

# **DEVELOPING THE PHILIPPINES NATURAL GAS INDUSTRY**

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## **INTRODUCTION**

In October of 1989, Occidental Philippines, Inc. (Oxy), a subsidiary of Occidental Petroleum Corporation, discovered natural gas in a deep-water well (the Camago well) located within a 350,000 hectare area some 75 km. northwest offshore Palawan province and 500 km. south-SW of Luzon. While this was not the first natural gas discovery in the country, it seemed a promising find which augured well for the establishment of a natural gas industry. In 1980, the Philippine National Oil Company –Exploration Corporation (PNOC-EC), discovered natural gas in Echague, Isabela (Northern Luzon) sufficient to generate about 3MW of power.

After a year, Oxy's exploration contract (GSEC 47) was converted into a service contract (SC38) with Shell Philippines Exploration B.V. (SPEX) farming in to the extent of a 50 percent interest. As part of its investment commitment, SPEX took over operation of the field and drilled three more wells, the second of which resulted in the discovery of the Malampaya gasfield in 1992. Thus, the Malampaya gasfield is connected to the Camago structure. Continuing with its drilling program over the next two years, SPEX was able to ascertain proven recoverable reserves of about 2.5 trillion cubic feet (TCF) of gas and some 85 million barrels (MMB) of condensate. The Malampaya gasfield was declared a commercial find in May 1998. Simultaneously, SPEX acquired full ownership in SC38 by September 1998 and formed a consortium with Texaco Philippines, Inc. (now Chevron Texaco) and PNOC-EC.

This SC 38 consortium then set about making the largest single foreign investment in the country's history by developing the Malampaya gasfield, laying 504 km. of pipeline through some of the world's best undersea vistas and building an on-shore gas facility that now processes the natural gas that is drawn from the Malampaya gasfield. With an estimated total cost of US\$4.5Billion, the project involved the drilling of five subsea wells in 820 meters of water, producing via a subsea manifold and two 30 km. long 16-inch flowlines to a concrete gravity platform, transportation of gas via a 504 km. 24-inch pipeline to an onshore gas plant in Tabangao, Batangas province (Southern Luzon). In October 16, 2001, President Gloria Macapagal-Arroyo inaugurated the Malampaya Deep Water Gas-to-Power Project which now supplies gas to fuel three combined cycle gas turbine (CCGT) power plants with a combined capacity of 2,760 MW, comprising about 19 percent of the country's total installed capacity in 2002. The gasfield has a potential capacity to produce up to 4.3 TCF of gas.

The project was completed in a little over three years, landing gas for power plant commissioning to its downstream buyers and commencing commercial deliveries in January 2002. With the completion of this project, the orientation shifted to bringing this new energy source to where it could be of most benefit. While the three power plants were all located within a 12 km. radius from the onshore gas plant in Batangas province in Southern Luzon, they were not the only potential users of the gas. It therefore became critical to prepare a blueprint for this new downstream industry which would encompass both the physical and regulatory aspects.

## **DEVELOPING THE INDUSTRY**

### **Upstream Exploration**

Upstream exploration in the Philippines is governed by Presidential Decree (P.D.) No. 87, otherwise known as "The Oil Exploration and Development Act of 1972". Promulgated by Ferdinand Marcos, P.D. 87 provides the legal underpinnings which enable companies to explore for, develop and produce petroleum in the Philippines. It introduced the service contract arrangement and sets the parameters which enable private companies to undertake petroleum operations in partnership with the National Government.

While, as a general proposition, the State may undertake such activities directly or in partnership with entities whose capitalization must be at least 60 percent Filipino-owned, the

Philippine Constitution (Article 12, Section 2) allows “the President to enter into agreements with foreign-owned corporations involving technical or financial assistance for large scale exploration, development and utilization of petroleum in accordance with the general terms and conditions provided by law, based on real contributions to economic growth and welfare of the country.”

