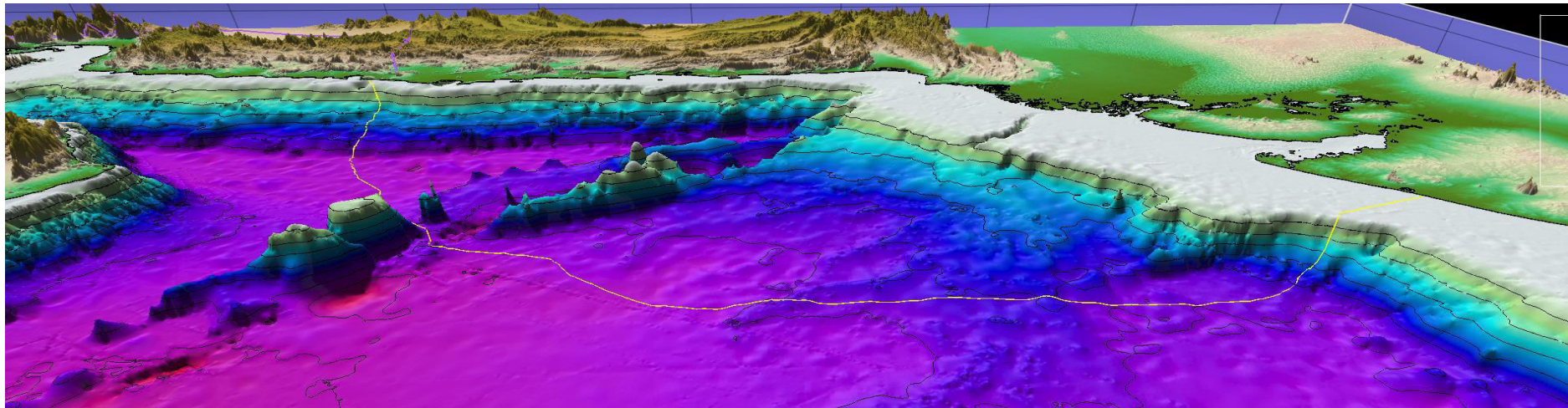


MIDDLE EAST TO INDIA DEEPWATER PIPELINE (MEIDP)



***Presentation to HE Dr. Amir Hossein Zamaninia
Hon. Dy. Minister for Trade and International Affairs
Ministry of Petroleum, Iran***

Tehran - 6th May 2017

The MEIDP Project

The MEIDP Project is envisaged as transmission pipeline **Infrastructure project** allowing transportation of Middle East Gas to the West Coast of India

The pipeline will be laid as a "**Common Carrier**" pipeline whereby SAGE will be the Gas Transporter and will be paid a Tariff for pipeline use

The Gas Buyers and the Gas seller will negotiate the **Long Term Gas Supply Contract** themselves [under the aegis of SAGE in a Tri-partite Framework Agreement]

MEIDP 1 will be the **first in a series** of pipelines supplying gas to the Gujarat coast of India, from the vast available resources in the Middle east, by the **safest, most economic and reliable** means

Iran - India's Gas Partner

India needs gas

- Over **2,000 TCF** of natural gas reserves are held by countries with which **India** has a traditional **trading relationship** i.e Iran, Qatar and Turkmenistan.
- **Iran** has over 1000 TCF reserves and is **eager to export gas**.
- The **deepwater route** across the Arabian Sea is the **shortest secure distance** between huge middle east reserves and the rapidly developing industrial heartland of India, and is **too short for LNG to be an economic** transportation option

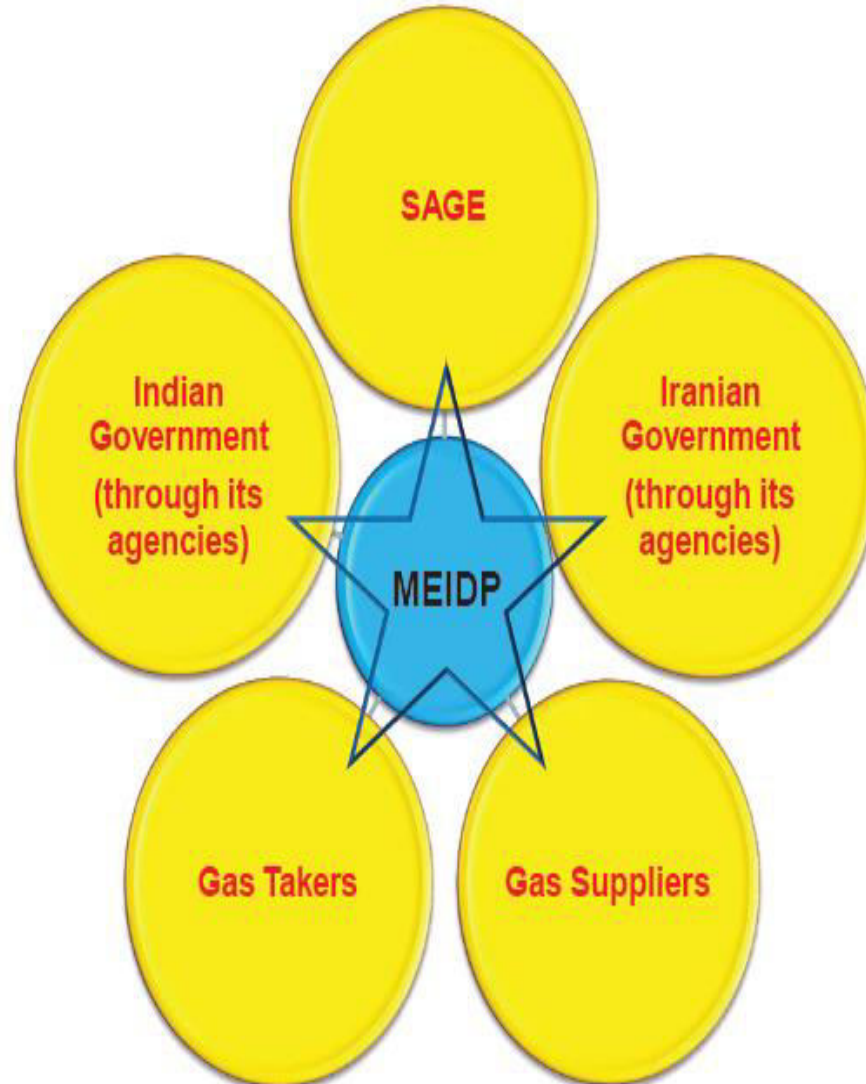
Iran has gas

- Iran has always been a friendly neighbour to India
- Iran has expressed its willingness to supply Natural Gas and a Framework Agreement has been discussed with NIGEC [Now NIOC Gas Export Division] for Pipeline Construction and Gas Supply through the SAGE Pipeline
- In 2015 NIGEC confirmed to SAGE that they are currently in a position to provide gas for **2 pipelines** from Iran to India

SAGE Key Team Members/ Technology Partners

| | | | |
|--------------------|--|-------------------------|---|
| Mr T.N.R Rao | Former Petroleum Secretary, Govt of India Architect of Oman-India Pipeline Chairman of SAGE Advisory Board | | Member of the SAGE Advisory Board and Senior Consultant to SAGE Leading International Expert on Marine Pipeline Engineering Professor Emeritus, University of Surrey UK & Visiting Professor, University College London |
| Mr Subodh Jain | Director South Asia Gas Enterprise PVT Ltd. Director Siddho Mal & Sons and Director INOX Air Products Ltd. Former Senior Advisor to Oman-India Pipeline | Dr Alastair Walker | |
| Mr Peter Roberts | Former Director South Asia Gas Enterprise PVT Ltd. Director Verderg Ltd. Former Project Director of Oman-India Pipeline | Dr Roberto Bruschi | Senior Vice President Saipem SpA, Milan, Italy |
| | | Dr Ping Liu | Operations Director, Intecsea BV, Netherlands |
| Dr Herman Franssen | Member of the SAGE Advisory Board and Senior Consultant to SAGE President, International Energy Associates, USA Former Advisor to Oman-India Pipeline & Former Economic Advisor to the Sultanate of Oman, MoP | Mr Marco Monopoli | Offshore Commercial Manager Saipem SpA, Milan, Italy |
| | | Mr Johan Drost | Allseas International, Delft, Netherlands |
| Mr Ian Nash | Managing Director, Peritus International (UK) Ltd. and Senior Technical Consultant to SAGE PM for Detailed Design of Europipe 2 Gas Trunkline and BP Block 31 ultra deep flowlines PM for MedGaz FEED Ultra Deep Trunklines and EM for Canyon Express Ultra Deep development | SBI Capital Markets Ltd | Financial Advisory Services |
| | | Engineers India Ltd | Leading Onshore Pipeline and Facilities Engineering SAGE Indian Design Consultants |
| | | Ernst & Young | Financial Advisory Services |

