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# Single Point Mooring System (SPM) - a Logistics Marvel

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# Indian Oil Overview



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The Energy of India



# Indian Oil Corporation Ltd.

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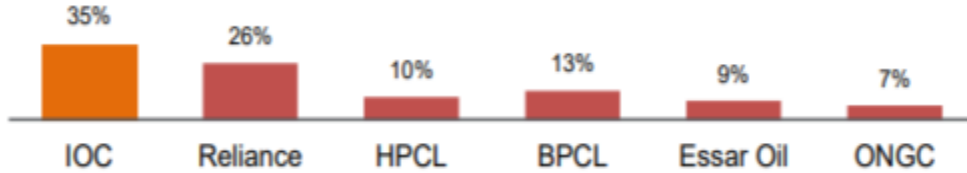




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# IOCL's Dominance in Downstream Oil Sector

## Leader in Refining Market Share<sup>(1)</sup>

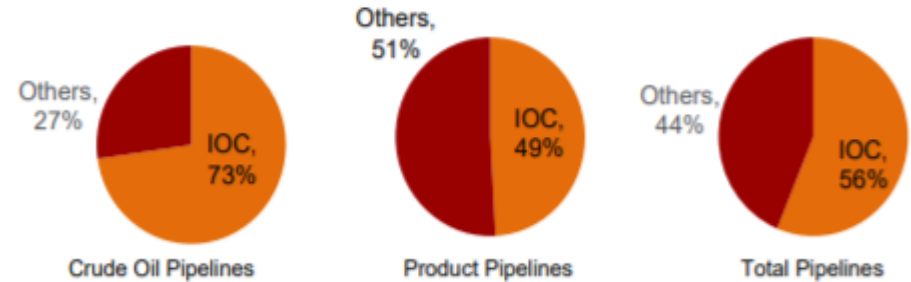


Note: Figures as of March 31, 2017.

(1) Market share based on group Refining Capacity

Source: PPAC website

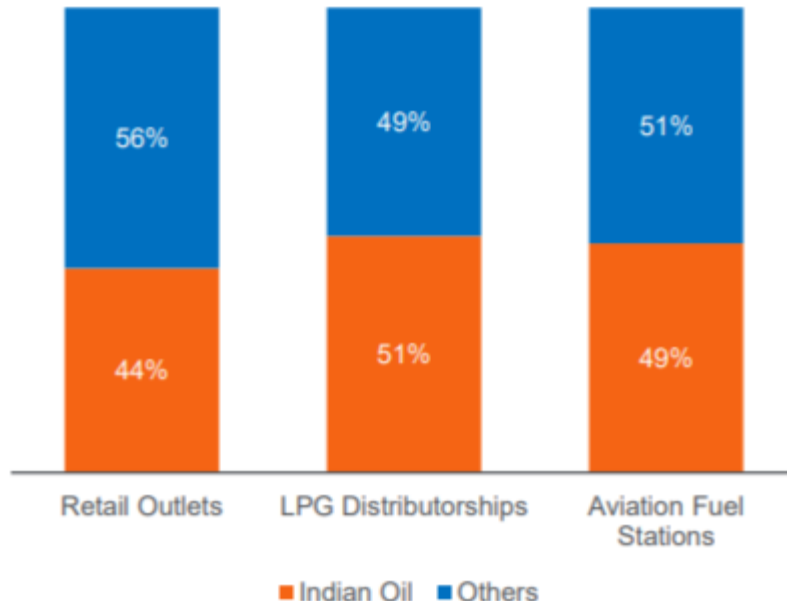
## Largest Pipeline Market Share - Downstream



Source: PPAC Website

Note: Figures as of March 31, 2017

## Leader in Market Infrastructure



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Source: Company Filing & PPAC Website

