

Energy Efficiency in Downstream Logistics

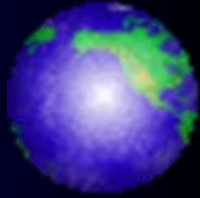
by

Ranjan Kumar Mohapatra

Chief Manager (Supply & Distribution)

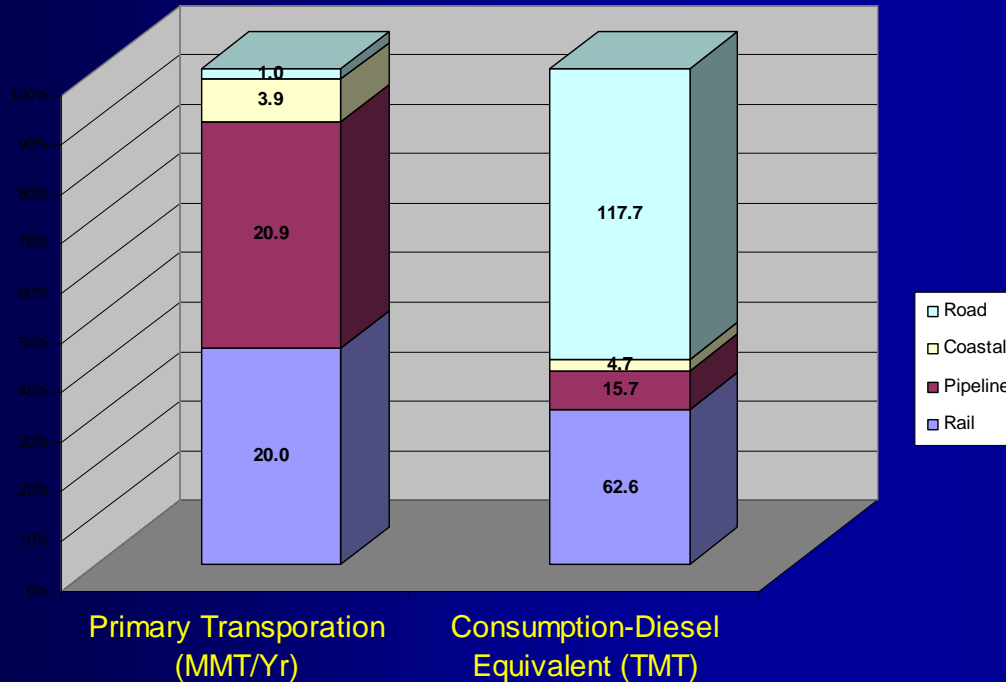
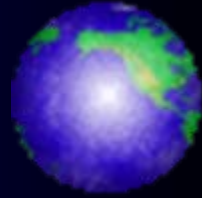
Indian Oil Corporation, Mktg HO, Mumbai

Three Energy Efficiency Myths



- **Myth 1 : Energy Conservation Potential in Modal Distribution is not sizeable**
- **Myth 2 : All Energy Efficiency Measures have to be Capital Intensive**
- **Myth 3 : Supply Chain Efficiency Measures are not complimentary to Energy Efficiency Measures**

Energy Consumption by Different Modes (IOC : 2007-08)



➤ The cost of energy in Rail Transportation is estimated at Rs. 238 Cr.

