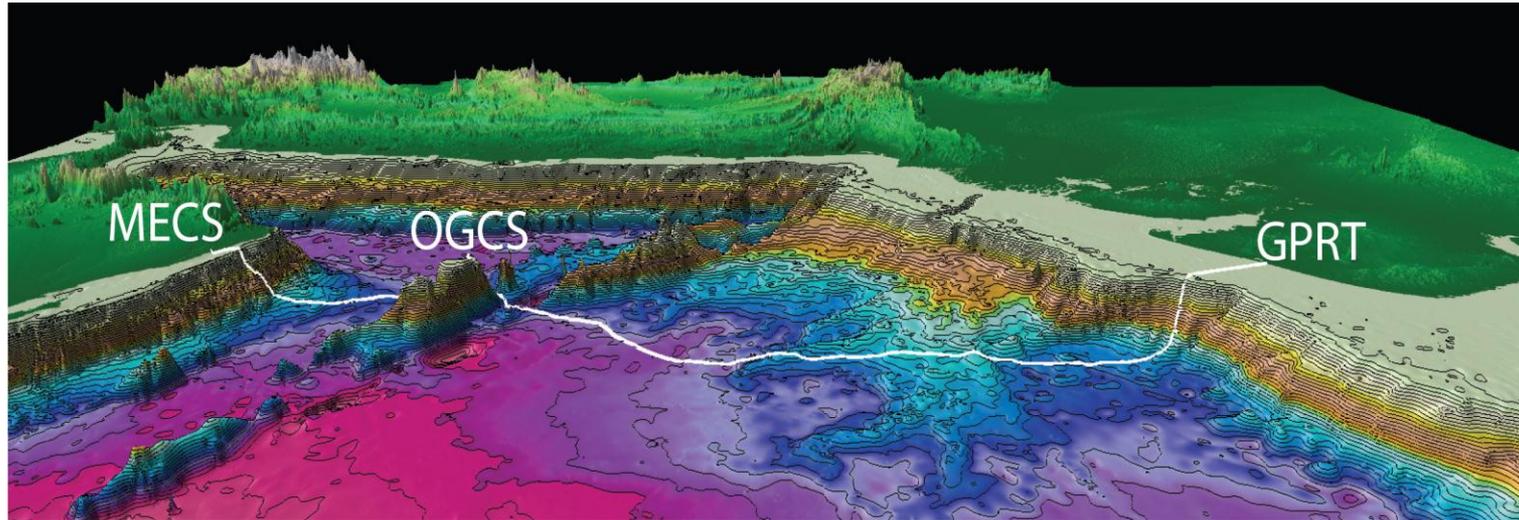


The Middle East to India Gas Pipeline



**Presentation to Hon'ble Shri Dharmendra Pradhan
Minister of Petroleum, MoPNG, Govt. of India**

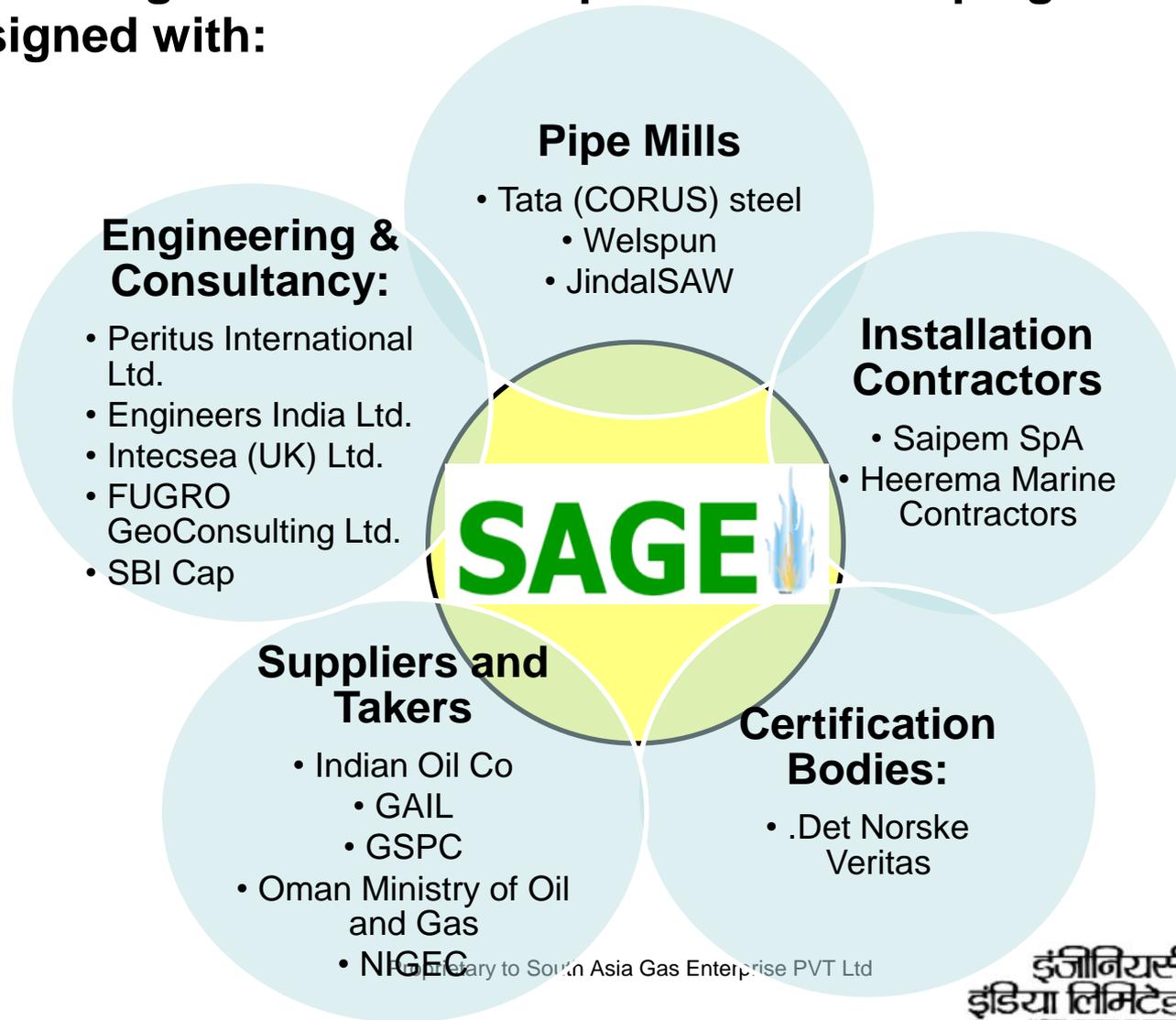
New Delhi, 11th May 2015

The Project

- 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.
- 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**]
- SAGE has been working on the Project for last 6 years, with Global Consortium

