

# Chapter 10

## Energy Independence

### I. SITUATIONER

#### A. Indigenous Energy Production (2001-2003)

The total indigenous energy production in 2003 increased by 8.6 percent reaching 140.1 million barrels of fuel oil equivalent (MMBFOE) as compared to its 2002 aggregate of 129.5 MMBFOE. The bulk of the increase may be attributed to the increased production of natural gas from the Malampaya gas field which enabled the country to enhance its energy self-sufficiency level increase from 51.1 percent in 2002 to 53.9 percent in 2003.

Domestic oil production declined by 0.3 MMBFOE in 2003 from the 5.0 MMBFOE registered in 2002. Both Nido and Matinloc oilfields have ceased production in September 2003 in view of the closure of the Caltex refinery, which was the main user of the crude oil produced from these fields. Furthermore, no oil was harnessed from the Malampaya Oil Rim in the same year since the field is currently under economic evaluation for commercial development.

Relatedly, total gas production from the San Antonio and Malampaya gas fields as of end-December 2003 reached 94,802.9 million cubic feet (MMCF) as compared to the 2002 output of 62,205 MMCF. Condensate production from the Malampaya gas field in 2003, on the other hand, amounted to 4.9 million barrels (MMB) as against 3.3 MMB in 2002.

Geothermal energy remains a significant source of power comprising 18.6 percent of the country's power requirements in 2003. For the year, power generation from this energy resource reached 9,822 gigawatt-hours (GW) translating to about 16.9 MMBFOE displacement. Further exploration and development of geothermal fields resulted in the drilling of ten wells in various geothermal areas in the country.

Hydropower contributed 13.6 MMBFOE to the country's total indigenous supply in 2003. This registered an 11.9 percent-increase from its year-ago level.

Meanwhile, the intensified exploration and development program for the country's coal resources enabled the coal sector to surpass its 2003 production target by 11.2 percent with the actual production level of 6.7 MMBFOE. This is mainly due to the increased output of the Semirara Mining Corporation (SMC) as well as the renewed interest in small-scale coal mining in Cebu and Zamboanga provinces. SMC, the largest open cut coalmine in the country, produced a total of 6.2 MMBFOE of coal from its Panian pit in Semirara Island, Antique.

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<sup>1</sup> Self-sufficiency level is obtained by taking the ratio of indigenous production over primary energy supply, net of exports, bunkering and stock change.

## Energy Independence

Moreso, renewable energy such as biomass, solar and wind continue to play a major role in the gross energy requirements of the sector. The total supply from these renewable sources posted a moderate growth of 4.8 percent from 76.8 MMBFOE in 2002 to 80.3 MMBFOE in 2003.

The total energy consumption of the country increased from 250.8 MMBFOE in 2002 to 268.16 MMBFOE in 2003 with an energy self-sufficiency level reaching 53.87 percent (as indicated in Annex 10-1: Assessment of the 2001-2004 MTPDP Targets). From 38 percent in 2002, the renewable power share in the power generation mix swelled to 42 percent in 2003.

### B. Oil Industry

As of August 2004, about 374 players are engaged in different downstream activities of the oil industry which is a 25.5-percent increase from 2002. The country has a total demand of 0.289 million barrels/day or 0.36 percent of the world oil demand while the current supply inventory is at 14,481 million barrels (MB) translating to a 50-day supply. The prevailing price range in Metro Manila as of September 10, 2004 is shown in Table 10-1.

**Table 10-1 Prevailing Price Range in Metro Manila**

| Product           | Price Range (PhP) | Unit   |
|-------------------|-------------------|--------|
| Unleaded Gasoline | 26.38-26.68       | liter  |
| Kerosene          | 21.51-21.96       | Liter  |
| Diesel            | 20.88-21.33       | Liter  |
| LPG               | 331-369           | 11 kgs |

Source: DOE

### C. Oil Price Status and Its Impact on Domestic Pump Prices

The country's domestic oil prices are generally based on international prices with Dubai [Freight on Board prices] as benchmark for crude oil price in Asia and the Mean of Platts in Singapore as basis for finished products. International oil prices have hit an all-time high largely due to steep demand from China and India in light of their increased economic activities. The declining spare production and refining capacity and speculative trading activities such as the terror alerts in the US, unresolved tax problems between the Yukos and the Russian Government, and sabotage activities on Iraqi pipelines further contributed to the increase in worldwide oil prices. For the month of January 2004, Dubai crude oil prices were estimated at US\$27.93 per barrel while the present price has now reached an estimated US\$35 per barrel. As government has no control over international oil price surges, this predicament should be viewed as a price problem rather than as a supply problem. As a rule of thumb, every US\$1 change in crude oil product cost results in a corresponding adjustment of PhP0.38 per liter in domestic pump price. Since the government has no resources to subsidize oil prices, there are the resulting increases in the domestic prices of oil products. However, compared to other oil importing countries, the Philippines still has one of the lowest pump prices as presented in Table 10-2.