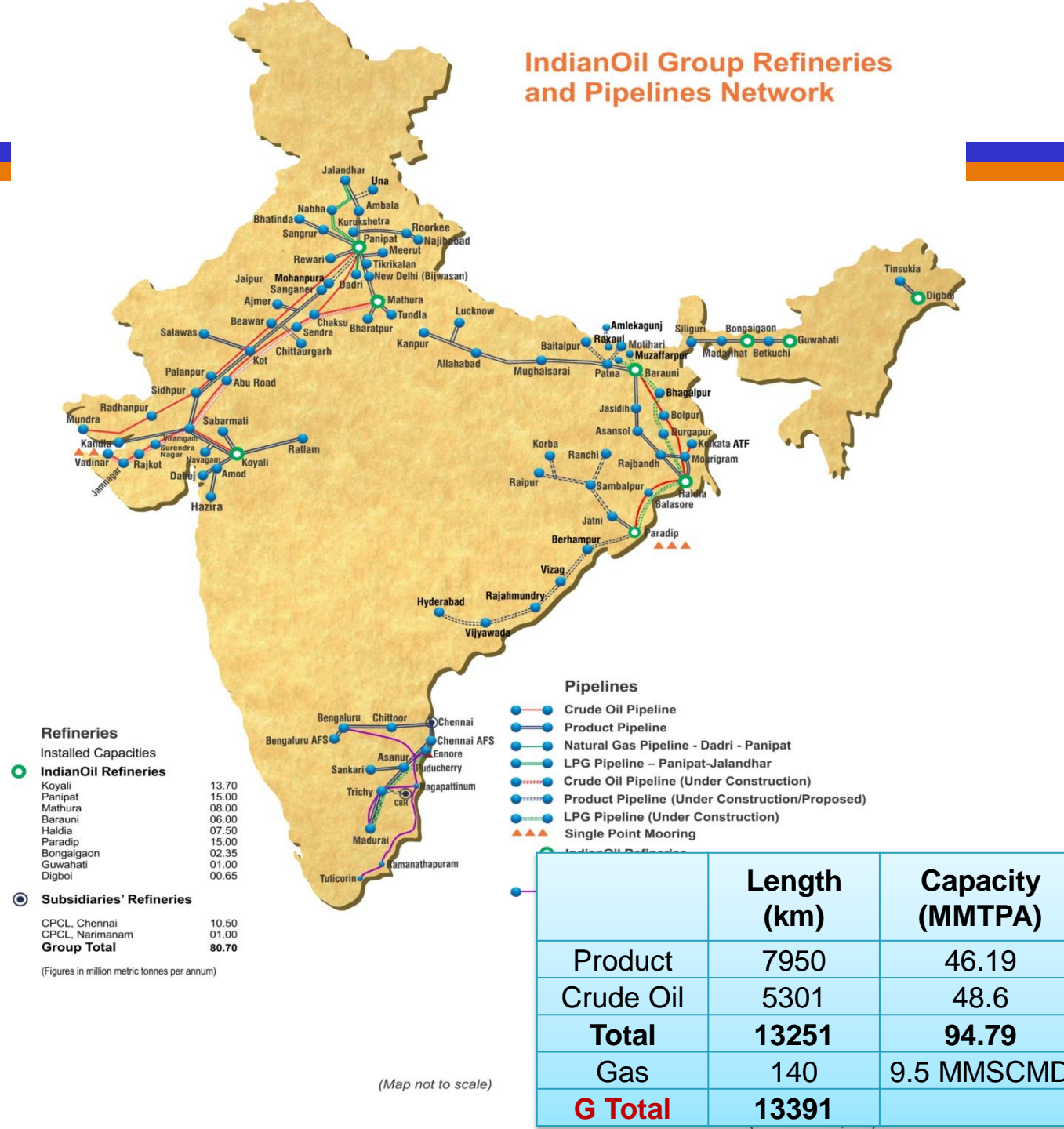
Indian Oil Corporation also has strong presences in

- R&D Prowess in all spheres of petroleum oil and NG
- Petrochemicals,
- LNG import facility and CGD network
- Domestic Overseas Operatorship
- Wind, Solar Biofuels Sustainability
- Nuclear JV with NPCIL
- Exports, Consultancy, Training, Downstream Marketing
- Several JVs doing flourishing business overseas



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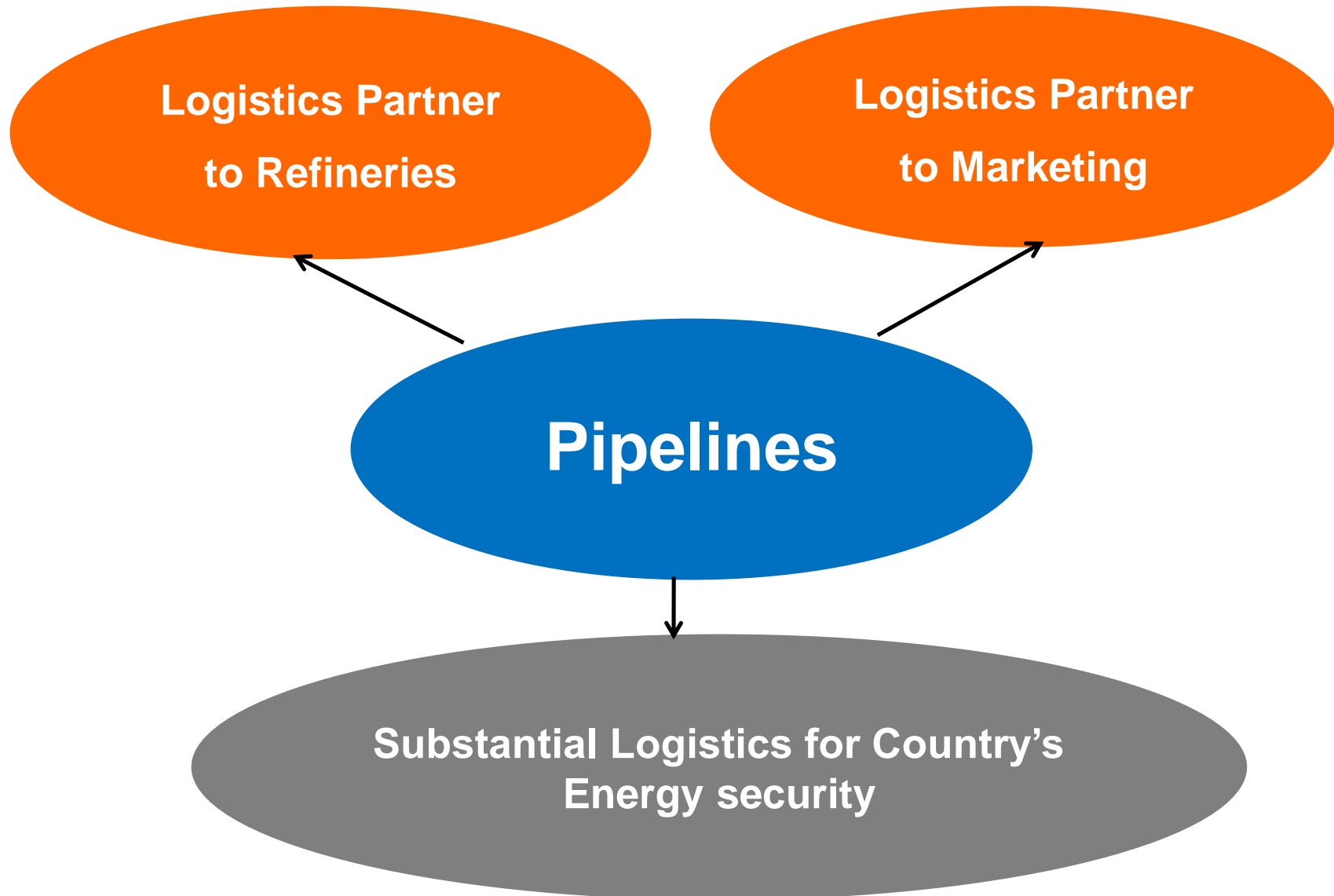
## IndianOil Group Refineries and Pipelines Network





