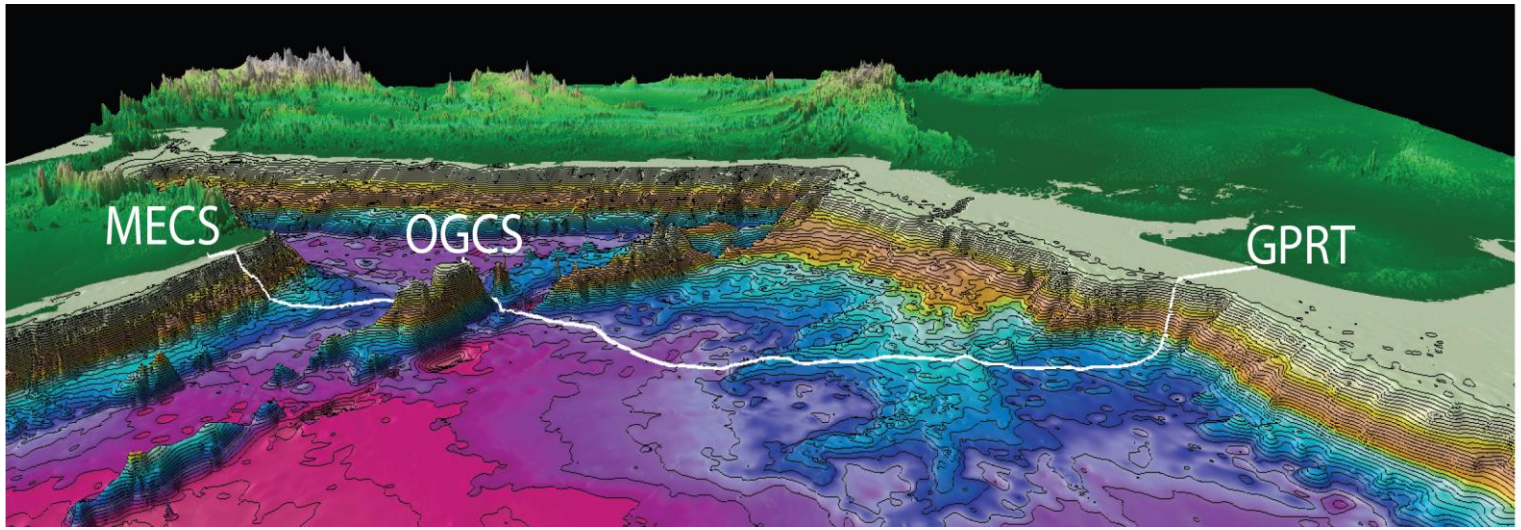
The Middle East to India Gas Pipeline



Presentation to the Indian Ministry of Petroleum and Natural Gas

New Delhi, 29th May 2014

Ian Nash Director of Operations, Peritus International

Introduction

SAGE

- South Asia Gas Enterprise Pvt Ltd (SAGE), a joint venture lead by the Indian Siddhomal group, is actively considering building a deepwater, transnational, natural gas pipeline system from the Middle East to India in the Private Sector.

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 Qatar, Iran and Turkmenistan.
- Iran having over 1000 TCF reserves is eager to export gas and looking forward for export solutions.
- 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.