Governments **must** be **stakeholders** (through their agencies) for Transnational Pipelines



All interest parties **must** be **stakeholders** for Large Infrastructure Projects

MOUs and Agreements to Co-operate in developing MEIDP have been signed with:

| Pipe Mills | Installation Contractors | Suppliers & Takers | Engineering & Consultancy |
|--|--|--|--|
| <ul style="list-style-type: none"> ▪Welspun (India) ▪Jindal SAW (India) ▪Tata Corus (UK) ▪PCK (China) ▪JFE (Japan) ▪Europipe (Germany) ▪NSSMC (Nippon Sumitomo) (Japan) ▪Bao Steel (China) | <ul style="list-style-type: none"> ▪Allseas ▪Saipem SpA ▪Heerema Marine Contractors <div data-bbox="575 791 962 953" style="background-color: #FFD700; text-align: center; padding: 5px;">Certification Bodies</div> <ul style="list-style-type: none"> ▪DNV-GL | <ul style="list-style-type: none"> ▪NIGEC ▪Indian Oil Corp. ▪GAIL ▪GSPC ▪Oman Ministry of Oil & Gas | <ul style="list-style-type: none"> ▪Peritus International Ltd. (uk) ▪Engineers India Ltd. ▪Intecsea ▪FUGRO ▪SBI Caps ▪Ernst & Young (EY) |

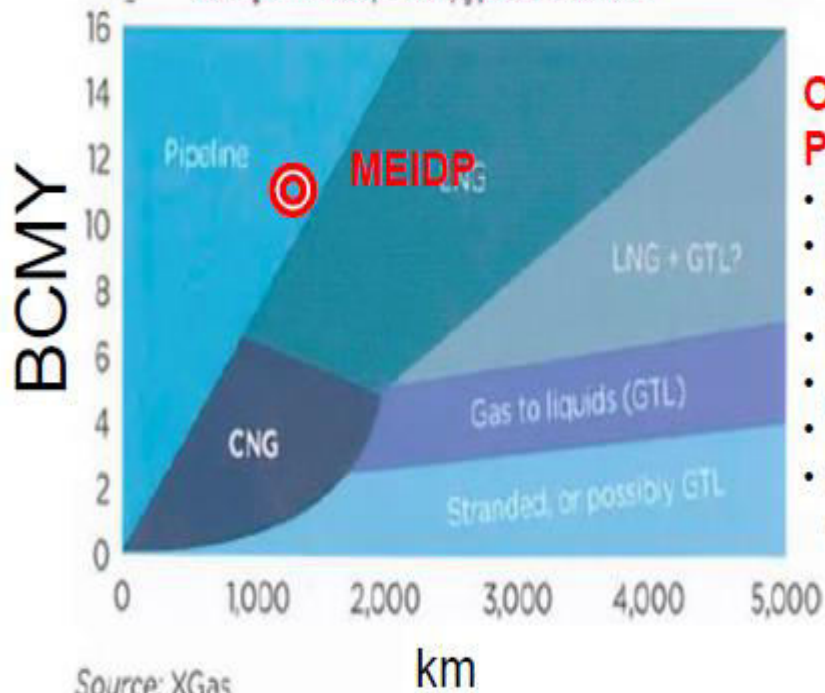
PIPELINE/ LNG COMPARISON

Key Highlights of Pipeline and LNG

| Particulars | Pipeline | LNG |
|----------------------|---|---|
| Constant Supply | Yes | No |
| Gas Source | Fixed source and destination for gas | Flexibility to source gas from various sources |
| Long Term Commitment | Yes | Possible to source Long Term and Spot Cargoes |
| Cost of Construction | Dependent on distance, capacity and depth | Dependent only on capacity – relatively independent of distance |
| Operating Cost | Only transportation tariff applies | Transportation tariff, Liquefaction charges, Regas charges |
| Maintenance Cost | Minimal | Periodic maintenance required |

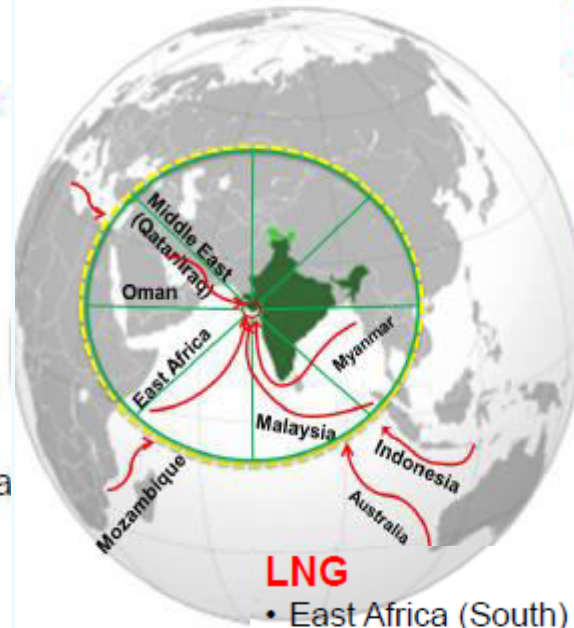
COMPETITIVENESS OF PIPELINES

Ultradeepwater capabilities and Challenges Statoil R&D



Offshore Pipeline

- Qatar
- Iraq
- Oman
- Iran
- Myanmar
- Malaysia
- East Africa (North)



Onshore Pipeline

- Turkmenistan
- Iran
- China
- Russia

LNG

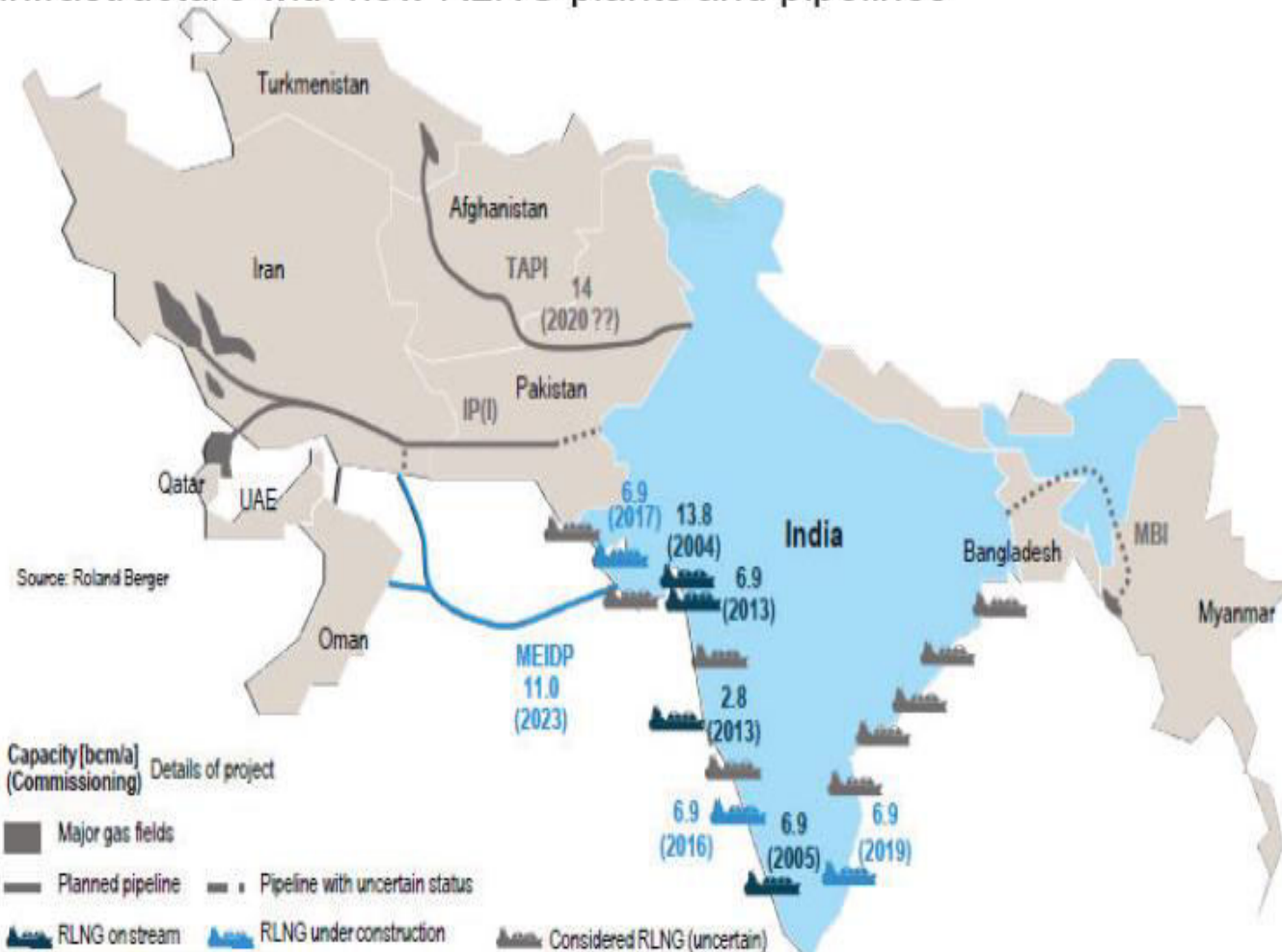
- East Africa (South)
- Australia
- Indonesia
- North Africa
- Western Med

