1,869	2,055	2,234	2,420
Sabtang	141	164	188	216	250	291	340	399
Itbayat	209	229	253	288	320	355	394	438
Calayan	193	239	283	351	405	468	544	634
Palanan	171	193	218	253	286	323	365	412
Kabugao	668	772	900	1,015	1,142	1,284	1,442	1,618
Lubuagan	179	230	278	335	401	477	574	691
Casiguran	1,006	1,088	1,183	1,282	1,400	1,528	1,665	1,821
Catanduanes	7,180	7,659	8,173	8,663	9,251	9,874	10,532	11,235
Rapu-rapu	363	437	486	541	603	671	748	786
Batan	310	337	367	418	476	532	594	663
Marinduque	12,866	13,778	14,743	16,059	17,199	17,976	18,943	19,969
Polilio	1,275	1,398	1,572	1,745	1,938	2,151	2,451	2,722
Patnanungan	229	281	332	419	499	595	711	851
Jomalig	108	132	159	184	211	245	283	323
Mindoro		40,848	42,616	44,242	46,089	48,190	50,350	52,594
Oriental Mindoro	30,014							
Occidental Mindoro	8,996							
Lubang	1,044	1,151	1,266	1,390	1,525	1,674	1,841	2,022
Tingloy	571	606	643	682	724	769	816	866
Puerto Princesa	31,070	36,089	42,037	49,006	56,491	66,030	77,328	90,670
Taytay								
Roxas								
San Vicente	437	468	509	555	608	668	735	809
El Nido	416	437	462	488	519	553	596	642
Busuanga	1,627	1,855	2,118	2,417	2,759	3,147	3,591	4,098
Cuyo	1,051	1,121	1,193	1,267	1,347	1,431	1,530	1,635
Culion	423	464	509	558	613	674	742	812
Linapacan	72	85	96	109	124	141	161	185
Araceli	193	213	239	274	317	368	430	496
Balabac	170	190	219	251	288	332	377	437
Cayagancillo	100	112	131	154	177	203	235	274
Agutaya	78	90	106	123	144	169	200	235
Masbate	9,388	10,153	10,981	11,877	12,846	13,895	15,029	16,257
Ticao	1,438	1,541	1,705	1,872	2,065	2,277	2,513	2,773
Tablas	5,264	6,187	6,585	7,038	8,203	9,552	11,131	12,943
Romblon	1,812	2,008	2,217	2,450	2,700	2,972	3,161	3,323
Sibuyan	1,405	1,554	1,716	1,887	2,092	2,316	2,565	2,842
Banton	308	370	388	414	444	488	560	642
Corcuera	320	360	404	455	511	575	647	727
Concepcion	323	361	404	452	506	566	634	709
San Jose	212	225	239	254	269	284	300	316

Visayas	**12,453**	**14,170**	**15,827**	**17,548**	**19,591**	**21,822**	**24,276**	**27,019**
Bantayan	3,945	4,454	4,965	5,571	6,252	7,016	7,865	8,805
Guintaran	128	158	183	213	247	291	344	406
Doong	214	261	325	390	470	541	633	741
Siquijor	2,960	3,287	3,597	3,892	4,292	4,737	5,194	5,707
Gigantes	226	274	303	348	397	452	515	588
Caluya	228	288	331	381	424	472	515	566
Camotes	1,988	2,264	2,508	2,776	3,070	3,393	3,745	4,131
Pilar	394	467	540	610	681	752	823	893
Maripipi	267	301	337	373	406	434	464	498
Limasawa	228	268	299	323	340	357	375	393
Zumarraga	234	258	278	310	346	386	430	480
Tagapulan	214	228	250	269	292	306	332	361
Almagro	129	148	165	183	204	228	253	282
Sto. Nino	149	177	206	232	270	303	340	381
San Antonio	473	568	653	684	785	900	1,032	1,184
Capul	267	309	358	414	479	555	642	744
San Vicente	128	151	179	211	250	295	350	414
Biri	281	309	350	368	386	404	424	445
Mindanao	**25,075**	**27,748**	**30,672**	**33,845**	**36,849**	**40,719**	**45,006**	**49,831**
Basilan	8,082	8,794	9,603	10,516	11,543	12,682	13,942	15,356
Jolo	6,471	7,144	7,943	8,602	8,879	9,705	10,609	11,577
Siasi	929	995	1,066	1,139	1,219	1,307	1,404	1,509
Lugus	90	111	122	148	172	200	233	271
Marungas	79	96	98	104	121	142	166	194
Pangutaran	114	125	136	188	213	241	273	309
Pata	47	55	66	75	90	108	129	155
Tapul	57	73	100	136	159	202	257	321
Tongquil	94	123	146	174	209	245	288	338
Bongao	2,219	2,418	2,641	2,891	3,170	3,478	3,813	4,266
Cag. De Tawi-tawi	309	345	383	425	475	531	594	664
Balimbing	227	262	309	341	378	419	465	518
Manok Mancao	120	135	154	173	194	219	244	272
West Simunul	345	399	458	525	583	636	686	739
Sibutu	304	334	375	420	472	535	603	682
Sitangkai	113	133	156	177	205	232	262	296
south Ubian	89	110	132	160	190	225	265	306
Tandubas	117	137	159	185	214	245	279	314
Sapa-sapa	80	92	105	122	145	172	200	230
Languyan	89	110	132	160	190	225	265	306
Dinagat	1,265	1,421	1,597	1,796	2,020	2,274	2,560	2,884
Loreto	390	448	493	543	598	659	726	800
Hikdop	197	220	228	322	379	440	511	578
Abad Santos	313	342	359	393	429	468	512	559
Talicud	298	309	338	371	406	446	490	529
Balut	198	289	311	335	361	389	420	452
Ninoy Aquino	206	232	267	295	329	361	397	452
Kalamansig	2,148	2,400	2,686	3,006	3,367	3,776	4,235	4,753
Palimbang	85	96	109	123	139	157	178	201

Annex A.1.12a
INDICATIVE POWER PLANT PROJECTS

(In Megawatts, MW)

Project	Capacity	Year Available	Location
Luzon	**3,103.00**	2009	
Burgos Wind Power Project I (formerly Luzon Wind Power Project Phase I)	40.00	2009	Ilocos Norte
Ilijan CCGT Expansion	300.00	2009	Ilijan, Batangas City
Bulacan Biomass-to-Energy Project	15.00	2010	Bocaue, Bulacan
Burgos Wind Power Project II	46.00	2010	Ilocos Norte
2nd Phase CFB Coal-Fired Power	50.00	2010	Mabalacat, Pampanga
4 x 150 MW Coal-Fired Power	300.00	2011	Subic
San Gabriel Power Plant	550.00	2011	Sta. Rita, Batangas City
Kalayaan Pumped Storage Power Plant III (CBK expansion)	360.00	2011	Kalayaan, Laguna
Tanawon Geothermal Project	40.00	2013	Sorsogon
Rangas Geothemal Project	40.00	2013	Sorsogon
Manito-Kayabon Geothermal Project	40.00	2013	Sorsogon
Balintingon River Multi-purpose Project	44.00		General Tinio, Nueva Ecija
Pagbilao Expansion	400.00		Pagbilao, Quezon
Pantabangan Expansion	78.00		Pantabangan, Nueva Ecija
2 x 150 MW CCGT Power Station	300.00		Quezon, Province
Quezon Power Expansion Project	500.00		Mauban, Quezon
Visayas	**624.00**	2010	
Coal-fired Plant	100.00	Phase I - 2010	Concepcion, Iloilo Panay Island
Toledo Coal Expansion	246.00	Phase II - 2011 2010	Toledo City, Cebu
Panay Biomass Power Project	25.00	2011	Panay Island
GBPC Coal-Fired Plant (2x50 MW)	164.00	2012	Iloilo, Panay Island
Dauin Geothermal	40.00	2012	Dauin, Negros Oriental
Aklan Hydropower Project	41.00	2013	Libacao, Aklan
Villasiga HEP	8.00		Sibalom, Antique
Mindanao	**745.50**	2010	
Cabulig Hydro	8.00	2010	Plaridel, Jasaan Misamis Oriental
Tamugan AB, Panigan and Suawan Hydroelectric Power	34.50	2010	Hedcor Tamugan , Inc.
Cagayan de Oro Biomass Power Project	10.00	2011	Cagayan de Oro
Agus 3 Hydroelectric Plant	225.00	2011	Lanao del Norte
SM 200 MW CFBB CFTPP	200.00	2012	Southern Mindanao
Suldan Kudarat Coal	200.00	2012	Sultan Kudarat
Tagoloan Hydropower	68.00		Bukidnon
Total	**4,472.50**		

Annex A.1.12b
POWER PLANT RETIREMENT SCHEDULE

(In Megawatts, MW)

	Capacity	Year
Hopewell GT	210	2009
Malaya 1	300	2010
Malaya 2	350	2010
Total	**860**	

Annex A.1.13
LIST OF AVAILABLE INDIGENOUS RESOURCES FOR INDICATIVE CAPACITY ADDITIONS, Geothermal

(In Megawatts, MW)

Region	Plant	Location	Capacity	Year Available
North Luzon Agribusiness Quadrangle				
CAR	Batong Buhay	Batong Buhay, Kalinga	60.00	2013
	Buguias Tinoc	Buguias Tinoc, Ifugao	60.00	2014
	Daklan	Daklan, Benguet	20.00	2014
II	Baua	Baua, Cagayan	20.00	2014
Metro Luzon Urban Beltway				
III	Natib	Natib, Bataan	40.00	2012
IV-A	Mabini	Mabini, Batangas	20.00	2012
IV-B	Montelago	Montelago, Oriental Mindoro	40.00	2012
Central Philippines				
V	Tanawon	Albay and Sorsogon	40.00	2011
	Rangas	Albay and Sorsogon	40.00	2013
	Manito Kayabon	Manito, Albay	40.00	2013
VI	Northern Negros*	Bago City, Negros Occidental	49.40	2007
	Mandalagan	Mandalagan, Negros Occidental	20.00	2014
VII	Nasulo**	Palinpinon, Negros Oriental	20.00	2010
	Dauin	Dauin, Negros Oriental	40.00	2011
VIII	Biliran	Biliran, Biliran	20.00	2012
Mindanao Agribusiness				
IX	Lakewood	Lakewood, Zamboanga del Sur	40.00	2012
XI	SE Apo	SE Apo (Kapatagan), Davao del Sur	40.00	2014
	Amacan	Amacan, North Davao	20.00	2013
XII	NW Apo	NW Apo (Tiko), North Cotabato	20.00	2012
	Mindanao III**	Mt. Apo, North Cotabato	50.00	2010
Total			**699.40**	

* *commissioned in February 2006*

** *committed projects*

Annex A.1.13
LIST OF AVAILABLE INDIGENOUS RESOURCES FOR INDICATIVE CAPACITY ADDITIONS, Hydropower

(in Megawatts, MW)

Region	Name of Plant	Location	Capacity	Year Available
North Luzon Agribusiness Quadrangle				
CAR	Ibulao MHP	Lagawe, Ifugao	1.50	2010
	Bulanao RIS	Tabuk, Kalinga	0.30	2010
	Atok 4 MHP	Atok, Benguet	0.30	2010
	Buguias 1 MHP	Benguet	0.60	2010
I	Pansian River MHP	Pagudpod, Ilocos, Norte	0.70	2010
II	Uddiawan MHP	Solano, Nueva Viscaya	1.00	2010
III	Pantabangan Expansion	Pantabangan, Nueva Ecija	78.00	2011
	Balintingon River	Nueva Ecija	44.00	2013
	Multi-purpose Project			
Metro Luzon Urban Beltway				
IV-A	Kalayaan Pumped Storage	Kalayaan, Laguna	360.00	2011
	Power Plant III (CBK expansion)			
	Power Plant III (CBK expansion)			
IV-B	Catuiran MHP	Naujan, Mindoro Oriental	8.00	2011
Central Philippines				
IV-B	Langogan MHP	Puerto Princesa Palawan	6.80	2011
	Batang Batang MHP	Palawan	3.50	2014
	Cabinbin MHP	Palawan	0.80	2014
V	Vera Falls	Malinao, Albay	0.20	2010
	Palali Falls	Malinao, Albay	0.10	2010
	Cumaginking	Malinao, Albay	0.20	2010
	Lower Dugui MHP	Virac, Catanduanes	3.20	2010
	Hitoma 1 MHP	Caramoran, Catanduanes	1.50	2010
	Hitoma 2 MHP	Caramoran, Catanduanes	1.60	2010
	Solong Falls MHP	San Miguel, Catanduanes	2.30	2010
	Kapipian MHP	Catanduanes	3.00	2010
VI	Villasiga HEP	Antique	8.00	2012
	Timbaban HEP	Madalag, Aklan	23.50	2012
	Aklan Hydropower Project	Libacao, Aklan	41.00	2012
	Sicopong HEP	Negros Oriental	17.80	2013
	Siaton MHP	Negros Oriental	5.40	2013
	Pacuan HEP	Negros Oriental	33.00	2013
	Igbolo MHP	Igbaras, Iloilo	4.00	2013
VIII	Bugtong MHP	Samar	1.00	2014
	Amandaraga MHP	Eastern Samar	4.00	2014
Mindanao Agribusiness				
IX	Salug Daku MHP	Josefina, Zamboanga del Sur	6.00	2010
	Lower Dapitan MHP	Zamboanga del Norte	3.80	2013
	Upper Dapitan MHP	Zamboanga del Norte	3.60	2013
	Middle Dapitan MHP	Zamboanga del Norte	4.40	2013
X	Agus 3 Hydroelectric Plant	Saguiaran, Lanao del Norte	225.00	2011
	Tagoloan Hydropower	Sumilao, Bukidnon	68.00	2012
	Cabulig MHP	Claveria, Misamis Oriental	8.00	2010
XI	Suwawan MHP	Davao City	5.50	2011
	Tamugan AB, Panigan and Suawan Hydroelectric Power	Davao City	34.50	2010
	Talaingod MHP	Talaingod, Davao del Norte	1.00	2012
XII	Magpet MHP	Magpet, North Cotabato	10.00	2012
Total			**1,025.10**	

Annex A.1.13
LIST OF AVAILABLE INDIGENOUS RESOURCES FOR INDICATIVE CAPACITY ADDITIONS, Wind

(in Megawatts, MW)

Region	Location	Capacity	Year Available
North Luzon Agribusiness Quadrangle			
I	Burgos, Ilocos Norte (Phase 1)	40.00	2009
	Burgos, Ilocos Norte (Phase 2)	46.00	2010
	Pagudpud, Ilocos Norte	40.00	2014
	Pasuquin, Ilocos Norte	57.00	2014
	Suyo, Ilocos Sur	40.00	2014
	Western Pangasinan	25.00	2014
	Eastern Pangasinan	35.00	2014
III	Carranglan, Nueva Ecija	50.00	2014
Metro Luzon Urban Beltway			
IV-A	Mauban, Quezon	50.00	2013
	Caliraya, Laguna	25.00	2013
IV-B	Marinduque	3.40	2009
	Puerto Galera, Oriental Mindoro	20.00	2013
	Sta. Cruz, Marinduque	5.00	2013
	Abra de Ilog, Occidental Mindoro	10.00	2014
Central Philippines			
IV-B	Romblon	1.70	2009
	Tablas Island, Romblon	3.40	2009
	Tablas Island, Romblon	5.00	2012
V	Baleno, Masbate	5.00	2009
VI	San Carlos Negros Occidental	30.00	2010
	Pandan, Antique	20.00	2010
	San Remigio, Antique	20.00	2010
	Manoc-manoc, Aklan	10.00	2012
Mindanao Agribusiness			
CARAGA	Nuventa, Surigao del Sur	15.00	2011
Total		**556.50**	

