Outline

- Petroleum Law
- Sedimentary Basin Map of the Philippines
- Existing Petroleum Service Contracts
- Natural Gas Resources
- Natural Gas Fields
- Sample Assays of Natural Gas in the Philippines
- Historical Gas Production
- Supply & Demand Scenario
- Major Programs on Natural Gas
- Key Challenges
Petroleum Law

Presidential Decree No. 87: “The Oil Exploration and Development Act of 1972”

* Service Contract System
  - Service Contract (SC)
  - Geophysical Survey and Exploration Contract (GSEC)
  - Non-Exclusive Geophysical Permit (NEGP)

* Philippine Energy Contracting Round
SEDIMENTARY BASIN MAP of the PHILIPPINES
EXISTING PETROLEUM SERVICE CONTRACTS (SC)

- 34 Active Service Contracts
- 1 Active Geophysical Survey & Exploration Contract (GSEC) for conversion to SC
Natural Gas Resources

- Discovered: 3.8 Tcf
- Undiscovered: 24.7 Tcf (33% mapped)
Gas Fields in the Philippines

San Antonio
- G&G for further development

Malampaya
- Drilling of appraisal well later this year

Libertad
- To fuel 2-MW power plant

Sultan-sa-Barongis
- For further evaluation
# Sample Assays of Natural Gas in the Philippines

## Gas Field 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration (l/m3 gas)</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td>3 - 3.8%m</td>
<td>Orsat</td>
</tr>
<tr>
<td>H₂S</td>
<td>4.8 - 12.3 ppm</td>
<td>Tutweiler</td>
</tr>
<tr>
<td>Radon-222</td>
<td>1.0 - 6.0 mWL</td>
<td>WLM-30</td>
</tr>
<tr>
<td>Water</td>
<td>3,850 – 14,248</td>
<td>Karl Fischer reagens (ASTM E700)</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.3 - 4.2 (μg)</td>
<td>KMnO4/H2SO4 (ISO Method 6978A)</td>
</tr>
<tr>
<td>Chlorides</td>
<td>0.35 - 1.4 (mg)</td>
<td>CL 0992/IP 77 (AG2NO4)</td>
</tr>
</tbody>
</table>
Sample Assays of Natural Gas in the Philippines

Gas Field 2

<table>
<thead>
<tr>
<th>Components</th>
<th>Mole Fraction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>96.3006</td>
</tr>
<tr>
<td>Ethane</td>
<td>0.3508</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>2.5832</td>
</tr>
<tr>
<td>CO₂</td>
<td>0.0532</td>
</tr>
<tr>
<td>Water</td>
<td>0.7122</td>
</tr>
<tr>
<td>Total</td>
<td>100.000</td>
</tr>
</tbody>
</table>
Sample Assays of Natural Gas in the Philippines

Gas Field 3

<table>
<thead>
<tr>
<th>Component</th>
<th>Mol %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>4.52</td>
</tr>
<tr>
<td>Hydrogen Sulphide</td>
<td>0.04</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>0.25</td>
</tr>
<tr>
<td>Methane</td>
<td>95.05</td>
</tr>
<tr>
<td>Ethane</td>
<td>0.13</td>
</tr>
<tr>
<td>Propane</td>
<td>0.01</td>
</tr>
<tr>
<td>Isobutane</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>N-Butane</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Isopentane</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>N-Pentane</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Hexanes</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Heptanes +</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Specific gravity (air = 1.00) | 0.576

1 Gross Heating Value (BTU/SCF) | 963
Average Molecular Weight       | 16.7

1 Gross Heating Value, @ 15° C per vol @STP. STP is 15° C and 1.01325 BAR
Philippine Historical Gas Production

Historical Gas Production

Year

Gas Production (mmscf)

## Annex A.1.3a
*NATURAL GAS DEMAND OUTLOOK*

<table>
<thead>
<tr>
<th>(In Billion Cubic Feet, BCF)</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Generation</td>
<td>70.00</td>
<td>74.00</td>
<td>79.00</td>
<td>95.00</td>
<td>107.00</td>
<td>121.00</td>
<td>139.00</td>
<td>155.00</td>
</tr>
<tr>
<td>Transport</td>
<td>4.05</td>
<td>4.44</td>
<td>4.83</td>
<td>5.66</td>
<td>6.65</td>
<td>7.38</td>
<td>7.77</td>
<td>7.83</td>
</tr>
<tr>
<td>Industrial</td>
<td>3.05</td>
<td>3.10</td>
<td>3.16</td>
<td>3.96</td>
<td>4.68</td>
<td>5.70</td>
<td>6.44</td>
<td>7.19</td>
</tr>
<tr>
<td>Total</td>
<td>77.10</td>
<td>81.54</td>
<td>86.99</td>
<td>104.62</td>
<td>118.33</td>
<td>134.08</td>
<td>153.21</td>
<td>170.02</td>
</tr>
</tbody>
</table>
Natural Gas Supply Outlook

![Graph showing natural gas and condensate production over time](image-url)
Major Programs on Natural Gas

- NGas Infrastructure Development
- Investment Promotion
- Market Identification & Development
- Advocacy for the passage of the Downstream Natural Gas Bill
Infrastructure Development Program

Transmission Pipelines in Luzon

- **BATMAN 2**
  - (Bataan - Manila)
  - 140 kms.

- **ET LOOP**
  - (EDSA - Taft Loop)
  - 40 kms.

- **SUMA**
  - (Sucat - Malaya)
  - 35 kms.

- **BATCAVE**
  - (Batangas - Cavite)
  - 40 kms.

- **RO-BIN**
  - (Rosario - Biñan)
  - 35 kms.

- **BATMAN 1**
  - (Batangas Manila)
  - 80-100 kms.

- **CATLINE (Calaca Spurline)**
  - 30 kms.

Locations:
- Bataan
- Manila
- Bataan
- Manila
- Sucat
- Malaya
- EDSA
- Taft Loop
- Rosario
- Biñan
- Batangas
- Cavite
- Calaca Spurline

Distances:
- 25 Km.
- 35 Kms.
- 40 Kms.
- 80-100 Kms.
Infrastructure Development Program

Proposed LNG Terminal & CNG Mother/Daughter Stations
Key Challenges

- Investment Promotion
- Environmental Issues
  - H2S & CO2 not a problem as of now
  - New guidelines for effluent discharge standard
- Strengthened Exploration Programs
- Long-term Gas Supply
Maraming Salamat Po!