Mr. T.N.R. Rao	<ul style="list-style-type: none"> ▪ Former Petroleum Secretary, Govt. of India and “Architect of the Oman-India Pipeline” ▪ Chairman of the SAGE Advisory Board ▪ Founder Chairman, Hydrocarbons Education & Research Society, Indian School of Petroleum ▪ Founder Chairman – University of Petroleum & Energy Studies
Subodh Jain	<ul style="list-style-type: none"> ▪ Director: INOX-AIR PRODUCTS Ltd. ▪ Director: South Asia Gas Enterprise PVT Ltd ▪ Director: Siddho Mal & Sons, New Delhi ▪ Former Senior Advisor to original Oman-India Pipeline team
Peter M Roberts	<ul style="list-style-type: none"> ▪ Director: South Asia Gas Enterprise PVT Ltd ▪ Director: VerdErg Ltd, London ▪ Former Project Director of original Oman-India Pipeline
Dr Herman Franssen	<ul style="list-style-type: none"> ▪ Senior Consultant to SAGE ▪ Member of the SAGE Advisory Board. ▪ President, International Energy Associates, USA ▪ Former Economic Advisor to the Oman-India Pipeline project ▪ Former Economic Advisor to the Sultanate of Oman, Ministry of Petroleum
Stefano Bianchi Roberto Bruschi	<ul style="list-style-type: none"> ▪ Senior Vice President, Saipem Energy Services, Milan. ▪ Sealine and Subsea Manager, Saipem Energy Services, Milan.
Ian Nash	<ul style="list-style-type: none"> ▪ Business Acquisition and Operations Director, Peritus International (UK) Ltd. ▪ Managing Director INTECSEA (UK) Ltd. ▪ Project Manager for Detailed Design of BP Block 31 Subsea flowlines and Structures ▪ Project Manager & Engineering Manager for MEDGAZ FEED. 24” Gas Trunkline in 2200m Water ▪ Engineering Manager (Saipem Inc) for Canyon Express design EPIC. ▪ Project Manager (SASP UK) for Europipe 2, 42-inch 650 Km Gas Trunkline detailed design.
Dr Alastair Walker FRS	<ul style="list-style-type: none"> ▪ Leading International Expert on Marine Pipeline Engineering ▪ Senior Consultant to SAGE ▪ Member of the SAGE Advisory Board ▪ Professor Emeritus, University of Surrey UK ▪ Visiting Professor, University College London
Engineers India Ltd. (EIL)	<ul style="list-style-type: none"> ▪ Leading Onshore Pipeline and Facilities Engineering
SBI Capital Markets Ltd	<ul style="list-style-type: none"> ▪ Financial Advisory Services

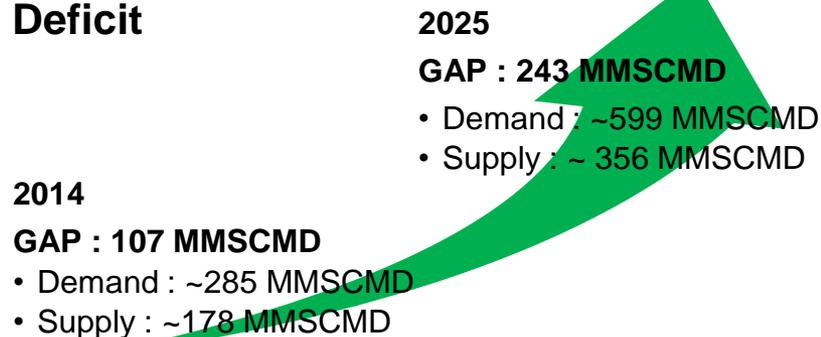
MOUs and Agreements to Co-operate in developing MEIDP have been signed with:



INDIA'S ENERGY SCENARIO

- 4th Largest Energy Consumer in the World
NG constitutes 8% of India's Energy Basket
NG consumption increased by 8% p.a. over last decade
- High projected economic growth
7.5% for FY 16 (Source IMF)
- Energy Demand to grow with GDP

Widening Gas Supply Deficit



Source: Industry Research

CURRENT SOURCES OF SUPPLY

DOMESTIC

- NOCs; Private Fields; Coal Bed Methane
- Declining/ lower than expected production

IMPORTED (R-LNG)

- High Landed Cost
- Contracts with Qatar, USA & Australia
- Limited RLNG Terminals on West Coast, viz. Dahej, Hazira, Dabhol, Kochi
- Projected increase in LNG Terminal Capacity from 66 (2014) to 207 (2025) MMSCMD
- Limited affordability of R-LNG