Economic Limit of Pipeline Gas to India West Coast is ~2000km

| | Dry Gas Price | Liquefaction Cost | Shipping Tariff | Regasification | Total Cost |
|--------------------------------|---------------|-------------------|-----------------|----------------|------------|
| LNG | 3-4 | ~4.0 | 0.3 | 0.5 | 7.8-8.8 |
| Pipeline | 3-4 | - | 2.5 | - | 5.5-6.5 |
| Difference in landed gas price | | | | | 2.3 |

COMPETING INDIAN GAS IMPORT PROJECTS

To cover the increasing gas demand, India plans to expand its import infrastructure with new RLNG plants and pipelines



- + 4 existing LNG regasification plants
- + 12 planned/considered LNG regasification plants
- + up to 4 pipelines

Pipelines help to moderate Gas prices

MEIDP's offshore route avoids regional conflicts

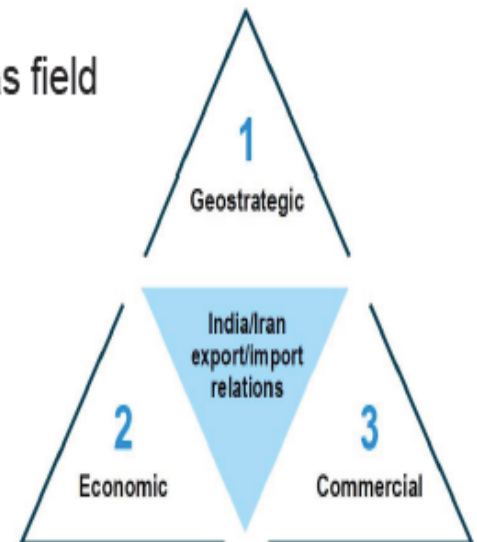


Source: Roland Berger

The larger MENA region and South Asia generally presents a **challenging geopolitical environment** and security environment for large-CAPEX cross-border infrastructure

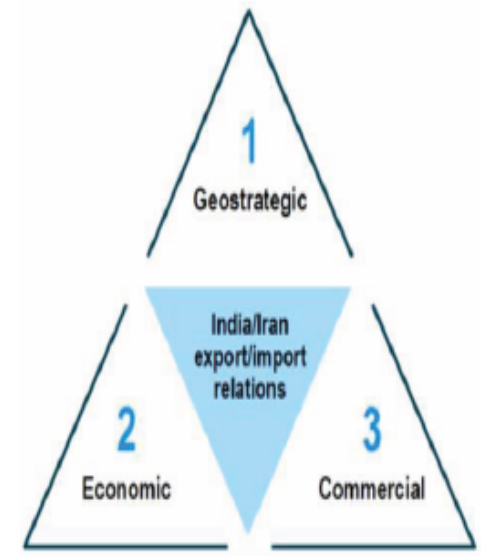
The offshore route of **MEIDP avoids conflicts** and limits the impact of potentially deteriorating geopolitical relations as well as **limiting on-the-ground security threats**.

- Provides Iran with a Safe and Secure long term means of Gas monetization. (Unlike other considered pipeline options such as IPI).
- Gives Iran access to a large and growing gas market on its doorstep. With potential for up to 4 Pipelines along the corridor based on India's projected gas shortage.
- Provides Iran with the opportunity for higher net back gas price than LNG given that LNG in Iran will be greenfield development.
- Facilitates upstream Investment in Iran by Indian companies in Discovered Gas field near SAGE pipeline to allow easy evacuation of Gas to India (OVL Farzad B).
- Builds on existing intergovernmental agreements on trade and development.



Even as a developing Country it can be argued that India is becoming too heavily dependent on costly LNG. SAGE pipeline Gas from Iran can generate Power at prices similar to Clean Coal. Potentially each SAGE Gas pipeline of 31.1 mmscmd saves India almost a billion dollars annually when compared to Spot / Term LNG imports / price.

- Pipeline/LNG competition moderates Gas prices to the consumer
- 50% of India Gas demand is from the Power & Fertilizer industry, who can only use Gas at affordable prices (\$5 to \$6 per mmbtu) and hence cannot afford LNG, unless subsidized.
- Currently 15,000 MW of Gas based Power generation capacity is stranded due to High long term LNG Gas prices
- Five new Fertilizer Plants are planned in India (India is also considering overseas Fertilizer plants).
- Much investment is taking place in India internal Gas pipelines (and LNG Terminals) but currently there is no Gas in India's main "Arteries"



- Potential Start Point : Chabahar (Iran)
- End Point : Near Porbandar (Gujarat), India
- Outside Diameter : 27.2”
- Design Pressure : 400 bar (g)
- Design Temperature : 60°C (max.) & -10°C (min)
- Flow Rate : 1.0 BSCFD (31.1 MMSCMD)
- Maximum Depth : 3,450 meters
- Offshore length : 1,300 kilometers
- Total Project Duration : 5 year (including 2 years construction)
- Project cost (approx.) : 5 billion USD

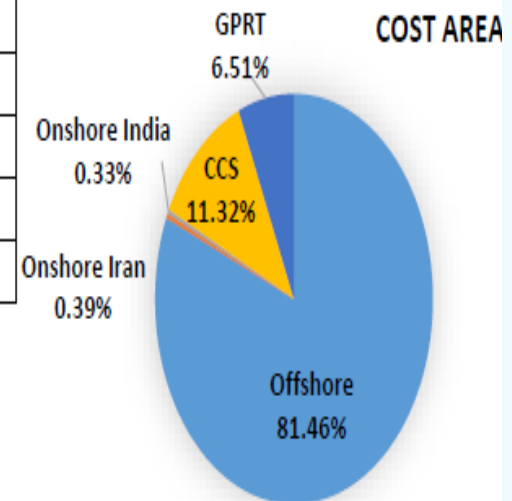
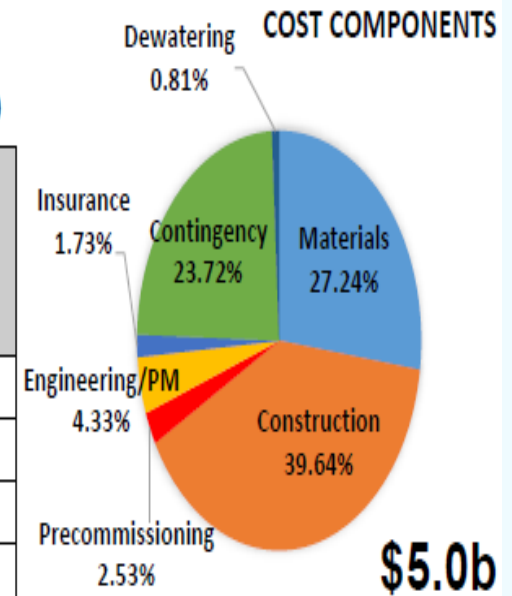
Indicative Project Cost- Capex Breakdown

