THE PHILIPPINE NATURAL GAS INDUSTRY: Vision, Strategy and Policy

A Briefing for the Proponents of House Bill No. 4754

February 5, 2003
Quezon City, Philippines
Briefing Outline

- Importance of Nat Gas Industry
- Industry Status
- Regulatory Concepts
- Proposed Framework
- Potential issues on HB 4754
Why Should We Care?

- Security of Supply
- Energy Self Sufficiency
- Eco Social Benefits
- Foreign Exchange Savings of $ 4.5 B
Birth of the Gas Industry
Upstream Sector

San Antonio Gas Field, 2.7 BCF

Malampaya Gas Field, 3.7 TCF
Birth of the Gas Industry
Malampaya Gas-to-Power Project

30 km
30 km
504 km
504 km

Upstream
Downstream

- 820 m
- 820 m
- 43 m
- 43 m
0 m
0 m

3rd flowline (2021)
Condensate storage
Condensate export

9 Development wells

Gas dehydration
Gas dewpointing
Condensate stabilisation
Export compression

Catenary Anchored Leg Mooring (CALM) buoy for tanker loading of condensate

Sulphur Recovery
H2S removal
Metering
Supply base

- 820 m
- 43 m
0 m

24" Dry gas pipeline

PLAT FORM
Manila
Batangas
Power Stations
Alternative Fuel

Subsea manifold

Condensate storage

2 x 16" CRA wet gas

3rd flowline (2021)

Batangas Refinery
Ilijan (NPC)
Santa Rita
Malampaya
San Lorenzo
Birth of the Gas Industry
Downstream Sector

Gas Pipelines and 2700-MW Gas Fired Power Plants

Onshore Gas Plant
SC 38 Consortium
Operating Oct 2001

San Lorenzo Power Plant
First Gas Corp. 560 MW
Operating Oct 2002

Ilijan Power Plant
KEILCO, 1200 MW
Operating June 2002

Sta. Rita Power Plant
First Gas Corp. 1,000 MW
Operating Jan 2002

504 km.
24-inch Pipeline
SC 38 Consortium

Maricaban Is.

Batangas Bay

Tabangao

504 km.
24-inch Pipeline
SC 38 Consortium
Birth of the Gas Industry
Downstream Sector

PNOC CNG-Refilling Station and NGVs
Natural Gas Production and Consumption of Asian Countries*

*Phil- 2002 data; all other countries- 2000

Source of Data: BP Amoco Statistical Review
Development and Growth
Development and Growth
Policies and Objectives

**Policies**

- Promote natural gas as an environment-friendly, secure, stable and economically efficient source of energy
- Promote competition by liberalizing entry into the industry and adopting pro-competitive and fair trade measures
- Ensure compliance with Philippine environmental laws and regulations and international safety standards

**Objectives**

- Competitive natural gas prices vis-à-vis other fuels
- Increased utilization of natural gas as fuel in power and non-power sectors
- Increased share of natural gas in the energy mix
- Adoption of state-of-the-art technology, development of experts and increased employment
- Enhanced economic benefits to consumers
## Development and Growth

### Natural Gas Share in Energy Mix (In %)

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2007</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth p.a.</td>
<td>3.2</td>
<td>5.2</td>
<td>5.2</td>
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<tr>
<td>Oil</td>
<td>45.3</td>
<td>38.6</td>
<td>39.6</td>
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<tr>
<td>Coal</td>
<td>9.2</td>
<td>9.7</td>
<td>5.3</td>
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<tr>
<td>Indigenous</td>
<td>45.5</td>
<td>51</td>
<td>44.4</td>
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<tr>
<td>Gas</td>
<td>0.6</td>
<td>7.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Other RE</td>
<td>31</td>
<td>27.9</td>
<td>24</td>
</tr>
<tr>
<td>Local Coal</td>
<td>1.5</td>
<td>1.9</td>
<td>4</td>
</tr>
<tr>
<td>Hydro</td>
<td>4.9</td>
<td>4.1</td>
<td>3.1</td>
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<tr>
<td>Geothermal</td>
<td>7.2</td>
<td>7.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Local Oil</td>
<td>0.1</td>
<td>2.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Others (unidentified)</td>
<td>0.7</td>
<td>10.7</td>
<td></td>
</tr>
</tbody>
</table>
Development and Growth
Gas Resources

Total Resources: 28,531 BCF (Mean)

Undiscovered
24,690 BCF

Discovered
3,841 BCF
Development and Growth
Location of Petroleum Resources

Found in 16 sedimentary basins with an area of over 700,000 sq. km.