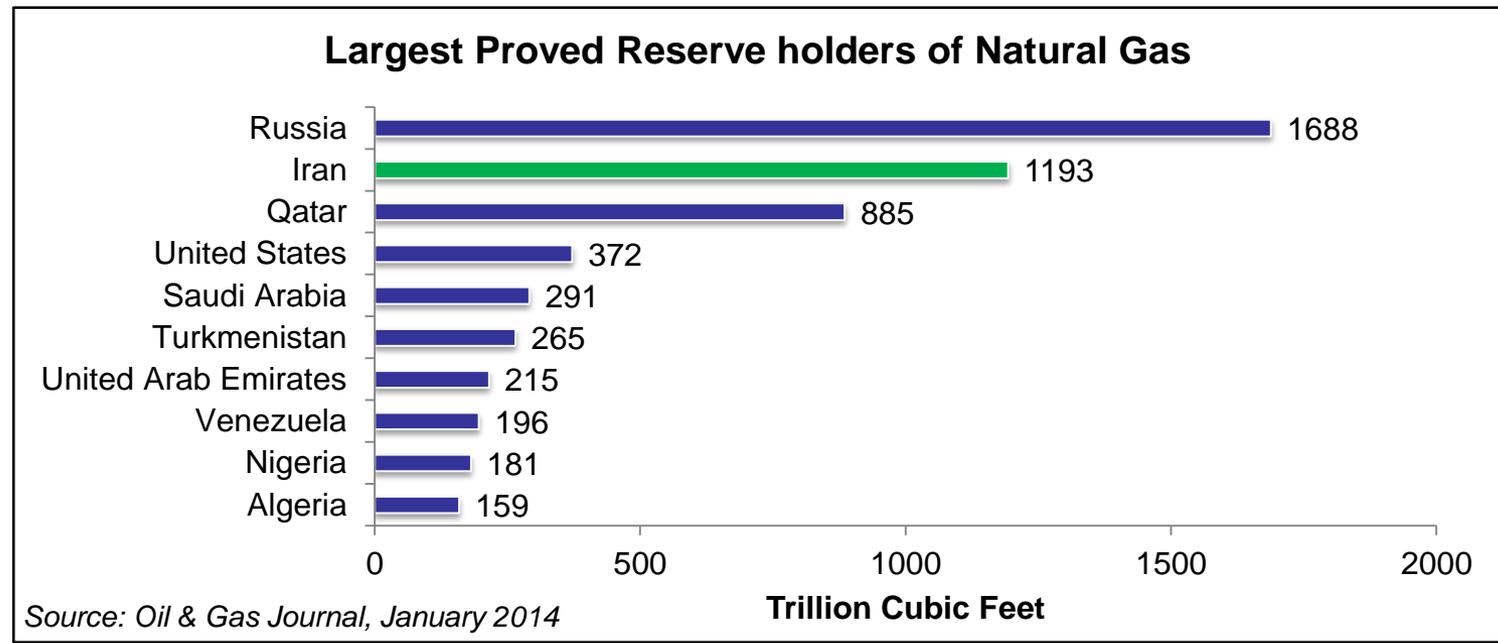
DEMAND FROM KEY SECTORS

- **Power Sector:** >20 GW capacity lying idle
- **Fertilizer Sector:** High Subsidy burden
- **Make in India:** Affordable energy required for development of manufacturing sector

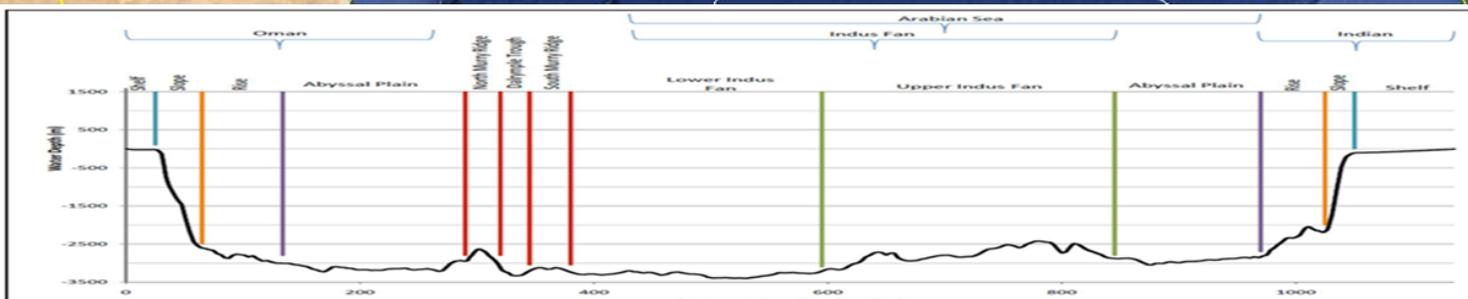
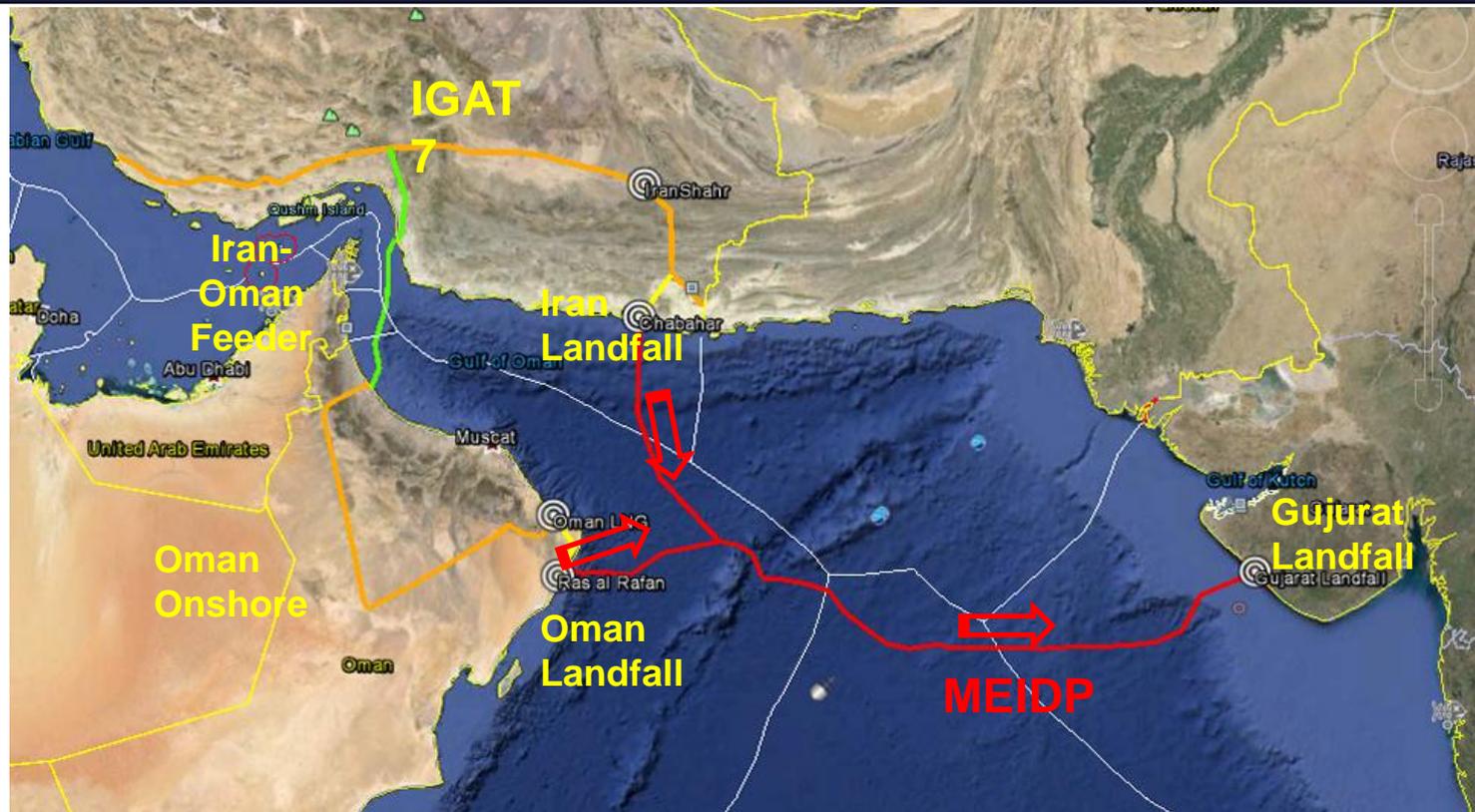
Need for Long Term Solution to address Energy Security Concern of India

Abundant Gas in Middle East

- Over 2000 TCF of Natural Gas is held by the countries with which India has trading relationships
- High success rate of natural gas exploration at 79% viz. a viz. World Avg. of 30%- 35%
- Gas Rich Middle East Countries looking for new export markets
- Onshore Cross Country Gas Pipeline have significant Geo- Political Issues