- “As Built” Project Cost (*Indicative*): ~USD 5 Bn
- Project Cost Break up

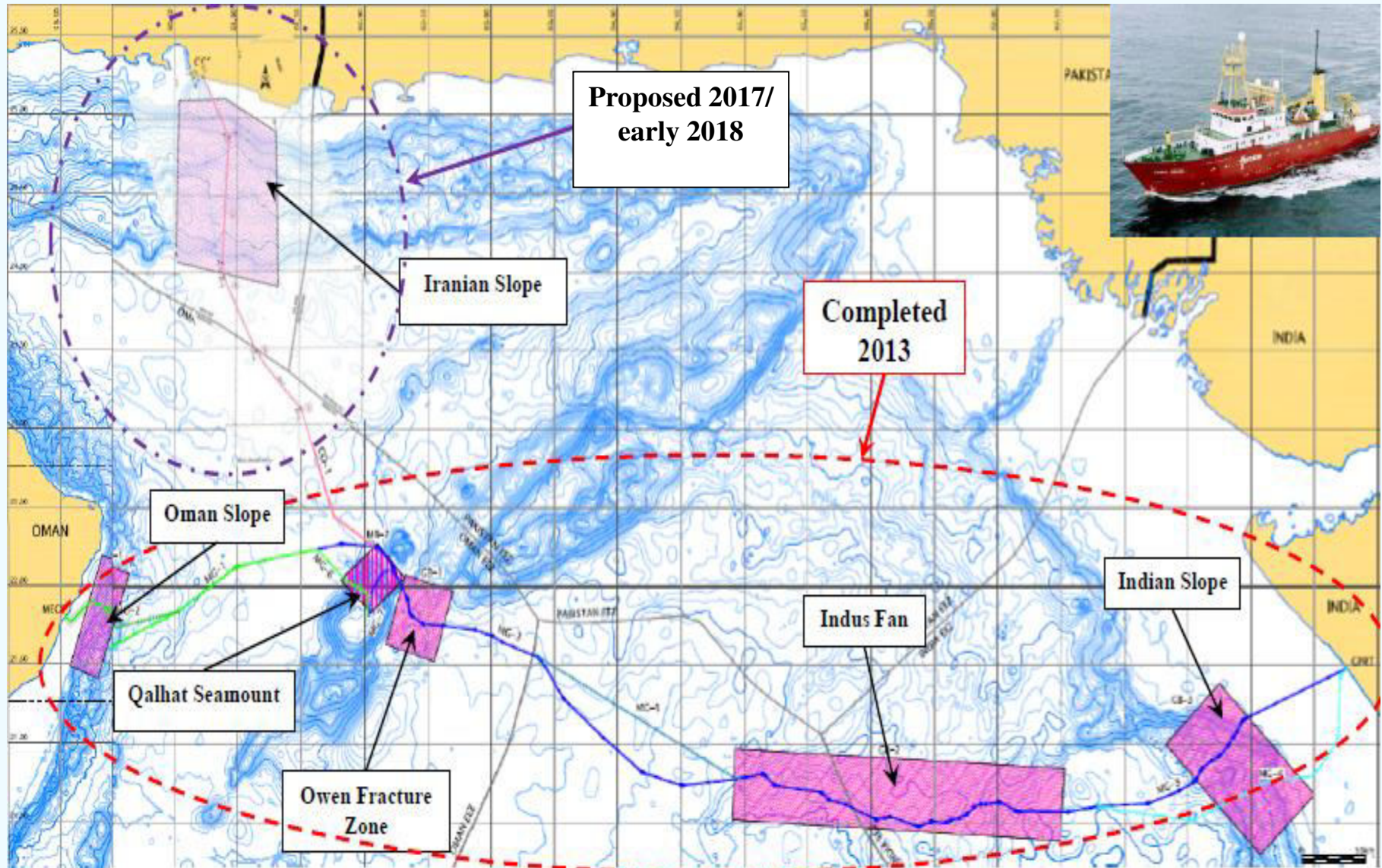
(USD Mn)

| Particulars | Offshore Segment | Iran Onshore Segment | India Onshore Segment | CCS* | GPRT# | Total |
|-----------------------------------|------------------|----------------------|-----------------------|--------------|--------------|----------------|
| Material Procurement | 960.6 | 2.2 | 1.3 | 202.6 | 100.0 | 1,266.6 |
| Construction | 1,708.2 | 7.1 | 5.6 | 196.7 | 118.2 | 2,035.9 |
| Pre- Commissioning& Commissioning | 89.8 | | | 8.1 | 5.3 | 103.1 |
| Engineering & Project Management | 120.2 | 7.8 | 7.8 | 50.6 | 40.0 | 226.4 |
| Insurance and Certification | 69.0 | 0.1 | 0.1 | 10.2 | 5.6 | 85.0 |
| Contingency | 863.6 | 5.1 | 4.4 | 196.9 | 113.3 | 1,183.4 |
| Total Hard Cost | 3,811.3 | 22.4 | 19.1 | 665.0 | 382.3 | 4,900.3 |
| Contingency Dewatering | 57.2 | | | | | 57.2 |
| Total Project Cost | 3868.5 | 22.4 | 19.1 | 665.0 | 382.3 | 4957.4 |