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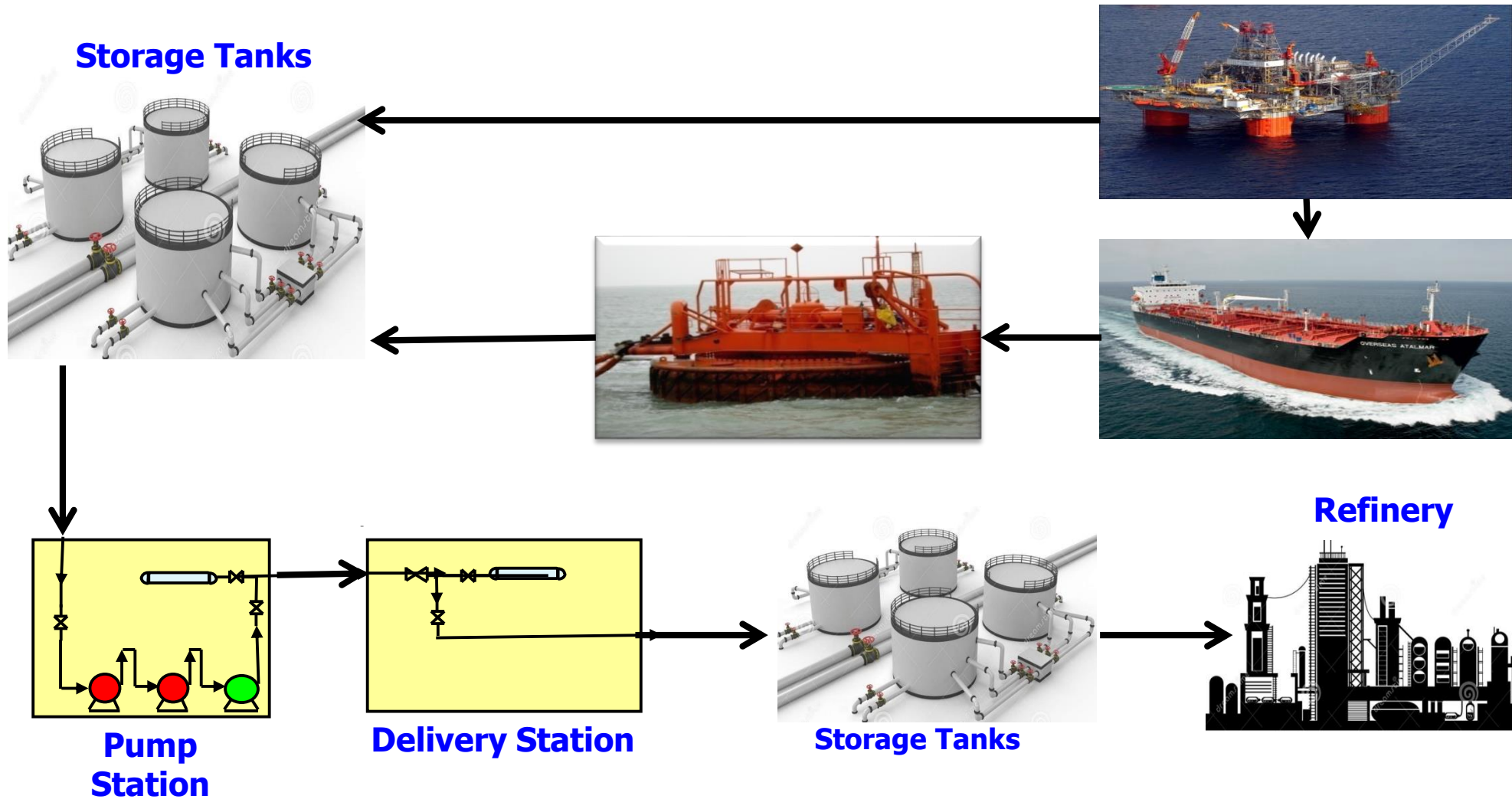
# Pipelines - The Critical Link