Thus, P.D. 87, through the service contract regime, has enabled foreign investors to undertake petroleum operations while enjoying fiscal and non-fiscal incentives which include a cost recovery scheme allowing for recovery of up to 70 percent of operating expenses from gross revenues arising out of petroleum production in a given year; exemption from national taxes except income taxes; and exemption from the payment of tariff duties and compensating tax on the importation of machinery, equipment, spares and materials used for petroleum operations.

While it is P.D. 87 that provides the legal basis, it is SC 38, executed in December 11, 1990, which governs the specific terms for the exploration, development, production and sale of natural gas from the Malampaya gasfield. The actual sale of the gas, on the other hand, to the two off-takers, namely the National Power Corporation (NPC) (for the 1,200MW Ilijan gas-fired facility) and First Gas Corporation (for the 1,000MW Sta. Rita and 500MW San Lorenzo facilities) are covered by Gas Sales and Purchase Agreements that run for 20 years. With the launching of the Philippine natural gas industry by these events, efforts continued to ensure a steady stream of investments to maintain supply security in the upstream sector.

This has led to a recent upgrading of Philippine sedimentary basins and a renewed interest in upstream exploration and development. Updated three dimensional surveys of the country’s sedimentary profile have indicated that the country’s total oil, natural gas and condensate potential amount to about 8.9 billion barrels of oil equivalent (BBOE). Of this number, the discovered resources, or those found from wells that have been drilled, have a total volume of 973 million barrels of oil equivalent (MMBOE).

On the other hand, undiscovered resources, or those that have a high potential of being found in wells yet to be drilled, are expected to reach 7.9 BBOE. Of this figure, natural gas amounts to 28.53 TCF in discovered resources and 24.69 TCF in undiscovered resources. Of the discovered gas, some 3.77 TCF is considered as reserves while 68 BCF is considered potential. To maximize the development of these potential resources, the Philippine Department of Energy (DOE) is revisiting the present regime provided under P.D. 87 to encourage more capital investment in this particular sector. P.D. 87 was previously amended by P.D. 1857 in 1983.

## **Downstream Industry**

Following the inauguration of the Malampaya Project, it became necessary for the DOE to plan the regulatory framework and physical infrastructure necessary to ensure a viable long-term downstream natural gas industry.

For the DOE to accomplish this, it needed to overcome some issues. The first issue involved the lack of an integrated piece of legislation and a comprehensive set of regulations governing the industry. While there are laws which deal with the downstream sub-sector in some form or another, such as Commonwealth Act (C.A.) No. 146 (“The Public Service Law”), Republic Act (R.A.) No. 8479 (“Downstream Oil Industry Deregulation Act of 1998”), Executive Order (E.O.) 172 (Creating the Energy Regulatory Board), R.A. 9136 (“The Electric Power Industry Reform Act of 2001”) and R.A. 7638 (“The Department of Energy Act of 1992”) there was no single law or set of regulations which tackled the subject in a comprehensive manner.

CA 146 created what was known as the Public Service Commission which had jurisdiction, supervision and control over all public services. Among its powers was the power to require public service operators to secure permits prior to operation; approve and fix just and reasonable rates; and fix just and reasonable standards. R.A. 8479 established the rules on competition in the downstream oil industry while R.A. 9136 provides for the restructuring of the electric power industry and, among others, sets the guidelines for pricing and regulation in the electric power industry. It also created an Energy Regulatory Commission (ERC) which took over the functions of the ERB. On the other hand, R.A. 7638 grants to the DOE the non-price regulatory jurisdiction, powers and functions over the

energy sector, including the natural gas sub-sector. E.O 172 consolidated the regulatory and adjudicatory functions in the energy sector into the Energy Regulatory Board (ERB), including regulating the prices of piped gas.

Secondly, it was important to ensure the successful establishment of the industry within the context of the on-going power sector restructuring in the Philippines, fully cognizant of the privatization efforts of NPC, the state-owned transmission and generation company. Since power generation constituted the only application of natural gas to date, the regulatory framework that was to govern its transmission, distribution and utilization needed to be crafted within these evolving trends.

Policies and Goals

As an initial step, the DOE formulated a natural gas policy and regulatory framework which highlights policies and objectives for the downstream natural gas industry and the role of the National Government in its development (Table 1).