*Chabahar Compression Station #Gujarat Port Receiving Terminal



MEIDP RECONNAISSANCE SURVEY ROUTE

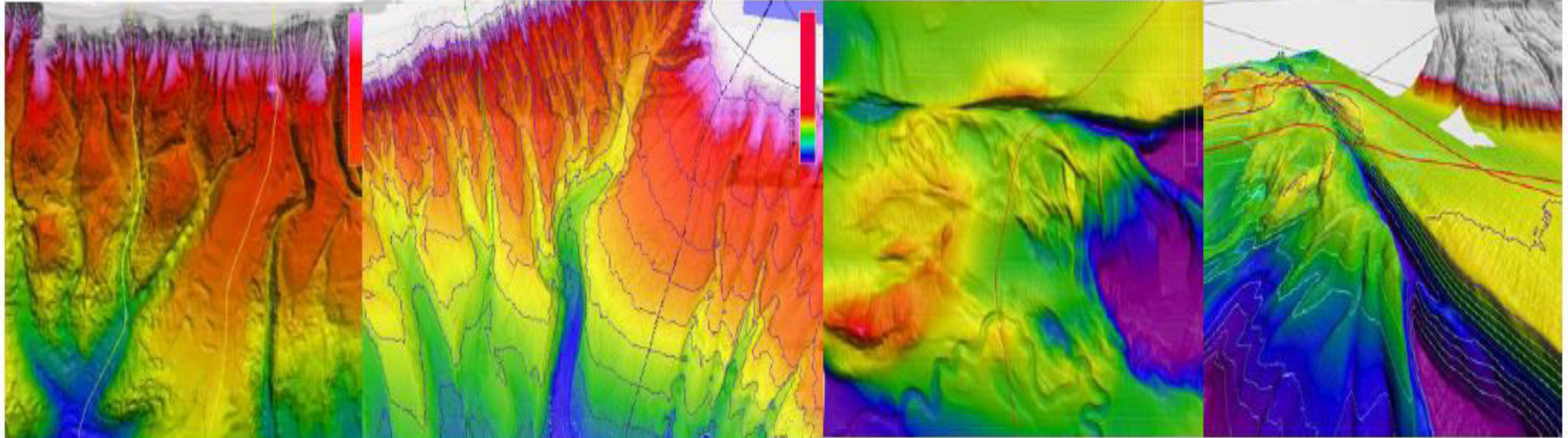


2013 MS Highlights

Oman Continental Slope

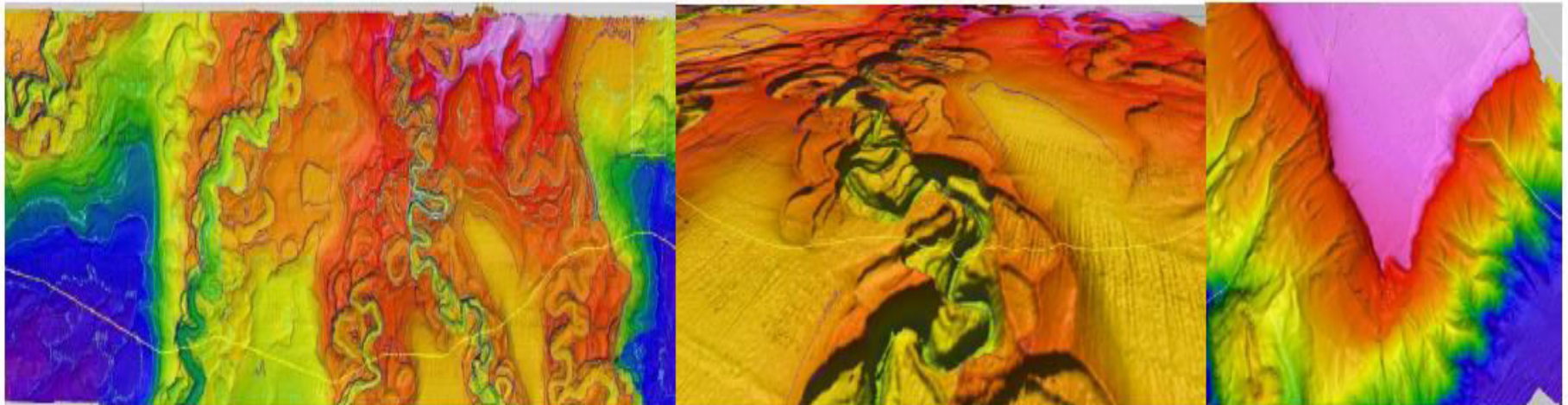
Indian Continental Slope

Owen Fracture Zone

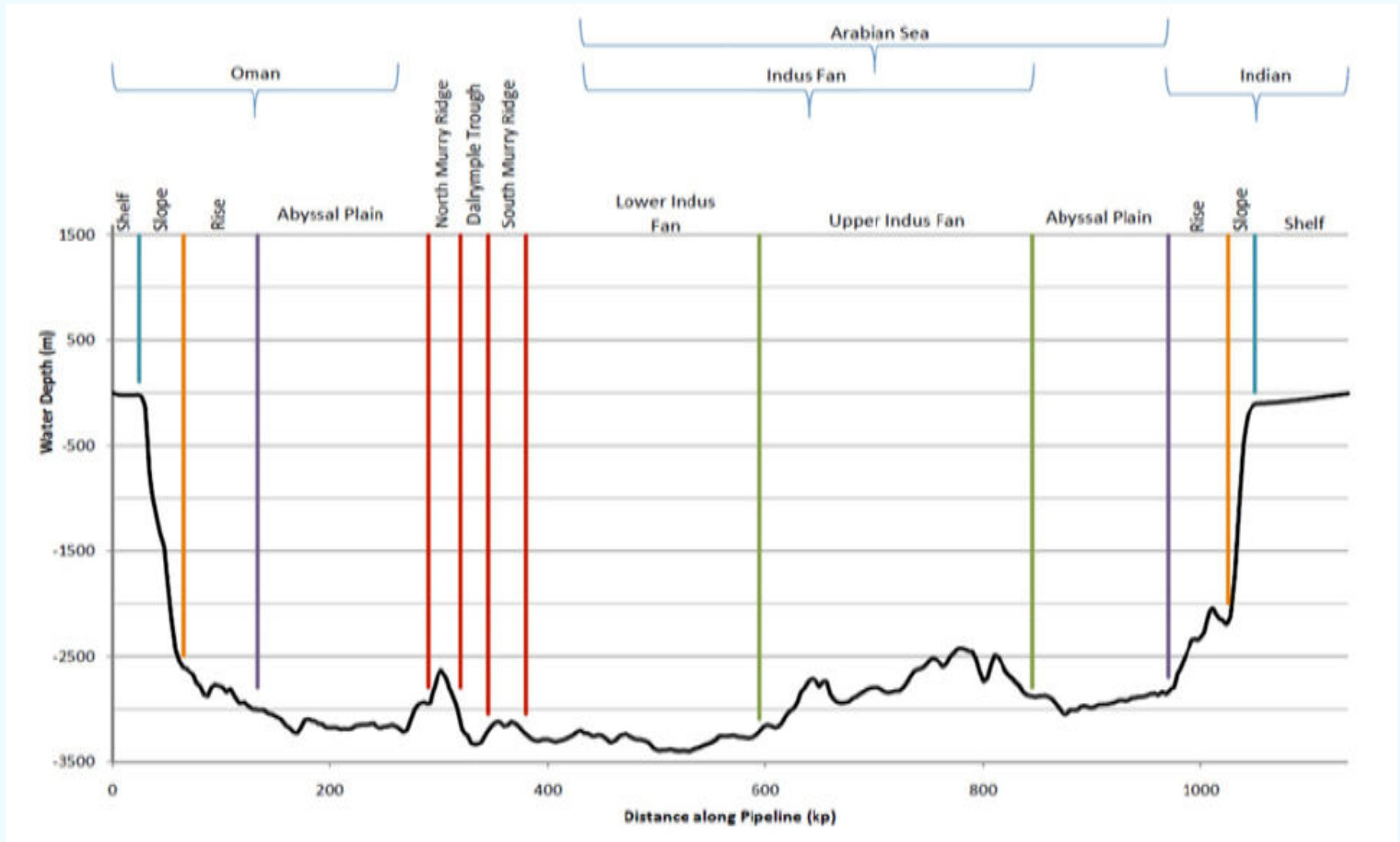


Indus Fan

Qalhat Seamount



MEIDP ROUTE TO INDIA



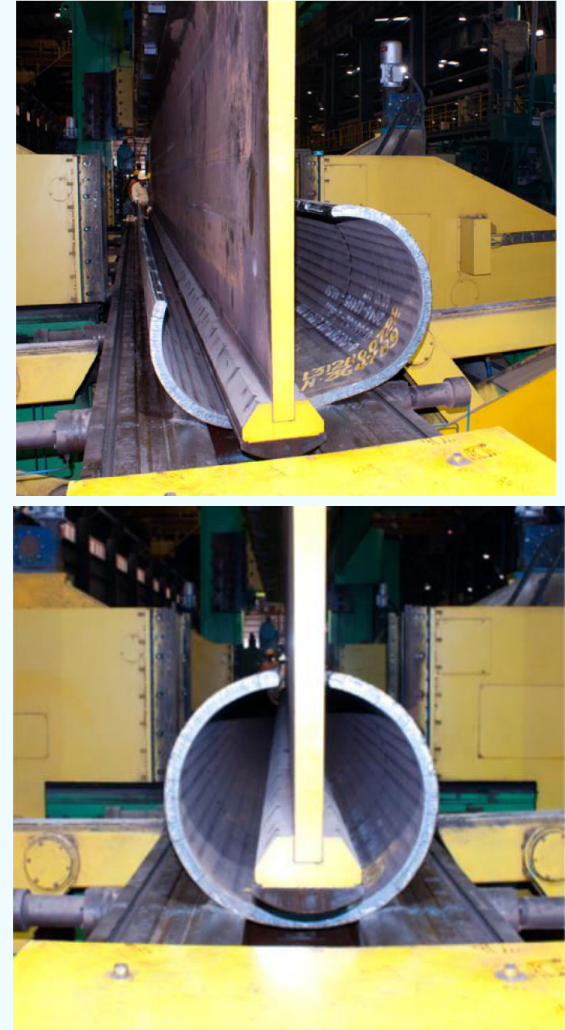
- Wall thickness required for deepest section is 40.3mm with 610mm ID line pipe.
- Buckle arrestors upto 70mm wall thickness may be required.

Building on Previous Experience

| ISSUES | Oman-India | MEIDP | Comments |
|----------------------------|---|--|---|
| Availability Of Pipe Mills | Upgrade in Capability required | Capability exists for the required size and thickness. | Welspun; Jindal SAW; Tata(CORUS) steel, JFE, PCK and Europipe are capable vendors |
| Lay Vessel | No Ultra Deep water vessel capability | Ultra Deep water vessels with adequate capability are available. | Pioneering Spirit, Casterone, Aegir and S7000 are already available in the field. JSD 6000 is still being considered. |
| Deep water repair system | No qualified deepwater pipeline repair system was available | Deepwater pipeline repair systems are now available and accessed by Repair "Clubs" | Diverless Subsea pipeline repair System have been developed for Deep water application by Saipem. Saipem currently has work class ROV rated to 4000m depth. |

Latest Mill Testing & Mill Capacity

- Seven pipe mills have responded to budget queries about the production of MEIDP line pipe, out of these three have stated they can produce the full range.
- Two pipe mills (JINDAL SAW & PCK) have manufactured line pipe in presence of SAGE team specifically for SAGE to MEIDP dimensions and specification. They have gone through SAGE test program involving collapse test and compression test.
- JFE & Europipe are about to embark on a similar production and testing trial.
- PCK (China) have undergone “Ring Collapse” test Program, witness by SAGE.



