

# –ONGC’s M2M Program Initiatives: A Case Study”

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# Coverage

- A brief about ONGC
- Carbon Mgt. Group (CMG) in ONGC
  - Mandate and activities
- GHG mitigation in ONGC
- M2M in ONGC
- Achievements
- Action Plans
- Monitoring, Collaboration, Conclusions

# Vision of ONGC

To be a World-Class Oil & Gas Co. Integrated in Energy Business with Dominant Indian Leadership and Global Presence

# ONGC...

- Flagship energy company of India(26th Global Energy Major, As per Platt's List 2009)
- ONGC is the **only company from India to figure in the elite list of 40 companies**, out of Fortune Global 500 companies list of 2009, based on “Return on Revenues” and “Return on Assets”
- Global presence in 16 countries and 40 projects
- ONGC occupies **152nd rank in the Forbes Global 2000 list** 2009 of the world's biggest companies
- Reserve Replacement Ratio of more than 1 for the last consecutive 5 years
- Turnover and Net Worth steadily increasing

## ONGC...

- Has been retaining its position as the highest profit making company in the country, in Private or Public sector
- Made Net Profit of Rs. 16,126 Crore last year despite supporting downstream PSUs with the highest level of subsidy discount of Rs. 28,225 Crore

## Reserve accretion

**FY'09: Ultimate Reserve Accretion  = 206.806 MTOE  
the highest in last 18 years**

### Domestic



### Overseas



# ONGC- an E&P company

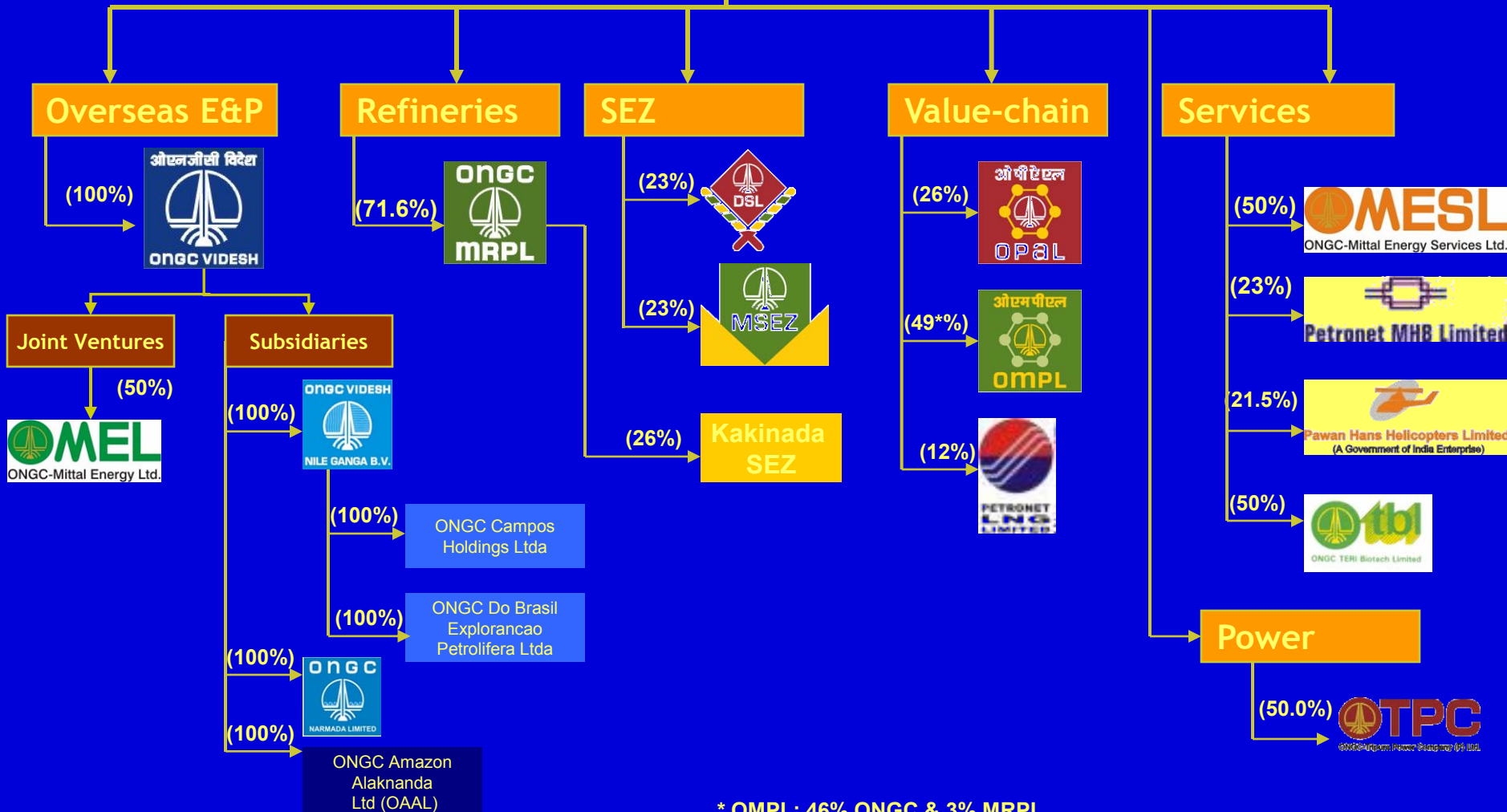
## Turnover, PAT, Net worth

Rs. Crore





# ONGC: The Corporate

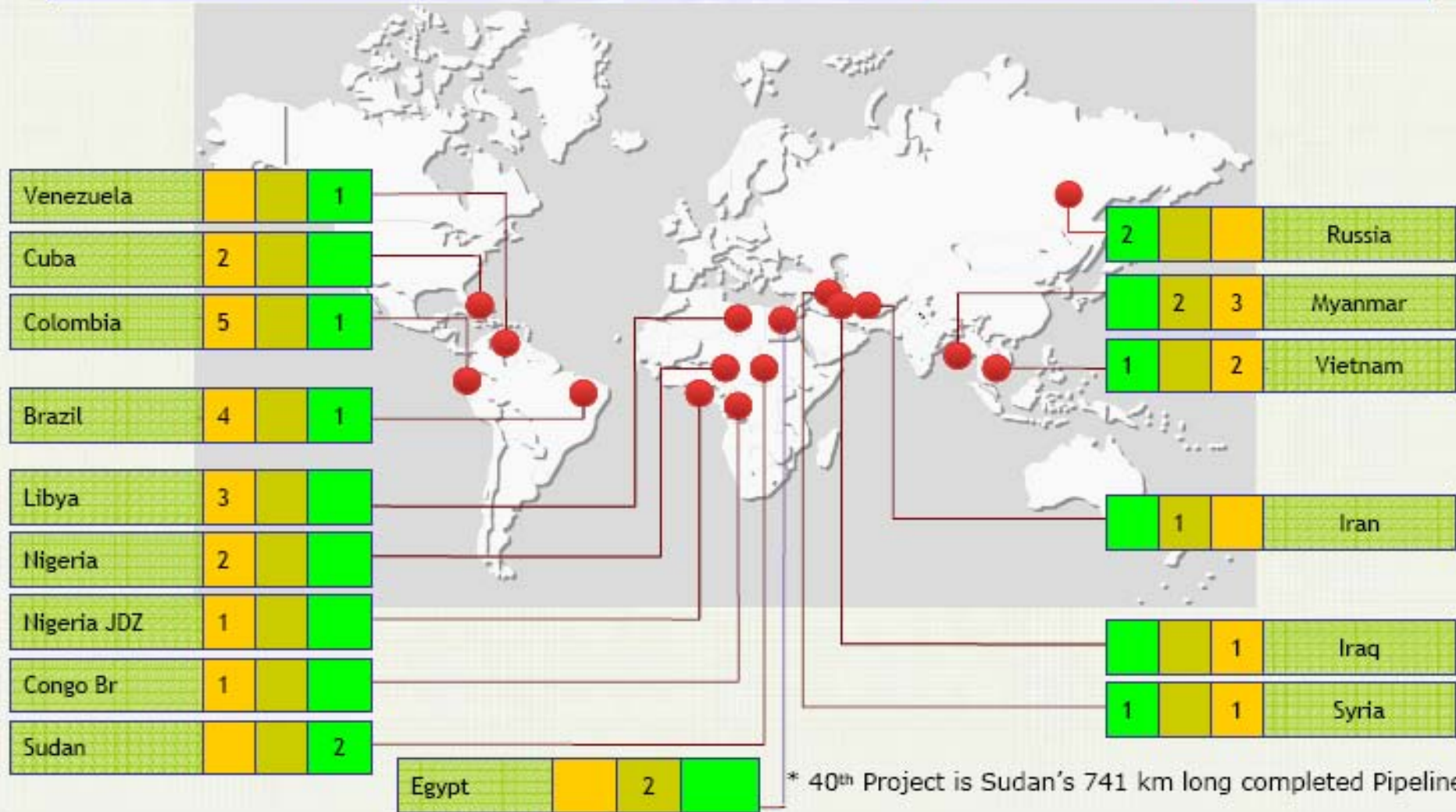


\* OMPL: 46% ONGC & 3% MRPL



# ONGC- E&P Global Footprints

40* Projects in 16 Countries	25 Exploration	5 Discovered/Development	9 Producing
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# ONGC: Domestic Operations