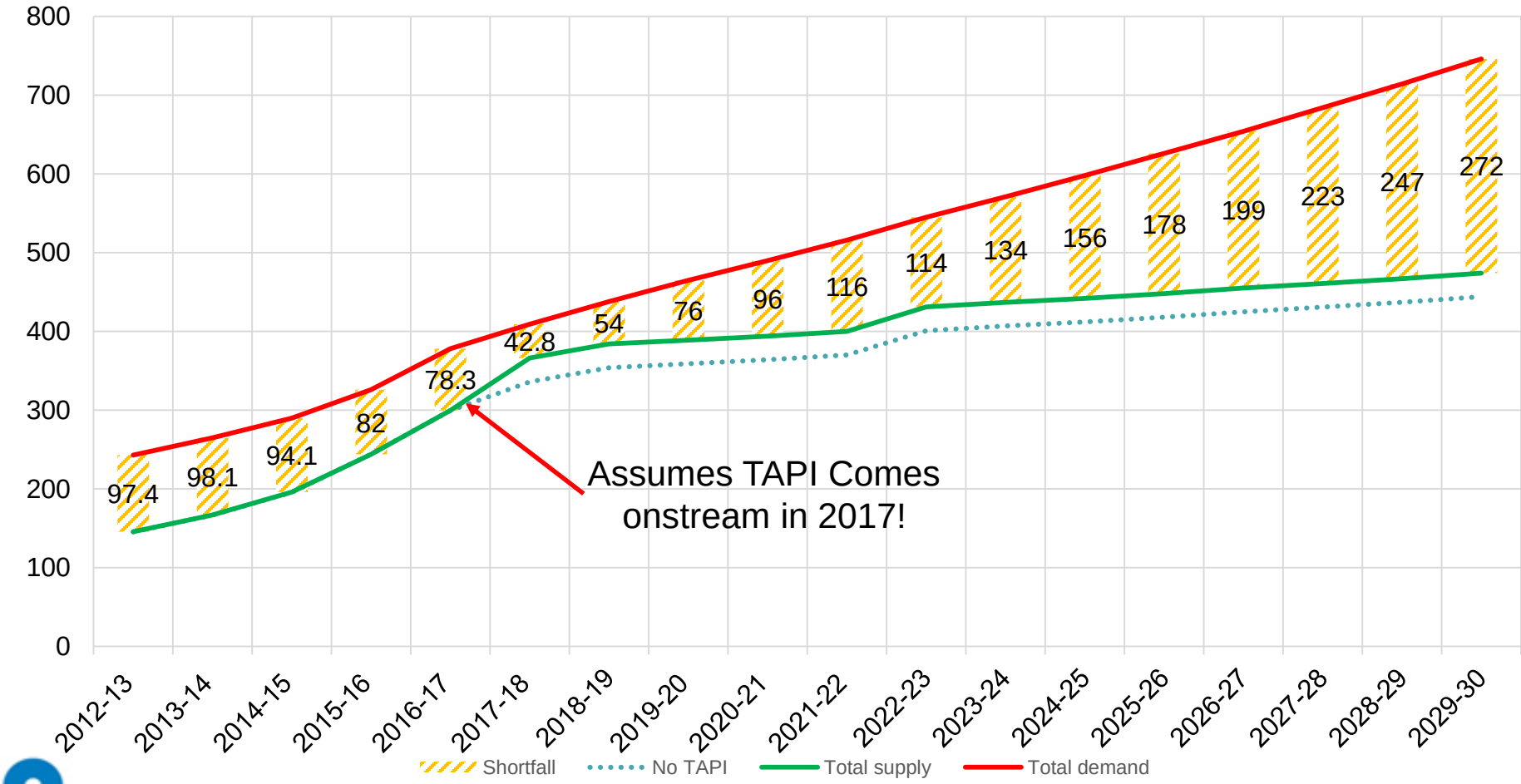
A pipeline across the Arabian Sea

- The current work builds on the extensive study of the deepwater route of the Oman to India Pipeline that was carried out in the early 1990's.
- The case for this route has been strengthened by recent development work undertaken by SAGE and by the major body of deepwater design and pipelay experience accumulated over the last decade.

India's Demand Supply Balance

PNGRB Vision 2030 - May 2013

(mmscmd)



Gas Reserves & International Supply

International Supply of Gas to India

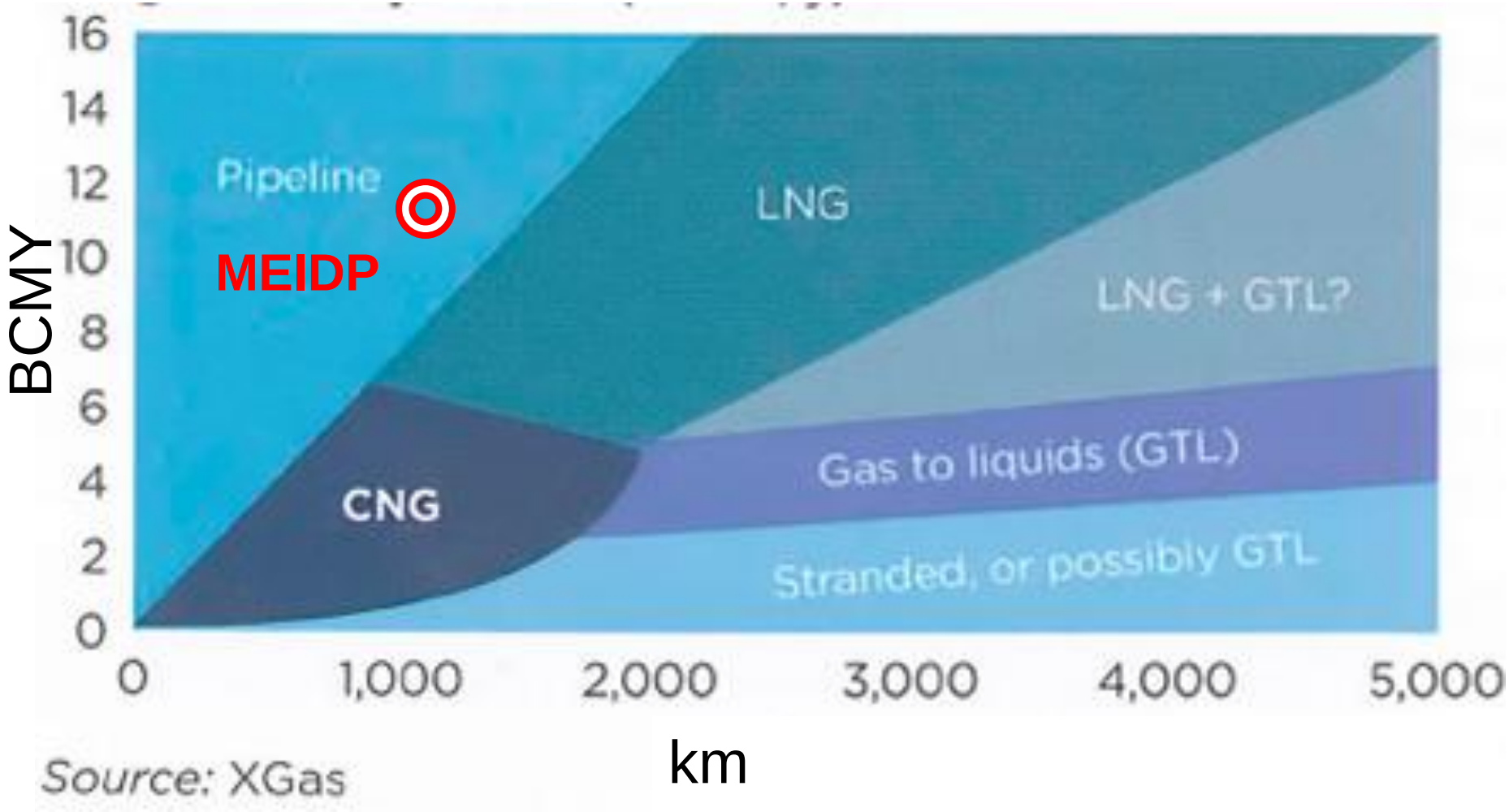
- Over 2,000 TCF of natural gas reserves are held by countries with which India has a traditional trading relationship, including Qatar, Iran and Turkmenistan
- Iran is looking for export solutions for its vast reserves of Natural Gas
- Qatar is looking for new export markets with the advent of Shale Gas explosion in USA
- Iraq is building its Gas development and looking for Export solutions
- Onshore Pipelines such as IPI and TAPI have significant security and supply issues