**Table 10-2 Comparative Pump Prices, in Peso/Liter  
(As of 1 October 2004)**

| Country     | Unleaded Gasoline | Diesel |
|-------------|-------------------|--------|
| Hong Kong   | 85.84             | 51.46  |
| South Korea | 66.64             | 42.29  |
| Singapore   | 50.31             | 30.23  |
| New Zealand | 46.61             | 24.17  |
| Australia   | 43.52             | 44.89  |
| Thailand    | 29.59             | 19.81* |
| Philippines | 26.43             | 21.63  |
| US          | 28.46             | 29.87  |

\* Diesel price in Thailand currently subsidized

Source: DOE

#### D. Industry Conditions

A comparison of industry conditions between the regulated and deregulated oil industry is presented in Table 10-3.

**Table 10-3 Comparison of Industry Conditions, Pre- and Post-Deregulation**

| REGULATED MARKET  | DEREGULATED REGIME  |
|---|---|
| 1. Only three companies in operation. (All are refiners)  | 1. Entry of 73 new players. (All direct importers)  |
| 2. Practically, all supplies were locally sourced with refinery utilization reaching more than 85 percent.      | 2. Clean Air Act requires importations of higher quality fuels, the quality of which local refiners cannot meet.  |
| 3. Thermal power plants (Sucat, Malaya, Tegen) were in full operation, thus, the higher demand for bunker fuel. | 3. Decrease in the demand for bunker fuel, following decommissioning of thermal plants which modified the demand mix to favor importation of lighter crude. |
| 4. Demand mix similar to hydroskimming yield of Dubai which is heavy crude.                                     | 4. No OPSF, No subsidy.   |
| 5. Government subsidy (Oil Price Stabilization Fund) to stabilize prices.                                       | 5. Power of choice for consumers.   |
| 6. Guaranteed return of 6 to 10 percent.  | 6. No guaranteed return. Business risks on the part of the players.   |

Source: DOE

#### E. Deregulation at Work

Despite world oil crude price increases, the downstream oil industry conditions seem to have improved after its deregulation. More players are now in the market providing better competition and improved quality products and facilities as well as ancillary services. New investments in bulk and retail businesses have also increased. The industry now boasts of 182 operational LPG refilling plants, 3,801 gasoline stations, 10,341 MB of storage capacity and 117 strategically situated depots, of which 11 are import/export terminals. Areas outside Metro Manila have also benefited in terms of wider access to petroleum products. In sum, oil deregulation has enhanced the consumer's power of choice.

**Table 10-4 Number of Gasoline Stations (Outside Metro Manila)**

|          | Dec. 2003 | Dec. 2002 | % Increase |
|----------|-----------|-----------|------------|
| Luzon    | 2,021     | 1,943     | 4.01       |
| Visayas  | 622       | 617       | 0.81       |
| Mindanao | 611       | 608       | 0.49       |
| TOTAL    | 3,254     | 3,168     | 2.71       |