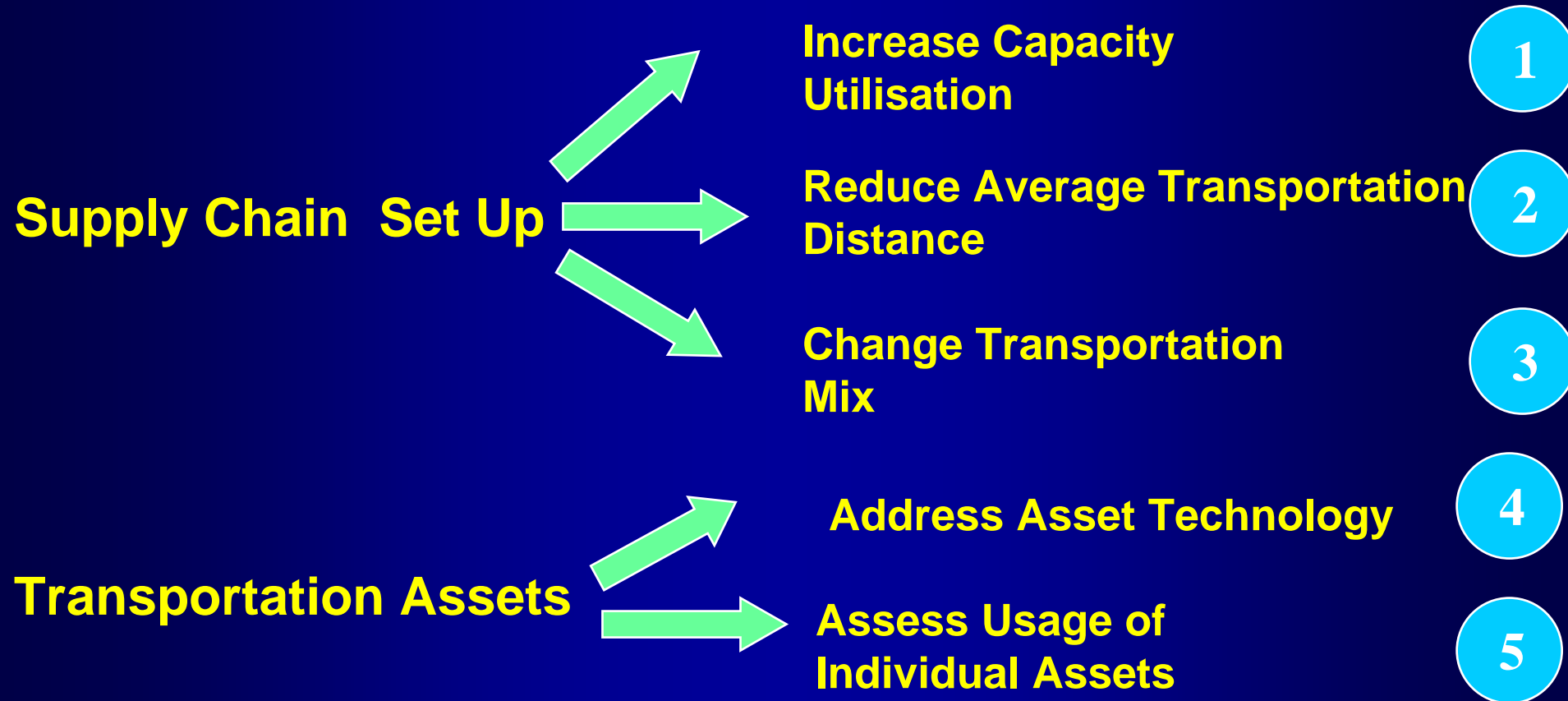
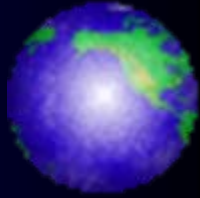


➤ The cost of energy in Road Transportation is estimated at Rs. 447 Cr.

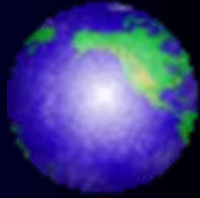


Pipelines – The Most Energy Efficient Mode of Petroleum Product Transportation

Opportunities to Reduce Energy Consumption In Downstream Logistics



Opportunities to Reduce Energy Consumption In Downstream Logistics



Supply Chain Set Up

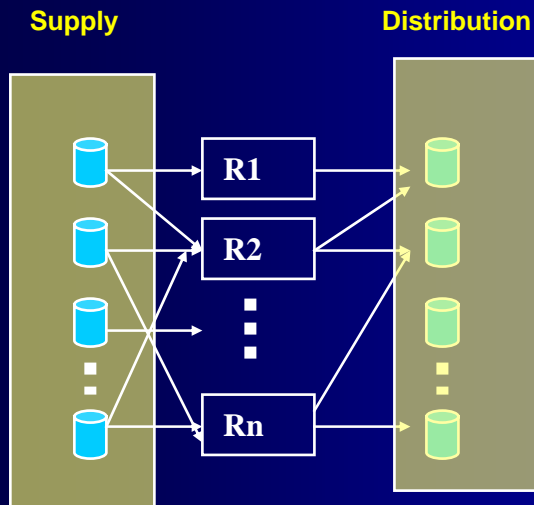


Increase Capacity Utilisation

1

What Can Be Done?? – Planning & Optimisation

Integrated Planning

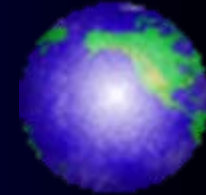


End to End Distribution Planning



IOC is estimated to have saved upto Rs. 500 Cr by reducing non-optimal movements

Opportunities to Reduce Energy Consumption In Downstream Logistics



Supply Chain Set Up



Reduce Average Transportation Distance

2

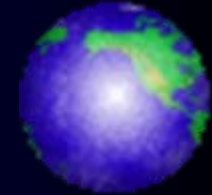
What Can Be Done?? – Transportation Scheduling & Execution