Annex A.1.13
LIST OF AVAILABLE INDIGENOUS RESOURCES FOR INDICATIVE CAPACITY ADDITIONS, Biomass

(in Megawatts, MW)

Region	Location	Project	Capacity	Year Available
North Luzon Agribusiness Quadrangle				
I	Calasiao, Pangasinan	Ricehull Cogeneration	9.90	2014
II	Gamu, Isabela	Ricehull Cogeneration	0.80	2014
	Isabela	Ricehull Cogeneration	9.90	2014
III	San Jose City, Nueva Ecija	Ricehull Cogeneration	9.90	2014
	Quezon, Nueva Ecija	Ricehull Cogeneration	2.50	2014
	Talavera, Nueva Ecija	Ricehull Cogeneration	2.50	2014
	Muñoz, Nueva Ecija	Ricehull Cogeneration	2.50	2014
Metro Luzon Urban Beltway				
III	Bocaue, Bulacan	Ricehull Cogeneration	15.00	2009
IV-B	Mindoro Occidental	Ricehull Cogeneration	3.70	2014
	Mindoro Oriental	Ricehull Cogeneration	10.00	2010
Central Philippines				
IV-B	Narra, Palawan	Ricehull Cogeneration	2.50	2014
V	Pili, Camarines Sur	Ricehull Cogeneration	5.00	2014
VI	Panay	Ricehull Cogeneration	25.00	2010
	Kabangkalan, Negros Occidental	Bagasse Cogeneration	12.00	2010
	Victorias, Negros Occidental	Bagasse Cogeneration	50.00	2013
	Pototan, Iloilo	Ricehull Cogeneration	5.00	2014
VII	Bohol	Ricehull Cogeneration	2.50	2014
Mindanao Agribusiness				
X	Cagayan de Oro City	Ricehull Cogeneration	10.00	2010
XII	Surallah, South Cotabato	Ricehull Cogeneration	5.20	2014
Total			**183.90**	

Annex A.1.14
LIST OF TRANSMISSION LINE PROJECTS, Small Island Grids

(In Kilometers, kms.)

Project	Length of Line	Target Year	Location
Metro Luzon Urban Beltway	**287.0**		
Minolo-Calapan (SC/CP)	50.0	2008-2010	Or. Mindoro
Sta. Cruz-San Jose Sched. 2-4 (SC/CP)	73.0	2005-2007	Occ. Mindoro
Bansud-Roxas (SC/SP)	39.5	2005-2008	Or. Mindoro
Calapan-Bansud (Rehab)	19.5	2005-2006	Or. Mindoro
Roxas-San Jose (SC/SP)	105.0	2006-2008	Or. Mindoro
Central Philippines	**653.5**		
Puerto-Roxas 138 kV T/L (SC/ST)	75.8	2005	Palawan
Roxas-Taytay 69 kV T/L (SC/ST)	75.6	2005-2006	Palawan
Re-routing of Puerto Irawan Tie Line	14.0	2005	Palawan
Brooke's Pt. - Bataraza (SC/ST)	28.0	2006-2008	Palawan
Taytay-El Nido (SC/ST)	75.0	2007-2009	Palawan
Odiongan-San Agustin (SC/SP)	36.0	2007-2009	Tablas, Romblon
Odiongan-Looc (SC/SP)	20.0	2007-2009	Tablas, Romblon
Ligao S/S-Caratagan (SC/SP)	45.0	2005-2006	Albay
Codon-Virac (SC/ST)	25.0	2005-2008	Catanduanes
Codon-Caramoran (SC/SP)	43.0	2007-2010	Catanduanes
Virac Viga (Post Const.)	52.1	2005	Catanduanes
Mobo-Cataingan 1 & 2 (SC/CP)	67.2	2005-2007	Masbate
Mobo-Aroroy (Post. Const.)	48.9	2005	Masbate
Bantayan-Madridejos (SC/CP)	15.0	2008-2010	Cebu
Siquijor-E. Villanueva (SC/SP)	23.0	2012-2014	Siquijor
Siquijor-San Juan (SC/SP)	10.0	2012-2014	Siquijor
Mindanao Agribusiness	**95.0**		
Jolo-Patikul (SC/SP)	10.0	2005-2007	Sulu
Jolo-Parang (SC/SP)	22.0	2005-2007	Sulu
Isabela-Lamitan (SC/SP)	28.0	2005-2007	Basilan
Isabela-Maluso (SC/SP)	35.0	2005-2007	Basilan
Total	**1,035.5**		

Annex A.1.15
LIST OF SUBSTATION PROJECTS, Small Island Grids

(In Megavolt Amperes, MVA)

Project	Capacity	Target Year	Location
Metro Luzon Urban Beltway	**85.00**		
Calapan	50.00	2005-2006	Or. Mindoro
Roxas	10.00	2006-2008	Or. Mindoro
San Jose	25.00	2005-2006	Occ. Mindoro
Central Philippines	**85.00**		
Roxas	5.00	2005	Palawan
Taytay	5.00	2005-2006	Palawan
Taytay (Exp.) 3-69 kV PCB		2007-2009	Palawan
El Nido S/S	5.00	2007-2009	Palawan
Brooke's Pt. (Exp.) 3-69 kV PCB		2006-2008	Palawan
Bataraza S/S	5.00	2006-2008	Palawan
Odiongan	5.00	2007-2009	Tablas, Romblon
San Agustin	5.00	2007-2009	Tablas, Romblon
Looc	5.00	2007-2009	Tablas, Romblon
Marinawa	10.00	2005-2007	Catanduanes
Codon	5.00	2007-2010	Catanduanes
Mobo	10.00	2005-2007	Masbate
Madridejos	5.00	2008-2010	Cebu
Bantayan	5.00	2008-2010	Cebu
Siquijor	5.00	2012-2014	Siquijor
E. Villanueva	5.00	2012-2014	Siquijor
San Juan	5.00	2012-2014	Siquijor
Mindanao Agribusiness	**30.00**		
Jolo	5.00	2005-2007	Sulu
Patikul	5.00	2005-2007	Sulu
Parang	5.00	2005-2007	Sulu
Isabela (Exp.) 3-69 kV PCB		2005-2007	Basilan
Lamitan	10.00	2005-2007	Basilan
Maluso	5.00	2005-2007	Basilan
Total	**200.00**		

Annex A.1.16
NATIONAL AND LOCAL GOVERNMENT SHARES FROM ENERGY RESOURCES

(In Million Pesos, PhP)

Year	Oil			Gas/Condensate			Coal			Geothermal			Hydropower		
	National	LGU	Total	National	LGU	Total	National	LGU	Total	National	LGU	Total	National	LGU	Total
2007	12.92	8.62	21.54	8,514.19	5,676.10	14,190.29	45.66	30.44	76.09	429.15	286.10	715.25	-	327.98	327.98
2008	240.06	160.22	400.28	8,816.98	5,877.98	14,694.96	51.03	34.02	85.04	461.14	307.43	768.57	-	334.40	334.40
2009	467.19	311.83	779.02	8,286.32	5,524.23	13,810.55	68.36	45.57	113.93	501.07	334.05	835.12	-	348.41	348.41
2010	642.20	428.41	1,070.61	7,902.84	5,268.56	13,171.40	75.62	50.41	126.03	552.41	368.27	920.68	-	411.88	411.88
2011	817.21	544.98	1,362.19	8,551.97	5,701.35	14,253.31	80.62	53.75	134.37	609.68	406.45	1,016.13	-	468.05	468.05
2012	815.22	543.65	1,358.87	8,683.96	5,789.32	14,473.28	90.44	60.29	150.73	654.24	436.16	1,090.39	-	507.56	507.56
2013	813.23	542.32	1,355.55	8,894.70	5,929.82	14,824.52	90.47	60.31	150.79	687.93	458.62	1,146.55	-	545.01	545.01
2014	791.72	527.87	1,319.60	8,521.57	5,681.01	14,202.59	90.47	60.31	150.79	714.34	476.23	1,190.57	-	550.38	550.38
Total	**4,599.76**	**3,067.90**	**7,667.65**	**68,172.53**	**45,448.37**	**113,620.91**	**592.65**	**395.10**	**987.75**	**4,609.95**	**3,073.30**	**7,683.25**	**-**	**3,493.66**	**3,493.66**

Annex A.1.17
CARBON DIOXIDE (CO_2) EMISSIONS FROM ENERGY USE

(In Million Metric Tons, MMMT)

Fuels	2007	2008	2009	2010	2011	2012	2013	2014
Oil and Oil Products	51.47	53.00	54.82	55.14	57.02	58.83	60.51	62.49
Natural Gas	8.13	8.16	8.18	10.40	11.77	13.19	14.96	15.88
Coal	26.47	26.88	26.97	27.05	27.13	27.21	27.29	27.39
Total	**86.07**	**88.04**	**89.97**	**92.59**	**95.91**	**99.22**	**102.76**	**105.77**

Annex A.1.18
ANNUAL INVESTMENT REQUIREMENTS By Sector

(In Billion Pesos, PhP)

Sector	2007		2008		2009		2010		2011		2012		2013		2014		Total	
	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private
Fossil Fuel Resources		**46.29**		**52.76**		**63.06**		**83.59**		**84.90**		**83.85**		**65.16**		**58.06**		**537.67**
Oil and Gas		42.97		43.25		42.04		57.84		57.11		56.31		52.05		46.94		398.51
Coal		3.32		9.51		21.02		25.75		27.79		27.54		13.11		11.12		139.16
Renewable Energy Resources	**3.98**	**0.71**	**6.18**	**8.60**	**5.24**	**50.27**	**6.80**	**64.98**	**3.13**	**28.44**	**2.30**	**26.72**	**4.50**	**25.06**	**4.46**	**16.97**	**36.59**	**221.74**
Geothermal	2.19	0.07	3.48	1.72	2.86	7.26	3.25	7.02	3.13	10.26	2.14	7.34	2.02	4.73	1.10	3.06	20.17	41.45
Hydropower			0.01	2.90	0.32	34.66	0.46	52.25		15.38	0.16	8.06	0.24	0.39			1.19	113.62
Biomass		0.64		3.38		3.64				2.13		5.83		3.95				19.57
Wind	1.79		2.69	0.60	2.06	4.71	3.09	5.71		0.67		5.49	2.24	15.99	3.36	13.91	15.23	47.10
Alternative Transport Fuels	**0.76**	**3.28**	**0.71**	**10.10**	**0.68**	**22.23**	0.68	18.43	**0.68**	**14.17**		**2.24**		**2.24**		**7.02**	**3.51**	**79.71**
Compressed Natural Gas		0.10		0.22		0.58		1.34		3.14		2.24		2.24		4.48		14.34
Biodiesel		0.65		1.30												0.65		2.60
Bioethanol		0.95				7.56				9.45						1.89		19.85
Jatropha	0.76	1.59	0.71	8.59	0.68	14.09	0.68	17.09	0.68	1.59							3.51	42.93
Energy Efficiency and Conservation	**0.46**	**3.09**	**0.49**	**3.76**	**0.61**	**4.66**	**0.63**	**5.20**	**0.65**	**5.85**	**0.68**	**6.54**	**0.69**	**7.00**	**0.72**	**7.69**	**4.92**	**43.77**
Information, Education and Communication Campaign	0.02	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.22	0.40
Voluntary Agreement																		
Energy Labeling and Efficiency Standards	0.06	1.64	0.08	2.21	0.10	2.71	0.12	3.20	0.14	3.85	0.16	4.49	0.18	4.95	0.20	5.64	1.04	28.67
Government Enercon Program	0.28		0.28		0.28		0.28		0.28		0.28		0.28		0.28		2.26	
Energy Management Programs	0.10	1.40	0.10	1.50	0.20	1.90	0.20	1.95	0.20	1.95	0.20	2.00	0.20	2.00	0.20	2.00	1.40	14.70
Downstream		**2.57**		**2.49**		**2.66**		**19.03**		**28.63**		**101.80**		**35.33**		**17.14**		**209.65**
Oil		2.57		2.49		2.66		0.64		0.50		0.50		0.51		0.52		10.39
Natural Gas								18.39		28.13		101.30		34.82		16.62		199.26
Power and Transmission Development	**11.60**	**11.66**	**7.05**	**39.76**	**3.43**	**115.33**	**5.01**	**114.47**	**1.92**	**9.47**	**0.93**	**3.23**	**0.93**	**34.61**		**60.65**	**39.09**	**380.98**
Power Generation	2.23	6.01	4.05	37.21	3.43	115.33	5.01	114.47	1.92	9.47	0.93	3.23	0.93	34.61		60.65	18.51	380.98
Transmission	9.37	5.65	3.00	2.55													20.58	
Expanded Rural Electrification	**0.91**	**0.69**	**1.44**	**1.19**													**2.13**	**2.10**
Total	**17.71**	**68.28**	**16.31**	**118.22**	**9.96**	**258.20**	**13.12**	**305.70**	**6.38**	**171.46**	**3.91**	**224.37**	**6.12**	**169.41**	**5.18**	**167.53**	**86.23**	**1475.62**

Annex A.1.19
OIL AND GAS INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Program/Projects	2007	2008	2009	2010	2011	2012	2013	2014	Total
Geophysical Data Acquisition	**0.735**	**0.396**	**0.396**	**0.396**	**0.396**	**0.396**	**0.396**	**0.396**	**3.507**
A. 2D Seismic	0.170	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.961
B. 3D Seismic	0.565	0.283	0.283	0.283	0.283	0.283	0.283	0.283	2.546
Exploration Well Drilling	**4.916**	**7.289**	**7.289**	**10.170**	**9.323**	**7.119**	**4.238**	**3.390**	**53.734**
A. Onshore	0.848	1.187	1.187	1.356	1.187	1.017	0.848	0.678	8.308
B. Offshore	4.068	6.102	6.102	8.814	8.136	6.102	3.390	2.712	45.426
Oil and Gas (Including Condensate) Production	**37.322**	**35.561**	**34.357**	**47.271**	**47.389**	**48.795**	**47.415**	**43.158**	**341.268**
A. Oil	6.876	5.213	4.108	10.252	10.469	11.522	10.241	6.401	65.082
B. Gas	27.492	27.492	27.492	34.360	34.360	34.811	34.811	34.788	255.606
C. Condensate	2.954	2.856	2.757	2.659	2.560	2.462	2.363	1.969	20.580
Total	**42.973**	**43.246**	**42.042**	**57.837**	**57.108**	**56.310**	**52.049**	**46.944**	**398.510**