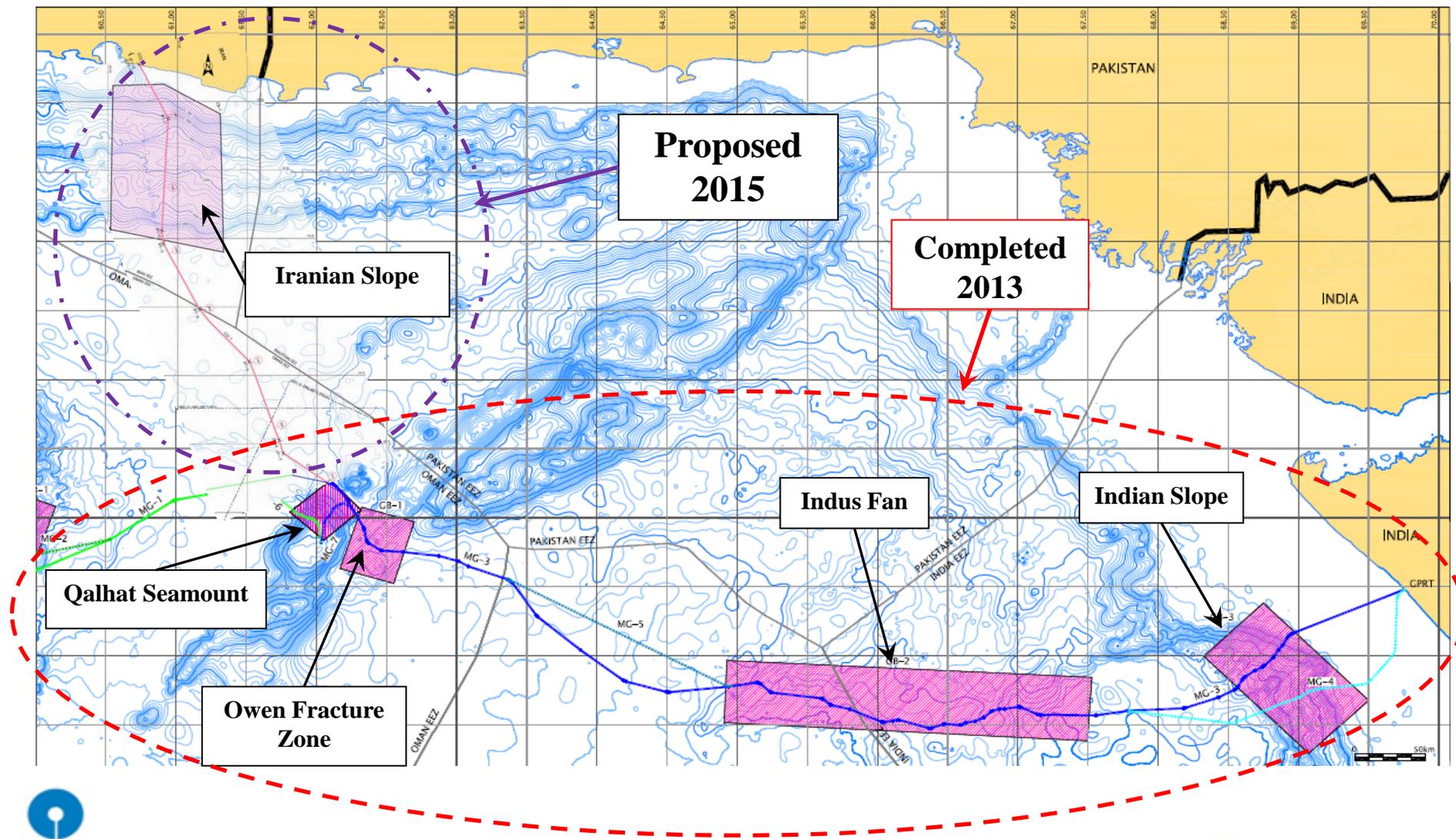


**Middle East Countries have abundant gas for export;
Need Significant Demand & Reliable Infrastructure to commercially exploit the gas reserves**



Proprietary to South Asia Gas Enterprise PVT Ltd

- **Start Points:** - Chabahar, Iran
- **End Point:** - Near Porbandar (South Gujarat), India
- **Flowrate:-** 1.1BSCFD (31.1mmscmd)
- **Inlet Pressure:-** 400barg
- **Diameter:-** 24" I.D. (27.2" O.D.)
- **Wall Thickness:-** 32.9-40.5mm WT (DNV OS-F101)
- **Steel Grade:** - DNV SAWL450 FDU
- **Maximum Depth:** - 3,450 meters
- **Length:** - 1,300 kilometers
- **Steel Tonnage:** - ~800,000 Tonnes
- **Project Duration:** - 5years (as Fast Track Project)
- **Pipeline Construction:** - 2 years



- Iran (NIGEC) has confirmed to SAGE that they are currently in a position to provide gas for **2 pipelines** from Iran to India
- On 20th June 2013 SAGE presented the project to Member (Energy) Planning Commission. All agreed that project is technically feasible and needs to be pursued further
- On 21st June 2013, SAGE completed a multi-million \$ Geophysical Survey of the Arabian Sea with Fugro's vessel to determine the most suitable pipeline route
- On 14th August 2013, project brief was presented to Dr. Kelkar Committee. SAGE endeavor was appreciated and was advised to pursue the project further.
- MOU Partners IOC/GSPC/GAIL along with SAGE & EIL visited Tehran in Dec,2013 to finalise Tripartite Framework Agreement for long term Gas supplies. OVL & Indian Embassy (Tehran) also participated.
- Gas discovered by OVL, IOCL & OIL in Farzan Block and Turkmenistan Gas can be swapped and transported to India through SAGE Pipeline

- **MoP&NG- May 2014**

Presentation made to Secretary MoP&NG; Positive Outlook for the Project with acceptability of technical & financial feasibility; SAGE was advised to pursue the Project further

- **CGLA World Infrastructure Forum, New York- February 2015**

SAGE invited to present the MEIDP Project shortlisted as Top 100 Infrastructure Projects in the World

- **Ministry of Power, March 2015**

Presentation made to Secretary, Ministry of Power; Positive Outlook for the Project; Importance of certainty of affordable natural gas emphasized for energy security of India