<b>Energy Sector Goals</b>	<b>Gas Policies</b>	<b>Gas Objectives</b>
Stable and secure energy supply	Promote natural gas as a secure, stable and economically efficient source of energy	Increased share of natural gas in the energy and power mix while maintaining a diversified fuel mix
Wider access to energy supply	Promote competition by liberalizing entry and adopting competition and fair trade measures with due regard to public welfare and the financial viability of industry participants	Increased utilization of natural gas as fuel in the power and non-power sectors
Fair and reasonable energy prices		Competitive natural gas prices vis-à-vis other fuels in a regulated market which eventually transforms into a deregulated market characterized by gas-to-gas competition and market based transactions
Clean and efficient energy fuels and infrastructure	Promote natural gas as an environmentally friendly source of energy	
Enhanced consumer welfare and protection	Ensure compliance with international safety standards and Philippine environmental laws, rules and regulations	Adoption of state of the art technology, development of experts in energy matters, increased employment and manpower development in localities where the development of indigenous natural gas is being undertaken
Technology transfer and manpower development		Increased economic benefits to consumers
Job creation from energy activities		

Table 1. Energy Sector Goals, Gas Policies and Objectives.

While it is envisioned that government was to lead the development of the upstream and downstream sectors, as a matter of policy, the financing, construction and operation of natural gas infrastructure projects in the downstream sector shall be left to the private sector with the government limiting itself to the formulation and implementation of strategies and programs conducive to the industry's growth and, where necessary, for the efficient management of strategic gas infrastructure projects. However, in instances where a strategic gas infrastructure project needs to be initiated, the National Government may take a lead investing role through PNOC-EC to spur project commencement.

For upstream gas exploration and development, the government shall maintain its current role of promoting exploration activities through joint production-sharing contracts with exploration companies. Within the broader energy sector goals established by the DOE, particular policies and objectives have been formulated for the natural gas industry to guide its stakeholders. Thus, it is clear that gas is to be promoted as a secure, stable, economically efficient and environmentally friendly source of energy and that competition within this industry is to be promoted by liberalizing entry and adopting competition and fair trade measures with due regard to public welfare and the financial viability of industry participants.

The formulation of clear, concise and effective strategies is a prerequisite to achieving the DOE's objectives for the Philippine downstream gas industry. Within the larger policy framework that has been established, strategies have been formulated that will allow for sharper focus in the development of the industry, namely (i) lowering the cost of natural gas; (ii) stimulating its demand; (iii) increasing its supply and establishing facilities; and (iv) providing a relevant and responsive regulatory regime.

Energy self-sufficiency remains a core policy for the sector in the face of the country's continued reliance on imported fuels. This, however, needs to be balanced with the policy of providing more affordable energy to the consumers. Thus, for both indigenous and imported natural gas, the DOE shall explore means to reduce cost by, among others, revisiting the current royalty sharing scheme between the government and investor (for indigenous gas) and import tariffs, excise and other taxes (for imported Liquefied Natural Gas or LNG) currently in place.

Once cost is brought down, demand may be readily stimulated for both power and non-power applications. The country is uniquely positioned to stimulate gas demand for power generation in view of the on-going privatization of NPC generation assets. With respect to industrial, transport and commercial applications, a shift to natural gas will likewise be encouraged to take advantage of its clean burning property, low emission and higher efficiency of conversion. The use of compressed natural gas (CNG) in the transport sector, for example, shall be aggressively pursued.

To sustain the anticipated demand for natural gas, an efficient infrastructure system in the form of transmission, distribution and city gas pipelines; LNG terminals; CNG refilling stations; and related facilities needs to be established within the next five years. The government will likewise need to promote upstream exploration and development to tap the significant reserves within the country's upgraded 16 sedimentary basins.

Finally, to ensure the cohesive and logical pursuit of these strategies, the government must provide for a relevant and responsive price and non-price regulatory regime that will prevent monopolistic behavior in the transport of natural gas without stifling fair commercial returns to investors. For example, while the prudent recovery of reasonable costs and the guaranteeing of a reasonable return on investments is recognized, the pricing methodology adopted for the regulation of tariffs should encourage efficiency. There is also a need to implement pro-competitive regulation which includes liberalizing entry into the industry; requiring non-discriminatory Third Party Access (TPA) to transmission and distribution pipelines; prohibiting cartels; and punishing abuse of market power and other practices that restrict, distort or prevent competition.