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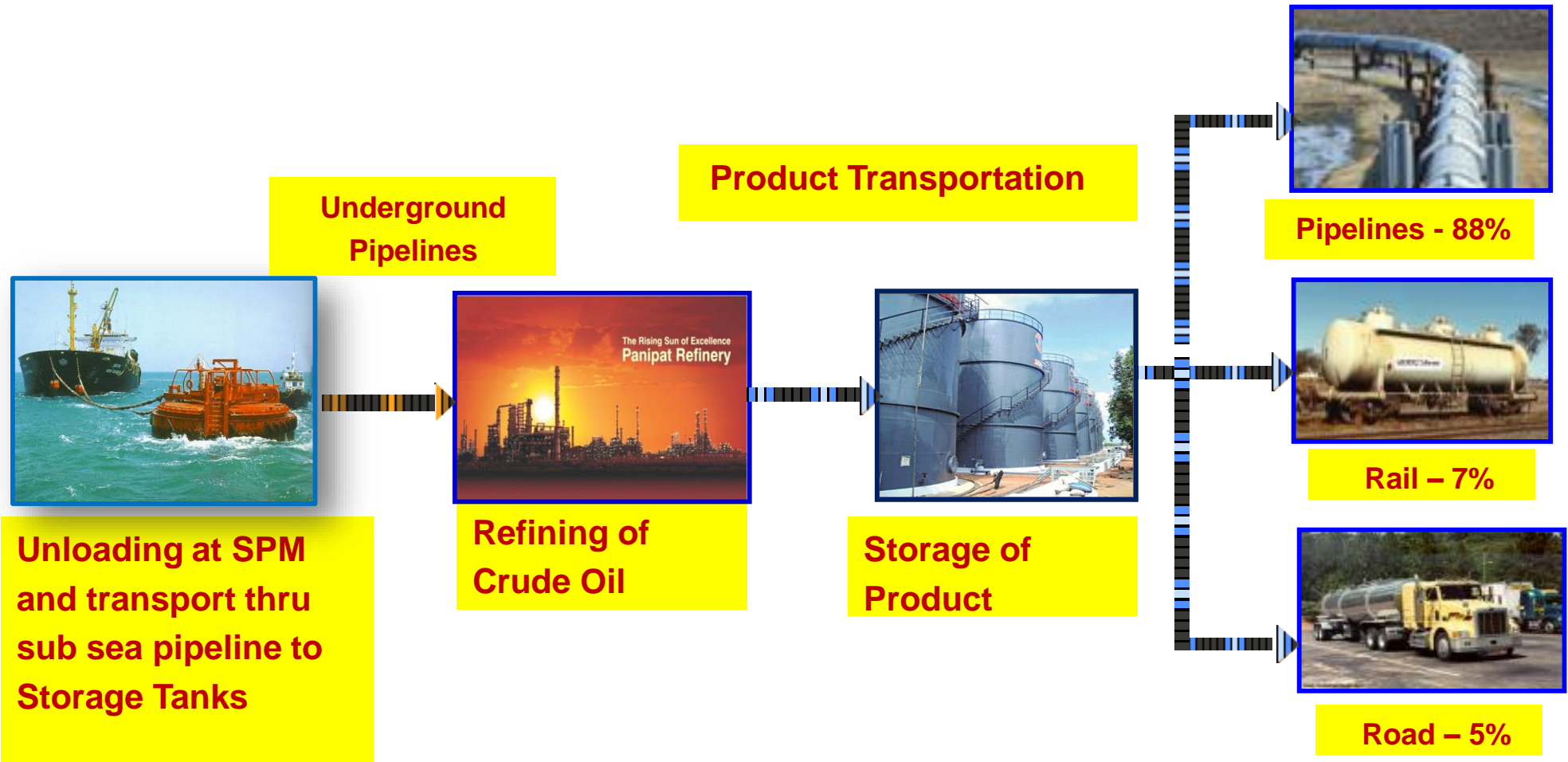
# Typical Supply Chain : Crude Oil