- **High Powered Indian Oil & Gas Delegation visit to Tehran, April 2015**

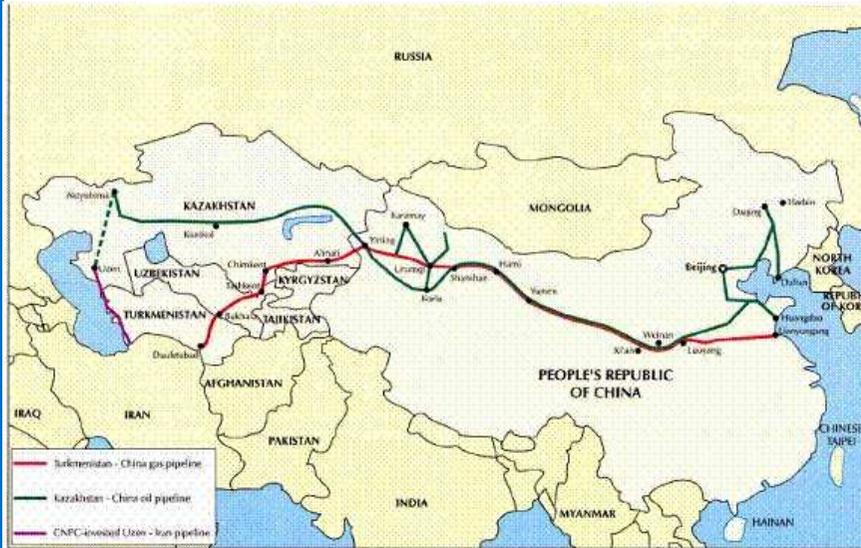
SAGE Project discussed with Iran; Reconfirmation of Supply of Gas for the Project by Iran

Building on Previous Experience

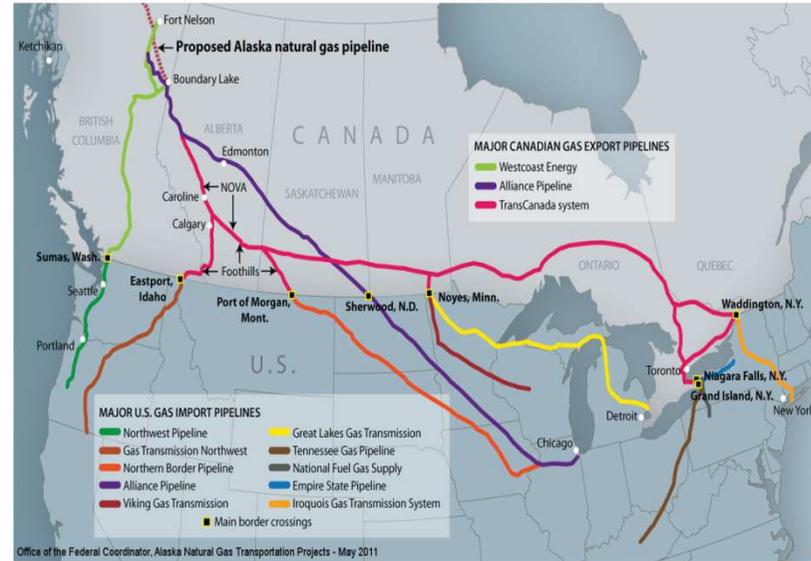
ISSUES	Oman-India	MEIDP	Comments
Availability Of Pipe Mills	Upgrade in Capability required	Capability exists for the required size and thickness.	Welspun; Jindal SAW; TATA (CORUS) Steel ;JFE and Europipe are capable vendors
Lay Vessel	No Ultra Deep water vessel capability	Ultra Deep water vessels with adequate capability are available.	Casterone and Aegir are already available in the field. Two more barges Pioneering Spirit and JSD 6000 are under construction.
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(SIRCOS) has been developed for Deep water application by Saipem. Saipem currently has work class ROV rated to 4000m depth.

Transnational Gas Pipelines Across the World

China-Central-Asia-Gas-Pipelines

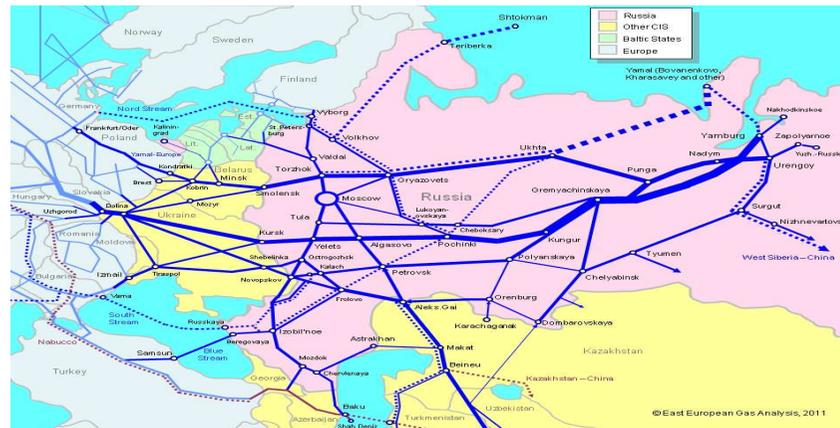


MAJOR CANADA, U.S. EXPORT-IMPORT GAS PIPELINES



FSU PIPELINES

- Russia
- Europe
- Other CIS



Source: Industry Research

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	1880	24"-28"	Gas

Long Distance Subsea Pipelines are Safe and Reliable Worldwide ONGOING PIPELINES

- Nordstream 1200km 48" 2 off {Russia → Germany} (2 further planned)
- FranPipe 840km 42" {Norway → France}
- ZeePipe 1400km 42" {Norway → Belgium}
- Europipe 650km 42" {Norway → Germany}
- Langeled 1170km 42" {Norway → UK}
- Gulfstream 1200km 36" {Alabama → Florida, USA}
- West Africa Pipeline 569km 20" {Nigeria → Benin → Togo → Ghana}
- Malampaya 504km 24" {Philippines}

PLANNED IN NEAR FUTURE

- Polarled 482km 36" {Arctic Circle → Norway}
- Southstream 925km 32" {Russia → Bulgaria}
- Galsi 550 km 28" {Algeria → Italy}
- East Med Pipeline 910km {Israel Greece}