# CMG in ONGC—Mandate

- ***GHG Management***
- Develop Green House Gases (GHG) inventory, accounting and information system of ONGC
- Identify and develop GHG programs and projects
- Monitor the existing/ ongoing registered CDM Projects
- Carbon disclosure in the company balance sheet
- Develop climate protection strategy and policy
- Strategic management of Climate Change and business opportunity thereof
- Develop sustainability reporting

# CMG in ONGC-- Activities

- Developed Corporate policy on Climate Change and sustainability
- Developed Policy on “Greening the vendor’s Chain”
- CDM project development
- GHG accounting for ONGC facilities
- Reporting through Carbon Disclosure Project
- Sustainability Reporting in progress
- Consultancy to ONGC JVCs on CDM Projects
  
- ***M2M (Methane to Markets) Program***

# GHG mitigation : Plan & programme

- GHG Accounting corporate wide
- Benchmarking of operations
- Developing possible CDM projects
- Corporate wide zero flaring norm
- Investment in renewables
- Emphasis on energy efficiency
- ***Arresting fugitive methane emission( M2M Program)***
- CCS for EOR

# M2M in ONGC

- 1<sup>st</sup> non North American oil company to join (Aug 07)
- 8<sup>th</sup> Global oil major to join the programme
- 4 technology transfer workshops in Dec 2007
- 7 pre feasibility( table top analysis) study in early 2008
- 4 pilot measurement studies in May 2008
- Presentation to ONGC Board in Sept 2008
- ONGC M2M action plan developed
- Longer duration repeat measurement at Uran & Kallol

# M2M in ONGC

## ONGC M2M Program team formation

- Core team with four members
- 10 Asset coordinators
- Hands on training of the core team on measurement techniques during June 26- June 30, 2009.
  - Through USEPA-ONGC collaboration
  - By HY-BON Engineering, Midland, Texas at ONGC Uran Plant



# M2M in ONGC

- Six prefeasibility studies undertaken in Early2009
- 2<sup>nd</sup> measurement study undertaken in Nov 2009
- Has been taking part in collaborative platforms organized by USEPA.
- ONGC's Director (Onshore) is an O & G Subcommittee Member from India.
- ONGC is in the advance stage of procuring the relevant equipments for undertaking leak detection and measurement of fugitive methane.

# Major outcomes of the measurement - 2008

- Total 16.3 Million M3 of fugitive methane
  - Heera Platform - 4.061 Million M3 of methane
  - Uran Plant – 8.522 Million M3 of methane
  - Ahmedabd (Kalol Production Complex) – 0.426 Million M3 of methane
  - Assam (Geleki Production Complex) – 3.272 Million M3 of methane
- 3 major sources identified
  - Vents 10.07 Million M3
  - Compressor with wet seal degassing 5.994 Million M3
  - Leakage 0.439 Million M3

# Major outcomes of the Longer duration measurement - 2009

- 2 longer duration (repeat) measurements were carried out during June 17-25, 2009
  - At Uran Plant &
  - At Kallol CTF Complex
  
- The findings are;
  - **Uran Plant:**
  - Emission of tank vapours - 20800 SCMD normal and 28000 SCMD peak

# Major outcomes of the Longer duration measurement - 2009

## ➤ **Kallol CTF Complex:**

- 6,216 SCMD from the tanks at Kallol CTF complex and
- 10,200 SCMD approx. from Kallol heater treater flare.

## ➤ **6 table top analysis of new installations undertaken during April- July 2009**

- CPF Gandhar
- Hazira Plant
- Ankleswar CTF Complex
- GGS 1 of Gandhar
- Mehsana CTF Complex
- SH Complex- Mumbai High
- Conducted actual measurements at three installations: S H Complex of Offshore, Hazira Gas Processing Complex & CPF Gandhar.

# Managing Methane emission – USEPA suggestion

- Vents-- Use of VRU and VRT
- Compressor seals– Replacement of wet seals by dry seals
- Leakage-- Directed Inspection & Maintenance (DI&M) practices

# Methane savings

By DI&M activities:

- Heera Platform- 8.86 Million cubic feet
- Uran Plant- 0.32 Million cubic feet
- Ahmedabad Kallol Complex- 1.84 Million cubic feet
- Assam Geleki CTF Complex- 3.8 Million cubic feet

*Total: 14.82 Million cubic feet*

# Methane savings

## By Rod packing Change:

Changed the rod packing seals of the all the eight Reciprocating Compressors as suggested by USEPA Technical Experts.