- Ilocos
- Cagayan
- Central Luzon
- West Luzon
- Southeast Luzon
- Bicol Shelf
- Mindoro - Cuyo
- Northwest Palawan
- Southwest Palawan
- East Palawan
- Reed Bank
- West Masbate / Iloilo
- Visayan
- Cotabato
- Agusan - Davao
- Sulu Sea
Projected Demand and Possible Importation of Natural Gas

Year

BCF

Possible importation
Projected demand
Development and Growth
Proposed Gas Pipeline Infrastructure

[Map showing proposed gas pipeline routes from Malampaya to BatMan 1 and BatMan 2, with key locations marked such as BatCave.]
Development and Growth
Potential Gas-Fired Power Plants

Ilijan 1200 MW (2002)
Santa Rita 1000 MW (2002)
San Lorenzo 560 MW (2002)
Sucat 300 MW (2008)
600 MW (2009)
Limay 620 MW (2008) Conversion
Malaya 600 MW (2010) Conversion

Additional Greenfield Capacity Requirement in Luzon
300 MW (2010)
1,200 MW (2011)
600 MW (2012)

Santa Rita 1000 MW (2002)
San Lorenzo 560 MW (2002)
## Development and Growth
### Potential Commercial Gas Markets

<table>
<thead>
<tr>
<th>No.</th>
<th>Mall Name</th>
<th>Source: FS on CNG Development for Public Utility Vehicles in Metro Manila</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gotesco Mall</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Commonwealth Center</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SM North Edsa</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Araneta Center</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Greenhills Mall</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>SM Megamall</td>
<td></td>
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<tr>
<td>7</td>
<td>Shangri-la Plaza</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>EDSA Central</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Tutuban Mall</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Robinson's Place</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>SM Manila</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Harrison Plaza</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Coastal Mall</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Rockwell</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Greenbelt Mall</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ayala Center</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Fiesta Mall (Duty Free)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>SM Southmall</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Alabang Town Center</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Festival Mall / Metropolis</td>
<td></td>
</tr>
</tbody>
</table>
Development and Growth
Proposed CNG Infrastructure

- Refilling Station in 2005
- Refilling Station in 2003
- Fort Bonifacio
- Proposed Sucat to Fort Bonifacio Gas Pipeline
- Proposed EDSA Gas Pipeline
- Manila Gas Corp. Pipeline
- Large Refilling Stations
- Metro Manila Bus Routes
- Batman 1

Stations (L):
1. EDSA Monumento
2. Fort Bonifacio
GAS INDUSTRY REGULATION

- Basic Concepts
- Industry Structure
- Stages of Gas Market Development
- International Experience
What is natural gas?

Source: Australian Gas Association
Natural gas was formed from the remains of plants and animals which lived on the Earth many millions of years ago. Over time the remains were covered by layers of sand, rock and ice. Heat and pressure eventually changed them into fossils. The gaseous form of these fossils is natural gas.

Source: Australian Gas Association
To reach natural gas we have to drill through layers of rock. 

Coal, oil and gas are hydrocarbons (compounds made mostly of hydrogen and carbon).

Source: Australian Gas Association
How does natural gas get to town?

1. drilling rig
2. extraction unit to clean gas
3. compressor station to maintain pressure in the pipeline
4. facility where an odour (or smell) is added
5. town - factories, houses, hospitals and hotels etc

Source: Australian Gas Association
How is natural gas used?

- Household use
  - cooling
- Manufacturing
- Water heating
- Power generation
- Cooking
- Fuel for cars
- Fuel for buses and trucks

Source: Australian Gas Association
Why is natural gas better for the environment?

Natural gas is a clean and efficient fuel.

Natural gas can help reduce emissions that contribute to the greenhouse effect, because it burns more cleanly than other fossil fuels.