Table 9. World proved natural gas reserves by country as of January 1, 2013 (trillion cubic feet)

Country	Reserves (trillion cubic feet)	Percent of world total
World	**6,793**	**100.0**
Top 20 countries	***6,200***	***91.3***
Russia	1,688	24.9
Iran	1,187	17.5
Qatar	890	13.1
Saudi Arabia	288	4.2
United States	273	4.0
Turkmenistan	265	3.9
United Arab Emirates	215	3.2
Venezuela	195	2.9
Nigeria	182	2.7
Algeria	159	2.3
China	124	1.8
Iraq	112	1.6
Indonesia	108	1.6
Kazakhstan	85	1.3
Malaysia	83	1.2
Egypt	77	1.1
Norway	73	1.1
Canada	68	1.0
Uzbekistan	65	1.0
Kuwait	63	0.9
Rest of world	593	8.7

2455tcf
36.1%

Competitiveness of Pipelines



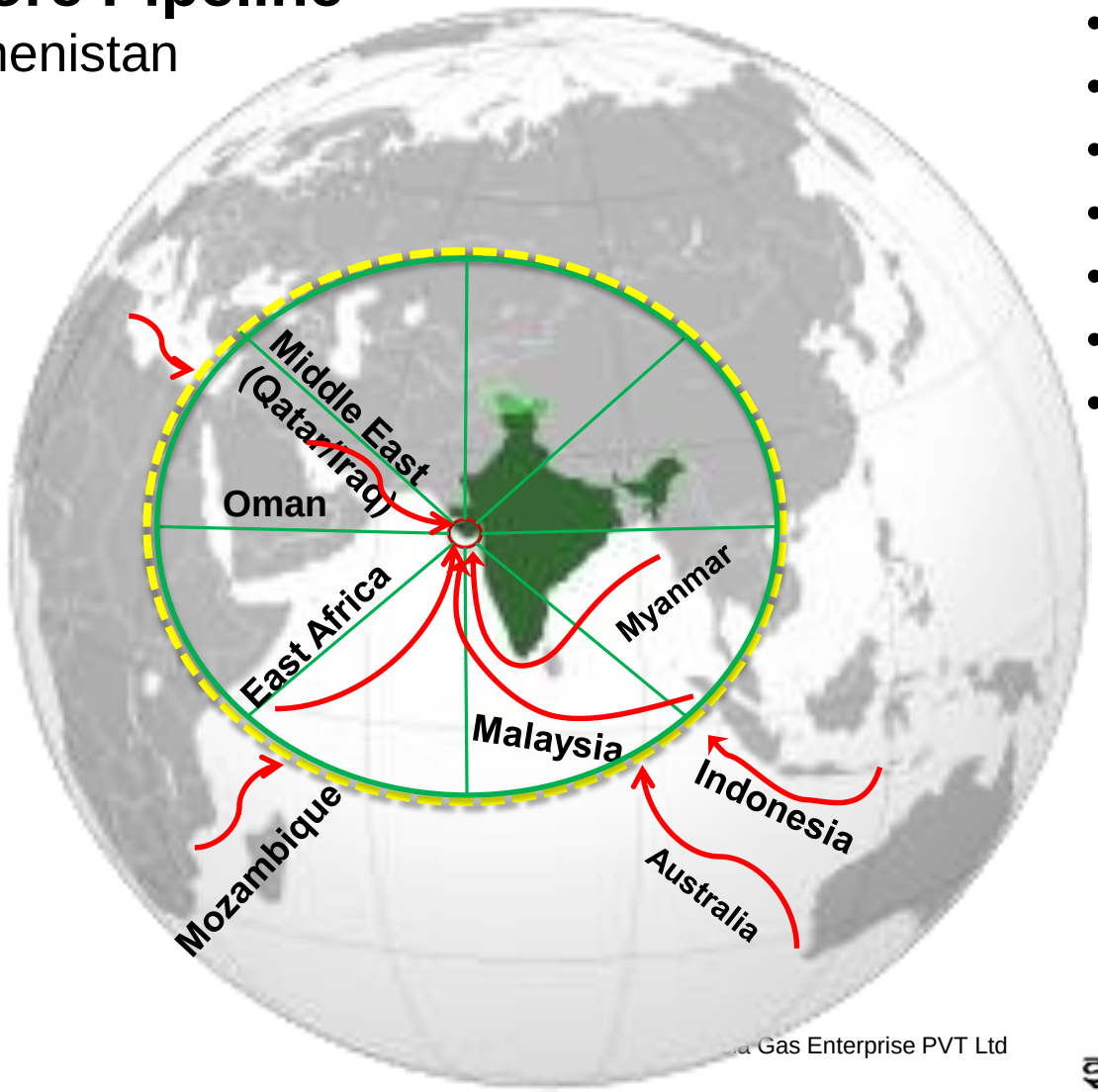
Source: XGas

Nominal Limit of Pipeline Gas to India is 2000km

Optimal Offshore Transportation To India West Coast (2000km)