*Source: DOE*

## **II. GOALS, STRATEGIES AND ACTION PLANS**

### **A. Energy Independence Strategy**

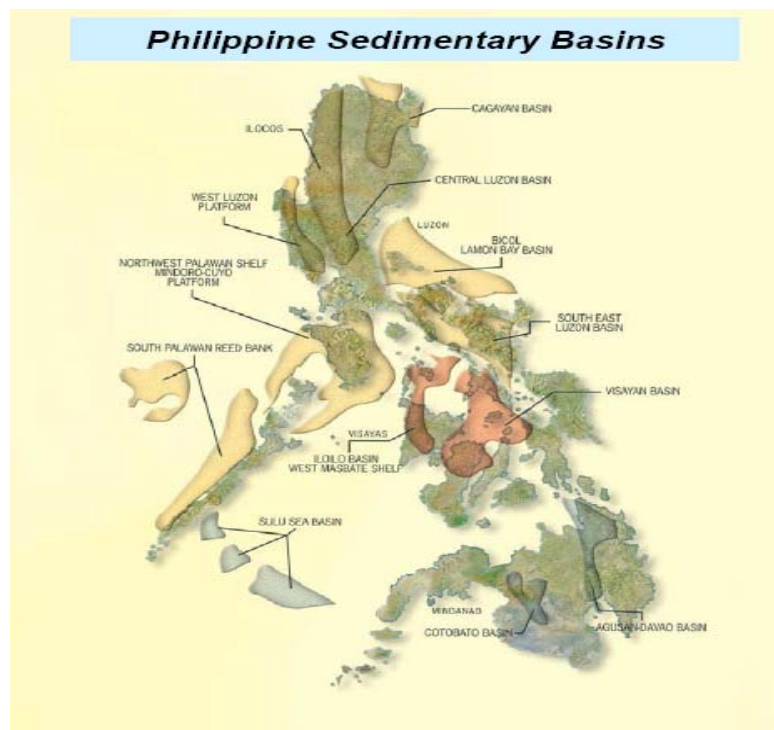
Energy independence can only be achieved through a predictable energy policy that promotes a level playing field. The government should set clear and transparent policy directions. Consistent policies among the three branches of the government (i.e., executive, legislative and judicial) should also be achieved. In addition, continuity in policy directions should be enforced in light of long gestation period of energy projects.

The implementation of critical and strategic energy infrastructure projects is the key strategy towards achieving energy independence. Activities on this entail expansion of oil and gas exploration/production activities, renewable energy development, alternative fuel development, and strong strategic alliances, among others.

#### ***1. Increasing Oil and Gas Exploration***

Intensive promotion of oil and gas exploration like that of the Malampaya oil and natural gas field should be pursued. The Department of Energy (DOE) will expand the country's oil and gas reserves by 20 percent in the next 10 years. Studies have shown that the Philippines has a vast potential for energy developments. Results of the Philippines Petroleum Resource Assessment showed that the country has an estimated nine billion barrels of fuel oil equivalent of total recoverable petroleum resources. Figure 10-1 shows the potential Philippine sedimentary basins. The oil and natural gas reserves in the country could be developed, supported by a business-friendly decision of the Supreme Court (SC) on hydrocarbons exploration, not just mining. Shell, which invested US\$4 billion to US\$5 billion when it took over the Malampaya field from U.S. Occidental Petroleum, would have fully recovered its cost by 2005. That means the Philippine government share of about US\$500 million a year of US\$10 billion over 20 years could begin to go up by 2005. Aside from this, the first Public Contracting Round (PCR -1) was launched in August 2003 offering 46 contract areas, while PCR-2 will be launched in 2005. Two blocks were bid by BHP Billiton, Amerada Hess and Occidental Petroleum. In addition, the Philippine National Oil Company (PNOC) has signed a Memorandum of Understanding with China National Offshore Oil Company to undertake a three-year joint petroleum resource potential exploration research in certain areas of the South China Sea. More investments are expected to be generated if the Supreme Court (SC) will reconsider its ruling on the Mining Act of 1995 which declared the Act's provisions as unconstitutional and void. Such decision has trimmed down the list of investors for the PCR. In view of this, DOE shall advocate for SC reconsideration inasmuch as the petroleum service contracts issued pursuant to the Oil and Exploration Development Act of 1972 contain provisions on the protection and welfare of the country and its resources.

**Figure 10-1 Potential Sedimentary Basins in the Philippines**



Source: DOE

Intensified exploration and development of domestic coal will be a continuing thrust of the government. The DOE will conduct studies to identify additional coal exploration areas to boost the production of local coal. The exploration and development of idle coal areas will be promoted to address the projected increase in coal demand with the programmed commissioning of mine-mouth coal-fired power plants in the country. Indigenous coal production of 45.2 million metric tons is expected to fuel coal-fired power plants scheduled for commissioning during the period. This includes indicative mine-mouth coal-fired power plants located in Cebu, Sultan Kudarat, Antique, Cagayan, Surigao and Isabela.

To address environmental concerns, DOE shall encourage the operation of coal power plants to only those that utilize clean coal technologies.

## **2. Strengthening of PNOC**

It is also crucial that the PNOC and its concerned subsidiaries be strengthened to spearhead the development of indigenous energy resources.