Mills capable of making MEIDP Linepipe

- Welspun (India) - JCOE.
- Jindal SAW (India) - JCOE.
- Tata Corus (UK) - UOE
- PCK (China) – JCOE
- Europipe (Germany) – UOE
- JFE (Japan) – JUOE
- Bao Steel (China) – UOE (UNDER REVIEW)

Vessel Status & Installability

- The requirements to install MEIDP along the Route options has been assessed
- Contact has been made with vessel owners to get confirmation of MEIDP installability. (Allseas, HMC, Saipem).
- Allseas, HMC and Saipem have all confirmed there vessels can install the pipeline

| Company | Pipelay Vessel | Tension Capacity (tonnes) | |
|----------------------------|-------------------|--|--------------------------------|
| | | J-Lay Mode | S-Lay Mode |
| Allseas | Pioneering Spirit | n/a | 2000 |
| | Solitaire | | 1050 |
| Saipem | S 7000 | 750 with tensioners 2000 with friction clamps | n/a |
| | Castorone | 2500 | 750 tonnes upgradeable to 1050 |
| Heerema Marine Contractors | Aegir | 1500 static 2000 dynamic | n/a |
| | Balder | 1210 static 1270 dynamic | |

MEIDP CAPABLE PIPELAY VESSEL

Operational



CastorONE (Saipem)

Operational



Aegir (HMC)

Operational



Pioneering Spirit (Allseas)

Operational



S7000 (Saipem)

Five vessels are capable of installing the MEIDP empty pipeline in the maximum water depth.

- SAIPEM's S7000.
- SAIPEM's Casterone.
- HMC's Balder.
- HMC's Aegir.
- Allseas Pioneering Spirit

- The project will have two compressor stations, one at Chabahar (Iran) and other at Porbandar (Gujarat, India).
- SAGE is in discussion with following two compressor manufacturers:
 - 1) Nova Pignoni (Italy)
 - 2) Siemens (Germany)

Today's Challenges

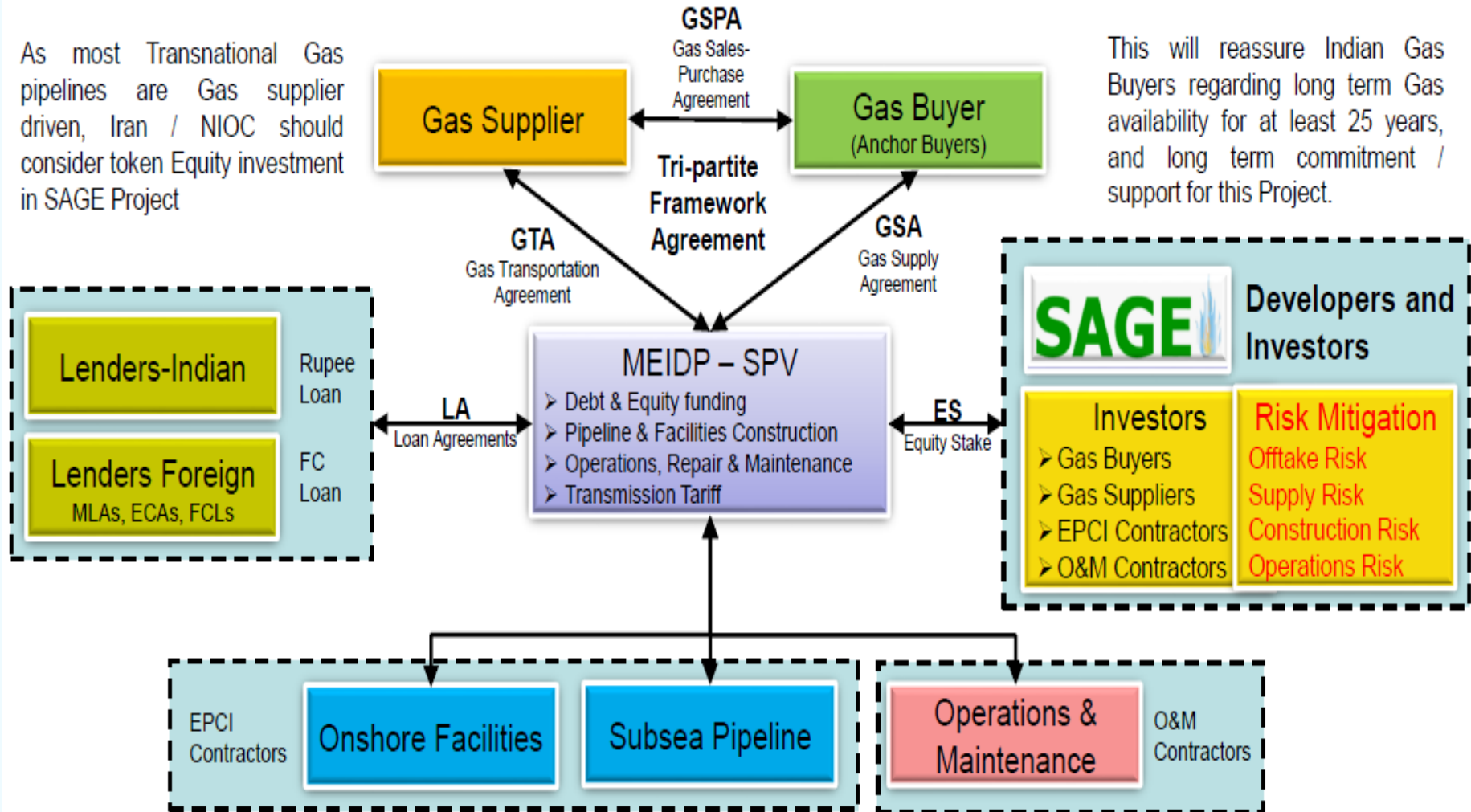
- ❑ Ultra Deep Water 3450m
- ❑ Wall Thickness on limit of Mill Capacity
- ❑ Mill Qualification
- ❑ Active Fault crossing (Seismic Design)
- ❑ Indus Fan channel crossings up to 200m deep and 30 degree slopes
- ❑ High pressure 400barg system
- ❑ Anti Flooding system required for Installation
- ❑ Hydrotest dispensation required
- ❑ Steep Slopes and geohazards on shelf breaks in Iran and India (Seismic Design)

SAGE has performed detailed assessments to ensure that these challenges can all be met by design methods and equipment/ vessel now available in the Offshore Pipeline industry.

Project proposed structure

As most Transnational Gas pipelines are Gas supplier driven, Iran / NIOC should consider token Equity investment in SAGE Project

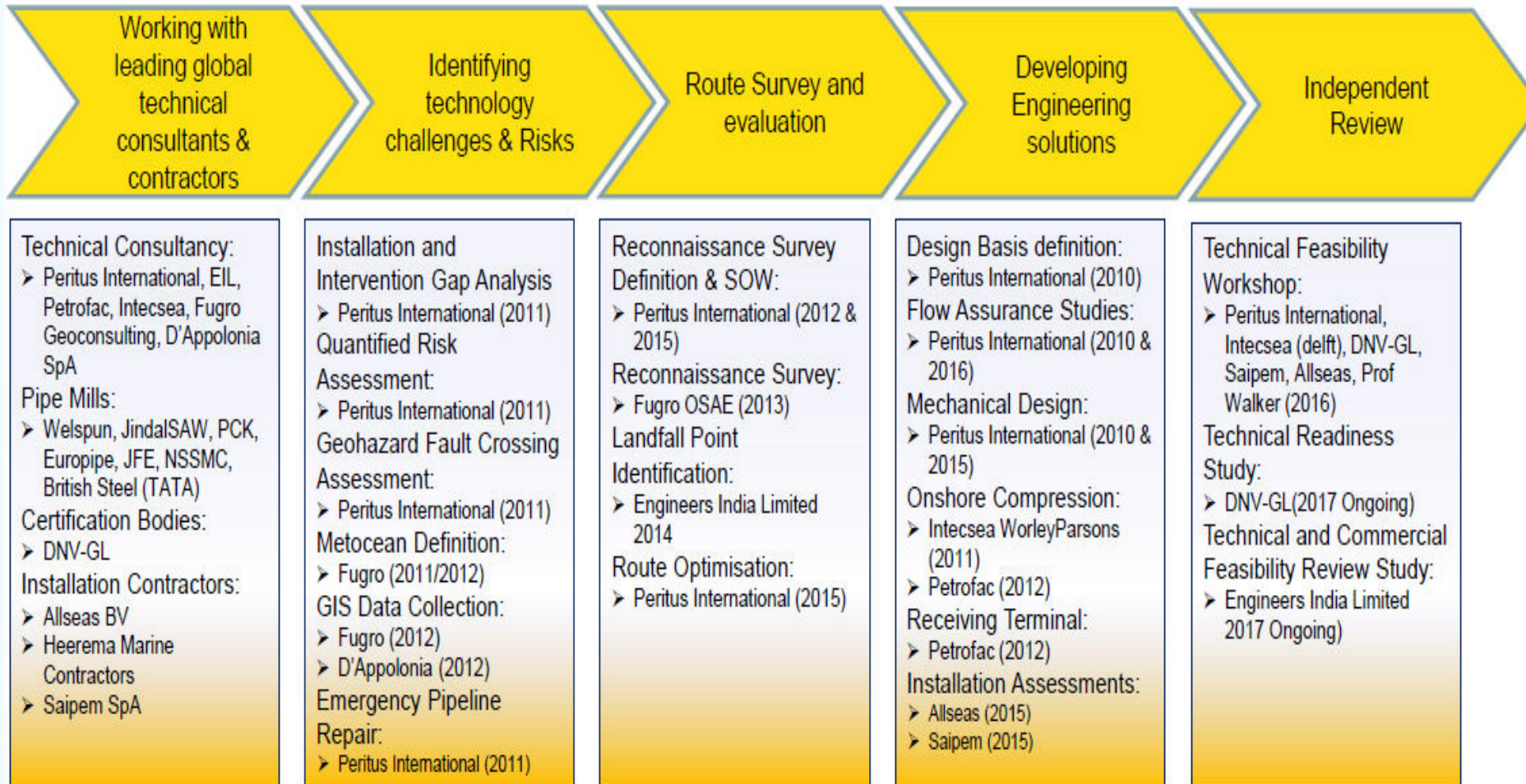
This will reassure Indian Gas Buyers regarding long term Gas availability for at least 25 years, and long term commitment / support for this Project.