Onshore Pipeline

- Turkmenistan
- Iran
- China



Offshore Pipeline

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

LNG

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

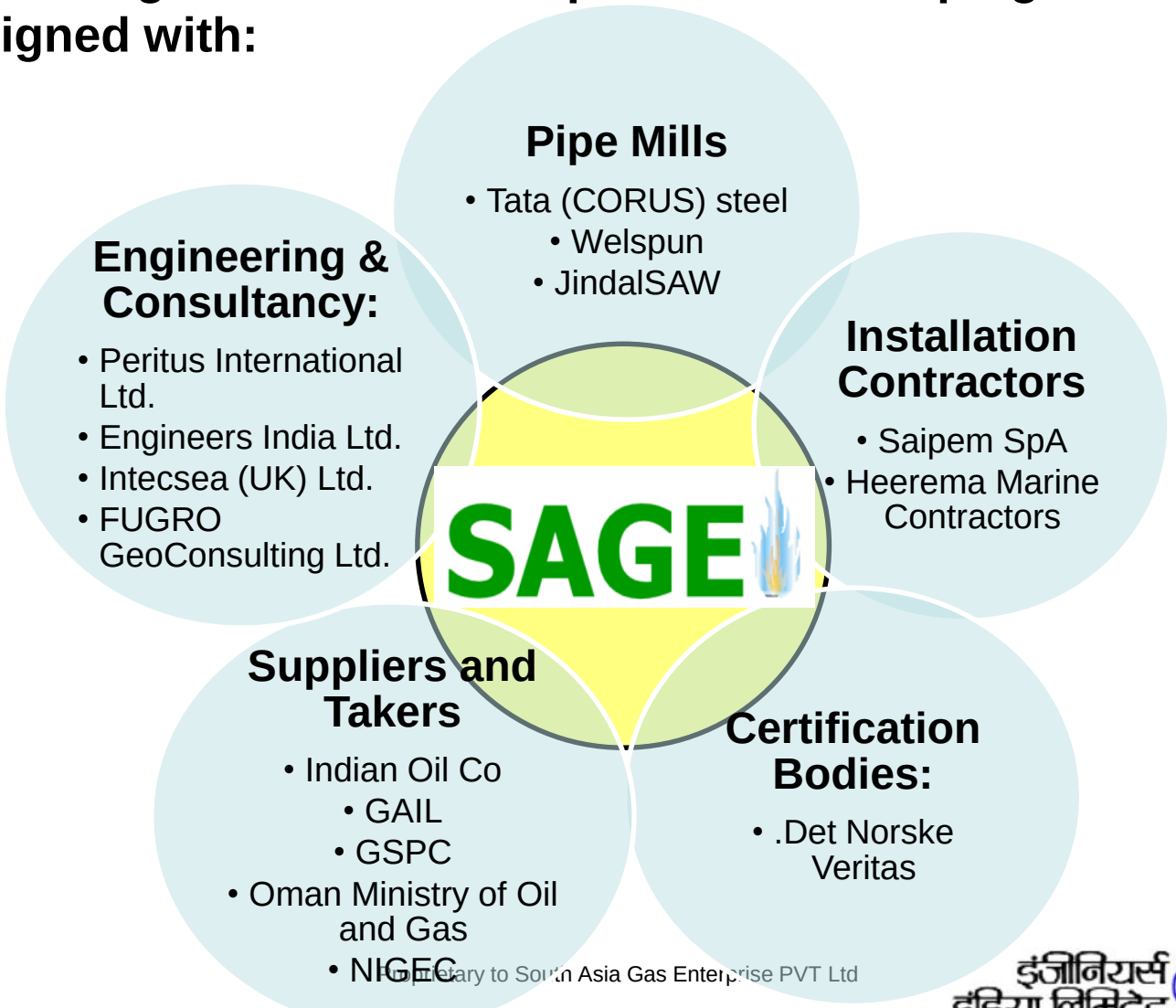
The SAGE Project Vision

The Project

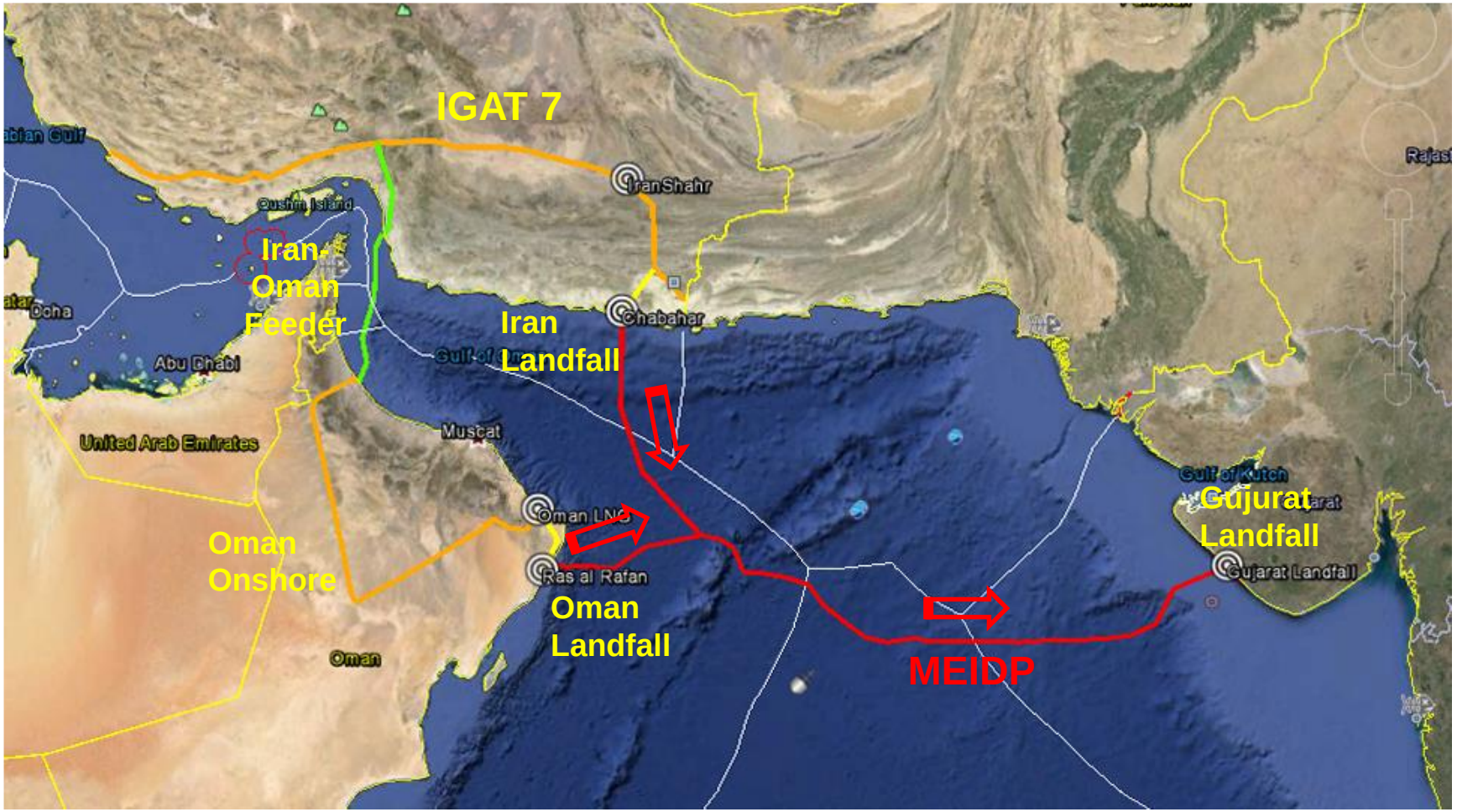
- MEIDP 1 will be the first in a series of pipelines supplying gas to the Gujarat coast of India, from