ONGC’s Experience in Implementing Vapour Recovery Units on Crude Oil Storage Tanks.

The Global Methane Initiative Partnership-Wide Meeting

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ONGC, India
Krakow
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Coverage

• ONGC - A snapshot
• Major Initiatives:
  – Shale gas
  – Wind Farm
  – Value multiplier initiatives
  – Carbon Management
    • GMI Specific Technological Interventions: implementing Vapor Recovery Unit
ONGC

Vision

To be a global leader in integrated energy business through sustainable growth, knowledge excellence and exemplary governance practices.

One of 6 Missions is:

“Continually strive to reduce CO₂ emissions across its activity chain with the objective of achieving carbon neutrality”
Performance
ONGC Group
O+OEG Production

- Highest ever O+OEG production

<table>
<thead>
<tr>
<th></th>
<th>FY'10</th>
<th>FY'11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude oil (MMT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ONGC</td>
<td>24.67</td>
<td>24.42</td>
</tr>
<tr>
<td>PSC-JV</td>
<td>1.79</td>
<td>2.86</td>
</tr>
<tr>
<td>OVL</td>
<td>6.49</td>
<td>6.76</td>
</tr>
<tr>
<td>Total</td>
<td>32.95</td>
<td>34.04</td>
</tr>
<tr>
<td>Natural Gas (BCM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ONGC</td>
<td>23.11</td>
<td>23.09</td>
</tr>
<tr>
<td>PSC-JV</td>
<td>2.49</td>
<td>2.23</td>
</tr>
<tr>
<td>OVL</td>
<td>2.38</td>
<td>2.69</td>
</tr>
<tr>
<td>Total</td>
<td>27.98</td>
<td>28.02</td>
</tr>
<tr>
<td>Total O+OEG (MTOE)</td>
<td>60.93</td>
<td>62.05</td>
</tr>
</tbody>
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ONGC Group: Financials

Highest-ever Turnover & PAT

 turno

\[ \text{Turnover} \]

\[ \begin{array}{cc}
\text{FY'10} & 108,679 \\
\text{FY'11} & 1,27,905 \\
\end{array} \]

\[ \text{18%} \]

\[ \text{PAT} \]

\[ \begin{array}{cc}
\text{FY'10} & 19,404 \\
\text{FY'11} & 22,456 \\
\end{array} \]

\[ \text{16%} \]

\[ \text{Net Worth} \]

\[ \begin{array}{cc}
\text{FY'10} & 100,565 \\
\text{FY'11} & 114,531 \\
\end{array} \]

\[ \text{12%} \]

(1 Crore = USD 0.22 million)
ONGC: Turnover

- Turnover up by 12%

₹ Crore

Revenue Sources (₹ Crore)

<table>
<thead>
<tr>
<th>FY'07</th>
<th>FY'08</th>
<th>FY'09</th>
<th>FY'10</th>
<th>FY'11</th>
</tr>
</thead>
<tbody>
<tr>
<td>59,058</td>
<td>61,543</td>
<td>65,049</td>
<td>61,983*</td>
<td>69,532</td>
</tr>
</tbody>
</table>

*Excludes trading of MRPL products

<table>
<thead>
<tr>
<th>FY'10</th>
<th>FY'11</th>
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<tbody>
<tr>
<td>45,483 (74%)</td>
<td>46,103 (68%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oil</th>
<th>Gas</th>
<th>VAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,942 (13%)</td>
<td>13,051 (19%)</td>
<td>8,305 (13%)</td>
</tr>
</tbody>
</table>
ONGC: Net Profit

- Highest-ever Net Profit; up by 13%
ONGC Videsh Ltd. (OVL)

- OVL wholly owned subsidiary of ONGC
- International E&P company operating in 15 countries with 33 projects

- India’s biggest MNC & third largest E&P company in India
- Overseas investment more than ₹59,000 Crore
OVL: Global footprint

33* Projects in 15 Countries

18 Exploration
5 Discovered
9 Producing

Venezuela
- 1 Exploration
- 1 Discovered
- 1 Producing

Cuba
- 2 Exploration
- 2 Discovered
- 2 Producing

Colombia
- 5 Exploration
- 1 Discovered
- 1 Producing

Brazil
- 5 Exploration
- 1 Discovered
- 1 Producing

Libya
- 1 Exploration
- 1 Discovered
- 1 Producing

Nigeria
- 2 Exploration
- 2 Discovered
- 2 Producing

North Sudan
- 2 Exploration
- 2 Discovered
- 2 Producing

South Sudan
- 2 Exploration
- 2 Discovered
- 2 Producing

Kazakhstan
- 1 Exploration
- 1 Discovered
- 1 Producing

Russia
- 2 Exploration
- 2 Discovered
- 2 Producing

Myanmar
- 2 Exploration
- 2 Discovered
- 2 Producing

Vietnam
- 1 Exploration
- 1 Discovered
- 1 Producing

Iran
- 1 Exploration
- 1 Discovered
- 1 Producing

Iraq
- 1 Exploration
- 1 Discovered
- 1 Producing

Syria
- 1 Exploration
- 1 Discovered
- 1 Producing

* 33rd Project is North Sudan’s 741 km long completed Pipeline
Major Initiatives
Shale gas

Shale gas strikes in first R&D well in Damodar valley

- Shale gas integrated Pilot project to drill 4 wells, 2 in Raniganj, West Bengal and 2 wells in North Karanpura, Jharkhand to find the potential of Shale gas in India basins.