The PNOC needs to be restructured and transformed into a world-class petroleum company to increase its competitive edge in discovering new indigenous energy resources and in building global partnerships and collaborative undertakings.

The PNOC-Exploration Corporation will be technically upgraded to increase the discovery of new oil and gas reserves in the country. The PNOC-Energy Development Corporation (PNOC-EDC)

will lead the country towards the goal of becoming the top geothermal producer in the world through strategic alliances with the private sector. Other PNOC subsidiaries will also undergo similar upgrading, to wit: PNOC-Petrochemical Company will play a key role in the revival and strengthening of the country's midstream petrochemical industry through the establishment of a naphtha cracker plant; and PNOC Shipping and Transport Company will modernize its fleet through strategic alliances with private sector to bring fuel to demand centers.

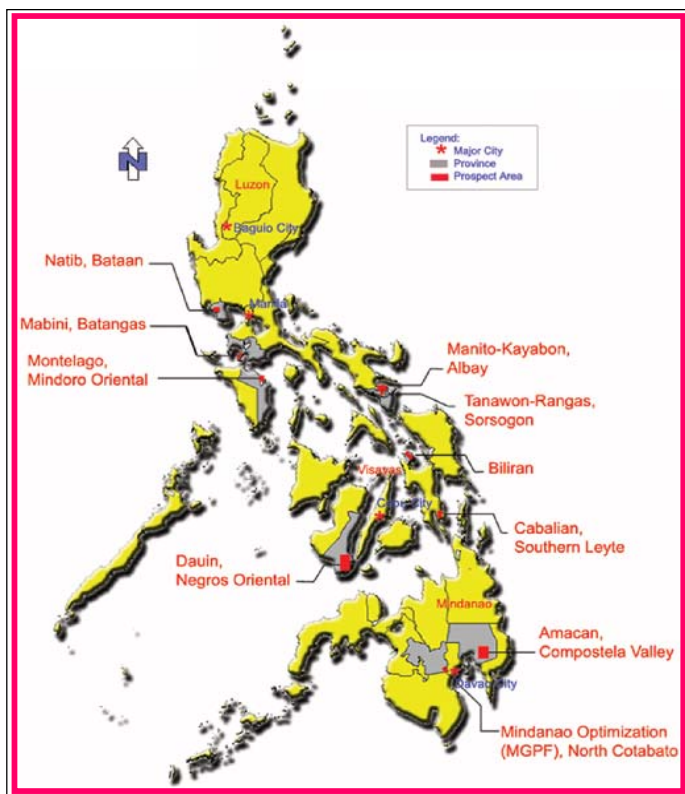
**3. Pursuing the Development of Renewable Energy**

For renewable energy development, the government has to strive to be the geothermal energy world leader, largest producer of wind power and solar manufacturing hub in Southeast Asia. In addition, the development of hydropower plants and biomass projects should be continuously pursued.

**a. Geothermal Energy**

Recent studies indicated that the country has 2,047 megawatt (mW) proven reserves and 4,790 mW potential reserves. Meanwhile, the full utilization/optimization of the already known fields such as the Bacman in Albay, Tongonan in Leyte, Palinpinon and Mambucal in Negros and Mt. Apo in Davao should be undertaken. Active promotion of geothermal exploration through Geothermal Bid Round should be continuously pursued in which geothermal sites are offered and bid out to private investors for their development. The first bidding round (extended until November 2005) offers 10 prospective geological sites with 300-510 mW potential capacity. Figure 10-2 shows the location and capacity of said existing geothermal plants.