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# Supply Chain-Product

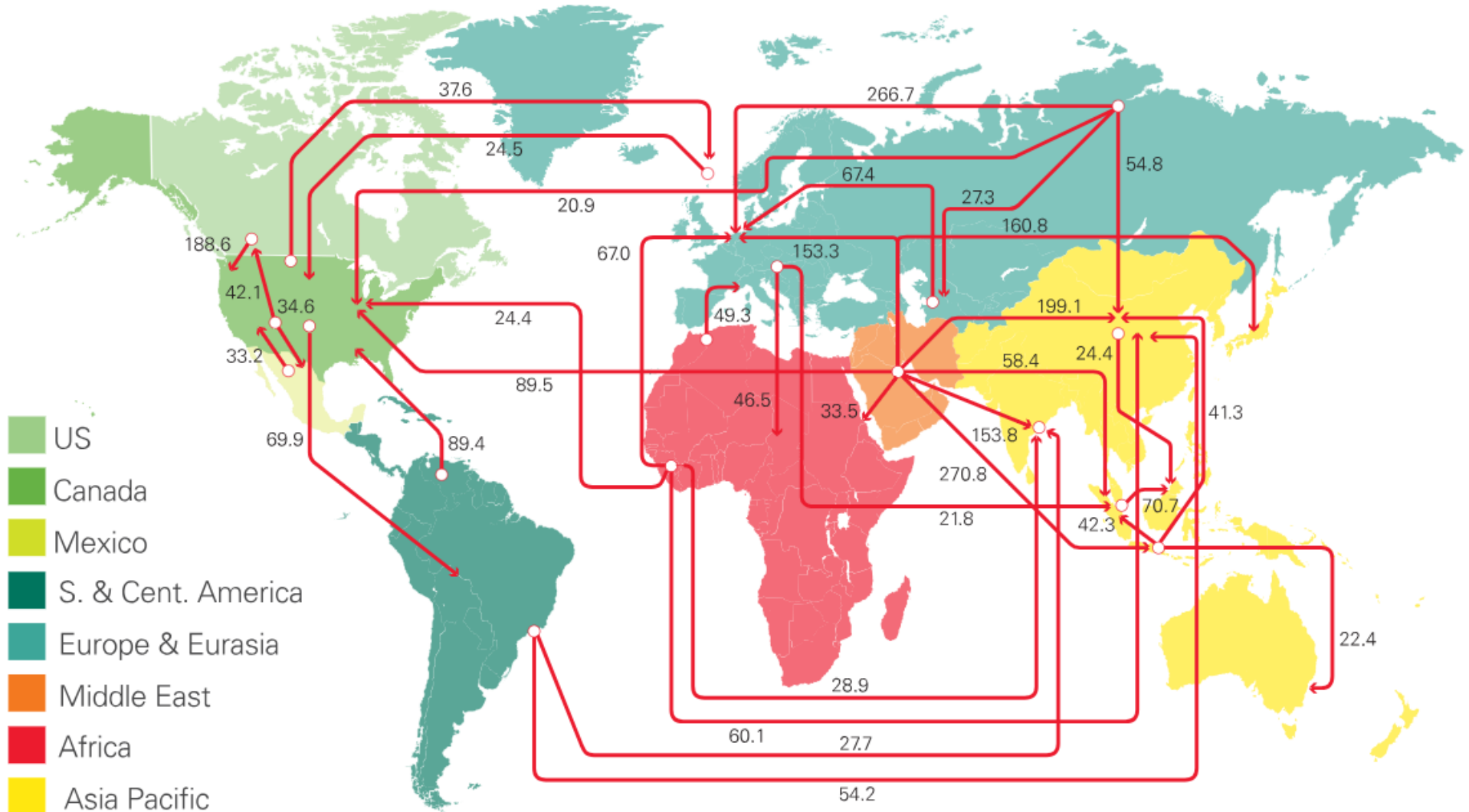






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# Global Crude Oil Movement





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# IOCL's Crude Oil Source

## Importing Crude from Across the Globe



Total crude oil import : 63.79 MMT (including 7.74 MMT for CPCL)

Figures for FYE 2017

Source: Company Filing



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# Crude Oil Transportation

- In 2017, 42 million barrels of crude oil moved each day out of which 4.4 million barrels to India

Such large volume requires significant logistics strategies to minimize cost of transportation :

Bulk transportation of crude oil over long distance is normally done by Tankers as cost of ocean transport is the lowest

To minimize cost of Transportation of crude oil over long distance, Very Large Crude Carriers (VLCC) is preferred wherever draft permits

VLCCs can carry about 270 TMT of crude oil during a laden voyage

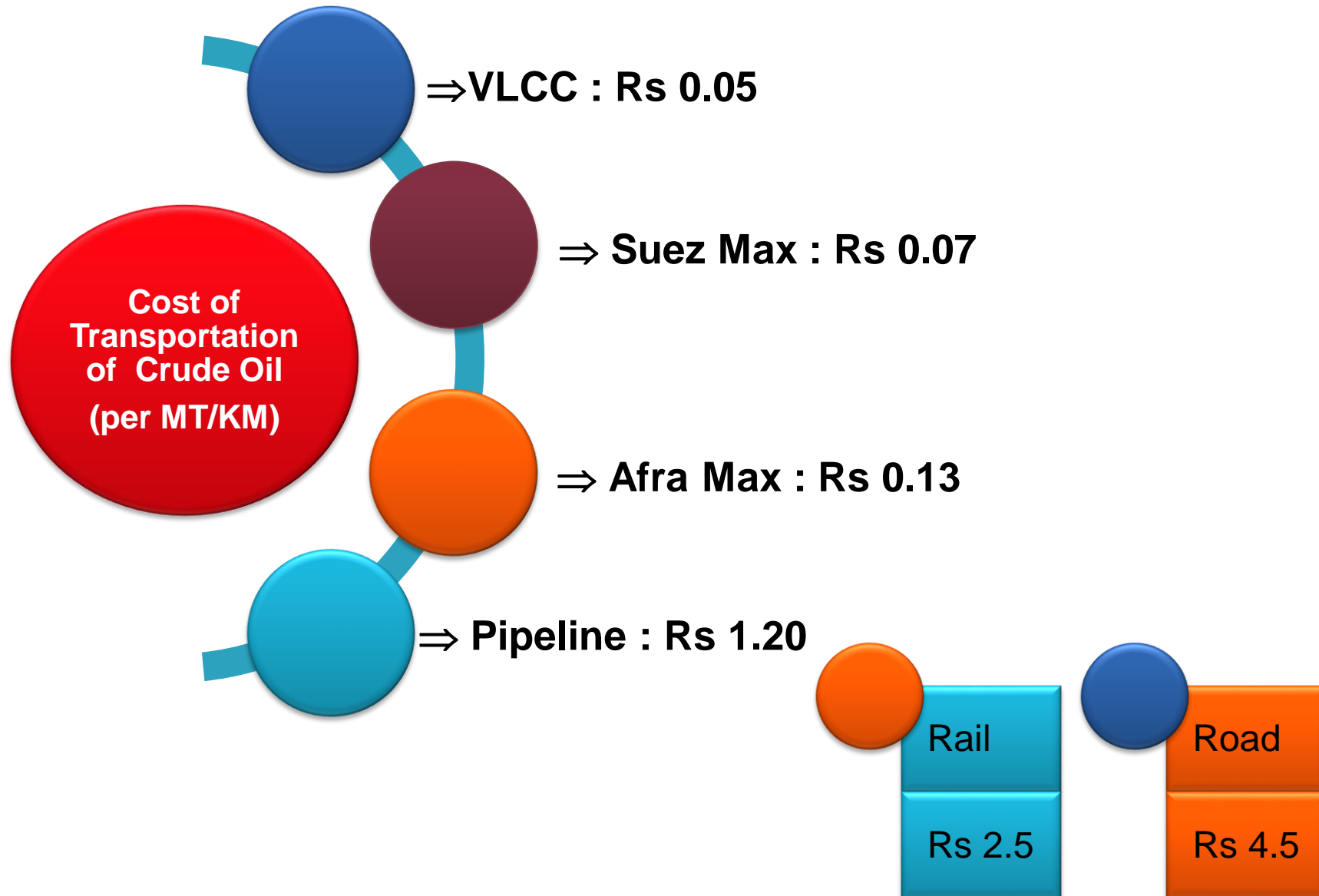
Laden VLCCs have draft of about 21 m and required  $> 28$  m for maneuvering