Annex A.1.20
COAL INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Region	Programs/ Projects	Capacity (MW)	Location	Year Available	2007	2008	2009	2010	2011	2012	2013	2014	Total
Luzon		**200**				**2.571**	**5.142**	**2.571**	**2.571**	**5.142**	**2.571**		**20.568**
II		50	Cauayan, Isabela	2009		2.571	2.571						5.142
		50	Cauayan, Isabela	2012					2.571	2.571			5.142
		50	Iguig, Cagayan	2010			2.571	2.571					5.142
		50	Iguig, Cagayan	2013						2.571	2.571		5.142
Visayas		**500**				**3.428**	**8.571**	**8.571**	**10.286**	**10.286**	**5.143**	**5.143**	**51.428**
VI		100	Antique	2010		3.428	8.571	8.571					20.570
		200	Antique	2012					10.286	10.286			20.572
		200	Antique	2014							5.143	5.143	10.286
Mindanao		**300**					**3.428**	**10.285**	**10.285**	**6.857**			**30.855**
XII		200	Sultan Kudarat	2009				6.857	6.857	6.857			20.571
XIII		100	Surigao	2011			3.428	3.428	3.428				10.284
Mine Investment					**3.318**	**3.514**	**3.876**	**4.322**	**4.650**	**5.252**	**5.399**	**5.976**	**36.307**
Total		**1,000**			**3.318**	**9.513**	**21.017**	**25.749**	**27.792**	**27.537**	**13.113**	**11.119**	**139.160**

Annex A.1.21
GEOTHERMAL INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Region	Program/ Projects	Location	Capacity (MW)	Year Available	2007		2008		2009		2010		2011		2012		2013		2014		Total	
					Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private
Luzon			**380.00**		**0.012**	**0.066**	**1.808**	**1.717**	**1.547**	**5.266**	**1.994**	**4.643**	**2.114**	**6.311**	**1.693**	**4.492**	**1.195**	**2.864**	**0.026**	**2.071**	**10.389**	**27.430**
CAR	Batong Buhay	Batong Buhay, Kalinga	60.00	2013				0.927		0.801		1.045		1.045		0.801		0.561		0.006		5.186
	Buguias-Tinoc	Tinoc, Ifugao	60.00	2014						0.927		0.801		1.045		1.045		0.801		0.561		5.180
	Daklan	Daklan, Benguet	20.00	2014										0.649		0.405		0.405		0.281		1.740
II	Baua	Baua, Cagayan	20.00	2014										0.649		0.405		0.405		0.281		1.740
III	Natib	Natib, Bataan	40.00	2012						0.927		0.919		1.045		0.560		0.005		0.130		3.586
IV-A	Mabini	Mabini, Batangas	20.00	2012						0.649		0.405		0.405		0.281		0.129		0.003		1.871
IV-B	Montelago	Montelago, Mindoro Or.	40.00	2012						0.927		0.919		1.045		0.560		0.005		0.130		3.586
V	Tanawon	Albay & Sorsogon	40.00	2011			0.809		1.045		0.683		0.560		0.005		0.004		0.004		3.109	
	Rangas	Albay & Sorsogon	40.00	2013			0.624		0.490		0.608		0.497		0.742		0.374		0.004		3.340	
	Manito-Kayabon	Manito, Albay	40.00	2013							0.565		0.801		0.927		0.560		0.005		2.857	
	Maintenance of Existing Plants				0.012	0.066	0.375	0.790	0.012	1.034	0.138	0.554	0.256	0.428	0.020	0.436	0.256	0.554	0.012	0.679	1.083	4.541
Visayas			**80.00**		**1.925**		**1.491**		**1.128**	**0.413**	**1.247**	**0.405**	**0.884**	**1.054**	**0.199**	**0.685**	**0.568**	**0.408**	**0.812**	**0.283**	**8.254**	**3.248**
VI	Mandalagan	Mandalagan, Negros Occidental	20.00	2014										0.649		0.404		0.404		0.281		1.739
VII	Dauin	Dauin, Negros Oriental	40.00	2011	0.580		0.690		0.816		0.690		0.445		0.005		0.004		0.130		3.359	
VIII	Biliran	Biliran, Leyte	20.00	2012						0.413		0.405		0.405		0.281		0.003		0.003		1.509
	Maintenance of Existing Plants				1.345		0.801		0.313		0.557		0.438		0.194		0.564		0.682		4.895	
Mindanao			**120.00**		**0.251**		**0.186**		**0.186**	**1.577**	**0.007**	**1.974**	**0.133**	**2.900**	**0.251**	**2.165**	**0.259**	**1.459**	**0.259**	**0.703**	**1.531**	**10.777**
IX	Lakewood	Lakewood, Zamboanga del Sur	40.00	2012						0.927		0.919		1.045		0.560		0.005		0.130		3.586
XI	Amacan	Amacan, North Davao	20.00	2013								0.649		0.523		0.405		0.281		0.011		1.868
	SE Apo	Kapatagan, Davao del Sur	40.00	2014										0.927		0.919		1.045		0.560		3.451
XII	NW Apo	Tiko, North Cotabato	20.00	2012						0.649		0.405		0.405		0.281		0.129		0.003		1.871
	Maintenance of Existing Plants				0.251		0.186		0.186		0.007		0.133		0.251		0.259		0.259		1.531	
Government-Private			**580.00**		**2.188**	**0.066**	**3.485**	**1.717**	**2.861**	**7.256**	**3.248**	**7.021**	**3.131**	**10.265**	**2.143**	**7.342**	**2.022**	**4.731**	**1.097**	**3.057**	**20.174**	**41.455**
Total						**2.254**		**5.202**		**10.117**		**10.269**		**13.396**		**9.485**		**6.754**		**4.154**		**61.63**

Annex A.1.22
HYDROPOWER INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Region	Program/ Projects	Locations	Capacity (MW)	Year Available	2007	
Northern Luzon Agribusiness Quadrangle			**126.40**			
CAR	Ibulao MHP	Lagawe, Ifugao	1.50	2010		
	Bulanao RIS	Tabuk, Kalinga	0.30	2010		
	Atok 4 MHP	Atok, Benguet	0.30	2010		
	Buguias 1 MHP	Benguet	0.60	2010		
I	Pansian River MHP	Pagudpod, Ilocos Norte	0.70	2010		
II	Uddiawan MHP	Solano, Nueva Vizcaya	1.00	2010		
III	Pantabangan Expansion	Pantabangan, Nueva Ecija	78.00	2011		
	Balintingon River Multi-purpose Project	Nueva Ecija	44.00	2013		
Metro Luzon Urban Beltway			**368.00**			
IV-A	Kalayaan Pumped Storage Power Plant III (CBK Expansion)	Kalayaan, Laguna	360.00	2011		
IV-B	Catuiran MHP	Naujan, Mindoro Oriental	8.00	2011		
Central Philippines			**160.90**			
IV-B	Langogan MHP	Puerto Princesa, Palawan	6.80	2011		
	Batang Batang MHP	Palawan	3.50	2014		
	Cabinbin MHP	Palawan	0.80	2014		
	Vera Falls	Malinao, Albay	0.20	2010		
V	Palali Falls	Malinao, Albay	0.10	2010		
	Cumaginking	Malinao, Albay	0.20	2010		
	Lower Dugui MHP	Virac, Catanduanes	3.20	2010		
	Hitoma 1 MHP	Caramoran, Catanduanes	1.50	2010		
	Hitoma 2 MHP	Caramoran, Catanduanes	1.60	2010		
	Solong Falls MHP	San Miguel, Catanduanes	2.30	2010		
	Kapipian MHP	Catanduanes	3.00	2010		
VI	Villasiga HEP	Antique	8.00	2012		
	Timbaban HEP	Madalag, Aklan	23.50	2012		
	Aklan Hydropower Project	Libacao, Aklan	41.00	2012		
	Igbolo MHP	Igbaras, Iloilo	4.00	2013		
VII	Sicopong HEP	Negros Oriental	17.80	2013		
	Siaton MHP	Negros Oriental	5.40	2013		
	Pacuan HEP	Negros Oriental	33.00	2013		
VIII	Bugtong MHP	Samar	1.00	2014		
	Amandaraga MHP	Eastern Samar	4.00	2014		
Mindanao Agribusiness			**369.80**			
IX	Salug Daku MHP	Josefina, Zamboanga del Sur	6.00	2010		
	Lower Dapitan MHP	Zamboanga del Norte	3.80	2013		
	Upper Dapitan MHP	Zamboanga del Norte	3.60	2013		
	Middle Dapitan MHP	Zamboanga del Norte	4.40	2013		
X	Agus 3 Hydroelectric Plant	Saguiaran, Lanao del Norte	225.00	2011		
	Tagoloan Hydropower	Sumilao, Bukidnon	68.00	2012		
	Cabulig MHP	Claveria, Misamis Oriental	8.00	2010		
	Suwawan MHP	Davao City	5.50	2011		
XI	Tamugan AB, Panigan and Suawan Hydroelectric Power	Davao City	34.50	2010		
	Talaingod MHP	Talaingod, Davao del Norte	1.00	2012		
XII	Magpet MHP	Magpet, North Cotabato	10.00	2012		
Government - Private			**1,025.10**			
Total						

2008		2009		2010		2011		2012		2013		2014		Total	
Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private
0.013	**0.184**	**0.020**	**3.770**		**5.242**		**1.971**		**2.957**					**0.034**	**14.123**
	0.067		0.101												0.168
0.013		0.020												0.034	
	0.013		0.020												0.034
	0.027		0.040												0.067
	0.031		0.047												0.078
	0.045		0.067												0.112
			3.494		5.242										8.736
							1.971		2.957						4.928
			16.486		**24.730**									**0.000**	**41.216**
			16.128		24.192										40.320
			0.358		0.538										0.896
	0.542	**0.305**	**0.814**	**0.457**	**3.248**		**7.569**	**0.157**	**4.305**	**0.235**	**0.390**			**1.154**	**16.867**
		0.305		0.457										0.762	
								0.157		0.235				0.392	
									0.036		0.054				0.090
	0.009		0.013												0.022
	0.004		0.007												0.011
	0.009		0.013												0.022
	0.143		0.215												0.358
	0.067		0.101												0.168
	0.072		0.108												0.179
	0.103		0.155												0.258
	0.134		0.202												0.336
					0.358		0.538								0.896
					1.053		1.579								2.632
					1.837		2.755								4.592
							0.179		0.269						0.448
							0.797		1.196						1.994
							0.242		0.363						0.605
							1.478		2.218						3.696
									0.045		0.067				0.112
									0.179		0.269				0.448
	2.173		**13.586**		**19.029**		**5.837**		**0.793**						**41.418**
	0.269		0.403												0.672
							0.170		0.255						0.426
							0.161		0.242						0.403
							0.197		0.296						0.493
			10.080		15.120										25.200
					3.046		4.570								7.616
	0.358		0.538												0.896
			0.246		0.370										0.616
	1.546		2.318												3.864
					0.045		0.067								0.112
					0.448		0.672								1.120
0.013	**2.899**	**0.325**	**34.655**	**0.457**	**52.248**		**15.378**	**0.157**	**8.055**	**0.235**	**0.390**			**1.187**	**113.624**
2.912		**34.980**		**52.705**		**15.378**		**8.212**		**0.625**				**114.811**	

Annex A.1.23
BIOMASS INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Region	Location	Capacity (MW)	Year Available	2007	2008	2009	2010	2011	2012	2013	2014	Total	Proponent(s)
Northern Luzon Agribusiness Quadrangle		**38.00**							**1.617**	**2.426**		**4.043**	
I	Calasiao, Pangasinan	9.90	2014						0.421	0.632		1.053	
II	Gamu, Isabela	0.80	2014						0.034	0.051		0.085	Westpoint Energy Resource, Inc.
	Isabela	9.90	2014						0.421	0.632		1.053	Full Advantage Philippines, Inc.
	San Jose City, Nueva Ecija	9.90	2014						0.421	0.632		1.053	San Jose I-Power Corp.
	Quezon, Nueva Ecija	2.50	2014						0.106	0.160		0.266	Full Advantage Philippines, Inc.
III	Talavera, Nueva Ecija	2.50	2014						0.106	0.160		0.266	No Proponent
	Muñoz, Nueva Ecija	2.50	2014						0.106	0.160		0.266	No Proponent
Metro Luzon Urban Beltway		**28.70**		**0.638**	**1.384**	**0.638**			**0.157**	**0.236**		**3.054**	
III	Bocaue, Bulacan	15.00	2009	0.638	0.958							1.596	Inter City - LGU of Bocaue, Bulacan
IV-B	Mindoro Occidental	3.70	2014						0.157	0.236		0.394	Full Advantage Philippines, Inc.
	Mindoro Oriental	10.00	2010		0.426	0.638						1.064	
Central Philippines		**102.00**			**1.575**	**2.362**		**2.128**	**3.830**	**0.958**		**10.853**	
IV-B	Narra, Palawan	2.50	2014						0.106	0.160		0.266	No Proponent
V	Pili, Camarines Sur	5.00	2014						0.213	0.319		0.532	Full Advantage Philippines, Inc.
VI	Panay	25.00	2010		1.064	1.596						2.660	
	Kabangkalan, Negros Occidental	12.00	2010		0.511	0.766						1.277	JG Summit Holdings Inc.
	Victorias, Negros Occidental	50.00	2013					2.128	3.192			5.320	Bronzeoak
	Pototan, Iloilo	5.00	2014						0.213	0.319		0.532	Full Advantage Philippine, Inc.
VII	Bohol	2.50	2014						0.106	0.160		0.266	No Proponent
Mindanao Agribusiness		**15.20**			**0.426**	**0.638**			**0.221**	**0.332**		**1.617**	
X	Cagayan de Oro City	10.00	2010		0.426	0.638						1.064	
XII	Surallah, South Cotabato	5.20	2014						0.221	0.332		0.553	No Proponent
Total		**183.90**		**0.638**	**3.385**	**3.639**		**2.128**	**5.826**	**3.952**		**19.567**	

Annex A.1.24
WIND INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Region	Location	Capacity (MW)	Year Available	2007	2008	2009	2010	2011	2012	2013	2014	Total		Proponent	Remarks
												Gov't.	Private		
Northern Luzon Agribusiness Quadrangle		**333.00**		**1.792**	**2.688**	**2.061**	**3.091**			**11.066**	**16.598**	**14.112**	**23.184**		
I	Burgos Ilocos Norte (Phase 1)	40.00	2009	1.792	2.688							4.480		PNOC - EDC	On-grid/FS Completed
	Burgos Ilocos Norte (Phase 2)	46.00	2010			2.061	3.091					5.152		PNOC - EDC	On-grid/FS Completed
	Pagudpod, Ilocos Norte	40.00	2014							1.792	2.688	4.480		PNOC - EDC	On-grid/FS Completed
	Pasuquin, Ilocos Norte	57.00	2014							2.554	3.830		6.384	Energy Logics Phils. Inc.	On-grid
	Suyo, Ilocos Sur	40.00	2014							1.792	2.688		4.480	Suyo UPC Asia Corp.	On-grid
	Western Pangasinan	25.00	2014							1.120	1.680		2.800	Pangasinan UPC Asia Corp.	On-grid
	Eastern Pangasinan	35.00	2014							1.568	2.352		3.920	Pangasinan UPC Asia Corp.	On-grid
III	Carranglan, Nueva Ecija	50.00	2014							2.240	3.360		5.600	Coastal Power Dev't. Corp.	On-grid
Metro Luzon Urban Beltway		**113.40**			**0.152**	**0.228**			**4.480**	**7.168**	**0.672**	**1.120**	**11.580**		
IV-A	Mauban, Quezon	50.00	2013						2.240	3.360			5.600	Pacific Manufacturing Resources, Inc.	On-grid
	Caliraya, Laguna	25.00	2013						1.120	1.680			2.800	No Proponent	On-grid
IV-B	Sta. Cruz, Marinduque	5.00	2013						0.224	0.336			0.560	Phil. Hybrid Energy Systems Inc. (PHESI)	Off-grid
	Marinduque	3.40	2009		0.152	0.228							0.380	3i Powergen	Off-grid
	Abra de Ilog, Occidental Mindoro	10.00	2014							0.448	0.672	1.120		PNOC - EDC	Off-grid
	Puerto Galera, Oriental Mindoro	20.00	2013						0.896	1.344			2.240	Phil. Hybrid Energy Systems Inc. (PHESI)	Off-grid
Central Philippines		**95.10**			**0.452**	**3.814**	**4.704**	**0.672**	**1.008**				**10.650**		
IV-B	Tablas Island, Romblon	3.40	2009		0.152	0.228							0.380	3i Powergen	Off-grid
	Romblon	1.70	2009		0.076	0.114							0.190	3i Powergen	Off-grid
	Tablas Island, Romblon	5.00	2012					0.224	0.336				0.560	No Proponent	Off-grid
V	Baleno, Masbate	5.00	2009		0.224	0.336							0.560		
VI	San Carlos, Negros Occidental	30.00	2010			1.344	2.016						3.360	Phil. Hybrid Energy Systems Inc. (PHESI)	Off-grid
	Pandan, Antique	20.00	2010			0.896	1.344						2.240	San Carlos Wind Power Corp.	On-grid
	San Remigio, Antique	20.00	2010			0.896	1.344						2.240	No Proponent	On-grid
	Manoc-manoc, Aklan	10.00	2012					0.448	0.672				1.120	No Proponent	On-grid
Mindanao Agribusiness		**15.00**				**0.672**	**1.008**						**1.680**		
CARAGA	Nuventa, Surigao del Sur	15.00	2011			0.672	1.008						1.680		
Government - Private		**556.50**		**1.792**	**3.293**	**6.776**	**8.803**	**0.672**	**5.488**	**18.234**	**17.270**	**15.232**	**47.094**		
Total												**62.326**			