**Figure 10-2 Geothermal Plants/Resources in the Philippines**

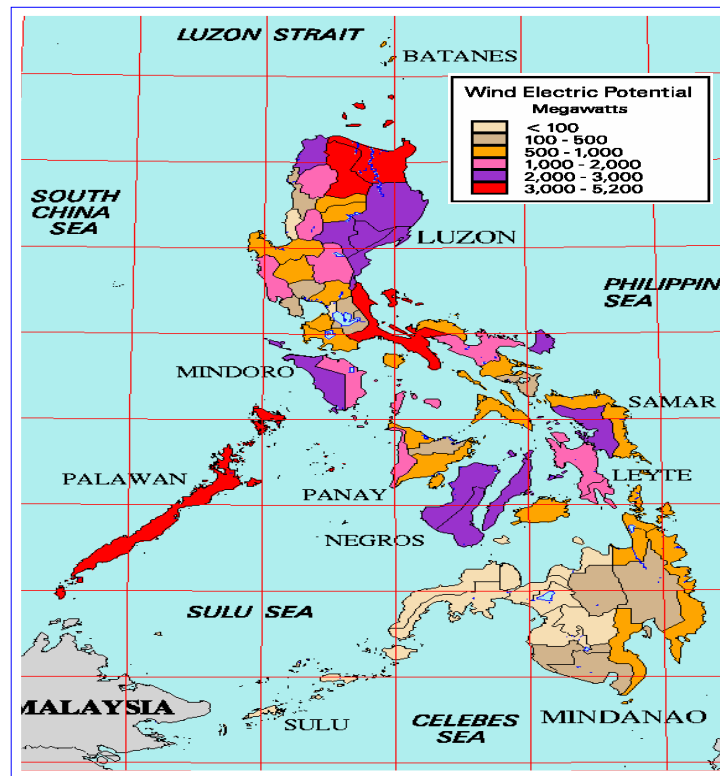


Source : DOE

b. Wind Energy

With the country's 1,038 wind sites having a potential capacity of 7,404 mW, the country can be on its way to become the leading producer of wind energy in Southeast Asia as seen in Figure 10-3. Within the next ten years, the government aims to install about 417 mW of wind-based power projects. At present, several studies are being conducted by PNOC-EDC to verify their viability. In June 2004, the first wind power investment kit that highlights the various opportunities for developing 16 wind power areas with an aggregate potential of 345 mW was launched. The groundbreaking of Northwind's 25-mW Wind Power Project in Bangui, Ilocos Norte was also held in April of the same year while the first commercial wind-diesel hybrid project in Batanes was inaugurated in August 2004. By 2008, Luzon will host three major wind farms, namely, Caranglan in Nueva Ecija, Mauban in Quezon, and Pagudpud in Ilocos Norte.

**Figure 10-3 Wind Energy in the Philippines**



Source: DOE

c. Solar Energy

Located just above the equator, the country has vast potential for solar energy. Energy from the sun has become a popular source of electricity specifically in off-grid barangays to counter the prohibitive cost of extending power transmission and distribution lines and difficulty of transporting generator to remote areas.

Highlighting the efforts of the energy sector on the promotion and use of solar energy is the award bestowed to PNOC's Solar Home Distribution Project as it garnered the first prize in the

Energy Globe Awards in Linz, Austria. On the other hand, the Sunpower Solar Wafer Fabrication Plant located in Laguna Technopark in Sta. Rosa, Laguna was inaugurated in April 2004. The US\$30-million plant manufactures high-efficiency photovoltaic cells and is expected to produce an equivalent of 25 mW in its initial year of operation increasing to 150 mW within the next five years. The plant can supply six percent of the world's total available market for photovoltaic industry, boosting the country's bid to become a solar manufacturing hub in Southeast Asia. The Sunpower project plans to distribute 30 percent of its production to the local market thereby significantly decreasing the cost of manufacturing solar panels.

### **d. Hydropower Energy**

Hydropower will be continuously developed through integrated and intensive exploration, development and management of these resources. Within the next ten years, the aim is to double the generating capacity from hydropower resources using the more acceptable run-of-river type of development.

The West Japan Engineering Company (WestJEC) and TransAsia Corporation have shown interest in the conduct of feasibility studies for the Timbaban and Villasiga Hydropower Projects. WestJEC has likewise conducted another study on the 18-MW Catuiran Hydropower project in Mindoro. For mini-hydropower development, several projects are being pursued in coordination with the local government units (LGUs) which include the 560-kilo watt (kW) Hinubasan in Surigao, 750-kW San Luis in Aurora, 960-kW Cantingas in Romblon and the 2.5-mW Sevilla in Bohol.

At the microhydropower level, the Government of Japan through the Japan International Cooperation Agency (JICA) has financed several projects in 2003. These include the Grass Roots Grant Aid Program which involves the construction of the 35-kW Cagaluan and the 18-kW Pantikian microhydropower plants in Kalinga Province, Development Study Program in Northern Luzon which identified 40 microhydropower sites for possible inclusion in the DOE's microhydropower database, and construction of micro-hydropower plants for electrification of upland dwellers in northern Luzon which will install 14 micro-hydropower plants amounting to PhP296 million for 19 unenergized off-grid barangays. A detailed feasibility study on this project will be conducted by JICA in 2005. JICA has likewise financed the establishment of the microhydropower testing center at the De La Salle University which will provide latest technological development thereby enhancing capability of local turbine manufacturers and fabricators.