Single Point Mooring (SPM) system located at water depth of  $> 30$  m can be used for berthing of VLCCs



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# Crude Oil Transportation – Cost Economics







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# SPMs of IOCL

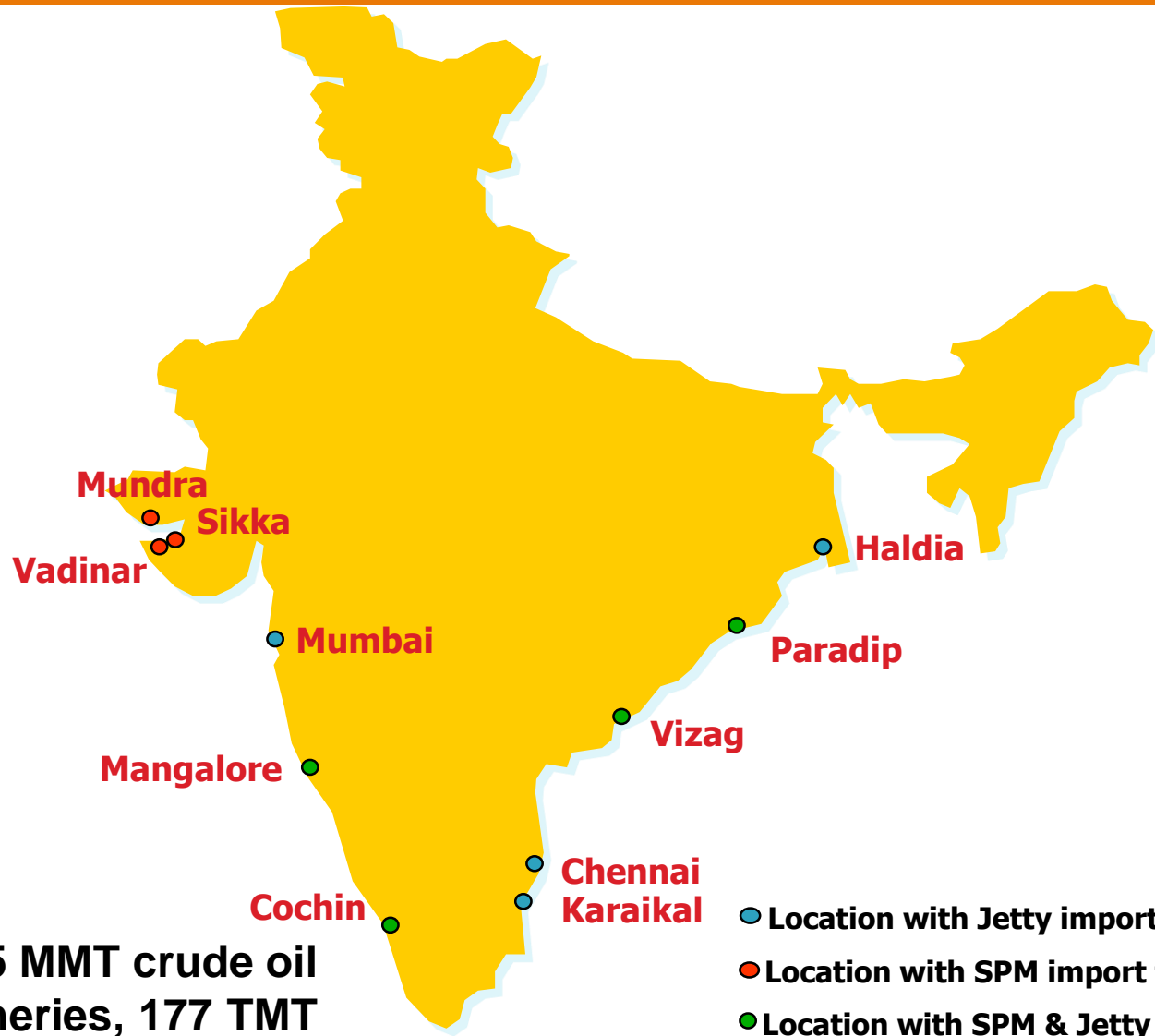


- ❖ India's 1<sup>st</sup> SPM was by IOCL at Vadinar in 1978
- ❖ Vadinar SPM in use for more than 40 years
- ❖ IOCL commissioned 1<sup>st</sup> SPM at Paradip in open waters on east coast of India for VLCC berthing in 2008 and additional 2 nos of SPMs in 2012.