the vast available resources in the Middle east, by the **safest, most economic** and **reliable** means.
- The MEIDP Project is envisaged as transmission pipeline **Infrastructure project** allowing 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

Working in Partnership

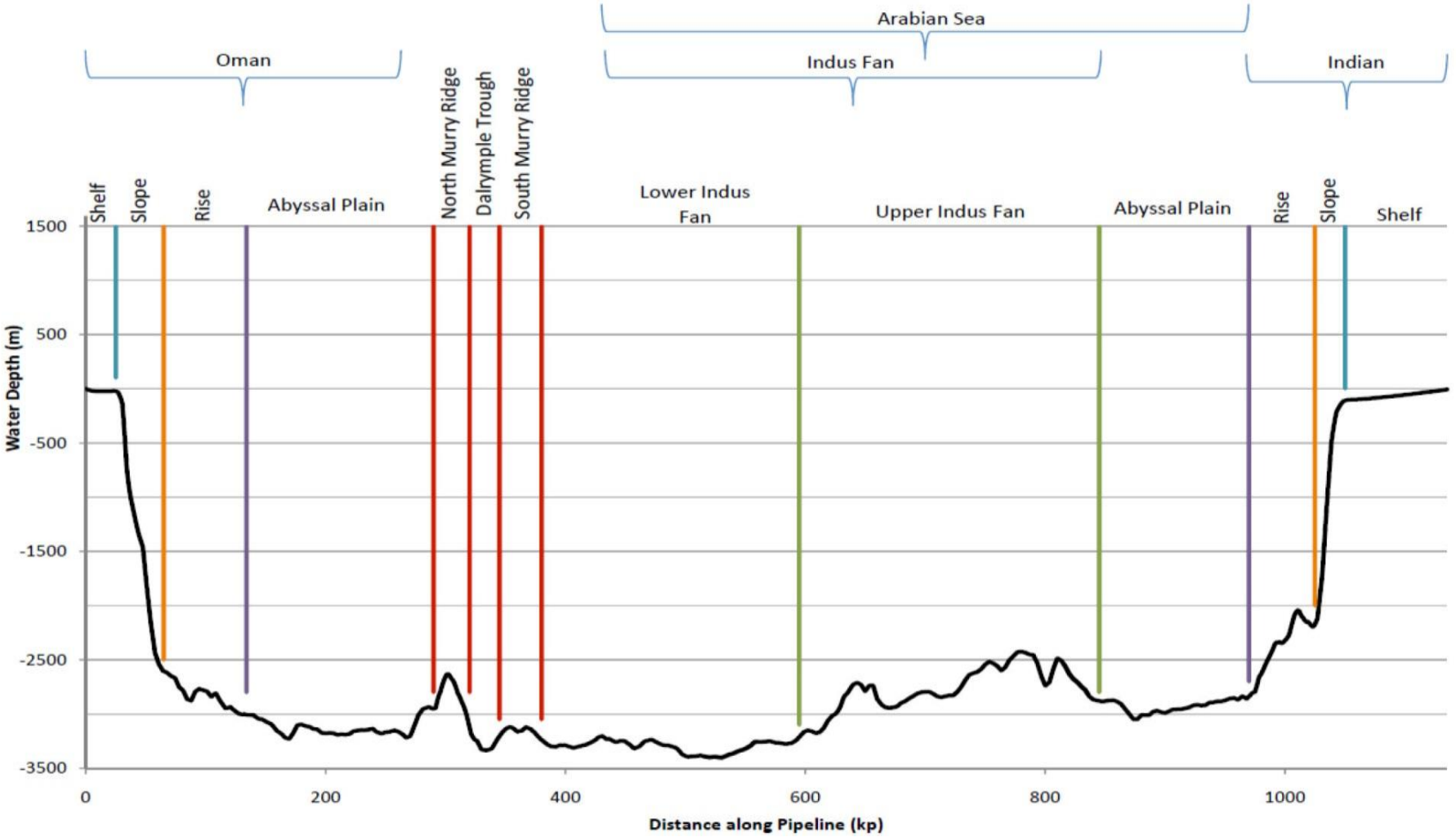
MOUs and Agreements to Co-operate in developing MEIDP have been signed with:



Middle East Gas Routes to India



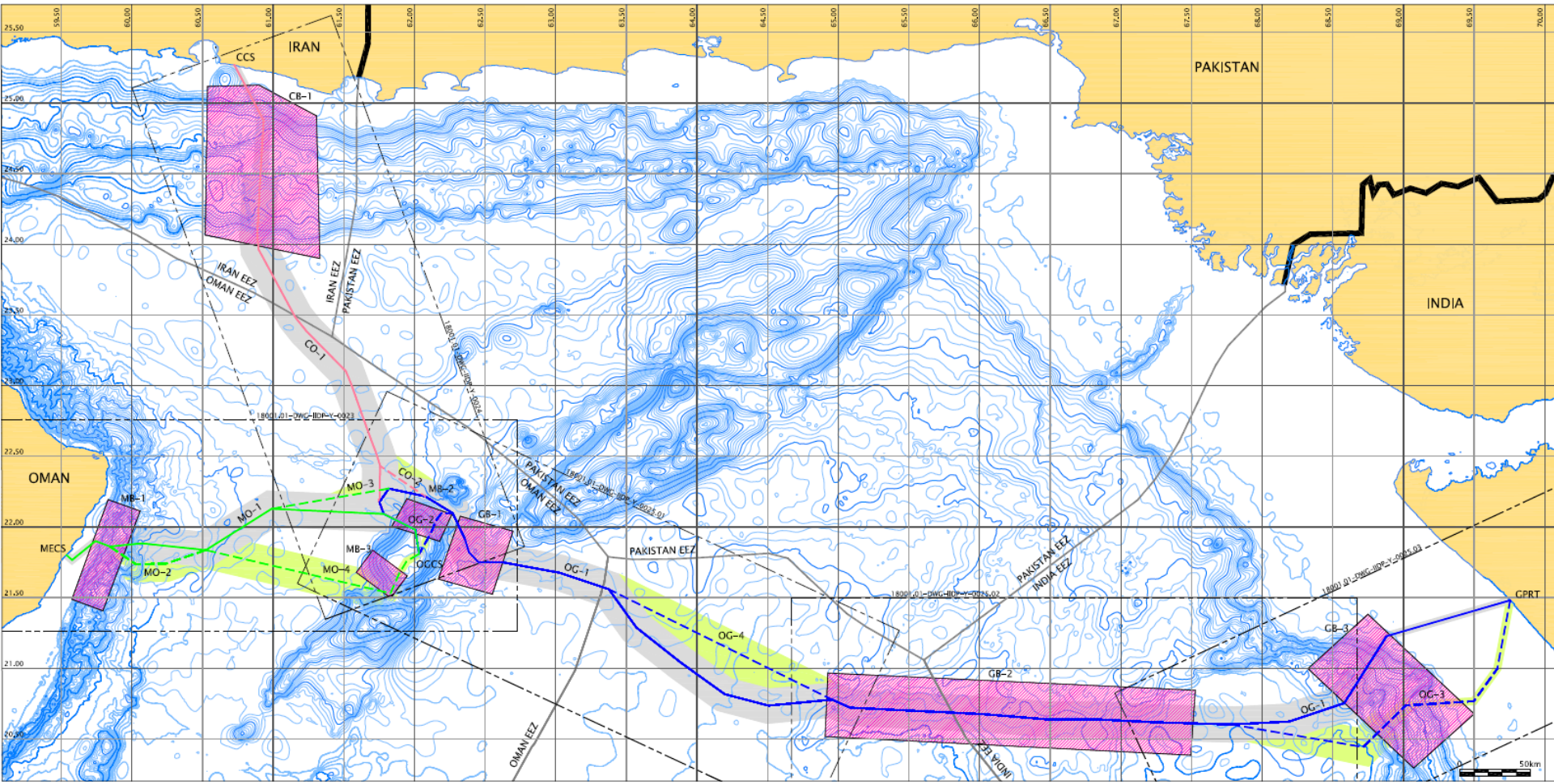
Pipeline Route Profile (Direct)