### **e. Biomass**

The country should strive to promote the development of biomass projects considering its abundance. The increased utilization of biomass will contribute to the government's agenda on energy independence. In line with this, DOE is pursuing the development of the 30-mW bioenergy project of Talisay Bioenergy Inc. and the 50-mW bagasse cogeneration station of Victorias Bioenergy Inc.

The 30-mW bioenergy project situated in Talisay City, Negros Occidental will utilize bagasse as supplemented with cane residues and woodchips. This project, which is expected to contribute to the carbon emission reductions program of the government, shall create a market for commercial tree plantations, provide employment for local people and provide the local community with a reliable electricity source. It is targeted for commissioning in 2007. On the other hand, the 50-mW bagasse cogeneration station will be located alongside the existing sugar mill and refinery complex in Victorias

City, Negros Occidental that will use bagasse from the Victorias Milling Corporation (VMC), supplemented by cane trash residues and woodchips during offseason fuel. The said plant shall provide process steam and electrical power requirements to VMC mills and export surplus electricity to the local electrical distribution system. It is targeted for commissioning in 2008.

f. Clean Development Mechanism and the Emerging Carbon Market

Last November 2003, the Philippines ratified the Kyoto Protocol in support of climate change efforts both in the local and international arena. The Department of Environment and Natural Resources (DENR) was designated as the national authority for the Clean Development Mechanism (CDM), by virtue of Executive Order (EO) 320 dated June 25, 2004, with the DOE taking the lead role in evaluating energy-related projects prior to their endorsement to/registration with the United Nations Framework Convention on Climate Change–CDM Executive Board. The CDM is a project-based mechanism that aims to reduce greenhouse gas emissions. Meanwhile, some industrialized countries like Germany have initiated the establishment of carbon funds which will be used to purchase carbon emission certificates (CER) to comply with their pledged reduction levels in GHG emission under the Kyoto Protocol. It will be advantageous to the country to actively participate in the emerging carbon market as a seller of CERs since it will boost the development of indigenous resources in line with the energy independence agenda.

***4. Expanding the Use of Natural Gas***

The use of natural gas should be expanded in the power sector through the conversion of existing and decommissioned power plants like the Malaya, Sucat and Limay power plants and the construction of greenfield power plants. In the transport sector, buses can run by compressed natural gas (CNG), while combined heat and power systems can be introduced in industrial and commercial applications. The necessary gas pipelines and associated facilities such as the Batangas-Manila (Figure 10-4) spur line and the Liquefied Natural Gas (LNG) terminals should be constructed by 2007 and 2008, respectively, to convey the gas fuel to the demand points. The CNG buses will start plying major routes from Manila to Laguna by first quarter of 2005 while the mother-daughter stations should also be established during this period. In line with this, local bus operators should sign purchase contracts for 140 units of CNG buses from China by September 2004. For the industrial sector, the

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<sup>2</sup> *CHP is the simultaneous production of electricity and heat using a single fuel that can be burnt in a boiler. The heat produced from the electricity generating process is captured and utilized to produce high and low steam which can be used as a heat source*

Figure 10-4 Proposed Batangas-Manila Natural Gas Pipeline



Source: DOE

### 5. Developing Fuel Blends

Accelerated development of fuel blends such as coco-biodiesel and ethanol should be resorted to boost the energy independence agenda. With regard to the acceleration of the Coco-biodiesel Program, Memorandum Circular No. 55 was issued on February 9, 2004, “Directing all departments, bureaus, agencies and instrumentalities of the government, including government-owned and controlled corporations, to incorporate the use of one percent by volume of coconut methyl ester in their diesel requirements.” This program was officially launched in April 2004 with commercial utilization commencing in July.

The government of Thailand through the Petroleum Authority of Thailand will help the country conduct a thorough study on the possibility of developing ethanol as a fuel additive. In addition, Petron Corporation has signified interest to take the lead in undertaking initial studies in determining the standards for the use of ethanol and viability of its implementation. The first Philippine Fuel Ethanol Alliance was founded with DOE, Department of Agriculture and Sugar Planters Association of the Philippines, Sugar Regulatory Administration, and Center for Alcohol Research and Development Foundation Inc. as members.