Offshore SPV to be incorporated based on tax implications of different geographies in the world

Project de-risked through the involvement of multiple global stakeholders who have the capability to implement this project

Project progress De-risking

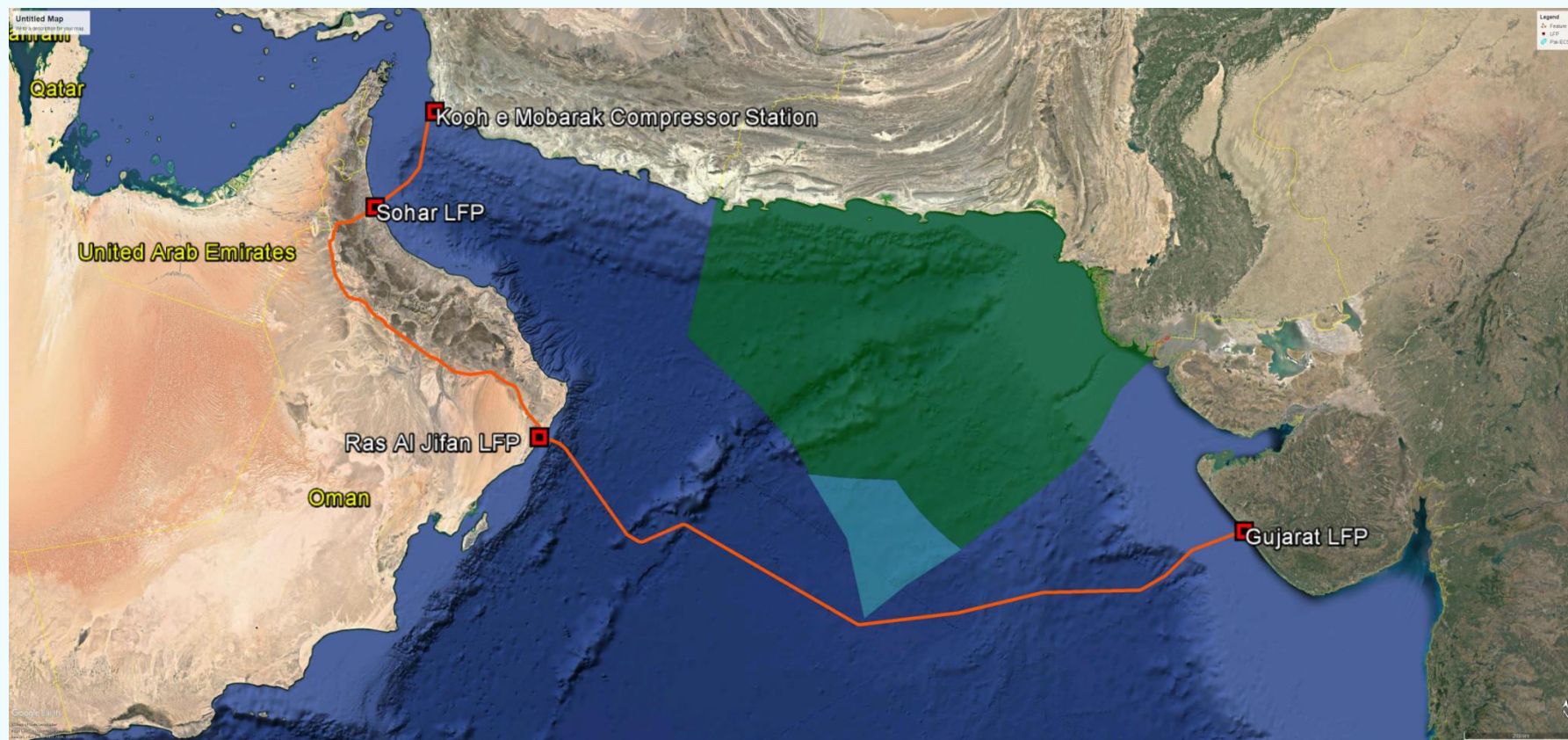


SAGE has collaborated with global leaders to develop solutions for MEIDP's technical challenges

- ❑ Project Definition and preliminary technical studies were carried out in 2010-2013
- ❑ Confirmed Technical Viability 2013
- ❑ Reconnaissance survey performed in 2013 on Oman to India route. Base case route reviewed and optimised
- ❑ Review of project economics and legal project framework 2014
- ❑ Route options defined to avoid Pakistan ECS and updated flow assurance mechanical design performed 2015/2016
- ❑ Updated Cost Estimate and schedule 2016
- ❑ Technical Review Workshop Held Aug 2016
(SAGE/Peritus/Intecsea/EIL/DNVGL/Saipem/Allseas)
- ❑ Technical and Commercial Feasibility Confirmation by EIL is ongoing
- ❑ Technical Readiness Confirmation by DNV-GL is ongoing

- ❑ Iran should participate in MEIDP by giving strong support to the project as a Gas Supplier
- ❑ Iran Ministry of Petroleum / NIOC / NIGEC should allocate the Gas to SAGE Project formally which would allow long term Gas negotiations by Gas Buyers such as GAIL / Indian Oil Corp. (IOC) / Gujarat State Petroleum Corp. (GSPC) to follow knowing the gas was available.

Alternate Option - Pipeline Route from Iran to India via Oman



SAGE is also looking for alternate route from Iran to India via Oman. SAGE has awarded the technical feasibility to EIL to look into this Optional route. EIL has carried out preliminary desktop study of this route. Possible synergy with Iran Oman pipeline is being explored.

SAGE has MOU with Oman Ministry of Oil and Gas since many years.