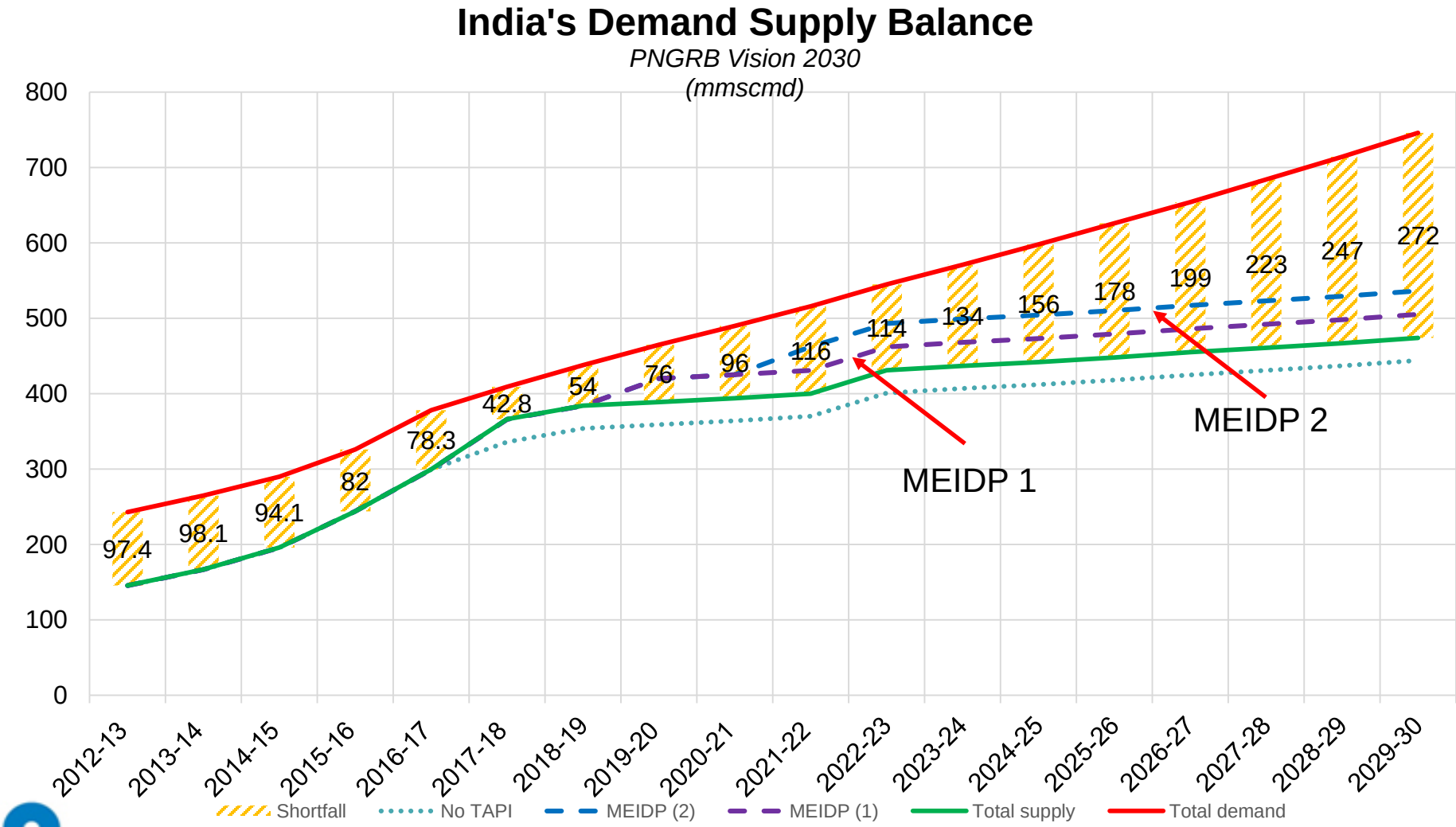
MEIDP Project Features

- **Potential Start Points:**
  - Chabahar, Iran
  - Ras al Jafan, Oman
- **End Point:** – Near Porbandar (South Gujarat), India
- **Diameter:-** 24” I.D. (27.2” O.D.)
- **Wall Thickness:-** 32.9-40.5mm WT (DNV OS-F101)
- **Flowrate:-** 1.1BSCFD (31.1mmscmd)
- **Maximum Depth:** - 3,450 meters
- **Length:** - 1,200- 1,300 kilometers
- **Project Duration:** - 5years (as Fast Track Project)
- **Pipeline Construction:** - 2 years

MEIDP Route Options and Survey Blocks



MEIDP Effect on Gas Shortfall



Discussion with Gas Stakeholders

SAGE have contacted potential Gas suppliers

I. **Iran – Numerous discussions have been held with National Iranian Gas Export Co. (NIGEC). Latest meeting held in Tehran in Dec, 2013.**

II. Qatar – MEIDP Project continues to be on their "Waiting List" considering their heavy commitments to LNG Projects.

III. Iraq - Preliminary discussions have been held to look at options for Iraqi gas

IV. Turkmenistan – Numerous discussions with Turkmen Oil Ministry. Oil Minister has advised that they are ready to Supply Gas Swap for MEIDP Project, when Iran gives NOC for the Gas Swap with Iran.

V. Oman - SAGE has MOU with Oman Ministry of Oil & Gas for a Strategic Alliance for Gas Sourcing from 3rd countries e.g. Qatar / Iran / Turkmenistan / Iraq.

Recent Developments

- Iran has expressed its willingness to supply Natural Gas and a Framework Agreement has been discussed with for Pipeline Construction and Gas Supply through the SAGE Pipeline. NIGEC has confirmed to SAGE that they are currently in a position to provide gas for **2 pipelines** from Iran to India
- In April 2013 Speaker of Iranian Parliament called for implementation of Iran's natural gas transfer project to Oman
- 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.

Comparison With OIP

Technical Risk Issues facing the project in 1995:

- Pipe mill upgrades needed to manufacture linepipe.
- Lack of lay vessel with enough tension capability. Conversion work needed to lay pipe to 3,500m water depth.
- Incomplete understanding of seismic activities and mitigation methods – mudflows, fault lines & slope failures.
- No qualified deepwater pipeline repair system was available.