## **6. Forging Strategic Alliances**

Strong strategic alliances should be forged like the cooperation with Thailand for the possible use of Subic as a regional storage facility, joint development efforts on upstream exploration with neighboring countries, and arrangements with Russia as new oil suppliers and China, Australia and Indonesia as primary coal suppliers.

## **7. Undertaking Research Programs**

Research and development for renewable energy systems have to be undertaken in support of the energy independence agenda. A web-based GIS on renewable energy including picohydro resources database as well as the compendium of biogas systems should be established to be spearheaded by DOE and the Department of Science and Technology. Other activities that need to be considered include: (a) the development of localized component kits and prospecting for local manufacturers of natural gas vehicles; (b) deep cycle battery; (c) small-scale biogas system technology validation and information packaging; (d) standardization of Balance of System; and (e) windmill technology validation and design improvement.

## **B. Energy Efficiency and Conservation**

The foregoing supply-side strategy must be accompanied by demand-side strategy to optimize the use of scarce resources. To save more on energy, the Energy Efficiency and Conservation Program was launched on August 25, 2004 by DOE. This program aims to help mitigate the impact of rising oil prices, reduce expenditures on fuel and power, and contribute to environmental protection program. In line with this, mandatory implementation of the following programs will be pushed: (a) the use of CNG for transport buses; (b) biofuels as mandatory fuel blends; (c) expansion of energy labeling to include other appliances, vehicles, electrical devices and equipment; (d) shift to energy efficient lighting in residential, commercial and industrial establishments; and (e) fuel consumption reduction among government agencies.

Public cooperation will be encouraged in terms of voluntary agreements like anti-idling, carpooling, “carless” day schemes, etc., partnership with fast food chains, ecozones, industries and companies, wider implementation of Energy Labeling and Efficiency Standards (e.g., fuel efficiency rating labels in auto dealer showroom, etc.), and Energy Audits and Demand Side Management.

In detail, the Energy Efficiency and Conservation Programs are the following:

### **1. Fuel Efficiency Guide Labels in Motor Vehicle Dealer Showroom**

The program aims to promote consumer awareness on fuel vehicle efficiency by encouraging car manufacturers and assemblers to display in their showrooms the fuel economy rating results of their entries in the previous DOE fuel economy runs. This would allow clients to consider fuel vehicle efficiency aside from the brand model, color, engine displacement or horsepower/torque rating in purchasing a vehicle.

### **2. Energy Labeling and Standards for Appliances and Equipment**

The energy labeling and standards program aims to improve the efficiency and performance of appliances, equipment and other energy consuming devices. As a consumer protection measure, an

energy label allows the consumers to compare the energy cost of competing brands and models of similar sizes and capacities. The projected cumulative savings under this program is estimated at 7.6 MMBFOE in the next ten years.

### ***3. Government Enercon Program***

The foremost objective of the program is to reduce electricity and fuel consumption by 10 percent in all government offices. It also aims to assist government agencies in instituting efficient energy management to reduce their expenditures on fuel and electricity by introducing energy efficient technologies and practices which include among others, the integration of energy efficiency concepts into the procurement practices of government agencies. The potential energy savings under the program is projected at an aggregate of 2.9 MMBFOE for the next ten years.

### ***4. Energy Management Programs***

These services are geared to assist the industrial and commercial establishments in determining the most cost-effective approaches towards the judicious and efficient utilization of energy.

### ***5. Energy Audit***

Energy audit of industrial and commercial establishments and government buildings will continuously be implemented in partnership with the energy service companies. The conduct of 36 energy audits per year will contribute total potential cumulative savings of 2.8 MMBFOE in 2005, 4.2 MMBFOE in 2010 and 4.7 MMBFOE in 2014.

### ***6. Partnership for Energy Responsive Companies (PERCs) and Partnership for Energy Responsive Ecozones (PEREZ) programs***

The PERCs and PEREZ programs are government-private sector partnerships aimed at assisting companies in lowering energy costs through various energy efficiency services offered by the DOE such as energy audit, energy briefing and energy consumption monitoring and evaluation.