Annex A.1.25
ALTERNATIVE FUELS INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Project	Location	Year Available	2007		2008		2009		2010		2011		2012		2013		2014		Total		Remarks
			Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	
Compressed Natural Gas				**0.099**		**0.215**		**0.582**		**1.344**		**3.136**		**2.240**		**2.240**		**4.480**		**14.336**	
Natural Gas Vehicle for Public Transport (NGVPPT) Acquisition of OEM CNG-fed buses	Metro Manila, Batangas, Laguna	2007		0.099		0.215		0.582		1.344		3.136		2.240		2.240		4.480		14.336	Pilot Phase of the Program covers up to 7 years and the 200 buses
Biodiesel				**0.650**		**1.300**												**0.650**		**2.600**	
Expansion/construction of biodiesel facilities	Metro Manila	2006		0.650		1.300												0.650		2.600	Supply infrastructure
Establishment of CME blend refuelling station	Nationwide																	1.890		19.845	
Bioethanol				**0.945**				**7.560**				**9.450**						**1.890**		**19.845**	
Establishment of bioethanol facilities	Nationwide	2006		0.945				7.560				9.450								42.930	
Jatropha			**0.760**	**1.586**	**0.705**	**8.586**	**0.680**	**14.086**	**0.680**	**17.086**	**0.680**	**1.586**							**3.505**		
Nursery	Nationwide	2007	0.080		0.025																Supply infrastructure, consultation meetings, IEC, Laboratory engine test, Capacity building
Plantation	Nationwide					7.000		12.500		15.500											
Refinery	Nationwide		0.680	1.586	0.680	1.586	0.680	1.586	0.680	1.586	0.680	1.586									
Government - Private			**0.760**	**3.280**	**0.705**	**10.101**	**0.680**	**22.228**	**0.680**	**18.430**	**0.680**	**14.172**		**2.240**		**2.240**		**7.020**	**3.505**	**79.711**	
Total			**4.040**		**10.806**		**22.908**		**19.110**		**14.852**		**2.240**		**2.240**		**7.020**		**83.22**		

Annex A.1.26
MAIN GRID INDICATIVE PROJECTS INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Project	Capacity	Year Available	2007		2008		2009		2010		2011		2012		2013		2014		Total	
			Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private	Gov't	Private
Luzon			**4.354**	**6.014**	**6.338**	**21.163**	**4.123**	**52.203**	**6.294**	**50.988**	**1.479**	**1.792**	**0.924**	**2.688**	**0.924**	**34.608**	**0.000**	**60.648**	**24.440**	**230.104**
Power Generation	3,103 MW		1.792	6.014	3.612	21.163	2.985	52.203	4.570	50.988	1.479	1.792	0.924	2.688	0.924	34.608	-	60.648	16.286	230.104
Transmission			2.562	-	2.726	-	1.138	-	1.724	-	-		-	-	-	-	-	-	8.150	
Visayas			**2.941**		**1.375**	**13.719**	**0.703**	**32.371**	**1.027**	**19.525**	**0.444**	**3.113**		**0.538**					**6.489**	**69.266**
Power Generation	624 MW		0.444	-	0.444	13.719	0.444	32.371	0.444	19.525	0.444	3.113	-	0.538	-		-		2.218	69.266
Transmission			2.497	-	0.931	-	0.259	-	0.583	-	-		-	-	-	-	-	-	4.271	
Mindanao			**4.311**		**1.995**	**2.330**	**1.604**	**30.762**	**0.248**	**43.948**		**4.570**							**8.158**	**81.610**
Power Generation	745.5 MW		-	-	-	2.330	-	30.762	-	43.948	-	4.570	-		-		-		-	81.610
Transmission			4.311	-	1.995	-	1.604	-	0.248	-	-	-	-	-	-	-	-	-	8.158	
Government-Private			**11.606**	**6.014**	**9.708**	**37.212**	**6.430**	**115.336**	**7.568**	**114.461**	**1.922**	**9.475**	**0.924**	**3.226**	**0.924**	**34.608**		**60.648**	**39.087**	**380.980**
Total			**17.620**		**46.920**		**121.766**		**7.568**		**9.475**		**3.226**		**34.608**		**60.648**		**420.07**	

Annex A.1.27
POWER GENERATION INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Project	Location	Capacity (MW)	Year Available	2007	2008	2009	2010	2011	2012	2013	2014	Total	
												Gov't.	Private
Luzon		**3103.00**		**7.806**	**24.775**	**55.188**	**55.558**	**3.271**	**3.612**	**35.532**	**60.648**	**16.286**	**230.104**
Bulacan Biomass-to-energy Project	Bocaue, Bulacan	15.00	2009	0.638	0.958								1.596
Burgos Wind Power Project Phase I (formerly Northern Luzon Wind Power Project Phase I)	Saoit, Burgos, Ilocos Norte	40.00	2009	1.792	2.688							4.480	
Ilijan CCGT Expansion	Ilijan, Batangas City	300.00	2009	5.376	8.064							5.152	13.440
Burgos Wind Power Project Phase II	Nagsurot, Burgos, Ilocos Norte	46.00	2010			2.061	3.091						5.992
2nd Phase CFB Coal-Fired Power Plant	Mabalacat, Pampanga	50.00	2010		2.397	3.595							24.360
2 x 150 MW Coal Fired Power Plant	Subic	300.00	2010		9.744	14.616							44.660
San Gabriel Power Plant	Sta. Rita, Batangas	550.00	2011			17.864	26.796						40.320
Kalayaan Pumped Storage Power Plant III (CBK Expansion)	Kalayaan, Laguna	360.00	2011			16.128	24.192						
Tanawon Geothermal Project	Bacman Geothermal Field, Sorsogon	40.00	2011		0.555	0.555	0.555	0.555				2.218	
Rangas Geothermal Project	Bacman Geothermal Field, Sorsogon	40.00	2013		0.370	0.370	0.370	0.370	0.370	0.370		2.218	
Manito-Kayabon Geothermal Project	Bacman Geothermal Field, Sorsogon	40.00	2013				0.555	0.555	0.555	0.555		2.218	
Balintingon River Multi-Purpose Project	General Tinio, Nueva Ecija	44.00	2013					1.792	2.688				4.480
Pagbilao Expansion	Pagbilao, Quezon	400.00	2014							12.992	19.488		32.480
Pantabangan Expansion	Pantabangan, Nueva Ecija	78.00	2014								8.736		8.736
2 x 150 MW CCGT Power Station	Quezon Province	300.00	2014							5.376	8.064		13.440
Quezon Power Expansion Project	Mauban, Quezon	500.00	2014							16.240	24.360		40.600
Visayas		**624.00**		**0.444**	**14.163**	**32.815**	**19.969**	**3.557**	**0.538**			**2.218**	**69.266**
Panay Biomass Power Project	Panay	25.00	2010		1.064	1.596							2.660
Coal-Fired Plant	Brgy. Nipa, Concepcion, Iloilo	100.00	2010		4.794	7.190							11.984
Toledo Expansion Project Phase I - 2 x 82 MW	Toledo City, Cebu	164.00	2010		7.862	11.792							19.654
Toledo Expansion Project Phase II - 1 x 82 MW	Toledo City, Cebu	82.00	2011			3.931	5.896						9.827
GBPC Coal-Fired Plant (Panay Power Corp.) 2 x 82	Iloilo, Panay Island	164.00	2011			7.862	11.792						19.654
Dauin Geothermal	Dauin, Negros Oriental	40.00	2011	0.444	0.444	0.444	0.444	0.444				2.218	
Aklan Hydropower Project	Libacao, Aklan	41.00	2012				1.837	2.755					4.592
Villasiga HEP	Sibalom, Antique	8.00	2012					0.358	0.538				0.896
Mindanao		**745.50**			**2.330**	**30.762**	**43.948**	**4.570**					**81.610**
Cagayan de Oro Biomass Power Project	Cagayan de Oro City	10.00	2010		0.426	0.638							1.064
Cabulig Hydro	Plaridel, Jasaan, Misamis Oriental	8.00	2010		0.358	0.538							0.896
Tamugan AB, Panigan and Suawan Hydroelectric Power	Baguio District, Davao City	34.50	2010		1.546	2.318							3.864
Agus 3 Hydroelectric	Lanao del Norte	225.00	2011			10.080	15.120						25.200
SM 200 MW CFBB CFTPP	Southern Mindanao	200.00	2011			8.960	13.440						22.400
Sultan Kudarat Coal	Sultan Kudarat	200.00	2011			8.228	12.342						20.570
Tagoloan Hydropower	Bukidnon	68.00	2012				3.046	4.570					7.616
Government - Private		**4472.50**		**8.250**	**41.267**	**118.765**	**119.475**	**11.397**	**4.150**	**35.532**	**60.648**	**18.510**	**380.980**
Total													**399.490**

Annex A.1.28
TRANSMISSION DEVELOPMENT INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Project	Expected Time of Completion	2007	2008	2009	2010	2011	2012	2013	2014	Total
LUZON GRID		**2.562**	**2.726**	**1.138**	**1.724**	**-**	**-**	**-**	**-**	**8.150**
ON-GOING PROJECTS										
Batangas Transmission Reinforcement Project	2009	0.429	0.137	0.001	0.000	-	-	-	-	
Biñan - Sucat 230 kV T/L	2009	0.369	0.056	0.003	0.002	-	-	-	-	
Hermosa - Balintawak 230 kV T/L Relocation	2008	0.101	-	-	-	-	-	-	-	
Luzon S/S Expansion Project - 1	2009	-	0.010	0.564	1.302	-	-	-	-	
Luzon (North) T/L Upgrading Projects - 1		1.015	0.524	0.009	0.005	-	-	-	-	
New Gamu 230 kV S/S Project	2007	0.115	0.016	-	-	-	-	-	-	
Tap Hermosa - Balintawak	2008	0.020	-	-	-	-	-	-	-	
T/L & S/S Projects (Package 1 & 2)	2007	0.003	0.001	-	-	-	-	-	-	
PROJECTS FOR IMPLEMENTATION										
Binga - San Manuel 230 kV T/L Project	2010	0.008	0.673	0.524	0.343	-	-	-	-	
Dasmariñas - Rosario 230 kV T/L	2009	0.048	0.205	0.037	0.001	-	-	-	-	
Luzon Mindoro Interconnection	2013				0.002					
Luzon Power Circuit Breaker Replacement Project	2011	-	0.000	0.000	0.046	-	-	-	-	
Luzon Substation Expansion Project - 2	2011	-	-	0.000	0.002	-	-	-	-	
Luzon Substation Expansion Project - 3	2013	-	-	-	-	-	-	-	-	
Luzon Transmission Equipment Upgrade	2009	0.310	0.730	-	-	-	-	-	-	
Luzon Voltage Improvement Project - 1	2009	0.145	0.374	-	-	-	-	-	-	
Luzon Voltage Improvement Project - 2	2011	-	0.000	0.000	0.020	-	-	-	-	
San Jose 500 kV Reconfiguration	2013	-	-	-	0.001	-	-	-	-	
San Jose - Balintawak Line 3	2013	-	-	-	0.001	-	-	-	-	
VISAYAS GRID		**2.497**	**0.931**	**0.259**	**0.583**	**-**	**-**	**-**	**-**	**4.271**
ON-GOING PROJECTS										
Cebu - Negros Interconnection Uprating Project	2008	0.443	0.145	0.002	0.001	-	-	-	-	
Cebu III Transmission (100 MVA Quiot SS)	2007	0.078	0.021	0.002	0.001	-	-	-	-	
Leyte - Samar Reinforcement Project	2007	0.006	0.005	0.000	0.000	-	-	-	-	
Negros V Transmission Project	2008	0.039	0.040	0.012	-	-	-	-	-	
Negros - Panay Interconnection Uprating Project	2008	0.514	0.159	0.002	0.003	-	-	-	-	
Northern Panay Backbone Project	2009	0.732	0.398	0.027	0.005	-	-	-	-	
Visayas Capacitor Project -1	2008	0.152	0.025	-	-	-	-	-	-	
Wrigth - Calbayog 138 kV Transmission Line Project	2008	0.534	0.106	0.009	0.004	-	-	-	-	
PROJECTS FOR IMPLEMENTATION										
Bohol Backbone Project	2010	-	0.020	0.023	0.068	-	-	-	-	
New Naga S/S Project	2010	-	0.006	0.019	0.303	-	-	-	-	
Visayas Power Circuit Breaker Replacement Program	2010	-	0.006	0.162	0.145	-	-	-	-	
Southern Panay Backbone Transmission Project	2010	-	0.001	0.002	0.054	-	-	-	-	
MINDANAO GRID		**4.311**	**1.995**	**1.604**	**0.248**	**-**	**-**	**-**	**-**	**8.158**
ON-GOING PROJECTS										
Abaga - Kirahon 230 kV T/L Project	2008	1.655	0.049	0.008	0.003	-	-	-	-	
Gen. Santos - Tacurong Trans. Project	2008	0.446	0.031	0.004	0.002	-	-	-	-	
Kirahon - Pulangui (Maramag) 230 kV T/L	2009	0.187	0.723	0.762	0.010	-	-	-	-	
Pulangui (Maramag) - Bunawan 230 kV T/L	2009	1.246	0.081	0.014	0.005	-	-	-	-	
Mindanao Sub-station Expansion - 2005	2008	0.116	-	-	-	-	-	-	-	
Mindanao Substransmission Line	2007	0.003	0.002	-	-	-	-	-	-	
San Francisco 138 kV S/S Project	2008	0.062	0.009	-	-	-	-	-	-	
Zamboanga City Area 138 kV T/L	2008	0.397	0.368	0.000	0.000	-	-	-	-	
PROJECTS FOR IMPLEMENTATION										
Aurora - Pulanco 138 kV T/L	2009	0.200	0.701	0.240	0.006	-	-	-	-	
Mindanao Mobile Transformer Project	2009	-	-	0.252	-	-	-	-	-	
Mindanao Reliability Compliance Project - Phase 1	2012	-	0.015	0.028	0.066	-	-	-	-	
Mindanao Power Circuit Breaker Replacement Program	2010	-	0.016	0.297	0.155	-	-	-	-	
Total		**9.370**	**5.653**	**3.001**	**2.555**	**-**	**-**	**-**	**-**	**20.579**