- ❖ Successfully operating SPMs at Paradip in all weather conditions



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# Crude Oil Receipt Locations - India



In 2016-17, out of the 245 MMT crude oil processed at Indian refineries, 177 TMT ( $\approx 73\%$ ) was through SPMs

- Location with Jetty import facility
- Location with SPM import facility
- Location with SPM & Jetty import facility

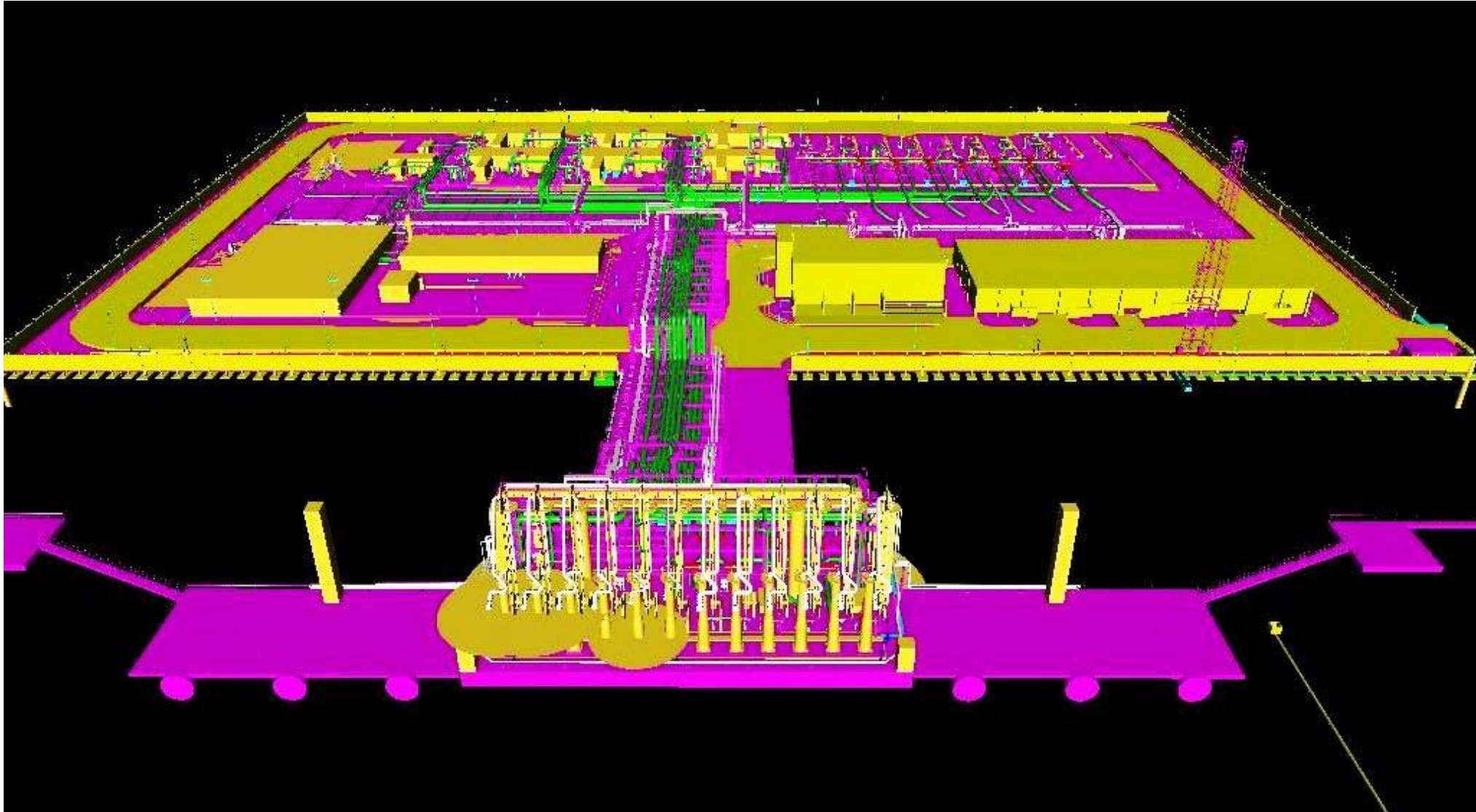
# Single Point Mooring (SPM)





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# South Oil Jetty & Back-up Area