MEIDP Capable Pipelay Vessels



CastorONE (Saipem SpA) 2013



Aegir (HMC) 2013



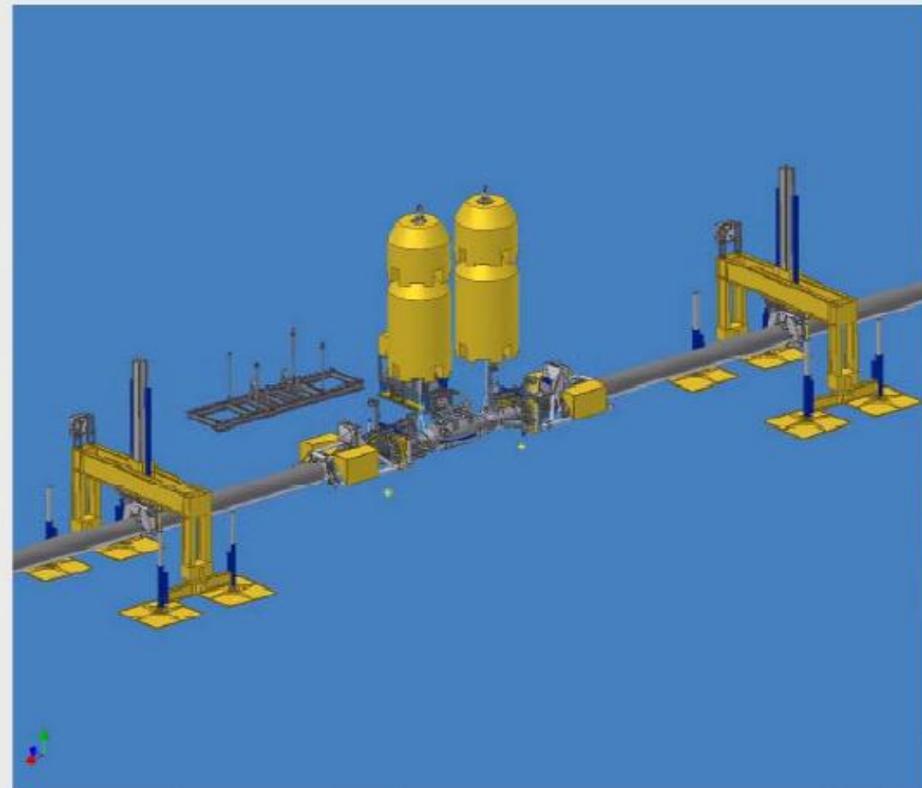
Pioneering Spirit (Allseas) 2014



JSD6000 (Petrofac) 2017

Diverless Sealine Repair System SIRCOS

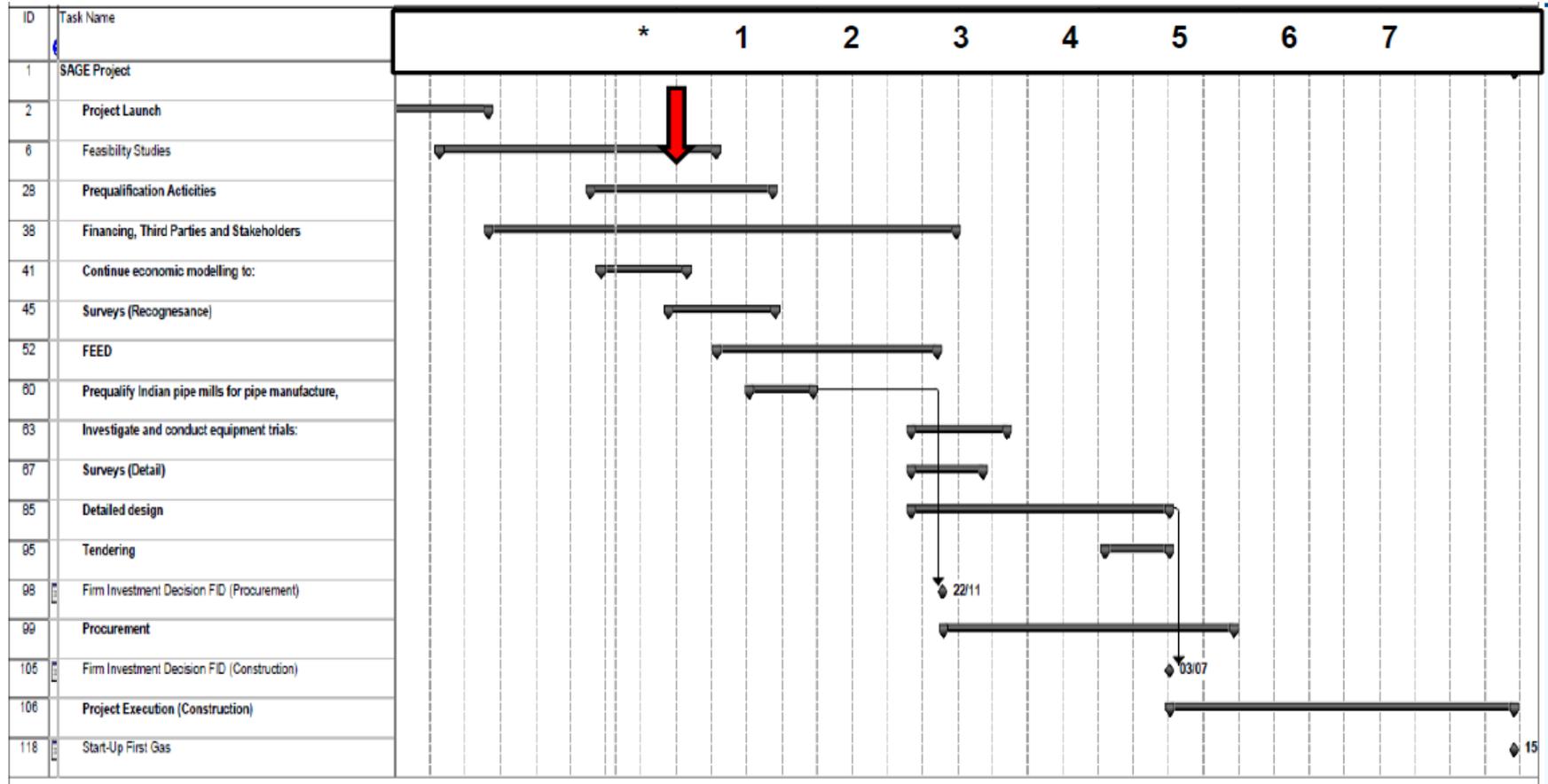
- SiRCoS is a pipeline repair system developed for deepwater application
- meeting requirements of TransMed (Tunisia – Sicily), Green Stream (Libya – Sicily), Blue Stream (across Black Sea)
- suited to pipeline size ranging from 20" to 32" in water depths up to 2200 m
- SiRCoS is available under a Service Contract Agreement



Saipem has stated that the system can be uprated to 3500m by change-out of buoyancy and control pod