Annex A.1.29
ENERGY EFFICIENCY AND CONSERVATION INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Programs	2007		2008		2009		2010
	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.
I. INFORMATION, EDUCATION AND COMMUNICATION CAMPAIGN	**0.01616**	**0.05000**	**0.02600**	**0.05000**	**0.03000**	**0.05000**	**0.03000**
A. Road Transport Patrol	0.00328		0.01100		0.01500		0.01500
B. Fuel Economy Run and Seminars	0.00100	0.05000	0.00100	0.05000	0.00100	0.05000	0.00100
C. Infocommercials/Publications/Collaterals for Fuel Efficiency and Conservation	0.00810		0.01000		0.01000		0.01000
D. Power Patrol	0.00378		0.00400		0.00400		0.00400
II. VOLUNTARY AGREEMENT			**0.00020**		**0.00020**		**0.00020**
A. Carless Day Program			0.00005		0.00005		0.00005
B. Carpooling Program			0.00005		0.00005		0.00005
C. Park and Wait Program			0.00005		0.00005		0.00005
D. Park and Ride Program			0.00005		0.00005		0.00005
III. ENERGY LABELING AND EFFICIENCY STANDARDS	**0.05933**	**1.63598**	**0.08001**	**2.20568**	**0.09816**	**2.70702**	**0.11619**
A. Efficiency Standard and Labeling for RACs	0.01114	0.30708	0.01215	0.33490	0.01526	0.42078	0.01582
B. Energy Labeling Program for Refrigerators and Freezers	0.00571	0.15752	0.00720	0.19848	0.00889	0.24512	0.00913
C. Labeling for CFLs	0.03388	0.93420	0.04543	1.25270	0.05712	1.57499	0.06919
D. Ballast L Standard and Labeling for Flourescent Lamp Ballast	0.00274	0.07563	0.00288	0.07942	0.00302	0.08339	0.00635
E. Luminaire Installation	0.00053	0.01459	0.00074	0.02042	0.00097	0.02680	0.00122
F. Linear Flourescent Lamp	0.00222	0.06126	0.00293	0.08066	0.00369	0.10185	0.00470
G. Household Electric Fans	0.00134	0.03702	0.00141	0.03888	0.00148	0.04082	0.00155
H. Television Stand-by Power Reduction			0.00432	0.11905	0.00468	0.12904	0.00506
I. Performance Certification Of Fans and Blowers	0.00177	0.04868	0.00182	0.05014	0.00187	0.05165	0.00193
J. Labeling of Electric Motors			0.00113	0.03103	0.00118	0.03258	0.00124
IV. GOVERNMENT ENERCON PROGRAM	**0.28159**		**0.28159**		**0.28159**		**0.28159**
A. Fuel Conservation	0.10726		0.10726		0.10726		0.10726
B. Electricity Conservation	0.17433		0.17433		0.17433		0.17433
V. ENERGY MANAGEMENT PROGRAMS	**0.10000**	**1.40000**	**0.10000**	**1.50000**	**0.20000**	**1.90000**	**0.20000**
A. Energy Audit Program		1.00000		1.00000		1.00000	
1. Cement		0.20000		0.20000		0.20000	
2. Sugar		0.20000		0.20000		0.20000	
3. Steel Industry		0.10000		0.10000		0.10000	
4. Chemical		0.02500		0.02500		0.02500	
5. Semiconductor		0.02500		0.02500		0.02500	
6. Pulp and Paper		0.10000		0.10000		0.10000	
7. Glass		0.05000		0.05000		0.05000	
8. Commercial/Institutional		0.10000		0.10000		0.10000	
9. Food Industry		0.05000		0.05000		0.05000	
10. Mining Industry		0.15000		0.15000		0.15000	
B. Heat Rate Improvement of Power Plants					0.10000	0.40000	0.10000
C. System Loss Reductiion Program	0.10000	0.40000	0.10000	0.40000	0.10000	0.40000	0.10000
1. Private Utilities (PU's and LGU owned)		0.40000		0.40000		0.40000	
2. Electric Cooperatives (REC's)	0.10000		0.10000		0.10000		0.10000
D. Demand Side Management				0.10000		0.10000	
Government - Private	**0.45708**	**3.08598**	**0.48780**	**3.75568**	**0.60995**	**4.65702**	**0.62798**
Total	**3.54306**		**4.24400**		**5.26697**		**5.83145**

	2011		2012		2013		2014		Grand Total	
Private	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private	Gov't.	Private
0.05000	**0.03000**	**0.05000**	**0.03000**	**0.05000**	**0.03000**	**0.05000**	**0.03000**	**0.05000**	**0.22216**	**0.40000**
	0.01500		0.01500		0.01500		0.01500		0.10428	
0.05000	0.00100	0.05000	0.00100	0.05000	0.00100	0.05000	0.00100	0.05000	0.00800	0.40000
	0.01000		0.01000		0.01000		0.01000		0.07810	
	0.00400		0.00400		0.00400		0.00400		0.03178	
	0.00020		**0.00020**		**0.00020**		**0.00020**		**0.00140**	
	0.00005		0.00005		0.00005		0.00005		0.00035	
	0.00005		0.00005		0.00005		0.00005		0.00035	
	0.00005		0.00005		0.00005		0.00005		0.00035	
	0.00005		0.00005		0.00005		0.00005		0.00035	
3.20347	**0.13948**	**3.84581**	**0.16267**	**4.48498**	**0.17969**	**4.95433**	**0.20437**	**5.63495**	**1.04000**	**28.67222**
0.43607	0.01606	0.44286	0.01933	0.53291	0.01769	0.48776	0.01946	0.53654	0.12691	3.49890
0.25178	0.00959	0.26435	0.01157	0.31893	0.01187	0.32725	0.01213	0.33447	0.07609	2.09790
1.90758	0.08352	2.30283	0.09803	2.70276	0.11270	3.10740	0.12755	3.51680	0.62742	17.29926
0.17511	0.00667	0.18387	0.00700	0.19306	0.00735	0.20271	0.01158	0.31927	0.04759	1.31246
0.03377	0.00150	0.04137	0.00180	0.04964	0.00213	0.05864	0.00248	0.06842	0.01137	0.31365
0.12946	0.00632	0.17434	0.00810	0.22340	0.01004	0.27692	0.01216	0.33524	0.05016	1.38313
0.04286	0.00163	0.04500	0.00171	0.04725	0.00180	0.04962	0.00189	0.05210	0.01281	0.35355
0.13943	0.01090	0.30048	0.01171	0.32287	0.01256	0.34630	0.01344	0.37065	0.06267	1.72782
0.05320	0.00199	0.05479	0.00205	0.05644	0.00211	0.05813	0.00217	0.05988	0.01571	0.43291
0.03421	0.00130	0.03592	0.00137	0.03772	0.00144	0.03960	0.00151	0.04158	0.00917	0.25264
	0.28159		**0.28159**		**0.28159**		**0.28159**		**2.25272**	
	0.10726		0.10726		0.10726		0.10726		0.85808	
	0.17433		0.17433		0.17433		0.17433		1.39464	
1.95000	**0.20000**	**1.95000**	**0.20000**	**2.00000**	**0.20000**	**2.00000**	**0.20000**	**2.00000**	**1.40000**	**14.70000**
1.00000		1.00000		1.00000		1.00000		1.00000		8.00000
0.20000		0.20000		0.20000		0.20000		0.20000		1.60000
0.20000		0.20000		0.20000		0.20000		0.20000		1.60000
0.10000		0.10000		0.10000		0.10000		0.10000		0.80000
0.02500		0.02500		0.02500		0.02500		0.02500		0.20000
0.02500		0.02500		0.02500		0.02500		0.02500		0.20000
0.10000		0.10000		0.10000		0.10000		0.10000		0.80000
0.05000		0.05000		0.05000		0.05000		0.05000		0.40000
0.10000		0.10000		0.10000		0.10000		0.10000		0.80000
0.05000		0.05000		0.05000		0.05000		0.05000		0.40000
0.15000		0.15000		0.15000		0.15000		0.15000		1.20000
0.40000	0.10000	0.40000	0.10000	0.40000	0.10000	0.40000	0.10000	0.40000	0.60000	2.40000
0.40000	0.10000	0.40000	0.10000	0.40000	0.10000	0.40000	0.10000	0.40000	0.80000	3.20000
0.40000		0.40000		0.40000		0.40000		0.40000		3.20000
	0.10000		0.10000		0.10000		0.10000		0.80000	0.00000
0.15000		0.15000		0.20000		0.20000		0.20000		1.10000
5.20347	**0.65127**	**5.84581**	**0.67446**	**6.53498**	**0.69148**	**7.00433**	**0.71616**	**7.68495**	**4.91628**	**43.77222**
	6.49708		**7.20944**		**7.69581**		**8.40111**		**48.68850**	

Annex A.1.30
BARANGAY ELECTRIFICATION INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Fund Source/Implementing Agency	2007			2008			Total		Total
	No. of Brgys	Gov't	Private	No. of Brgys	Gov't	Private	Gov't	Private	
NEA/ECs	**301**	**0.500**		**160**	**0.320**		**0.820**		**0.820**
DOE	**125**	**0.179**	**0.022**	**556**	**1.112**	**0**	**1.291**	**0.022**	**1.313**
Barangay Electrification Program	48	0.048		20	0.040				
Energy Regulation 1-94	28	0.056		22	0.044				
Remote Area Electrification (inc. SPUG)	2	0.004		118	0.236				
PGMA Priority Areas (SC 38)	25	0.050		186	0.372				
DOE-Winrock	21	0.021	0.021						
AMORE Solar Energy for Rural	1		0.001						
Electrification and Developement (SERED)									
DOE-NEA				210	0.420				
DAR/Solar POwer Technology Support (SPOTS)	**9**	**0.009**		**12**	**0.012**		**0.021**		**0.021**
PNOC-EDC	**29**		**0.058**	**38**		**0.076**		**0.134**	**0.134**
IPPs	**395**		**0.556**	**300**		**0.300**		**0.856**	**0.856**
MIRANT									
- Grid (next 500)	106		0.212					0.212	
- Grid (Beacon)	1		0.002					0.002	
- Mirant/Amore 2	54		0.108					0.108	
- Mirant/DOE - Sustainable Solar Market Package (SSMS)	53		0.053					0.053	
KEPCO	180		0.180	300		0.300		0.480	
Luzon Hydro	1		0.001					0.001	
Philippine Rural Eelectricity Services (PRES)	**32**		**0.272**	**96**		**0.816**		**1.088**	**1.088**
Private Investor-Owned Utilities (PIOUs)	**1**		**0.002**					**0.002**	**0.002**
Cotabato Light & Power	1		0.002					0.002	
Government and Private	**892**	**0.688**	**0.910**	**1162**	**1.444**	**1.192**	**2.132**	**2.102**	**4.234**
Total	**892**	**1.598**		**1162**	**2.636**		**4.23**		

Annex A.1.31
DOWNSTREAM INDUSTRY INVESTMENT REQUIREMENTS

(In Billion Pesos, PhP)

Sector	2007	2008	2009	2010	2011	2012	2013	2014	Total
Oil	**2.57**	**2.49**	**2.66**	**0.64**	**0.50**	**0.50**	**0.51**	**0.52**	**10.39**
Natural Gas	**0.00**	**0.00**	**0.00**	**18.39**	**28.13**	**101.30**	**34.82**	**16.62**	**199.26**
Power Plant				13.83	27.66	55.97	33.20	16.60	147.26
LNG Terminal						35.28			35.28
Pipelines				4.56	0.45	10.03	1.60		16.64
Refilling Stations					0.02	0.02	0.02	0.02	0.08
Total	**2.57**	**2.49**	**2.66**	**19.03**	**28.63**	**101.80**	**35.33**	**17.14**	**209.65**

Annex B: HISTORICAL PERFORMANCE

Annex B.1
ENERGY MIX

(In Million Barrels of Fuel Oil Equivalent, MMBFOE)

	1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006	
	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share
Indigenous Energy	**109.72**	**50.37**	**106.86**	**46.51**	**107.94**	**45.14**	**108.86**	**43.15**	**115.99**	**45.14**	**128.81**	**48.23**	**134.88**	**49.07**	**125.79**	**47.76**	**137.02**	**51.33**	**140.96**	**52.33**	**143.83**	**53.51**	**146.84**	**54.57**	**148.65**	**55.40**
Oil	1.55	0.71	0.89	0.39	0.31	0.13	0.28	0.11	0.27	0.10	0.29	0.11	0.39	0.14	0.66	0.25	4.29	1.61	3.66	1.36	3.31	1.23	4.23	1.57	3.87	1.44
Natural Gas	0.03	0.01	0.03	0.01	0.05	0.02	0.03	0.01	0.05	0.02	0.04	0.02	0.06	0.02	0.80	0.30	10.03	3.76	15.03	5.69	14.12	5.25	18.70	6.95	17.52	6.53
Coal	5.30	2.43	4.71	2.05	4.05	1.69	3.94	1.56	4.23	1.65	3.66	1.37	4.95	1.80	4.50	1.71	5.56	2.08	7.30	2.72	9.07	3.37	10.53	3.91	8.61	3.21
Hydro	10.11	4.64	10.75	4.68	12.12	5.07	10.46	4.15	8.74	3.40	13.52	5.06	13.45	4.89	12.25	4.65	12.13	4.54	13.57	5.05	14.82	5.51	14.46	5.37	17.14	6.39
Geothermal	37.64	17.28	36.54	15.90	38.91	16.27	43.10	17.08	53.09	20.66	63.09	23.63	69.24	25.19	62.19	23.61	61.00	22.85	58.50	21.77	61.24	22.78	58.98	21.92	62.33	23.23
Biomass (Bagasse and other RE)	55.09	25.29	53.95	23.48	52.49	21.95	51.05	20.23	49.62	19.31	48.20	18.05	46.79	17.02	45.40	17.24	44.01	16.49	42.64	15.49	41.28	15.36	39.93	14.84	39.14	14.59
Solar and Wind	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	0.01	0.00	0.03	0.01
CME	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	0.00	0.00
Imported Energy	**108.10**	**49.63**	**122.90**	**53.49**	**131.20**	**54.86**	**143.44**	**56.85**	**140.99**	**54.86**	**138.25**	**51.77**	**140.00**	**50.93**	**137.57**	**52.24**	**129.92**	**48.67**	**127.80**	**47.55**	**124.95**	**46.49**	**122.21**	**45.42**	**119.65**	**44.60**
Oil	104.03	47.76	116.65	50.77	120.29	50.30	127.91	50.70	125.33	48.77	119.19	44.63	113.52	41.30	109.79	41.69	104.68	39.22	102.96	38.22	99.46	37.00	96.52	35.87	91.43	34.08
Coal	**4.07**	1.87	6.25	2.72	10.91	4.56	15.53	6.15	15.65	6.09	19.06	7.14	26.48	9.63	27.78	10.55	25.24	9.46	24.84	9.24	25.49	9.48	25.69	9.55	28.21	10.51
Ethanol	-		-		-		-		-		-		-		0.00		0.00						0.01	0.00	0.01	0.00
Total Energy	**217.82**	**100.00**	**229.77**	**100.00**	**239.13**	**100.00**	**252.30**	**100.00**	**256.98**	**100.00**	**267.05**	**100.00**	**274.88**	**100.00**	**263.37**	**100.00**	**266.93**	**100.00**	**268.76**		**268.79**	**100.00**	**269.05**	**100.00**	**268.30**	**100.00**
Growth Rate, percent	**7.77**		**5.49**		**4.08**		**5.50**		**1.86**		**3.92**		**2.93**		**(4.19)**		**1.36**		**0.68**		**0.01**		**0.10**		**(0.28)**	
Self Sufficiency, percent	**50.37**		**46.51**		**45.14**		**43.15**		**45.14**		**48.23**		**49.07**		**47.76**		**51.33**		**52.45**		**53.51**		**54.57**		**55.40**	