The Energy Gateway to Eastern India





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# SPM Facility at Paradip

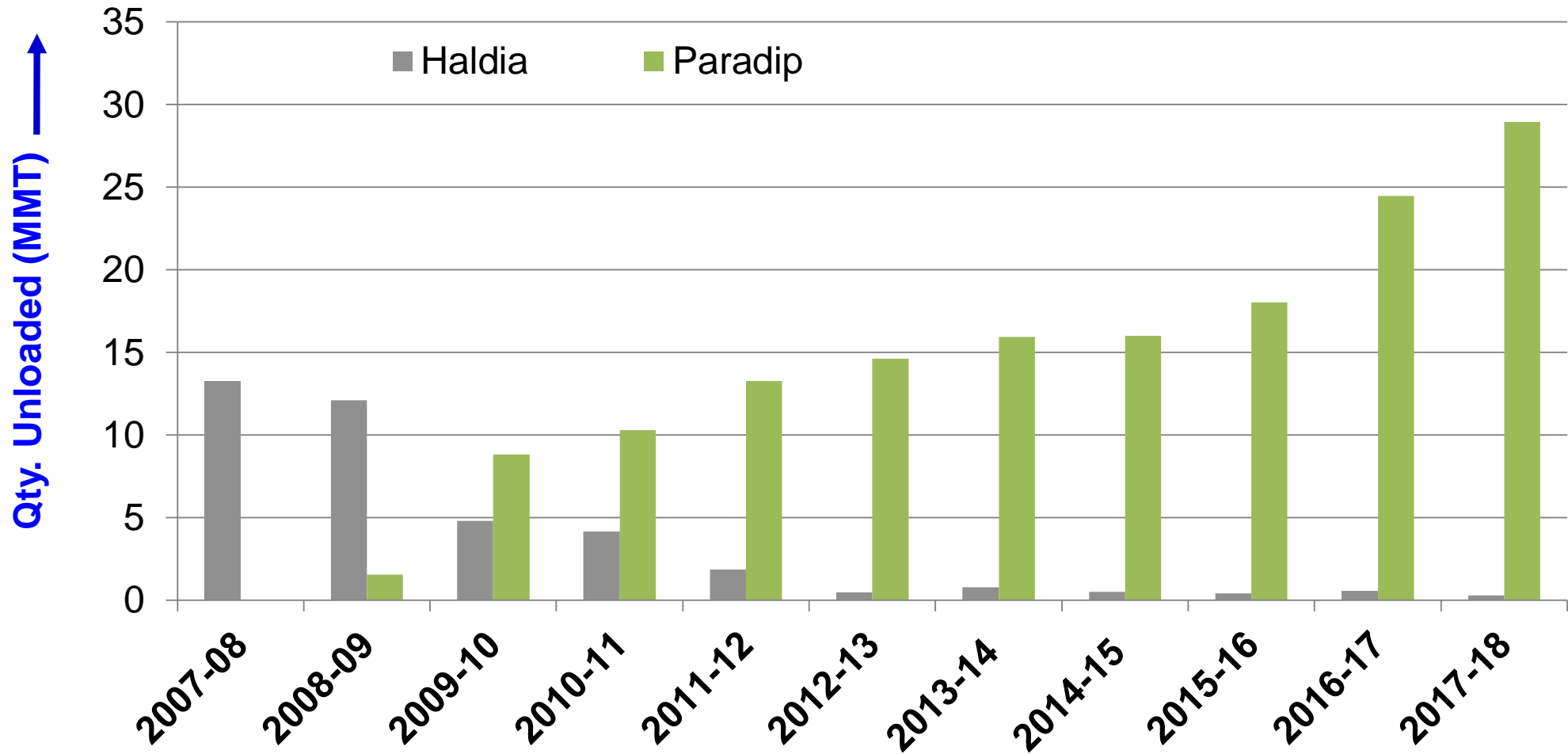
- ❖ Paradip also has a state of the art jetty facility for evacuation of product and input of crude oil from South Oil Jetty
- ❖ Paradip is the biggest crude oil import location of IndianOil and the 3<sup>rd</sup> largest in India
- ❖ The crude oil is received in 31 large crude oil storage tanks each of 60 Tkl capacity each which can meet 16 days processing requirement of IOCL refineries fed from east coast





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# Crude Oil Handling Paradip & Haldia



- ❖ Crude Oil handling at Haldia reduced post commissioning of SPMs at Paradip
- ❖ Oil Handling at Paradip increased significantly in last 10 years of operation



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# Paradip Operation

**Crude oil import at Paradip has increased from 1.5 MMT in 2008-09 to about 29 MMT in 2017-18**

**The VLCC share in terms of quantity is more than 82%, which is one of the best in the industry**

**Lighterage at sea and Jetty add significant cost to the crude oil input cost**

**Use of smaller vessels (MR, LR II) for bulk crude oil transportation is costly**

**Energy gateway to eastern, north eastern and central India**

**Meeting crude oil requirement of Paradip, Haldia, Barauni, Bongaigaon and Guwahati refineries**



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# Conclusion

**India's dependence on crude oil import to continue**

**SPM provides an aid to minimize crude oil positioning cost due to scale of transportation**

**SPM operation makes other vital port assets available for more value added services**

**SPMs are cost effective and safe for operation generating value in the supply chain**





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