- Real Time information on demand
- Logistics movement aligned with demand
- Avoidable movements eliminated



Reduction of avg 1 KM of Road Transportation can save Rs. 9 Cr./ yr of fuel consumption



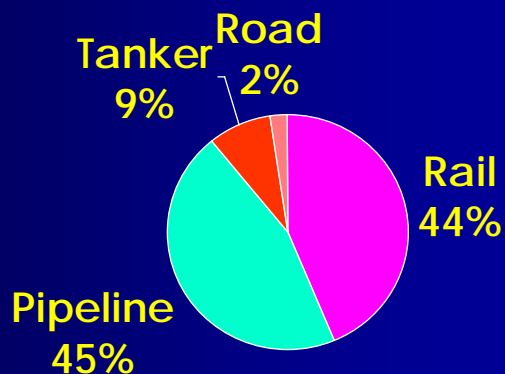
Modewise Primary Transportation – IOCL vs. USA

Supply Chain Set Up

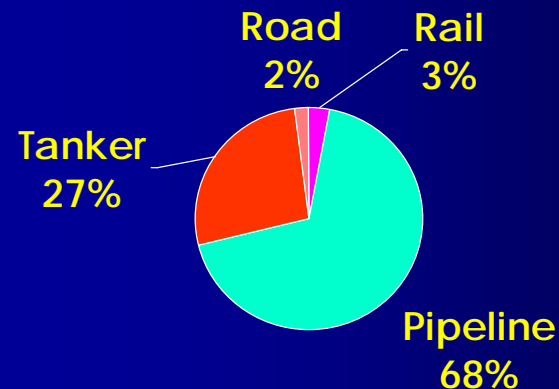


Change Transportation Mix

3

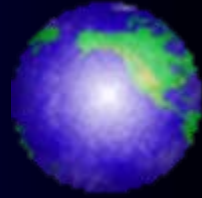


IOC



USA *





Modewise Primary Transportation

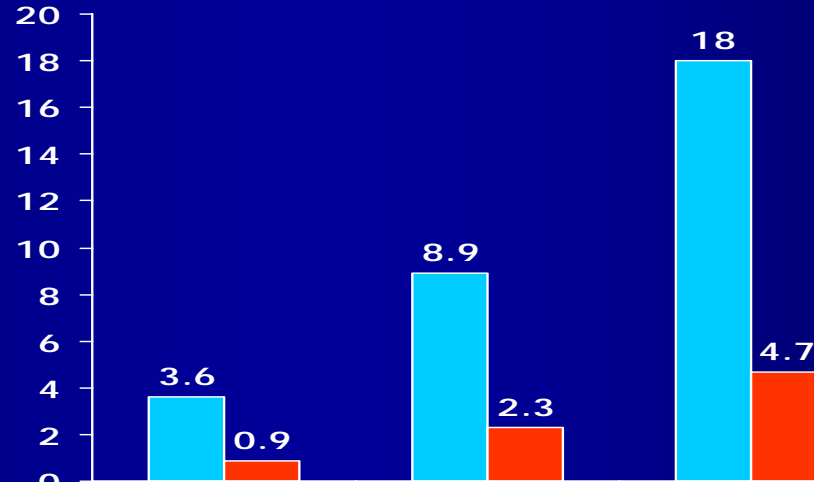
Supply Chain Set Up



Change Transportation Mix

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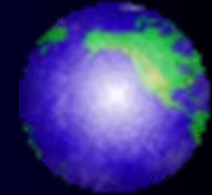
Rs. Cr/year & Eq Diesel TMT/yr



	2%	5%	10%	
■ Rs. Cr/ year	3.6	8.9	18	
■ Equivalent Diesel Consumption (TMT)/ yr	0.9	2.3	4.7	

Potential Savings thru Shifting from Rail to Pipeline

Opportunities to Reduce Energy Consumption In Downstream Logistics



Transportation Assets



Address Asset Technology

4

What Can Be Done??