#### Regulatory Framework

Last August 27, 2002, Secretary Vincent Perez of the DOE promulgated the Interim Rules and Regulations Governing the Transmission, Distribution and Supply of Natural Gas (Gas Rules also known as DOE Circular No. 2002-08-005). These Gas Rules are designed to maximize economic efficiency in the context of the development stage of the Philippine downstream natural gas industry while at the same time seek to achieve the most efficient use of natural gas resources, the lowest possible production costs, the improvement of products and production techniques while assuring the integrity and security of supply and a reasonable return on investment.

The Philippine natural gas industry is at a very early stage of development. It has a single supplier of indigenous gas who happens to own one of the two existing pipelines from the gathering

facilities to the receiving CCGT power stations, with non-existent imports and downstream infrastructure. The SPEX consortium owns the 10.5 km onshore pipeline from Tabangao, Batangas to the Sta. Rita power plant. The National Power Corporation, on the other hand, owns the 15 km. pipeline to the Ilijan Power Plant. The current regulatory framework should therefore serve the twin and equally urgent objectives of attracting investments as well as laying a robust foundation for the development of an efficient and competitive industry.

The key elements of the Gas Rules consist of (i) entry conditions; (ii) structure of the industry; (iii) pricing; (iv) promotion of competition; (v) institutional arrangements; and (vi) review.

### *Entry*

In the upstream sector (exploration and production of gas), entry shall still be through the execution of service contracts with the National Government pursuant to the provisions of P.D. 87.

For the downstream sector, liberalized entry shall be encouraged to increase the supply of natural gas and promote competition, subject only to the Constitutional requirement of a franchise to be issued by Congress for transmission and distribution systems operating as public utilities and a DOE-issued permit for all transmission and distribution entities, gas suppliers, operators of LNG facilities and other related ancillary facilities.

### *Structure*

In terms of the industry structure, cross-ownership between different industry segments shall be allowed to promote economies of scale and mitigate price risks for new investments. The development of additional reserves, production capacity and transport infrastructure requires huge investments which can be met by alliances between and among upstream and downstream investors. Vertical integration should minimize the risks associated with investments in capital assets involving large sunk costs such as gas pipeline systems and production wells.

However, to ensure that vertical integration does not retard the expansion of gas markets that may be brought about by the absence of access to essential facilities which constitute natural monopolies (i.e., transmission and distribution pipelines and their related facilities), the owners and/or operators of such facilities are required to provide third party access (TPA) to other gas suppliers on a non-discriminatory basis on terms consistent with a TPA Arrangements Code to be developed by the DOE. Section 1, Rule 11 of the Gas Rules provides that "Gas Transmission Systems and Gas Distribution Systems excluding those constructed and operated for own use shall be available for non-discriminatory access by third party users which may include parties to a Service Contract, Suppliers and Customer, with due regard to the economic viability of the operation of such facilities. Section 3 of the same rule provides that the DOE may defer the implementation of TPA where (a) it can be demonstrated that such deferment is necessary to enable the efficient planning of the infrastructure and aggregation of the initial demand needed to justify investments in Gas Transmission and Distribution Systems; and (b) it is necessary to ensure supply stability. A three and five year deferral period is provided for Transmission and Distribution systems, respectively, subject to extension on reasonable grounds.

In addition, horizontal competition for transmission, distribution and supply shall be promoted. Thus, investors may engage in the construction, installation and operation of transmission, distribution and related facilities subject to the permitting requirements of the DOE.

### *Pricing*

The current stage of the Philippine downstream natural gas industry and the government's objective of encouraging a shift to natural gas require that price setting for the transport of natural gas be guided by prudent regulation until such time that a competitive market develops.