- First well RNSG-1 proved presence of Shale gas on 25th Jan’2011

- R&D efforts continuing
Wind Farm

51 MW Wind farm commissioned in Gujarat in 2008

102 MW Wind farm planned to be set up in Rajasthan

- Investment ₹ 800 Crore
- Likely commissioning in FY’14

First 51 MW wind farm commissioned in Gujarat on 6th Sept 2008
Value-multiplier projects

**ONGC Petro-additions Ltd.**
- To produce: HDPE/LLDPE, Poly Propylene, Benzene
- Scheduled completion Q3, FY’13

**ONGC Mangalore Petrochemicals Ltd.**
- To produce Paraxylene/ Benzene
- Scheduled completion Q4, FY’12

**ONGC Tripura Power Company Ltd.**
- 726.6 MW Gas based power plant
- Scheduled completion Q4; FY’12
Carbon Management

- Green House Accounting (GHG) & Benchmarking
- Development of CDM projects
- Flaring reduction
- Renewables
Carbon Management (contd)

- Energy efficient initiatives
- *Fugitive methane emission (GMI (M2M) Program)*
- Carbon Capture Reformation opportunities (CO$_2$-23%, Flue gas-5%)
- Disclosure-Sustainability Reporting, Carbon Disclosure Project & M2M
- Sustainable water management
GMI (M2M) Program

• Partnership with EPA

• 4 Technology transfer workshops in Dec 2007

• Conducted *desktop prefeasibility analyses* at 13 sites (in 2008 & 2009)

• Conducted seven *onsite measurement studies* - methane emission sources and potential mitigation measures (four in May 2008) & (three in Nov 2009).
GMI (M2M) Program

- Conducted **26** onsite *In-house* measurement studies:
- Over 30 million m$^3$ of fugitive methane identified from 7 installations
- Reduced methane emission through DI&M activities
  - 3.2 MMSCM (2008-09)
  - 4.7 MMSCM (2009-10)
GMI (M2M) Program: Achievements

Methane emission reduction through technological interventions: 0.623 MMSCM (2010-11)

A snapshot

- Implementation of TVRU at Uran Plant Total Tank Vapor Saving: 9000 M3/DAY
  
  Methane saving: 2025 M3/DAY

- Replacement of servo gas system by instrument air at GCP Kallol
  
  Methane saving: 850 M3/DAY

- Tank Vapour Recovery by Ejector System at GCS Kuthalam
  
  Methane saving: 200 M3/DAY
TVRU - Uran Plant

- Initial finding by USEPA-ONGC collaborated measurement through service provider at Uran: Avg 20000 SCMD of wet vapour from Twin Intermediate Tanks
- C1 component (CH$_4$) = 22.5%
- Capex infused: Approx. Rs 13 crores  
  - Approx USD 2.7 million
- Opex: Rs 42 Lakhs/Annum – cost of electricity to run the compressors  
  - Approx. USD 100000
- Total Power required-120 KW  
  - Power required to drive the TVRU compressor- 60 KW  
  - Power required to compress gas in CSU off gas compressors - 60 KW

(Vapour recovery was non functional for quite sometime)
Intermediate tanks – Uran Plant
Intermediate tanks – Uran Plant
Intermediate tanks – Uran Plant
Measurement through Ultrasonic meter
Measurement in Progress(2009) Study
Existing TVRU – Uran Plant
Existing TVRU – Uran Plant
Existing TVRU – Uran Plant
Existing VRU has been rehabilitated:

1. Instrument logics improved
2. Liquid trapping in the piping have been taken care of
3. Compressors are thoroughly serviced
4. Nonfunctioning parts have been replaced
TVRU - Uran Plant

- Average quantity of vapours recovered is about 9000 M³/Day
  Methane saving: 2025 M³/DAY (0.74 MMSCM per annum)

- Additional revenue from VAP INR 10 crores per/year (USD 2.2 Million approx)

- Pay back period is less than two years

- Emission reduction: 15300 Tons CO₂e per/year

- Running since: Dec 7, 2010
Future opportunity

1. Kallol CTF Complex Process tanks, Ahmedabad Asset

2. GGS VIII- Ahmedabad Asset

3. Many more would surface out once a comprehensive measurement study is carried out.
Conclusion

GMI: A positive step towards Sustainable Development

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Thank you