1. **Use of RFID for Tankwagons/ TTs**
2. **Use of VFDs for Pipeline Pumping**
3. **Use of Intelligent Pigging**
4. **Knowledge Management/ Training**

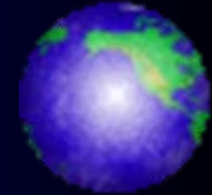


Benefits of RFID

- **Tracking helps unnecessary movements**
- **Early Planning/ Readiness by Terminals to receive T/W**



Opportunities to Reduce Energy Consumption In Downstream Logistics



Transportation Assets  Assess Usage of Individual Assets

5

What Can Be Done??

1. Use of Non-conventional energy at Terminals/ Depots
e.g.

- Rainwater harvesting
- Solar Lamps
- Energy Efficient Lamps

2. Preventive Maintenance

3. Corrosion Monitoring especially pipelines

4. Knowledge Management/ Training

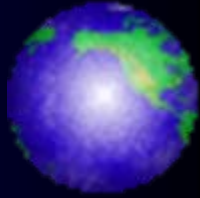


Quantitative Benefits

- Use of Mag coupled lamps at one depots can save 1.52 lac/yr
- Use of 2400 LPM flow meter with 4" hose can save 61.5 KWH of power



Three Energy Efficiency Myths



- **Myth 1 : Energy Conservation Potential in Modal Distribution is not sizeable**

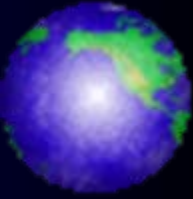
Reality: Energy Conservation Potential is nearly Rs 500 Crores

- **Myth 2 : All Energy Efficiency Measures have to be Capital Intensive**

Reality: Reengineering can also bring in considerable savings in Energy

- **Myth 3 : Supply Chain Efficiency Measures are not complimentary to Energy Efficiency Measures**

Reality: Supply Chain Efficiency Effort can compliment Energy Efficiency

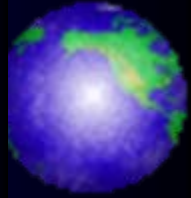


Thank You



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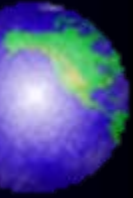
Downstream Logistics- Energy Consumption (Rail)



Working of Energy Consumption for Rail (Source: Indian Railways: Facts & Figures 2007-08)

- Mineral Oil NTKM = 23.4 Billion (a)
- IOC (assumption 60% of the total) = 14.04 Billion (b)
- Total OE by Railways = 220006 Million Rs.(p)
- Total passenger KM = 769956 MTKM (q)
- Total Freight KM = 521993 MTKM (r)
- OE per KM = $p/(q+r) = 0.17$ Rs/ KM (s)
- Energy Consumption in Rs = (b) X (s) = 238 Cr.





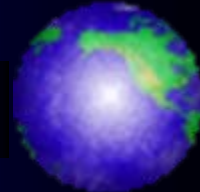
Downstream Logistics- Energy Consumption (Road)

Working of Energy Consumption for Road (Source: Indian Oil Data)

- Total transportation by Road = 41.2 MMT (x)
- Average distance by Road = 50 km = 100 RTKM (y)
- Total load by truck (10 tonne) = (x)/ 10 MT = 4.12 million (z)
- Average dist by truck = (y) * (z) = 412 MKM (e)
- Average distance/ litre of diesel = 3.5 Km/ litre (f)
- Price of Diesel = Rs. 38 / litre (g)
- Total Energy Cost by Road = (e)*(g)/f = Rs. 447 Cr.














US Petroleum Pipeline Transportation Map



Source:

http://www.theodora.com/pipelines/united_states_pipelines.html

LEGEND:

- | | | | |
|---|--|---|---------------------------------------|
|  | Oil pipeline |  | Inter-Country oil pipeline label |
|  | Oil pipeline (planned/under construction) |  | Cross-Border oil pipeline label |
|  | Gas pipeline |  | Inter-Country gas pipeline label |
|  | Gas pipeline (planned/under construction) |  | Cross-Border gas pipeline label |
|  | Products pipeline |  | Inter-Country products pipeline label |
|  | Products pipeline (planned/under construction) |  | Cross-Border products pipeline label |