For example, when used to make electricity, natural gas only produces around half the greenhouse emissions of other fossil fuels.

Source: Australian Gas Association
The Natural Gas Industry Chain

Source: Australian Gas Association
Rationale for Gas Industry Regulation

**Gas industry characteristics**
- Natural monopoly
- Large sunk costs
- Public good

**Role of Regulation**
- Prevent abuse of market power
- Minimize risks
- Protect public interest

**Objective**
- Competition and Efficiency
- Encourage investments
- Security and affordability of gas supply
Concepts and International Experience

Key Elements of Gas Regulatory Regime

What to regulate:
- Structure
  - Ownership - State/Private sector role
  - Vertical integration/cross-ownership
  - Stage of Gas Market Development

How to regulate:
- Approaches
  - Entry Regulation
  - Price Regulation
  - Access Regime
  - Public Service Obligations
  - Promotion of Competition

Who to regulate:
- Institution/Authority
  - Law- and Policy/Rule-making
  - Economic Regulator
  - Competition Authorities
  - Arbitration/Dispute Resolution
## Stages of Gas Market Development

<table>
<thead>
<tr>
<th>Market Creation</th>
<th>Market Development</th>
<th>Mature Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undeveloped gas reserves, small market</td>
<td>More supply options; rapid demand growth</td>
<td>Abundant supplies and demand saturation</td>
</tr>
<tr>
<td>Limited infrastructure</td>
<td>Heavy investments in infrastructure</td>
<td>Developed infrastructure</td>
</tr>
<tr>
<td>Integrated Structure; monopoly-monopsony operations</td>
<td>Producers sell some gas directly to buyers; third party access and large market competition</td>
<td>Unbundled supply chain; gas spot market; Retail competition</td>
</tr>
<tr>
<td>Heavy regulation or state</td>
<td>Regulation manages competition; assists entry of new players</td>
<td>Minimal government intervention to sustain competition</td>
</tr>
</tbody>
</table>
Stages of Gas Market Development

Stage: Gas Market Creation

Structure: Vertically Integrated Monopoly

PRODUCERS/IMPORTERS  TRANSMISSION COMPANY  DISTRIBUTION COMPANY  END USERS

- Gas Transportation
- Gas Supply Transaction
Stage: Gas Market Development
Structure: Open Access And Wholesale Competition

Gas Transportation
Gas Supply Transaction
Stage: Mature Market
Structure: Unbundled Industry and Retail Competition

Stages of Gas Market Development

- PRODUCERS/IMPORTERS
- TRANSMISSION COMPANY
- DISTRIBUTION COMPANY
- SPOT MARKET
- TRADERS AND SUPPLIERS
- Residential
- Commercial
- Industrial
- Power Plants

Gas Transportation
Gas Supply Transaction
<table>
<thead>
<tr>
<th></th>
<th>PHIL</th>
<th>IND</th>
<th>THAI</th>
<th>MAL</th>
<th>MEX</th>
<th>ARG</th>
<th>US</th>
<th>UK</th>
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</thead>
<tbody>
<tr>
<td><strong>Proven Reserves</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(TCF)*</td>
<td>3</td>
<td>72</td>
<td>12</td>
<td>82</td>
<td>30</td>
<td>26</td>
<td>167</td>
<td>27</td>
</tr>
<tr>
<td><strong>R/P Ratio (Years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Years)$^1$</td>
<td>32</td>
<td>19</td>
<td>52</td>
<td>24</td>
<td>20</td>
<td>9</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td><strong>% NGas in Energy Mix</strong></td>
<td>4.6 (2002)</td>
<td>28</td>
<td>30</td>
<td>47</td>
<td>25</td>
<td>55</td>
<td>26</td>
<td>38</td>
</tr>
<tr>
<td><strong>Pipeline Km</strong></td>
<td>526</td>
<td>4,469</td>
<td>377 (1998)</td>
<td>1,753</td>
<td>12,000</td>
<td>&gt;100,000</td>
<td>1.84 MM</td>
<td>278,650</td>
</tr>
</tbody>
</table>

$^1$ Ratio of year-end reserves to annual production

* 2000 data

Source of basic data: WB, BP Amoco, APERC
Evolution of Regulatory Reforms in Mature Gas Markets – United States