### ***7. Heat Rate Improvement of Power Plants***

The heat rate<sup>3</sup> improvement program reduces the amount of fuel consumed and minimizes the air pollutants emitted by power generating plants. This is made possible with the provision of technical assistance, training and improved information access to enhance a power plant's life, reduce operating costs and ensure reliable power reserves. Institutional (i.e., coordination among power plants, credit support and competitive financing schemes) and operational (i.e., operational information system, sustainable system for continuing heat rate improvement program on a nationwide scale) improvement is expected to be achieved by the program in compliance with the heat rate standards set by the Energy Regulatory Commission (ERC) at 10,850 British Thermal Unit per kilowatt-hour (BTU/kWh) and 9,773 BTU/kWh for oil-fired and coal-fired power plants, respectively. Increasing savings of 0.3 MMBFOE in 2005, 0.4 MMBFOE in 2010 and 0.6 MMBFOE in 2014 are expected to be achieved from this program.

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<sup>1</sup> Heat rate is the amount of heat added (Btu) to produce a unit amount of work (kWh). HR is inversely proportional to the efficiency of a plant. [El-Wakil, M.M. (1984) *Powerplant Technology*. New York: McGraw-Hill]

### C. Financial Requirement for the Energy Independence Agenda

The total financial requirement of the plan activities related to the energy independence agenda (i.e., based on the 10-point agenda and its enhancements) is estimated at about PhP55 billion. This ballpark figure, however, does not include the estimated cost of the development of the petrochemical industry (with the establishment of a naphtha cracker plant), hydropower plants as discussed above and promotion of local coal using clean coal technology.

### D. Legislative Agenda

The following legislative bills are critical to the fulfillment of the foregoing strategies:

1. **Alternative Fuels Utilization Bill** is proposed to further promote the wider utilization of alternative fuels to expand the market for coconut oil and other agricultural products, create more jobs and increase the income of farmers, improve air quality and enhance countryside development. It also aims to aggressively reduce the country's energy dependence on energy imports through fuel switching from oil to natural gas, and other alternative fuels such as coco-methyl ester, autogas and ethanol.

2. **Natural Gas Bill** aims to institutionalize regulatory mechanisms and provide statutory basis for concerns which are presently beyond the purview of existing laws. It will also promote natural gas as a secure, stable and clean source of energy as well as encourage competition by liberalizing entry and fair trade measures.

3. **Ethanol Bill** is proposed for the development of ethyl alcohol as an alternative transport fuel to reduce the impact of rising oil world prices as it can reduce the consumption of imported petroleum products by 60 percent. It mandates government and private financial institutions to provide credit to farmers and cooperatives who will participate in the mass production of raw materials for ethanol.

4. **Renewable Energy Bill** provides for the guidance and procedures for the preferential treatment of renewable resources in terms of interconnection and dispatch.

5. **Liquefied Petroleum Gas (LPG) Bill** is proposed for the provision of stringent safety standards and penalty/sanctions to violators. This will give more teeth in implementing sanctions to violators and establishing safety standards for consumer protection.

Assessment of the 2001-2004 MTPDP Targets

| 2001-2004 MTPDP Targets  | Accomplishments as of 2003   |
|--|--|
| Energy self-sufficiency from 45% in 2000 to 52% by 2004  | 53.87% energy self-sufficiency   |
| Aggregate installed generating capacity from 13,264 mW in 2000 to 15,479 mW by 2004  | 15,132 mW installed generating capacity  |
| Construct additional 6,885 circuit km of transmission lines  | 41.8 circuit-kilometers installed; 750 MVA Substations                                     |
| Number of barangays served from 33,602 or 80.1% in 2000 to 38,849 or 92.6% by 2004   | As of July 2004, 38,285 barangays energized or 91.27 % of total potential 41,945 barangays |
| Construct additional 44,780 circuit km of distribution lines and 56 units of 5 MVA and 43 units of 10 MVA substation distribution facilities from 2001 to 2004 to enhance reliability of service | 187,000 ckt-kms and 3,280 MVA installed  |
| Reduction of system losses by setting caps on recoverable system losses allowed to private utilities and electric cooperatives to 9.5% and 14%, respectively                                     | Average Distribution System Losses   |
|  | Private Utilities - 10.67%   |
|  | Electric Cooperatives - 15.08%   |
| Potential savings of about 24.2 MMBFOE   | 9.47 MMBFOE energy savings   |
| Comply with the provisions of the Clean Air Act  | Energy sector has active participation on different inter-agency activities                |