Thus, the pricing of natural gas services shall be based on the following guiding principles: (i) the prices of transmission, distribution and supply of natural gas to customers will be regulated until the Philippine Secretary of Energy determines that the markets for such products and/or services are

effectively competitive; (ii) the energy value of natural gas sold to customers shall likewise be regulated; and (iii) prices of products and/or services in competitive markets shall be deregulated (Section 2, Rule 15, Gas Rules). However, notwithstanding the pricing of natural gas services, the pricing of natural gas itself shall be market driven. Moreover, the rates and prices of transmitting, distributing and supplying natural gas shall be just and reasonable (Section 3, Rule 15, Gas Rules).

All matters pertaining to the fixing and regulation of the rate or schedule of prices of piped gas (to be charged by duly franchised gas companies that distribute gas by means of an underground pipe system) shall remain the responsibility of the Energy Regulatory Commission, ERC (Section 1, Rule 15, Gas Rules), the independent body which is likewise tasked to regulate the transmission and distribution sectors of the Philippine electric power industry under R.A.9136.

#### *Promotion of Competition*

Consistent with the objective of attaining economic efficiency, competition shall be promoted by the Gas Rules which, among others, prohibits agreements to fix prices and/or output and other practices which restrict, prevent or distort competition including predatory and excessive pricing, bundling and other vertical restraints and denial of access to essential facilities on fair terms.

#### *Institutional Arrangements*

The regulation of the downstream natural gas industry shall be the responsibility of the DOE and ERC. The ERC shall be responsible for price regulation while the DOE shall be responsible for non-price regulation. It is the DOE that has the power to issue permits for the construction of pipeline systems and related facilities.

#### *Review*

Finally, the development of a successful industry hinges on a dynamic regulatory framework. The Gas Rules must therefore evolve in accordance with the industry's evolution and anticipate future requirements. Accordingly, the regulatory framework shall be reviewed periodically by the DOE in consultation with industry players with a view to its updating in a manner consistent with the development requirements of the industry at such time.

## **ESTABLISHING THE INDUSTRY**

Together with the preparation of the Gas Rules, the DOE commenced laying the foundation for a viable gas market in the country that would necessitate the establishment of needed infrastructure to bring the gas where it is to be utilized.

### **Power**

The Philippine Energy Plan (PEP) is prepared annually by the DOE to chart the course of the country's energy sector over short to long term horizons. The 2003-2012 PEP expounds on the country's evolving energy mix, power sector profile and other sectoral plans and programs.

Based on planning parameters consisting mainly of GDP growth, population increase, foreign exchange estimates and crude price forecasts over the current planning period, total potential demand for gas is expected to increase from about 94 BCF in 2003 to 147 BCF in 2008 and further to 182 BCF by 2012 (Table 2). Base Case GDP is expected to reach Php 1.1 trillion in 2003 and Php 1.3 trillion in 2007. Average annual GDP growth rate for 2003-2012 is estimated at 5.4 percent. US Dollar-Php exchange rate is pegged at USD\$1 to Php 51 while crude oil prices are estimated at US\$25/bbl.

	2002	2003	2004	2005	2008	2010	2012
Power	73	94	108	114	138	161	166
Non-Power	0	0	0	1	9	9	16
Total	73	94	108	115	147	170	182

Table 2. Total demand for natural gas in BCF, 2002 - 2012 (2003-2012 PEP).

A significant component of this energy mix consists of power demand, which is likewise expected to increase significantly within the next ten years. To meet the forecasted rise in electricity demand, a total of 7,1500 MW of capacity needs to be commissioned within the planning period, of which 1,000 MW is considered committed capacity (refers to the portion of the total capacity requirement that has been awarded and currently in an advanced stage of development, financing and construction). This translates to required indicative capacity additions of 4,500 MW for Luzon starting in 2008, 950 MW for the Visayas beginning in 2005 and 700 MW for Mindanao starting also in 2005.

Of the total required capacity, it is estimated that as much as 4,200 MW, or 93 percent of the estimated requirements in Luzon, could be fueled by natural gas. As a component of the power mix, generation from gas-fired facilities is seen to increase from 18.2 percent in 2002 to 26.6 percent in 2007.