***Total savings: 100.4 Million cubic feet***

(An amount of ***2.843 Million meter cube*** was estimated to be leaking from the rod packing seals of compressor battery at CTF complex, Geleki)



# Financial Analysis

- Seal cost:
    - Total seal cost of 8 compressors
    - Rs  $(12360 * 13 + 12365 * 3 + 18064 * 1) * 7 + Rs(15885 * 16 + 28840 * 4) * 1$
    - RS 18,80,393/
  - Man-hour cost:
    - Total man-hour  $3 * 8 * 8 = 192$
    - Cost =  $192 * 1000 = 1,92,000/$
- Total cost= 21,00000/ (approx) Say Rs 21 lakhs approx

# Financial Analysis

- Revenue = @Rs 1920/1000m3  
= RS 1920 \* 2843  
= Rs 54,58,560

Pay Back period is just 5 months.

# Arresting tank hydrocarbon emissions by Using VRU

## Location: Uran Plant of ONGC

- **A Brief about the project:**
- The project aims at recovering 20,800 SCMD of rich & wet tank vents from its two intermediate storage tanks which was otherwise being emitted to the atmosphere.
- A detailed study was carried out during June – July, 2009 through HY-BON Engineering, USA under a joint effort from USEPA & ONGC to accurately measure the tank vents and suggest the suitable technical interventions necessary towards this end. HY-BON has suggested the use of VRU.
- Detailed reports received on Sep 12, 2009.
- Actions being undertaken.

# Arresting tank hydrocarbon emissions by Using VRU

## ➤ Estimated emissions reduction

- The gas is typically wet & rich.
- The percentage of methane is 36.75%.
- It would amount to a saving of approx. 7644 m<sup>3</sup> of methane per day.
- This is equivalent to 40,000 tons of CO<sub>2</sub>e per annum.

## ➤ Projected capital

- Approx: \$2 million

## ➤ Timeline for completion

- Oct 2010

# Arresting Vents & Flare Gas: Use of Screw Compressor

## **Name of the project:**

To recover low pressure & very low pressure gas by using screw compressor

**Location:** Heera and Neelam Offshore Platforms of ONGC

## **A Brief of the project:**

- The project aims at recovering 18.25 MMSCM per year (50,000 SCMD) of gas in each platform which was otherwise being flared and vented.
- The vented component of the project is approx 2.54 MMSCM of natural gas per year.
- The project aims at capturing the entire gas by using Screw Compressor

# Arresting Vents & Flare Gas: Use of Screw Compressor

## ➤ Estimated emissions reduction

- Heera gas contains 57.34% methane
- The total methane saving from Heera Platform from the vented gas of 2.54 MMSCM per year would be = Approx 1.5 Million cubic meter or approx 54 Mcf per annum.
- Saving of 15.7 MMSCM per year of NG which is otherwise being flared
- This is equivalent to 54,554 tons of CO<sub>2</sub>e per annum.

*(32,711 tons of Co<sub>2</sub> equiv from 15.71 MMSCM of NG which is being flared and 21,843 tons of Co<sub>2</sub> from 2.54 MMSCM per year which is being vented.)*

## ➤ Projected capital

- Approx: \$13 million

## ➤ Timeline for completion

- Oct 30, 2010

# Long term action plan towards Methane Capture

- In-house capacity building- Core team already been trained - Development of measurement team
- Procurement of measuring equipments in the offing
- Further training of the measurement team members: USEPA-ONGC collaboration
- Fugitive emission mapping of all facilities of ONGC
- Creating ONGC fugitive emission inventory



# Collaboration

- Sharing ONGC experience through Natural Gas STAR International Programme
- Representing in various NGS forums
- Propagating M2M message

Ambition: To make ONGC a Methane Leakage free organization to the extent possible.

# Conclusion

## Opportunities exist for ONGC

- Evaluate and implement cost-effective projects
- Seek to improve project economics through carbon markets
- Develop dedicated methane emission identification and measurement team- *build capacity*
- Gain recognition for efforts via promotion internally and to external stakeholders
- Share learning and best practices with other Gas STAR companies (presentations, articles)
- Can emulate Gas STAR Rewards and Recognition program to incentivise employee participation and further innovation

# Conclusion

- M2M : A positive step towards Sustainable Development

Thank you

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