NOTE:
Biomass supply is based on 2004 Household Energy Consumption Survey

(In Thousand Tons of Oil Equivalent, KTOE)

	1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006	
	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share	Volume	%Share
Indigenous Energy	**15,843.02**	**50.37**	**15,430.78**	**46.51**	**15,586.27**	**45.14**	**15,719.52**	**43.15**	**16,749.54**	**45.14**	**18,599.54**	**48.23**	**19,476.64**	**49.07**	**18,164.21**	**47.76**	**19,785.15**	**51.33**	**20,354.27**	**52.33**	**20,769.68**	**53.51**	**21,203.31**	**54.57**	**21,464.50**	**55.40**
Oil	224.33	0.71	127.95	0.39	44.16	0.13	40.07	0.11	38.77	0.10	42.12	0.11	55.97	0.14	95.58	0.25	619.10	1.61	527.82	1.36	478.44	1.23	610.19	1.57	559.25	1.44
Natural Gas	4.54	0.01	4.39	0.01	7.40	0.02	4.50	0.01	7.66	0.02	5.90	0.02	8.75	0.02	115.32	0.30	1,448.75	3.76	2,208.05	5.69	2,039.21	5.25	2,700.85	6.95	2,529.44	6.53
Coal	764.87	2.43	680.70	2.05	585.00	1.69	568.24	1.56	610.77	1.65	528.28	1.37	714.73	1.80	649.10	1.71	802.19	2.08	1,054.33	2.72	1,309.07	3.37	1,519.89	3.91	1,243.32	3.21
Hydro	1,459.56	4.64	1,551.69	4.68	1,750.38	5.07	1,511.12	4.15	1,261.46	3.40	1,952.08	5.06	1,941.85	4.89	1,768.73	4.65	1751.12	4.54	1,959.48	5.05	2,139.54	5.51	2,088.19	5.37	2,474.78	6.39
Geothermal	5,435.20	17.28	5,276.10	15.90	5,619.24	16.27	6,223.75	17.08	7,665.64	20.66	9,110.89	23.63	9,998.36	25.19	8,980.13	23.61	8,808.54	22.85	8,447.30	21.77	8,842.52	22.78	8,516.10	21.92	9,000.14	23.23
Biomass (Bagasse and other RE)	7,954.52	25.29	7,789.95	23.48	7,580.08	21.95	7,371.84	20.23	7,165.23		6,960.27	18.05	6,756.97	17.02	6,555.36	17.24	6,355.45	16.49	6,157.29	15.87	5,960.90	15.36	5,766.34	14.84	5,652.33	14.59
Solar and Wind	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	1.63	0.00	4.70	0.01
CME	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	0.11	0.00	0.54	0.00
Imported Energy	**15,609.71**	**49.63**	**17,747.31**	**53.49**	**18,944.60**	**54.86**	**20,712.11**	**56.85**	**20,358.35**	**54.86**	**19,962.64**	**51.77**	**20,216.50**	**50.93**	**19,865.78**	**52.24**	**18,760.19**	**48.67**	**18,454.22**	**47.55**	**18,043.47**	**46.49**	**17,648.60**	**45.42**	**17,277.33**	**44.60**
Oil	15,022.15	47.76	16,844.36	50.77	17,369.85	50.30	18,469.94	50.70	18,098.22	48.77	17,210.83	44.63	16,392.20	41.30	15,853.93	41.69	15,115.72	39.22	14,867.79	38.22	14,362.49	37.00	13,937.28	35.87	13,202.72	34.08
Coal	587.56	1.87	902.95	2.72	1,574.75	4.56	2,242.16	6.15	2,260.12	6.09	2,751.81	7.14	3,824.30	9.63	4,011.85	10.55	3,644.47	9.46	3,586.42	9.24	3,680.98	9.48	3,709.93	9.55	4,073.19	10.51
Ethanol	-		-		-		-		-		-		-		0.00		0.00		0.00		-		1.40		1.41	
Total Energy	**31,452.73**	**100.00**	**33,178.09**	**100.00**	**34,530.87**	**100.00**	**36,431.63**	**100.00**	**37,107.89**	**100.00**	**38,562.18**	**100.00**	**39,693.13**	**100.00**	**38,029.99**	**100.00**	**38,545.34**	**100.00**	**38,808.49**		**38,813.15**	**100.00**	**38,851.91**	**100.00**	**38741.83**	**100.00**
Growth Rate, percent	**7.77**		**5.49**		**4.08**		**5.50**		**1.86**		**3.92**		**2.93**		**(4.19)**		**1.36**		**0.68**		**0.01**		**0.10**		**(0.28)**	
Self Sufficiency, percent	**50.37**		**46.51**		**45.14**		**43.15**		**45.14**		**48.23**		**49.07**		**47.76**		**51.33**		**52.45**		**53.51**		**54.57**		**55.40**	

Annex B.2a
OIL AND GAS SECTOR HIGHLIGHTS

	No. of Wells Drilled		Seismic Lines (km.)	GP	GSEC	SC	Discovery Wells	Production		
	Onshore (Cum.)	Offshore (Cum.)						Oil (MMBLS)	Condensate (MMBLS)	Gas (MMCF)
1982	32	93	5,663	5	2	0	3	3.57	0	0.00
1983	35	95	22,887	0	3	0	0	4.87	0	0.00
1984	36	96	3,343	0	0	0	1	3.89	0	0.00
1985	36	96	540	0	1	0	0	2.89	0	0.00
1986	36	96	2,524	0	1	0	0	2.52	0	0.00
1987	37	99	2,794	0	2	2	0	2.04	0	0.00
1988	39	104	2,918	0	3	1	2	2.18	0	0.00
1989	42	109	504	0	7	2	2	1.88	0	0.00
1990	44	111	2,734	4	1	2	3	1.73	0	0.00
1991	46	119	2,917	4	2	0	4	1.09	0	0.00
1992	46	124	10,238	10	9	0	0	3.26	0	0.00
1993	46	128	10,637	10	4	0	1	3.32	0	0.00
1994	49	136	3,727	15	7	0	1	1.67	0	233.68
1995	55	139	9,995	5	4	1	0	0.95	0	225.51
1996	56	141	45,978	3	8	0	0	0.33	0	310.79
1997	56	143	106,320	0	2	0	0	0.30	0	203.21
1998	56	146	130,114	1	6	2	0	0.29	0	341.70
1999	58	147	0	5	0	0	0	0.31	0	253.20
2000	61	155	210	6	2	0	7	0.42	0	375.90
2001	63	156	0	0	0	0	0	0.47	0.30	4,951.27
2002	63	156	10,896	0	2	0	0	1.27	3.10	62,204.97
2003	67	156	2,200	0	0	0	0	0.15	4.86	94,803.00
2004	67	158	0	0	0	2	0	0.14	4.40	87,556.60
2005	67	158	1,216	0	0	11	0	0.21	5.60	115,966.00
2006	68	158	11,297	0	0	7	0	0.18	5.10	108,606.00

Notes:
** Includes 2D and 3D seismic lines acquisition*
GP - Geophysical Permit
GSEC - Geophysical Survey and Exploration Contract
SC - Service Contract

Annex B.2b
COAL SECTOR HIGHLIGHTS

	No. of Service Contracts (Cum.)	Annual Production (MT, R.O.M.)	Cumulative Reserves (In Million MT)	
			Proven	Potential
1982	59	557,983	263	1,538
1983	63	1,019,594	312	1,506
1984	68	1,216,388	337	1,535
1985	71	1,261,564	354	1,558
1986	71	1,235,503	354	1,558
1987	78	1,208,072	371	1,558
1988	88	1,358,241	370	1,558
1989	92	1,360,416	315	1,558
1990	100	1,243,013	315	1,558
1991	104	1,325,591	314	1,558
1992	108	1,660,660	312	1,558
1993	112	1,581,873	370	2,367
1994	115	1,449,160	384	2,367
1995	115	1,333,185	384	2,367
1996	118	1,108,381	383	2,367
1997	122	1,076,611	382	2,367
1998	123	1,157,204	381	2,367
1999	124	1,176,658	399	2,367
2000	124	1,353,453	423	2,367
2001	125	1,229,822	421	2,367
2002	126	1,664,762	420	2,367
2003	128	2,030,289	420	2,367
2004	128	2,726,499	420	2,367
2005	138	3,164,432	440	2,367
2006	140	2,529,308	440	2,367

Annex B.2c
GEOTHERMAL SECTOR HIGHLIGHTS

	No. of Fields (Cum.)	No. of Wells Drilled (Cum.)	Proven Steam Capacity (MW)	Installed Gen. Capacity (Cum. MW)	Electricity Generation (GWh)	Oil Displacement (MMBFOE)	Forex Savings (Million US$)
1982	6	287	1,377	559	3,540	6.10	200.19
1983	6	324	1,546	784	4,077	7.03	201.25
1984	6	336	1,348	894	4,532	7.81	217.93
1985	6	350	1,485	894	4,929	8.50	226.65
1986	6	356	1,448	894	4,576	7.89	103.04
1987	7	362	1,427	894	4,532	7.81	132.60
1988	7	373	1,367	894	4,844	8.35	113.00
1989	7	394	1,309	888	5,316	9.17	148.48
1990	7	413	1,316	888	5,466	9.42	195.55
1991	7	433	1,402	888	5,758	9.93	175.22
1992	8	456	1,470	888	5,700	9.83	176.80
1993	9	486	1,589	963	5,667	9.77	155.84
1994	9	534	1,788	1073	6,320	10.90	166.94
1995	9	572	1,767	1154	6,135	10.58	175.80
1996	9	595	1,900	1446	6,534	11.27	217.65
1997	9	607	2,043	1819	7,237	12.48	235.33
1998	9	608	2,017	1856	8,914	15.37	186.43
1999	9	610	2,017	1931	10,594	18.27	319.65
2000	9	614	2,017	1931	11,626	20.04	546.82
2001	9	619	2,017	1931	10,381	17.90	420.25
2002	9	627	2,017	1931	10,243	17.66	441.51
2003	9	637	2,017	1931	9,822	16.93	474.17
2004	9	648	2,017	1931	10,282	17.73	625.07
2005	9	658	1,629	1978	9,902	17.07	880.98
2006	9	661	1,797	1978	10,465	18.04	1,140.72

Annex B.2d
HYDROPOWER SECTOR HIGHLIGHTS

	Installed Generating Capacity (MW)	Electricity Generation (GWh)	Equivalent Fuel Oil Displacement (MMBFOE)	Forex Savings (Million US$)
1982	1,262	3,773	6.51	213.37
1983	1,585	2,968	5.12	146.51
1984	1,666	5,278	9.10	253.80
1985	1,961	5,553	9.57	255.34
1986	2,147	6,017	10.37	135.49
1987	2,142	5,247	9.05	153.52
1988	2,139	6,264	10.80	146.12
1989	2,147	6,485	11.18	181.13
1990	2,153	6,062	10.45	216.87
1991	2,155	5,145	8.87	156.57
1992	2,257	4,440	7.66	137.72
1993	2,259	5,030	8.67	138.33
1994	2,254	5,862	10.11	154.84
1995	2,301	6,232	10.74	178.58
1996	2,301	7,030	12.12	234.17
1997	2,301	6,069	10.46	197.35
1998	2,301	5,066	8.73	105.95
1999	2,301	7,840	13.52	236.55
2000	2,301	7,799	13.45	366.82
2001	2,518	7,104	12.25	287.59
2002	2,518	7,033	12.13	303.15
2003	2,867	7,870	13.57	379.93
2004	3,217	8,593	14.82	522.40
2005	3,223	8,387	14.46	746.13
2006	3,257	9,939	17.14	1,083.40

Annex B.3a
PETROLEUM PRODUCTS CONSUMPTION

(In Thousand Barrels, MB)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Premium Gasoline	11,478	13,780	15,791	17,109	17,671	17,913	17,151	17,404	18,165	18,597	19,074	18,980	17,835
Regular Gasoline	3,597	3,959	4,142	4,470	4,970	5,420	5,545	5,691	5,938	5,975	5,755	5,159	4,708
Diesel	29,526	33,470	36,297	39,354	38,575	39,956	39,884	40,435	41,787	41,492	42,194	39,916	37,727
LPG	6,555	8,335	9,119	9,927	10,690	11,904	12,288	12,214	12,732	13,183	12,754	11,534	10,931
Kerosene	4,283	4,361	4,577	5,049	5,007	5,178	4,533	4,014	3,669	3,330	2,980	2,246	1,747
Avturbo	4,985	4,914	6,187	7,694	5,357	5,869	6,701	6,750	6,422	6,725	7,349	7,870	7,899
Avgas	52	34	35	35	35	36	28	26	24	25	26	26	27
Fuel Oil	14,298	23,078	23,236	26,826	26,470	24,300	17,571	17,793	15,559	13,624	13,978	12,439	11,123
Total	**74,776**	**91,932**	**99,385**	**110,463**	**108,774**	**110,576**	**103,702**	**104,328**	**104,294**	**102,952**	**104,110**	**98,171**	**91,998**

Annex B.3b
OIL DEMAND By Sector

(In Thousand Barrels, MB)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Power Generation	22,981	26,916	26,006	26,995	25,835	16,773	13,565	14,249	9,720	11,288	13,231	9,957	7,280
Residential	9,825	11,614	12,473	13,439	14,197	15,229	14,113	13,118	13,336	13,042	12,871	10,381	9,344
Transport	49,142	57,686	65,595	71,526	70,251	70,771	65,559	70,370	71,085	69,164	71,930	68,940	64,562
Industrial	12,637	18,973	17,339	20,768	19,145	18,588	17,306	13,304	12,155	13,130	12,510	12,243	11,394
Commercial	1,335	1,482	1,642	2,117	2,736	3,646	4,657	5,672	5,683	5,435	4,775	4,597	4,911
Agriculture	1,836	2,177	2,336	2,614	2,444	2,342	2,066	1,865	2,036	2,181	2,024	2,010	1,786
Total	**97,757**	**118,847**	**125,391**	**137,457**	**134,609**	**127,349**	**117,267**	**118,577**	**114,015**	**114,240**	**117,341**	**108,128**	**99,277**