Thus, additional gas-fired capacity should be strategically and effectively deployed within a relatively short period of time. Included among the potential green and brown field candidates that could fill this gap is the 950 MW Sucat thermal plant located in Metro Manila which was shut down in December 2002. Another potential candidate for conversion is the 600-MW Limay thermal power plant in the Bataan peninsula which is currently running on bunker and diesel fuel. Both plants are ideal candidates for conversion into natural gas since they are among the NPC generation assets that would be privatized pursuant to R.A. 9136. In fact, during the inauguration by President Macapagal-Arroyo of the San Lorenzo gas-fired power plant in Batangas last January 28, 2003, she instructed PSALM (Private Sector Assets and Liabilities Management Corp., created pursuant to R.A. 9136) to complete the privatization of these two plants within 2003.

If these plants, and other identified anchor loads are to run on natural gas, it is necessary to establish a credible, physical infrastructure network which includes (i) an 80-100 km. high-pressure gas transmission pipeline from Tabangao, Batangas, to Metro Manila (BatMan 1) that will service the converted Sucat thermal plant; (ii) a 130-150 km. high-pressure gas transmission pipeline from the Bataan peninsula to Metro Manila (BatMan 2) that will supply gas to the Limay plant and also possibly the Sucat plant; (iii) alternatively, a 40 km. undersea high pressure gas transmission pipeline from the Bataan peninsula to Metro Manila or Cavite province (Bat Cave) to service the Sucat plant and the co-generation needs of industrial zones in Cavite province; (iv) a 35 km. high pressure gas transmission pipeline from Sucat to Piliia, Rizal province, for the 650 MW Malaya Thermal Power Plant currently running on bunker fuel; (v) a 40 km. city gas pipeline network along Metro Manila's main artery (EDSA) to service large commercial users; (vi) LNG receiving terminals in the Bataan peninsula or Batangas province to ensure secure supply of gas; and (vii) a network of gas refilling stations for Natural Gas Vehicles (NGV) in the Metro Manila and Batangas province (Figure 1)

These projects are envisioned for the island of Luzon where demand concentration for natural gas is projected to be the highest in the next ten years. Based on topography, population density and access to markets, the most likely initial configuration of the transmission system in Luzon will consist of a trunk pipeline system running from Tabangano, Batangas to the southern tip of Metro Manila in Sucat. Branch lines could then extend westwards from Metro Manila to Cavite province or, skirting Metro Manila altogether, heading north to Bulacan. Some 20 industrial and economic estates and zones lining the proposed pipeline route could also benefit from the gas delivery for their power needs.



**Figure 1.** The strategic pipeline infrastructure to expand the use of natural gas in the country.

In the case of the LNG infrastructure, a receiving facility in Bataan could be anchored on the existing Limay power plants which shall be converted into natural gas or a greenfield development. A 40 km. undersea high pressure gas transmission pipeline traversing Manila Bay could transport LNG from the Bataan peninsula to Metro Manila or Cavite province. Alternatively, a Batangas LNG facility would service the needs of the Sucat or Malaya power plants. These plants could fill the need for additional gas-fired generation capacity needed by 2008.

Beyond Luzon, additional gas demand may come from the Visayas and Mindanao regions. The BatMan 1 pipeline could then extend a spur line heading south through the Visayas and finally hitting Mindanao. This leg could complete the country's national pipeline network which could allow for the eventual transport of gas to any point in the country (Figure 2). Preliminary demand estimates indicate, however, that the required volume of gas demand to justify this southern leg may not be available until 2015.



**Figure 2.** The proposed natural gas pipeline that would deliver natural gas to the southern part of the country namely Visayas and Mindanao.

## **Non-Power Use**

For the non-power application of natural gas, ongoing studies are ascertaining the possible demand of industries clustered along the proposed BatMan 1 pipeline for their process heat, air conditioning and power requirements. Along the Batangas-Manila corridor, for example, there are more than 20 industrial parks or economic zones with multiple locators which can harness natural gas for their various needs. For the Bataan-Manila pipeline, on the other hand, the Clark Special Economic Zone in Pampanga province and Subic Freeport Zone in Olongapo are ideal candidates.