- The Technical Feasibility of MEIDP is proven
- Design methods for ultra deepwater pipeline and pipelines in seismic zones are well established
- Mills can and have made pipe to meet MEIDP Requirements
- Vessels are available in the market that can install the pipeline and more are due soon
- Intervention tools to avoid flooding and effect pipeline repair are available

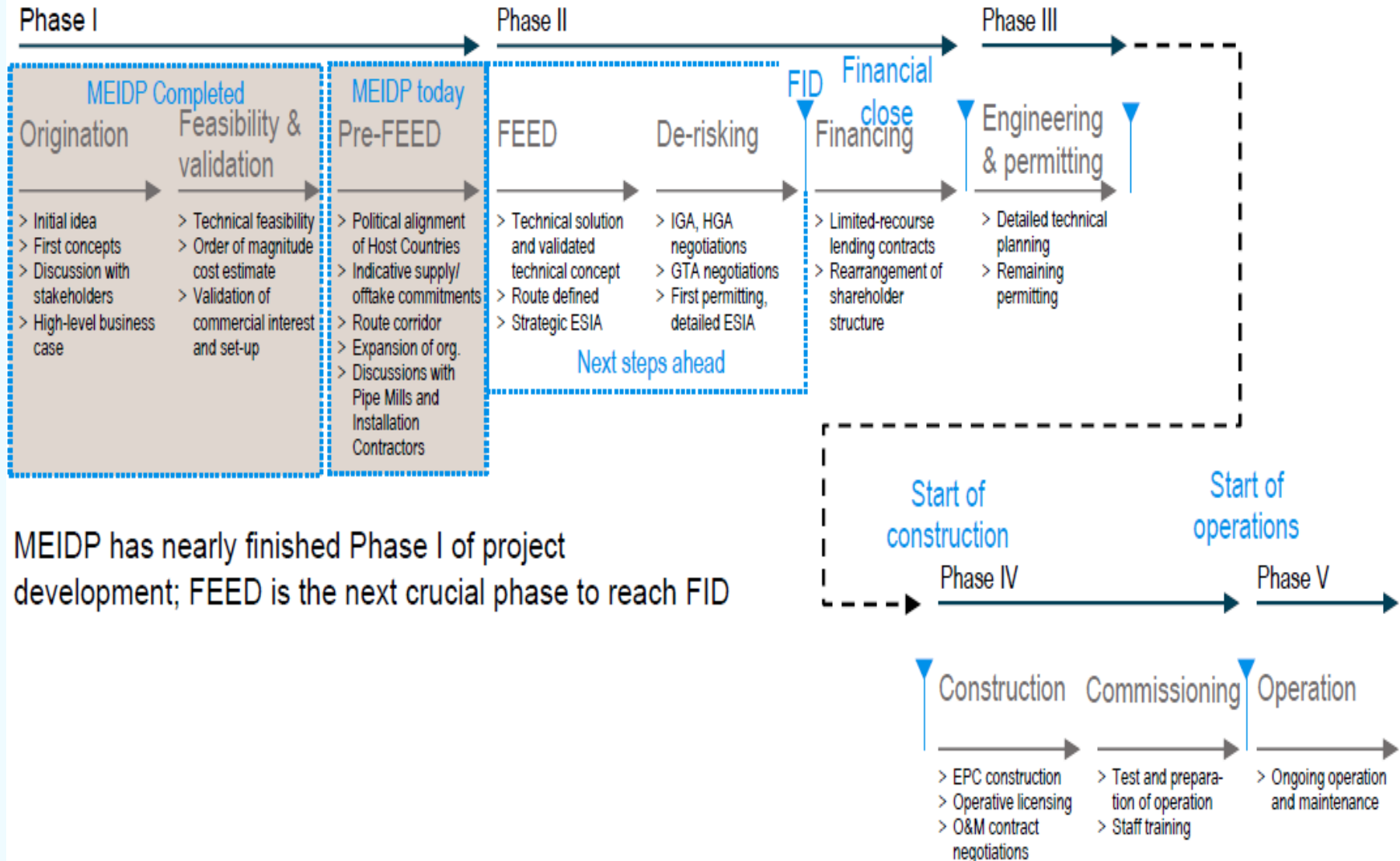
PROGRAMME – CURRENT TIMELINE (PROVISIONAL)

| Event | Date |
|---|----------|
| Award Reconnaissance And Metocean Surveys | Jun 2017 |
| Commence Reconnaissance Survey | Oct 2017 |
| Commence Metocean Survey | Oct 2017 |
| Award Onshore & Offshore FEED | Aug 2017 |
| Award Detailed Surveys | Oct 2017 |
| Final Investment Decision | Dec 2018 |
| Award Linepipe Contract | Dec 2018 |
| Award Onshore & Offshore EPIC | Jun 2019 |
| Start Offshore Construction | Oct 2020 |
| Start Compressor Station Construction | Apr 2021 |
| Complete Offshore Construction | Apr 2023 |
| Complete Compressor Station Construction | Jun 2023 |
| First Gas | Dec 2023 |

Project can be set up in a 5 year time span if bought on fast track with active government support as substantial preparatory work has already been done and continues

Pipeline construction will occur over a 2 year period

MEIDP the way ahead



MEIDP has nearly finished Phase I of project development; FEED is the next crucial phase to reach FID

Ultra deep water pipeline across Mediterranean

- Israel signed a preliminary agreement to export gas to Cyprus, Greece and Italy via Mediterranean Sea.
- Approx. project cost is 6 – 7 billion USD.
- Proposed project would be the world's longest and deepest subsea pipeline. Extending from Israeli and Cypriot offshore gas fields to Greece and Italy.
- Length of pipeline-2200km & max. water depths over 3000m.



Deepwater and Long distance Pipelines with Emergency Repair Systems

| Project | Location | Year | Water depth (m) | Length (km) | Size | Product | Repair System |
|------------------|---------------|------|-----------------|-------------|---------|---------|----------------|
| Trans Med | Mediterranean | 1983 | 503 | 155 | 20 | Gas | Saipem SirCoS |
| Zeepipe/Franpipe | North Sea | 1993 | 120 | 840 | 40"/42" | Gas | Technip EPRS |
| Europipe 1 & 2 | North Sea | 1999 | 350 | 658 | 40"/42" | Gas | Technip EPRS |
| Asgard | North Sea | 2000 | 300 | 707 | 42" | Gas | Technip EPRS |
| Greenstream | Mediterranean | 2004 | 1100 | 540 | 32" | Gas | Saipem SirCoS |
| Bluestream | Black Sea | 2005 | 2150 | 396 | 24" | Gas | Saipem SirCoS |
| Petronius | GOM | 2005 | 1116 | 32 | 12"/14" | Gas/Oil | Oil States PRS |
| Mardi Gras | GOM | 2006 | 1950 | 512 | 16"-28" | Gas/Oil | Oil States PRS |
| Langeled | North Sea | 2007 | 385 | 1166 | 42"/44" | Gas | Technip EPRS |
| Dolphin | Persian Gulf | 2007 | 55 | 364 | 48" | Gas | Subsea 7 |
| Medgaz | Med | 2008 | 2155 | 210 | 24" | Gas | Saipem SirCoS |
| NordStream | Baltic | 2012 | 210 | 1222 | 48" | Gas | Technip EPRS |
| Polarled | Norway | 2015 | 1265 | 480 | 36" | Gas | Statoil EPRS |
| Ichthys | NW Shelf | 2015 | 1350 | 890 | 42" | Gas | Subsea 7 |

Recent & Planned Deep water Projects

| Project | Location | Year | Water depth (m) | Length (km) | Size | Product |
|-----------------|-------------------|------|-----------------|-------------|---------|---------|
| Canyon Express | GOM | 2002 | 2200 | 180 | 12" | Gas |
| Bluestream | Russia-Turkey | 2003 | 2150 | 385 | 24" | Gas |
| Mardi Gras | GOM | 2006 | 2150 | | 16"-30" | Gas |
| Medgaz | Algeria - Spain | 2008 | 2155 | 210 | 24" | Gas |
| Cascade Chinook | GOM | 2009 | 2680 | 19 | 9" | Oil |
| Perdido | GOM | 2009 | 2961 | 10 | 10" | Oil |
| Jack St.Malo | GOM | 2013 | 2200 | 220 | 24" | Gas |
| South Stream | Russia - Bulgaria | 2015 | 2200 | 925 | 32" | Gas |
| Galsi | Algeria-Italy | - | 2800 | 565 | 26" | Gas |
| Eastern Med | Israel - Greece | - | 3200 | 2200 | 24"-28" | Gas |

- Indian gas demand and supply balance **shortfall** continues to increase from 100mmscmd in 2014 to **270 mmscmd in 2030** as per PNGRB vision 2030 study.
- Iran has 31 mmscmd gas for MEIDP. Iran is also willing to consider to supplying a **2nd SAGE Pipeline**.
- Project will add to energy **security by diversification**.
- Provides an **economically competitive** method of gas supply and **promotes competition** in Indian energy markets.
- The **technology** to design and lay deep sea pipeline is available **now**.
- The project is **financially** and **technically viable**.
- Long Term contracts and surety of supply, will facilitate **existing** projects in India which utilise the Gas (eg., Power / Fertilizer Plants).
- Project needs **strong diplomatic & political** support from Iranian and Indian Governments
- Long Term contracts and surety of supply, will facilitate new greenfield projects in India especially **Power & Fertilizer** Sectors.
- Turkmenistan Gas & OVL Farzad B Gas can also come to India through SAGE Pipeline route.

Thank you

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