Annex B.4
OIL DEMAND By Product

(In Thousand Barrels, MB)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Residential	**9,825**	**11,614**	**12,473**	**13,439**	**14,197**	**15,229**	**14,113**	**13,118**	**13,336**	**13,042**	**12,871**	**10,381**	**9,344**
LPG	5,846	7,548	8,215	8,779	9,534	10,419	9,949	9,443	9,976	10,070	10,177	8,392	7,781
Kerosene	3,980	4,067	4,258	4,659	4,663	4,809	4,164	3,675	3,360	2,972	2,695	1,990	1,563
Transport	**49,142**	**57,686**	**65,595**	**71,526**	**70,251**	**70,771**	**65,559**	**70,370**	**71,085**	**69,164**	**71,930**	**68,940**	**64,562**
Gasoline	15,055	17,723	19,915	21,570	22,630	23,316	22,684	23,084	24,089	24,561	24,817	24,129	22,530
Diesel	24,784	28,189	31,059	32,926	32,238	32,751	32,868	32,914	34,514	34,099	35,541	33,567	31,253
Fuel Oil	4,265	6,825	8,399	9,301	9,992	8,800	3,278	7,595	6,033	3,748	4,192	3,335	2,810
Aviation Fuel	5,038	4,948	6,222	7,729	5,391	5,905	6,729	6,777	6,446	6,750	7,375	7,896	7,925
Industrial	**12,637**	**18,973**	**17,339**	**20,768**	**19,145**	**18,588**	**17,306**	**13,304**	**12,155**	**13,130**	**12,510**	**12,243**	**11,394**
LPG	85	86	113	127	102	102	558	703	573	759	346	752	790
Kerosene	239	234	258	323	269	304	320	282	258	303	242	221	145
Diesel	3,076	3,309	3,130	3,712	3,452	3,924	3,611	3,672	3,669	3,935	3,676	3,612	3,602
Fuel Oil	9,237	15,345	13,838	16,605	15,322	14,258	12,817	8,646	7,655	8,133	8,247	7,658	6,858
Commercial	**1,335**	**1,482**	**1,642**	**2,117**	**2,736**	**3,646**	**4,657**	**5,672**	**5,683**	**5,435**	**4,775**	**4,597**	**4,911**
LPG	625	702	791	1,020	1,053	1,383	1,780	2,068	2,180	2,348	2,226	2,378	2,316
Diesel	-	-	-	506	749	1,186	1,547	2,224	1,793	1,578	1,232	924	1,256
Fuel Oil	710	781	851	591	934	1,078	1,331	1,380	1,710	1,509	1,316	1,294	1,339
Agriculture	**1,836**	**2,177**	**2,336**	**2,614**	**2,444**	**2,342**	**2,066**	**1,865**	**2,036**	**2,181**	**2,024**	**2,010**	**1,786**
Gasoline	20	16	18	9	11	17	13	11	13	12	12	10	14
Kerosene	65	61	61	66	76	64	49	57	51	56	43	36	38
Diesel	1,666	1,973	2,108	2,210	2,135	2,096	1,859	1,625	1,811	1,880	1,745	1,813	1,617
Fuel Oil	86	127	148	329	222	164	146	172	161	233	223	151	116
Power Generation	**22,981**	**26,916**	**26,006**	**26,995**	**25,835**	**16,773**	**13,565**	**14,249**	**9,720**	**11,288**	**13,231**	**9,957**	**7,280**
Fuel Oil	20,145	23,654	23,058	23,957	22,647	14,924	11,694	12,434	8,248	9,667	11,298	8,436	6,181
Diesel	2,836	3,262	2,948	3,038	3,188	1,849	1,871	1,815	1,473	1,621	1,933	1,521	1,099
Total	**97,757**	**118,847**	**125,391**	**137,457**	**134,609**	**127,349**	**117,267**	**118,577**	**114,015**	**114,240**	**117,341**	**108,128**	**99,277**
Diesel	32,362	36,732	39,245	42,392	41,763	41,805	41,756	42,250	43,260	43,113	44,127	41,438	38,826
Fuel Oil	34,443	46,732	46,294	50,782	49,117	39,224	29,266	30,227	23,806	23,291	25,277	20,875	17,304
Gasoline	15,075	17,739	19,933	21,578	22,641	23,333	22,696	23,095	24,102	24,573	24,829	24,139	22,544
LPG	6,555	8,335	9,119	9,927	10,690	11,904	12,288	12,214	12,732	13,183	12,754	11,534	10,931
Kerosene	4,283	4,361	4,577	5,049	5,007	5,178	4,533	4,014	3,669	3,330	2,980	2,246	1,747
Aviation Fuel	5,038	4,948	6,222	7,729	5,391	5,905	6,729	6,777	6,446	6,750	7,375	7,896	7,925

Annex B.5
COAL CONSUMPTION By Sector

(In Metric Tons, MT)				
Year	Power Generation	Cement	Ind'l/Direct Uses*	Total
1994	1,256,976	1,279,619	42,663	2,579,258
1995	1,420,972	1,342,289	47,452	2,810,713
1996	2,470,363	1,391,036	36,941	3,898,340
1997	3,275,721	1,553,741	47,375	4,876,836
1998	4,045,758	1,338,172	25,611	5,409,540
1999	4,882,889	1,266,257	32,588	6,181,734
2000	7,170,194	1,299,117	28,464	8,497,775
2001	6,995,997	1,271,841	41,768	8,309,607
2002	6,525,469	1,245,138	52,927	7,823,534
2003	6,307,223	1,560,492	46,394	7,914,109
2004	6,586,695	1,667,000	31,704	8,285,399
2005	7,832,044	1,924,519	77,113	9,833,676
2006	7,037,396	2,148,249	78,118	9,263,763
Total	**73,333,220**	**21,527,107**	**695,157**	**95,555,482**

** Energy Uses*

Annex B.6
COAL IMPORTATION By Source

(In Metric Tons, MT)													
Source	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Australia		367,818	728,872	1,282,877	1,229,439	2,435,486	422,174	1,065,957	372,981	348,444	368,484	589,680	809,008
China	348,637	338,303	88,299	256,676	603,882	369,632	3,844,362	3,134,884	3,492,002	3,370,910	3,425,329	1,947,217	1,015,776
Indonesia	497,508	561,754	1,757,910	2,503,960	2,311,926	2,277,284	2,735,531	3,117,128	2,725,519	2,756,116	2,638,767	4,024,773	5,289,959
Vietnam	192,194	140,903	139,311	179,276	136,911	131,334	159,903	283,108	275,357	250,433	468,510	467,371	602,557
South Africa			125,803				83,765		39,155	69,136	73,112		
Russia	74,893	302,001	143,423	25,343									
Total	**1,113,232**	**1,710,779**	**2,983,618**	**4,248,132**	**4,282,158**	**5,213,736**	**7,245,734**	**7,601,077**	**6,905,014**	**6,795,039**	**6,974,202**	**7,029,041**	**7,717,301**

Annex B.7
INSTALLED GENERATING CAPACITY

(In Megawatts, MW)

Year	Hydropower	Coal	Geothermal	Diesel/Oil	Natural Gas	NRE	Total
1982	1,262	50	559	3,277			5,148
1983	1,585	50	784	3,338			5,757
1984	1,666	350	894	3,011			5,921
1985	1,961	350	894	2,578			5,783
1986	2,147	530	894	2,741		191	6,503
1987	2,142	535	894	2,790		184	6,545
1988	2,139	525	894	2,915		167	6,640
1989	2,147	525	888	3,136		167	6,863
1990	2,153	525	888	3,136		167	6,869
1991	2,155	405	888	3,341		NA	6,789
1992	2,257	405	888	3,399		NA	6,949
1993	2,259	441	963	4,296		NA	7,959
1994	2,254	550	1,073	5,335		NA	9,212
1995	2,301	850	1,154	5,425		NA	9,730
1996	2,301	1,600	1,417	5,844		NA	11,162
1997	2,301	1,600	1,819	5,973		NA	11,693
1998	2,301	2,200	1,856	5,568	3	NA	11,928
1999	2,301	3,493	1,931	4,839	3	NA	12,567
2000	2,301	3,963	1,931	4,987	3	NA	13,185
2001	2,518	3,963	1,931	3,927	1,063	NA	13,402
2002	2,518	3,963	1,931	3,527	2,763	NA	14,702
2003	2,867	3,958	1,932	3,604	2,763	NA	15,124
2004	3,217	3,967	1,932	3,669	2,763	NA	15,548
2005	3,223	3,967	1,978	3,663	2,763	25	15,619
2006	3,257	4,177	1,978	3,602	2,763	26	15,803

Annex B.8
POWER GENERATION By Source

(In Gigawatt-Hour, GWh)

Year	Hydropower	Coal	Geothermal	Natural Gas	Diesel/Oil	NRE	Total
1982	3,773	433	3,540		11,316	344	19,406
1983	2,968	568	4,077		12,988	853	21,454
1984	5,278	1,083	4,532		9,460	827	21,180
1985	5,553	3,347	4,929		7,947	990	22,766
1986	6,017	2,643	4,576		7,565	996	21,797
1987	5,247	2,246	4,532		10,242	374	22,641
1988	6,264	2,582	4,844		10,471	377	24,538
1989	6,485	2,413	5,316		10,966	393	25,573
1990	6,062	1,934	5,466		12,434	431	26,327
1991	5,145	1,942	5,758		12,804		25,649
1992	4,440	1,791	5,700		13,939		25,870
1993	5,030	2,015	5,667		13,867		26,579
1994	5,862	1,348	6,320		16,929		30,459
1995	6,232	2,109	6,135		19,078		33,554
1996	7,030	4,855	6,534		18,288		36,707
1997	6,069	7,363	7,237	12	19,116		39,797
1998	5,066	9,388	8,914	20	18,190		41,578
1999	7,840	11,183	10,594	16	11,799		41,432
2000	7,799	16,663	11,626	17	9,185		45,290
2001	7,104	18,789	10,442	848	9,867		47,050
2002	7,033	16,128	10,242	8,771	6,293		48,467
2003	7,869	14,939	9,822	13,139	7,170		52,939
2004	8,593	16,194	10,282	12,384	8,504		55,957
2005	8,387	15,257	9,902	16,861	6,141	19	56,568
2006	9,939	15,294	10,465	16,366	4,665	55	56,784

Annex B.9
ELECTRIFICATION PROFILE

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total Number of Barangays	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945	41,945
Cum. Barangays Energized	26,785	27,426	28,087	28,818	29,400	30,254	31,599	32,281	33,647	34,900	36,578	37,748	38,763	39,381	39,910
Electrification Level, percent	**63.78**	**65.31**	**66.88**	**68.62**	**70.01**	**72.04**	**75.24**	**76.87**	**80.12**	**83.10**	**87.10**	**89.90**	**92.41**	**93.89**	**95.15**

Annex B.10
ENERGY-ECONOMY INDICATORS

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Economic Parameters													
GDP (in billion PhP)	766.37	802.22	849.12	892.86	887.91	918.00	958.40	990.04	1,032.97	1,081.50	1,138.02	1,209.47	1,274.42
Growth Rate (in percent)	4.39	4.68	5.85	5.15	(0.55)	3.39	4.40	1.76	4.34	4.70	5.23	4.97	5.37
Population (million)	66.54	68.62	69.95	71.54	73.15	74.80	76.50	78.03	79.59	81.18	82.80	84.46	86.97
Forex (PhP/US$)	26.42	25.71	26.22	29.47	40.89	39.09	44.25	51.00	51.61	54.22	56.00	55.06	51.29
Crude Cost ($ per barrel)	15.32	16.62	19.32	18.86	12.13	17.21	26.14	22.81	23.80	26.79	37.54	49.32	61.48
Energy													
Energy (in MMBFOE)	146.51	209.75	222.86	241.73	240.24	245.49	250.89	249.74	255.38	265.46	278.71	273.92	272.88
Growth Rate	7.09	43.16	6.25	8.47	(0.62)	2.19	2.20	(0.46)	2.26	3.95	4.99	0.23	(0.38)
Energy (net of NRE, in MMBFOE)				171.79	171.36	176.09	174.43						
Growth Rate				11.03	(0.25)	2.76	(0.94)						
Petroleum (in MMBFOE)	102.72	114.01	117.85	132.93	129.20	122.63	113.61	112.22	108.96	105.16	107.64		
Growth Rate	7.02	10.99	3.37	12.80	(2.81)	(5.09)	(7.36)	(1.22)	(2.91)	(3.49)	2.36		
Oil (in MMBFOE)				132.93	129.21	122.65	106.61					99.49	96.20
Growth Rate				12.80	(2.80)	(5.08)	(13.08)					(2.67)	(3.30)
Electricity (in GWh)	30,459.00	33,554.00	36,708.00	39,797.00	41,578.00	41,432.00	45,290.00	47,040.10	48,467.44	52,941.00	55,957.00	56,567.74	56,784.13
Growth Rate	14.60	10.16	9.40	8.42	4.48	(0.35)	9.31	3.86	3.03	9.23	5.70	(0.14)	0.38
Elasticity													
Energy-to-GDP	1.62	9.23	1.07	1.64	1.11	0.64	0.50	(0.26)	0.52	0.84	0.96	0.05	(0.07)
Energy-to-GDP (net of NRE)				2.14	0.45	0.81	(0.21)						
Petroleum-to-GDP	1.60	2.35	0.58	2.48	5.06	(1.50)	(1.67)	(0.70)	(0.67)	(0.74)	0.45		
Oil-to-GDP				2.48	5.04	(1.50)	(2.97)					(0.54)	(0.62)
Electricity-to-GDP	3.33	2.17	1.61	1.63	(8.06)	(0.10)	2.12	2.20	0.70	1.96	1.09	(0.03)	0.07
Intensity													
Energy-to-GDP (BFOE/P'0000)	1.91	2.61	2.62	2.71	2.71	2.67	2.62	2.52	2.47	2.45	2.45	2.26	2.14
Energy-to-GDP (BFOE/P'0000) (net of NRE)				1.92	1.93	1.92	1.82						
Petroleum-to-GDP (BFOE/P'0000)	1.34	1.42	1.39	1.49	1.46	1.34	1.19	1.13	1.05	0.97	0.95		
Oil-to-GDP (BFOE/P'0000)	16.00	23.49	5.76	24.84	50.56	(15.00)	(16.71)					0.82	0.75
Electricity-to-GDP (kwh/P'000)	39.74	41.83	43.23	44.57	46.83	45.13	47.26	47.51	46.92	48.95	49.17	46.77	44.56
Energy per capita (BFOE)	2.20	3.06	3.19	3.38	3.28	3.28	3.28	3.20	3.21	3.27	3.37	3.24	3.14
Petroleum per capita (BFOE)	1.54	1.66	1.68	1.86	1.77	1.64	1.49	1.44	1.37	1.30	1.30	1.18	1.11
Energy per capita (BFOE) (net of NRE)	0.00	0.00	0.00	5.83	4.19	4.50	3.94	0.00	0.00	0.00	0.00		
Oil per capita (BFOE)	6.70	6.86	6.10	7.05	10.65	7.13	4.35	4.92	4.58	3.91	3.91		
Electricity per capita (kwh)	457.79	489.00	524.80	556.30	568.39	553.90	592.03	602.85	608.97	652.13	675.77	669.75	652.90
Imported Oil (MMBFOE)	102.18	113.98	117.40	132.76	128.93	123.30	113.30	111.33	117.34	115.70	113.22	95.27	92.33
Imported Oil Share to Total Energy	69.74	54.34	52.68	54.92	53.67	49.80	45.16	44.58	45.95	43.58	40.62	34.78	33.83
Oil Import Bill (CIF, MM$)	2.00	2.40	2.85	2.89	1.94	2.47	4.09	3,442.00	3,328.40	3,943.40	4,569.90		
Oil Fraction in Total Import Bill (%)	15.87	16.06	16.68	17.61	19.51	24.14	41.70						