Apart from industrial usage, the DOE has embarked on a program to harness natural gas for the transport sector. Thus, President Macapagal Arroyo launched, in October 16, 2002, the Natural Gas Vehicle Program for Public Transport which aims to have up to 100 public transport buses running on natural gas by October 2003. Several incentives have already been provided to ensure the success of this program, including a reduced tariff on the importation of natural gas engines, buses and related support facilities; priority in the issuance of franchises to natural gas buses; attractive financing packages for the purchase of buses and engines; and reduced red tape for the granting of various government permits.

Finally, for commercial applications, natural gas could prove to be an alternative source of power for lighting and airconditioning use for large customers such as commercial establishments, shopping malls, airports, hospitals and other like establishments. Two major commercial developments are currently being assessed as to the potential for the establishment of a gas distribution system to supply such needs.

## **FUTURE OUTLOOK**

### **Filling the Gaps**

While much has been accomplished in the government's natural gas program since its launching in 2001, there is certainly much that still needs to be done to ensure its success. Towards this end, to address both the perceived and identified gaps in the present regulatory framework, the DOE has been working with Congress for the passage of a comprehensive Natural Gas Bill that will incorporate into a single law the various concepts and principles critical to ensure the success of the downstream natural gas industry. The targeted promulgation of this law is before the end of 2003.

### **Roadmap for Development**

With respect to future natural gas usage and the infrastructure that is to harness it, the DOE has prepared a roadmap for development which complements the power demand forecasts of the PEP and the power facilities identified for conversion into natural gas by the end of 2003.

Based on the power demand forecasts for the island of Luzon in the next ten years, and the preferential bias identified for natural gas-generated power, additional capacity beyond that to be generated by the Sucat and Limay power plants will be needed. Apart from the potential 620 MW and 900 MW to be generated from the Limay and Sucat power plants, respectively, an additional 600 MW in mid-range capacity shall be needed in 2010 and 2011, while a total of 1500 MW in baseload capacity shall be needed by 2011 and 2012. This configuration takes into account a converted Malaya power plant (600 MW) also in 2010 (Figure 3).

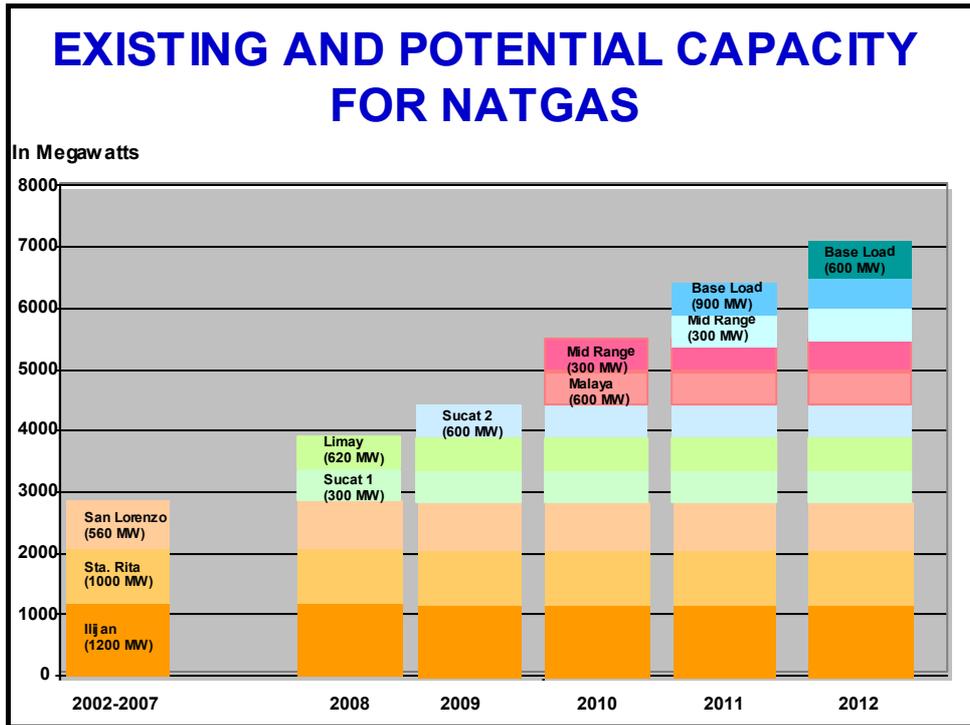


Figure 3. The natural gas-fired generation capacity line-up.