In million tons of oil equivalent

Production
Prodn + Imports
Consumption

Partial wellhead price deregulation
Voluntary open access
Mandatory open access, Unbundling, Capacity release, wholesale price decontrol
Total wellhead price decontrol
Retail competition in some states

Source: F. M. Andres, unpublished thesis
Evolution of Regulatory Reforms in Mature Gas Markets - United Kingdom

- **Nationalization**
- **Managed Competition**
- **Competition**

In million tons of oil equivalent

- **BG creation**
- **TPA to BG pipelines**
- **BG privatization, large market competition**
- **BG unbundling**
- **Retail market competition**

Source: F. M. Andres, unpublished thesis
Evolution of Regulatory Reforms in Mature Markets - Argentina

Source: F. M. Andres, unpublished thesis
Lessons Learned from International Experience

- US and UK experience are “experiments” – piecemeal approach to deregulation/liberalization
- Latter reformers (e.g., Argentina, Victoria) took a more proactive, quicker path to gas reform
- No single entity should have excessive market power for competition to work
- Regulation needs complementary measures to work – e.g., TPA and unbundling
- Electricity market deregulation hastens gas market competition but drives reintegration
POLICY AND REGULATORY FRAMEWORK

• Existing Legal and Policy Framework
• DOE Gas Circular
Existing Policy and Regulatory Framework
Recent Developments

- DOE Charter
- E.O. No. 66
- DOE Gas Circular – Interim Rules and Regulations
- Philippine Energy Plan 2003-2012
Interim DOE Gas Circular
Policy Declaration

• Promote Natural Gas as an efficient and economical source of energy
• Facilitate private sector participation
• Promote competition by liberalizing entry and adopting pro-competition/fair trade measures
• Ensure compliance with international safety standards and relevant Philippine laws and regulations
Interim DOE Gas Circular

Key Provisions

*Industry Structure*

Downstream Natural Gas Industry: Transmission (T), Distribution (D) and Supply (S)

Vertical integration allowed

*Entry Regulation*

Franchise and other legislative authorizations required to operate T&D as public utility

Permits required for T, D and S

Own-use permit allowed for end-user facilities
Interim DOE Gas Circular

Key Provisions

**Access Liberalization**

Third Party Access to T, D and related facilities required

Deferment allowed on new facilities

Access conditions negotiated

**Price regulation**

Prices of T, D, and S deregulated for competitive markets.

ERC to regulate prices charged by distribution utilities

**Promotion of Competition**

DOE to enforce measures to restore competition
Meetings
11 meetings since September 2002

Participants
Committee on Energy Secretariat

Government – DOE, ERC, DOF, DENR, NEDA, PNOC, PNOC-EC, PNOC-EDC

Industry – SPEX, FGHC, PAP, BP Amoco, GN Power, Chevron-Texaco, Caltex, Price-Waterhouse

NGO – Freedom from Debt Coalition
Major Issues

- Regulatory Agencies
- Franchise
- Price Regulation
- TPA
- Promotion of Competition
Natural Gas Bill

Key Recommendations of the TWG

Industry structure

Downstream gas industry: T, D and S
Vertical integration allowed

Entry regulation

Franchise to operate T & D as public utility
Permit required to operate T, D & S
Own-use permit allowed for end-user facilities
Natural Gas Bill
Key Recommendations

**Access Liberalization**

- TPA mandatory for T, D and related facilities
- Deferment allowed on new facilities
- Access conditions negotiated

**Price Regulation**

- Prices for captive markets regulated
- Market-based prices for contestable markets
Natural Gas Bill

Issues to be resolved

Regulatory Agencies
Division of price and non-price functions between DOE and ERC or single regulatory agency

Franchise
Whether Service Contractors need a franchise to engage in T & D PNOC Charter in lieu of a franchise

Price Regulation
Classifying markets as contestable or captive for pricing purposes
Natural Gas Bill

Issues to be resolved

*Third Party Access*
- Whether to require T, D utilities capacity expansion to accommodate third party users
- Negotiated versus regulated access charges

*Promotion of Competition*
- What competition measures to be imposed
- Whether to identify measures in the legislation or empower regulator to determine