Saipem currently has its Workclass ROV's rated to 4000m WD

Project Development Schedule



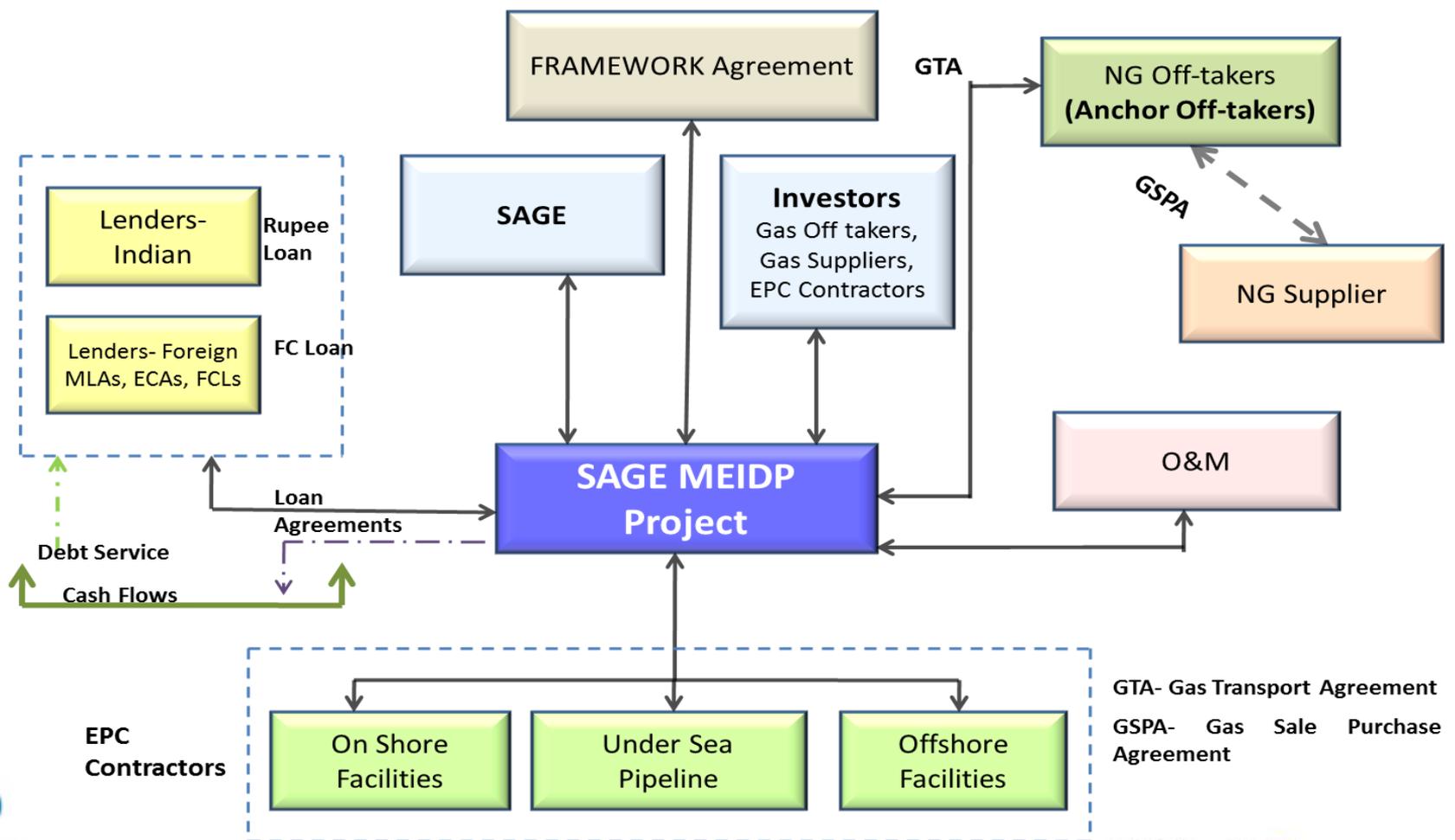
- ❑ Pre-FEED to 1st Gas is a 7yr undertaking
- ❑ On Fast Track FEED to 1st Gas can be 5yrs
- ❑ Offshore Construction Period 2 yrs

- Design Basis definition
- Flow Assurance Studies
- Mechanical Design
- Onshore Compression Station
- Offshore Compression Station Definition & Review
- Receiving Terminal Definition
- Quantified Risk Assessment - OIP Update
- Geohazard and Fault Crossing Assessment
- Metocean data collection
- Emergency Repair Equipment
- GIS Data collection
- Riser and Subsea By-Pass definition
- Pipeline Intervention Review
- Vessel & Equipment Capabilities review
- Alternative Integrity Verification Phase 1 (Establish no hydrotest principle)
- Cost Estimate Update
- Reconnaissance Survey definition and scope of work
- Mill qualification and ring testing program
- Reconnaissance Survey Completed
- Landfall point identification in India

Planned Work

- Master Project Schedule Update
- Cost Estimate Update
- Metocean Data Acquisition Scope definition and ITT Documentation
- Route Review and Refinement
- Intervention optimisation at the Continental Slopes, Owen Fracture Zone and Indus Fan
- Metocean Data Collection on Site
- Environmental Statement ITT and Scope Definition
- Onshore Facilities FEED ITT and Scope definition
- Offshore Pipeline FEED ITT and Scope Definition
- Environmental Survey Scope Definition and ITT Documentation.

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



GTA- Gas Transport Agreement
 GSPA- Gas Sale Purchase Agreement

SAGE- Key Contributor to India's Energy Security

Vital to address India's Energy Security

- Energy Security Critical for achievement the desired GDP growth of 9-10%
- MEIDP Project Secures **Long Term Supply of Gas** for India
- Emphasis on Strategic International Partnerships created from preliminary stages of project development
- Long Term availability of **Affordable Gas** for the key sectors (**Power, Fertilizer and City Gas Distribution**)

Power Sector

- 27123 MW- Gas based power plant capacity
- Gas through MEIDP \approx 31 MMSCMD
- Power generation potential \approx 7000 MW
- Production Cost lower by \approx Rs 1.50 unit
(MEIDP viz. z viz. LNG)
- Availability of gas to increase power production at affordable price.

Fertilizer Sector

- Secures gas for New Investment Policy for Urea Manufacturing
- Envisaged Investment of Rs 40,000 Cr
- Δ USD 1/ MMBtu in gas \rightarrow Δ USD 20/ MT
- Substantial Savings in Subsidy through gas from MEIDP viz. a viz. LNG