In view of these potential capacity additions within the next ten years, it is necessary to plan for the appropriate pipeline network to ensure the stable supply of natural gas. Thus, apart from the pipeline systems previously identified, it is necessary to establish additional natural gas pipelines connecting to these anchor loads (Figure 4).

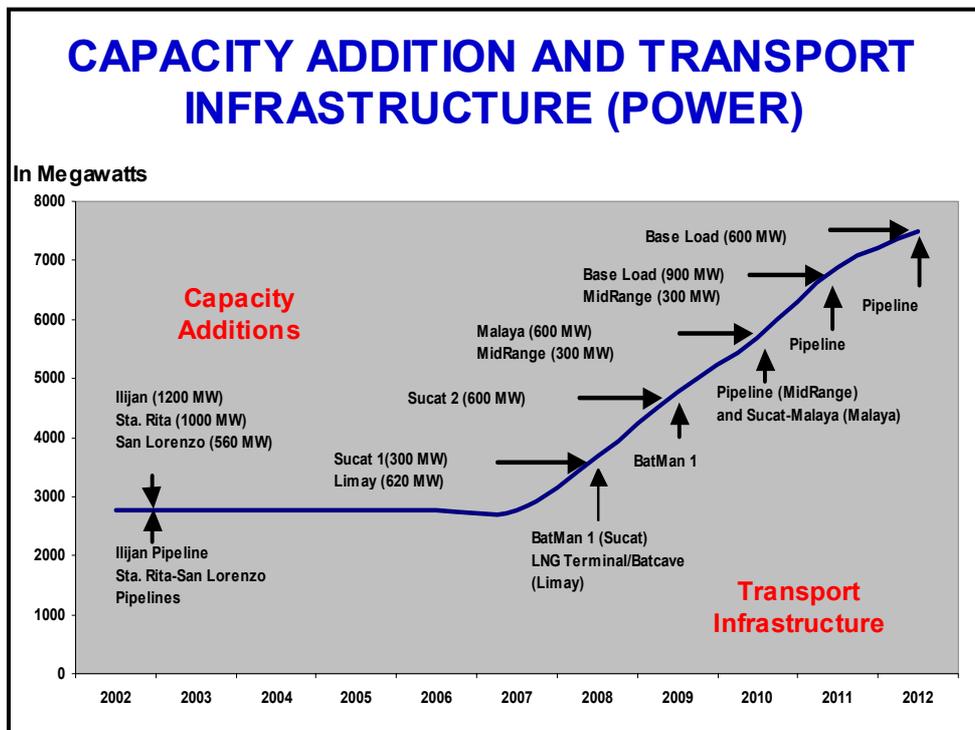


Figure 4. The natural gas infrastructure development program for the power sector.

## **CONCLUSION**

The birth of the Philippine natural gas industry brings the country closer to its goal of harnessing environmentally sound fuels to ensure a stable, diverse and secure energy supply. However, the growth of this industry is anchored on the development of additional gas-generated capacity, other non-power applications and the necessary infrastructure that is to bring the natural gas to its potential markets. The infrastructure includes the appropriate pipeline transmission and distribution networks, LNG terminals and facilities, gas refilling stations for CNG-run vehicles and ancillary facilities.

The stage for the industry's development has been set with the preparation of a gas policy framework, industry rules and regulations and a pronouncement by no less than the Philippine President for the preferential generation of power using natural gas. With clear and concise policies, objectives, programs and strategies formulated by the DOE, together with the critical cooperation and participation of the private sector, a successful industry is ensured.

While there is still much to be done, the DOE will be at the forefront of efforts to rally the participants in this new industry to success.