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Dir. Romeo S. Añano (OIC)
Information Technology
and Management Services

Dir. Raquel S. Huliganga
Energy Research Testing
and Laboratory Services

LIST OF UNITS OF MEASUREMENTS

BCF	-	Billion Cubic Feet
BOPD	-	Barrels of Oil Per Day
ckt.-kms.	-	Circuit Kilometers
CO_2	-	Carbon Dioxide
GWh	-	Gigawatt-hours
KTOE	-	Thousand Tonnes of Oil Equivalent
kW	-	Kilowatt
kWp	-	Kilowatt (peak)
MB	-	Thousand Barrels
MMB	-	Million Barrels
MMBFOE	-	Million Barrels of Fuel Oil Equivalent
MMCFG	-	Million Cubic Feet of Gas
MMMT	-	Million Metric Tons
MMSCF	-	Million Standard Cubic Feet
MMT	-	Thousand Metric Tons
MTOE	-	Million Tonnes of Oil Equivalent
MVA	-	Megavolt Ampere
MW	-	Megawatt
Php	-	Philippine Peso
sq. kms.	-	Square Kilometers
TCF	-	Trillion Cubic Feet
TOE	-	Tonnes of Oil Equivalent

LIST OF ACRONYMS

AAP	-	Automobile Association of the Philippines
ACD	-	Asian Cooperation Dialogue
AFTA	-	ASEAN Free Trade Area Agreement
AHAM	-	Association of Home Appliance Manufacturers
AMEM	-	ASEAN Ministers on Energy Meeting
AMEM-SOME	-	ASEAN Ministers on Energy Meeting - Senior Officials Meeting on Energy
AMORE	-	Alliance for Mindanao Off-grid Renewable Energy
AMM	-	Abandoned Mine Methane
ANGVA	-	Asia Pacific Natural Gas Vehicle Association
A.O.	-	Administrative Order
APAEC	-	ASEAN Plan of Action on Energy Cooperation
APEC-EMM	-	Asia Pacific Economic Cooperation - Energy Ministers' Meeting
APEC-EWG	-	Asia Pacific Economic Cooperation - Energy Working Group
APG	-	ASEAN Power Grid
APSA	-	ASEAN Petroleum Security Agreement
ARC	-	Agrarian Reform Community
Batman 1	-	Batangas-Manila Gas Pipeline
Batman 2	-	Bataan-Manila Gas Pipeline
BCQ	-	Bilateral Power Supply Contracts Quantities
BIR	-	Bureau of Internal Revenue
BOI	-	Board of Investment
BOT	-	Build-Operate-Transfer
BRECDA	-	Barangay Renewable Energy and Community Development Association
CAA	-	Clean Air Act
CAI	-	Certificate of Authority to Import
CAMPI	-	Chamber of Automotive Manufacturers of the Philippines, Inc.
CAPEX	-	Capital Expenditure
CBRED	-	Capacity Building to Remove Barriers to Renewable Energy Development
CCRU	-	Continuous Catalytic Reform Unit
CCT	-	Clean Coal Technology
CEPZA	-	Cavite Export Processing Zone Authority
CFL	-	Compact Fluorescent Lamp
CME	-	Coco-Methyl Ester
CMM	-	Coal Mine Methane
CMMI	-	Chase Makros Management, Inc.
CNG	-	Compressed Natural Gas
CNOOC	-	China National Offshore Oil Corporation
CNPLS	-	Cebu-Negros-Panay-Leyte-Samar
COC	-	Coal Operating Contract
CSEZ	-	Clark Special Economic Zone
CWPO	-	Consumer Welfare and Protection Office
DA	-	Department of Agriculture
DBM	-	Department of Budget and Management
DBP	-	Development Bank of the Philippines
D.C.	-	Department Circular
DENR	-	Department of Environment and Natural Resources
DLF	-	Development and Livelihood Fund
DOE	-	Department of Energy

DOF	-	Department of Finance
DOJ	-	Department of Justice
DOLE	-	Department of Labor and Employment
DOST	-	Department of Science and Technology
DOT	-	Department of Tourism
DOTC	-	Department of Transportation and Communications
DSM	-	Demand-Side Management
DTI	-	Department of Trade and Industry
DU	-	Distribution Utility
EAS	-	East Asia Summit
EC	-	Electric Cooperative
ECA	-	Energy Conversion Agreement
ECC	-	Environmental Compliance Certificate
ECT	-	The Energy Charter Treaty
ECTF	-	EAS-Energy Cooperation Task Force
EELS	-	Energy-Efficient Lighting Systems
EF	-	Electrification Fund
EIMP	-	Energy Information Management Program
EMB	-	Environmental Management Bureau
E.O.	-	Executive Order
EOR	-	Enhanced Oil Recovery
EPIRA	-	Electric Power Industry Reform Act
ER	-	Expanded Rural Electrification
ERC	-	Energy Regulatory Commission
ESA	-	Energy Sales Agreement
ESCO	-	Energy Service Company
ESI	-	Energy Security Initiative
ESOM	-	Electricity Supply, Operation and Maintenance
ET Loop	-	Metro Manila Gas Loop
FAME	-	Fatty Acid Methyl Ester
FFV	-	Flexi-Fuel Vehicle
GDP	-	Gross Domestic Product
GEF	-	Global Environment Facility
GEMP	-	Government Energy Management Program
GFA	-	General Framework Agreement
GFI	-	Government Financing Institution
GHG	-	Greenhouse Gas
GK	-	Gawad Kalinga
GSLFAP	-	Gasoline Station Lending and Financial Assistance Program
GVA	-	Gross Value Added
IAEA	-	International Atomic Energy Agency
IEC	-	Information, Education and Communication
IEE	-	Initial Environmental Examination
IEF	-	International Energy Forum
IOR	-	Improved Oil Recovery
IPP	-	Independent Power Producer
IRR	-	Implementing Rules and Regulations
JAMA	-	Japan Automobile Manufacturers Association
JAPEX	-	Japan Petroleum Exploration Philippines, Ltd.
JDA	-	Joint Development Agreement
JICA	-	Japan International Cooperation Agency
JMSU	-	Joint Marine Seismic Undertaking
JODI	-	Joint Oil Data Initiative
KEPCO	-	Korean Electric Power Corporation
LFO	-	Liquid Fuel Oil
LGU	-	Local Government Unit
LOI	-	Letter of Intent
LPG	-	Liquefied Petroleum Gas

LRT	-	Light Railway Transit
LTFRB	-	Land Transportation Franchising and Regulatory Bureau
MAR	-	Maximum Allowable Revenue
MEPS	-	Minimum Energy Performance Standards
METI	-	Ministry of Energy, Trade and Industry
MFI	-	Micro-finance Institutions
MIR	-	Minimum Inventory Requirement
MMDA	-	Metropolitan Manila Development Authority
MMS	-	Market Management System
MOA	-	Memorandum of Agreement
MOPS	-	Mean of Platts Singapore
MOST	-	Market Operations Scenario Tests
MOU	-	Memorandum of Understanding
MRT	-	Metro Rail Transit
MSC	-	Market Service Center
NBB	-	National Biofuels Board
NCC	-	Negotiated Commercial Contract
NCR	-	National Capital Region
NEDA	-	National Economic and Development Authority
NEECP	-	National Energy Efficiency and Conservation Program
NGO	-	Non-government Organization
NGVPPT	-	Natural Gas Vehicle Program for Public Transport
NNPP	-	Northern Negros Power Plant
NPC	-	National Power Corporation
NPP	-	New Power Provider
NPSC	-	Nuclear Power Steering Committee
NSCB	-	National Statistical Coordination Board
NSO	-	National Statistics Office
OEB	-	Overall Energy Balance
OECD	-	Organization for Economic Cooperation and Development
OEM	-	Original Equipment Manufactured
OTEC	-	Ocean Thermal Energy Conservation
PAGCOR	-	Philippine Amusement and Gaming Corporation
PAMATEC	-	Paris-Manila Technology Corporation, Inc.
PCA	-	Philippine Coconut Authority
PCC	-	Pre-Commercial Contract
PCRM	-	Pricing and Cost Recovery Mechanism
P.D.	-	Presidential Decree
PDM	-	Price Determination Methodology
PDP	-	Power Development Plan
PECR	-	Philippine Energy Contracting Round
PELMATP	-	Philippine Efficient Lighting Market Transformation Project
PEMC	-	Philippine Electricity Market Corporation
PEP	-	Philippine Energy Plan
PETROVIETNAM	-	Vietnam Oil and Gas Corporation
PHESI	-	Philippine Hybrid Energy Systems, Inc.
PhilRice	-	Philippine Rice Research Institute
PIA	-	Philippine Information Agency
PNCC	-	Pre-Negotiated Commercial Contract
PNOC-AFC	-	PNOC-Alternative Fuels Corporation
PNOC-EDC	-	Philippine National Oil Company-Energy Development Corporation
PNRI	-	Philippine Nuclear Research institute
PNS	-	Philippine National Standard
PRES	-	Philippine Rural Electrification Service
PSALM	-	Power Sector Assets and Liabilities Management

		Corporation
PSC	-	Production-Sharing Contract
PSPC	-	Pilipinas Shell Petroleum Corporation
PTFCC	-	Presidential Task Force on Climate Change
PUV	-	Public Utility Vehicle
QTP	-	Qualified Third Party
R.A.	-	Republic Act
REPF	-	Renewable Energy Policy Framework
RPP	-	Rural Power Project
RWMHEEF	-	Reforestation, Watershed Management, Health, and/or Environment Enhancement Fund
SAARC	-	South Asian Association for Regional Cooperation
SC	-	Service Contract
SCA	-	Settlement and Clarification Agreement
SDA	-	Self-Drive Away
SEC	-	Securities and Exchange Commission
SISID	-	Small Island Submarine Interconnection Development
SPOTS	-	Solar Power Technology Support
SRA	-	Sugar Regulatory Administration
SSMP	-	Sustainable Solar Market Package
STF	-	Special Trust Fund
SURE	-	Solution Using Renewable Energy
RAB	-	Regulatory Asset Base
ROMM	-	Rehabilitation, Operation, Maintenance and Management
TAGP	-	Trans-ASEAN Gas Pipeline
TCPPA	-	Technical Committee on Petroleum Products and Additives
TDP	-	Transmission Development Plan
TFEC	-	Total Final Energy Consumption
TPES	-	Total Primary Energy Supply
TransCo	-	National Transmission Corporation
TWRG	-	Transmission Wheeling Rate Guidelines
UC	-	Universal Charge
USAID	-	United States Agency for International Development
USDOE	-	United States Department of Energy
USGS	-	United States Geological Services
WB-GEF	-	World Bank-Global Environment Facility
WESM	-	Wholesale Electricity Spot Market
WTI	-	West Texas Intermediate

CONVERSION TABLE

Length

1 meter	39.3701 inches

Area

1 square meter	10.7639 square feet
1 square kilometer	0.386102 square mile 100 hectares
1 hectare	10,000 square meters 2.47105 acres

Volume

1 liter	0.0353147 cubic foot 0.264172 US gallon 0.001 cubic meter 0.219969 Imperial gallon
1 US barrel	5.6146 cubic feet 0.158987 cubic meter 42 US gallons 34.9726 Imperial gallons

Mass

1 kilogram	2.20462 pounds 0.907185 tonne 0.892857 long tone
1 tonne (metric)	1,000 kilograms 2,204.62 pounds 0.984207 long tone 1.10231 short tons
1 long ton (Imperial)	2,240 pounds 1.12 short tons 1.101605 tonnes

Energy and Power

1 international table (IT)	
1 calorie	4.1868 joules
1 kilocalorie=(IT)	1.163 watt hours
1 kilowatt hour	3,412.14 BTUs 895.845 kilocalories (IT) 3.6 megajoules 1.34102 horse powerhours
1 metric horsepower	735.499 watts 542.476 foot pounds force/second 0.98632 Imperial horsepower
1 kilowatt	737.562 foot pounds force/second 1.35962 metric horsepower

Product specific gravity ranges

	Specific Gravity	Barrels per tonne
Crude Oil	0.80-0.97	8.0-6.6
Aviation gasoline	0.70-0.78	9.1-8.2
Motor gasoline	0.71-0.79	9.0-8.1
Kerosene	0.78-0.84	8.2-7.1
Gas Oil	0.82-0.92	7.8-6.9
Diesel Oil	0.82-0.92	7.8-6.9
Lubricating Oil	0.85-0.95	7.5-6.7
Fuel Oil	0.92-0.99	6.9-6.5
Asphaltic bitumen	1.00-1.10	6.4-5.8

Converting into Barrels of Fuel Oil Equivalent (BFOE)

Energy Forms are converted into a common unit, BFOE, based on fuel oil equivalent at 18,600 BTU/lb as follows:

Electricity	600 kwh	1.0000
Regular Gasoline	1 bbl	0.8470
Premium	1 bbl	0.8624
Kerosene	1 bbl	0.8798
Diesel Oil	1 bbl	0.9328
LPG	1 bbl	0.6384
Aviation Gas	1 bbl	0.8478
Fuel Oil		
Pitch	1 bbl	1.0058
PPC	1 bbl	1.0197
Coal (10,000 BTU/lb)	1 MT	3.3500
Alcohol	1 bbl	0.5561
Bagasse (50% moisture)	1 MT	1.4400
Coconut Oil	1 bbl	1.0000

Approximate heat energy content of fuels

	BTU/lb	MJ/kg
Crude oil	18,300-19,500	42-45.2
Gasoline	20500	47.7
Kerosene	19800	46.1
Benzole	18100	42.1
Ethanol	11600	27.0
Gas oil	19200	44.7
Fuel oil (bunker)	18300	42.6
Coal (bituminous)	10200-14600	23-734.0
LNG (natural gas)	22300	51.9

Crude oil	0.1344 TOE/bbl
BFOE	0.1444 TOE/bbl
Coal	0.488 TOE/MT
Electricity	0.086 TOE/MWh

ACKNOWLEDGEMENTS

- We, at the Department of Energy together with our attached agencies: the Philippine National Oil Company (PNOC) and its subsidiaries, National Power Corporation (NPC), National Electrification Administration (NEA), Power Sector Assets and :Liabilities Management (PSALM) Corporation, National Transmission Corporation (TransCo) and the Wholesale Electricity Spot Market (WESM) through the Philippine Electricity Market Corporation (PEMC) gratefully acknowledge the various contributions from our partners in government and the private sector who collaborated with us in coming up with the 2007 Philippine Energy Plan Update. This Plan Update would not have been possible without the valuable inputs and support of our co-workers, and respected stakeholders from the energy circle as well as other concerned organizations.

- We wish to particularly thank the National Economic and Development Authority, Bangko Sentral ng Pilipinas (BSP), National Statistics Office and the National Statistical Coordination Board (NSCB) for providing us the socio-economic planning parameters used in coming up with the energy demand forecasts.

- We also acknowledge with appreciation the continuing support of the United States Agency for International Development-Energy and Clean Air Project and its academic network for providing us with the technical assistance in the conduct of the regional energy consultations in four key cities of the country, namely: the cities of Bacolod, General Santos, Laoag and Batangas. Similarly, we wish to thank the local government units of these respective cities for their significant contributions rendered during the consultations.

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