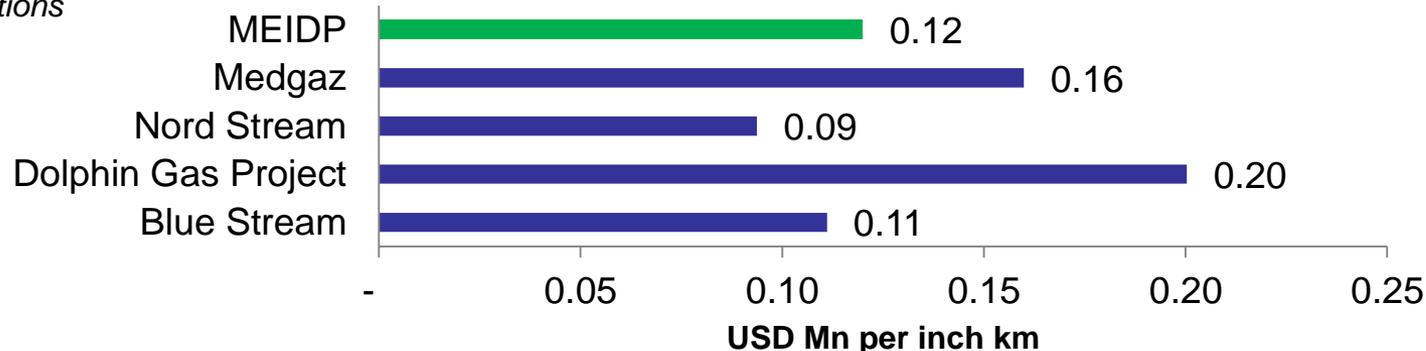
City Gas Distribution

- Increasing focus of Govt. to establish CGD Networks in new cities
- Limited availability of Domestic Gas
- Gas through MEIDP to positively impact viability of CGD Companies and affordability of SMEs

MEIDP: A Step forward for India's Energy Security

Pipeline	Year	Description	Length (km)	Diameter (inch)	Cap- Ex (USD Mn)	Cap- Ex (USD Mn/ inch/km)
MEIDP	Proposed	Middle East to India	1300	28	4500	0.12
Medgaz	2012	Algeria to Spain	210	24	806	0.16
Nord Stream	2011	Russia to Germany	1222	48	5500	0.09
Dolphin Gas Project	2009	Qatar to UAE	364 (offshore)	48	3500	0.20
Blue Stream	2005	Russia to Turkey	1200	24	3200	0.11

Source: Public Domain/ Research Publications



Project Cost of the MEIDP Pipeline is in line with Latest Pipeline Projects

RLNG

- LNG forms a significant constituent of Gas Supply in India
- Additional Cost Component attributable to Imported LNG:
 - Liquefaction and Regasification of gas: ~ 4– 4.5 USD/ MMBtu
 - Transportation of LNG: ~ 1 USD/ MMBtu

Additional cost of around 5- 5.5 USD/ MMBtu over and above the price of gas

MEIDP

- MEIDP: Development of Permanent International Gas Transport Corridor
- Tariff for MEIDP Project calculated on the basis of Target Return on Equity

Estimated Tariff ~2- 2.25 USD/MMBtu

Natural Gas supply through SAGE Pipeline economical by 3-3.5 USD/MMBtu vs Imported LNG

MEIDP- Long Term Affordable Solution for Price Sensitive Indian Gas Market

Source: Public Domain / Research Publications

MEIDP LINE-PIPE REQUIREMENT

- Steel Grade DNV SAWL485 FDU
- $\alpha_{fab} = 1.0$
- Inside Diameter 24 inch
- Size Range 32.9mm - 40.5mm
- Requirement 796,500 tonnes
- Recommended number of Mills for pipe Supply -3

MILLS CAPABLE OF MAKING MEIDP LINE-PIPE

- Welspun (India) - JCOE
- JindalSAW (India) – JCOE
- Tata (UK) - UOE
- Europipe (Germany) - UOE
- JFE (Japan) - UOE

- The Project is expected to be implemented at a cost of USD 4.5 Bn
- Raw Material (pipes) form ~35% of the Total Project Cost

Significant Involvement of Indian Pipe Mills

- MoUs have been signed with Indian Pipe Mills viz. Welspun, Jindal Saw, TATA (Corus) Steel
- Significant R&D Investments have been made by Indian Pipe Mills
- Qualification trials carried out in Indian Pipe Mills (Welspun & Jindal Saw)
- Indian Pipe Mills have the capability to manufacture pipes of required thickness
- Technology transfer would facilitate the production of the required pipes

Development of Project Implementation Capabilities

- Project Implementation by Indian Agencies:

Indian Firms to work with International project Implementation Agencies

- Project would help in building project implementation capabilities in the niche sector

International Infrastructure Made for India with Equipment “Made in India”



- Considerable progress made in terms of initial feasibility, surveys, finalisation of route, etc.
- Project acknowledged by various key stakeholders
- Significant amount of investment made by the Sponsor

NEXT STEP

- Onshore & Offshore FEEDs + Detailed Geo-Physical Survey to be carried out- Rs 300 Cr (USD 50 Mn)
- Framework Agreement (FA) to be signed by agencies like GAIL, IOCL, GSPC to get first mover advantage in view of probable lifting of the sanctions
- FA signing is a pre-requisite to signing of various inter-related agreements like GSPA, GTA for implementation of the Project
- Identification of Seed Equity Investors for part funding the Pre-FEED/ FEED Cost

DRAFT FRAMEWORK AGREEMENT

- Draft Framework Agreement has been finalised based on discussions with various agencies.
- Framework Agreement, **Non- Binding**, would lead to finalization of broad principles regarding implementation of the Project by the Signing Parties
- National Iranian Gas Export Company (NIGEC), the Seller, will supply gas to Buyers like GAIL, IOCL, GSPC at a mutually agreed location at Iranian Border.
- SAGE as a Transporter will implement the Project and provide transportation of ~31 MMSCMD of Iranian Gas to India through Oman Sea & Arabian Sea for 25 years
- Signing of Framework Agreement is a pre- requisite for signing of Inter-related agreements by parties like GSPA, GTA for the implementation of the Project

- MEIDP Project: Key Participant for ensuring India's Energy Security
- USD 4.5 Billion Mega Project for creation of International Energy Corridor dedicated to India.
- Technologically Feasible Project; Funding Support possible from Lending Community.
- Govt.'s Political / Diplomatic Support to Project in all bilaterals with Iran.
- Government support critical for signing of **Non-binding** Tri- Partite Framework Agreement with GAIL, IOCL, GSPC and Supplier Nation as:
 - No investment involved
 - Necessary for commencement of price negotiations
- In line with Government's Policy on Chahabar Port Development (Agreement signed recently) **Non-binding** Framework Agreement for MEIDP Project can also be signed, giving India the **FIRST MOVER ADVANTAGE**.

MoP&NG Mentoring essential for Success of MEIDP Project

- Indian gas demand and supply balance **shortfall** continues to increase from 107mmscmd in 2014 to 243 mmscmd in 2025.
- Iran is willing to provide 31 mmscmd Gas for a period of 25 years with possibility of Gas for a 2nd SAGE Pipeline.
- Project will add to India's Energy **Security by diversification**.
- Provides an **economical and affordable** Gas Supply significantly less than the cost of LNG .
- **Technology** to design and lay deep sea pipeline is available **now**.
- The project is financially and technically viable.
- The Project will provide billions of Dollars of opportunities to Indian Cos. to participate in the supply of equipment & services.
- Long Term contracts and surety of supply, will facilitate new projects in India especially Power & Fertilizer Sectors.

Thank You

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