However even in 1995, 15 years ago:

- These were not considered to be fatal impediments by the industry and three competitive bids were received and evaluated before the gas was re-assigned elsewhere.

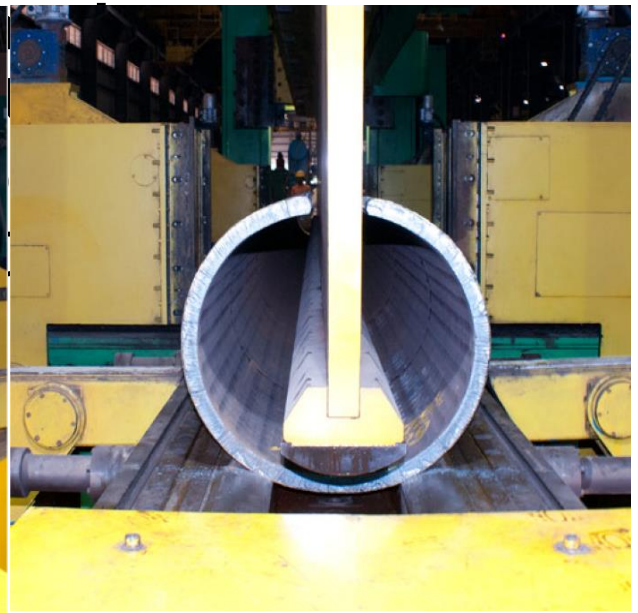
Building on Previous Experience

ISSUES	OIP	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 Pieter Schelte & AC 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.

MEIDP Pipe Manufacture

a) “J-ing” Stage

b) “C-ing” Stage



c) “O-ing” Stage

JCOE Pipe Forming at JindalSAW, India (2012)

WELSPUN Product Development For Ultra Deepwater Offshore

INTERNAL	GALSI	PETROBRAS	SOUTH STREAM	SAGE
• 48”ODx23.7 mm WT • L555M PSL2 • Strain based design	• 26”ODx37.1 mm WT • L485 IFDU • Offshore • Deep water (2880 m) • Sweet service	• 20”ODX 19.05 mm WT • L485 SFDU • Offshore • Deep water (1450 m) • Sour service	• 32”ODx39 mm WT, L485 SFDU • 33”ODx41.0 mm, L450 SFDU • Offshore • Deep water (2200 m) • Sour service	• 26”ODx37.1 mm WT *Note 1* • SAWL 485 FDU • Offshore • Deep water (3500 m) • Sweet service

Note 1: Pipe size 26” ODx37.10 mm WT was used for development in SAGE Project Ring Collapse Testing in place of pipe size of 27.2”ODx40.50 mm WT.

WELSPUN

Dare to commit.

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MEIDP Capable Pipelay Vessels

Operational

CastorONE (Saipem SpA) 2013

Operational

Aegir (HMC) 2013

Construction

Pieter Schelte (Allseas) 2014

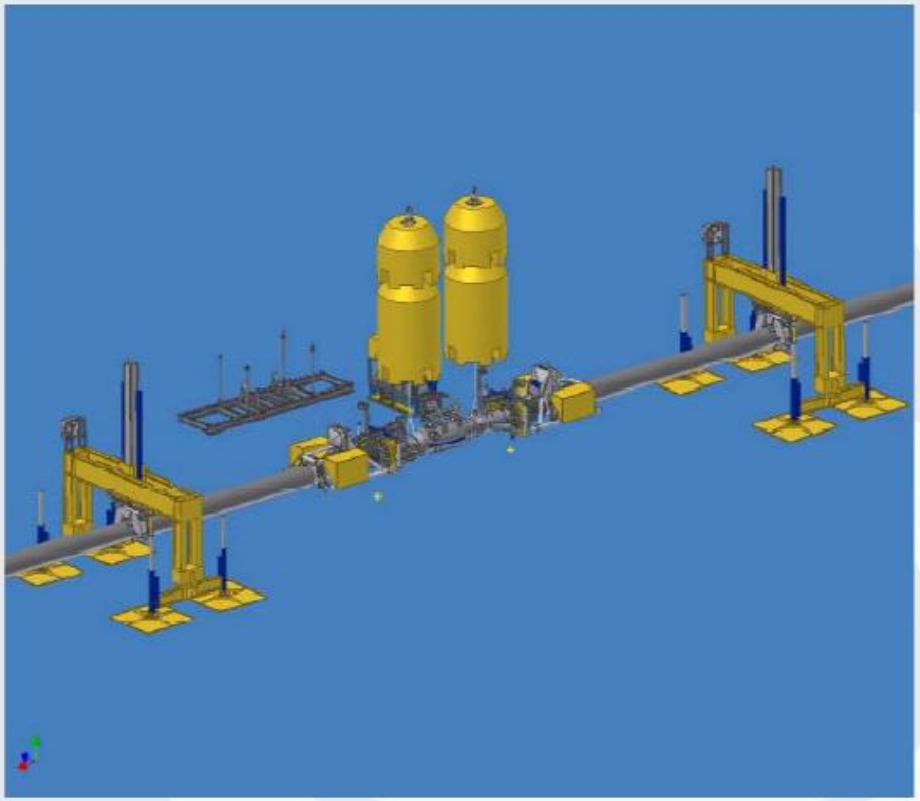
Construction

JSD6000 (Petrofac) 2017

Emergency Pipeline Repair Systems

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



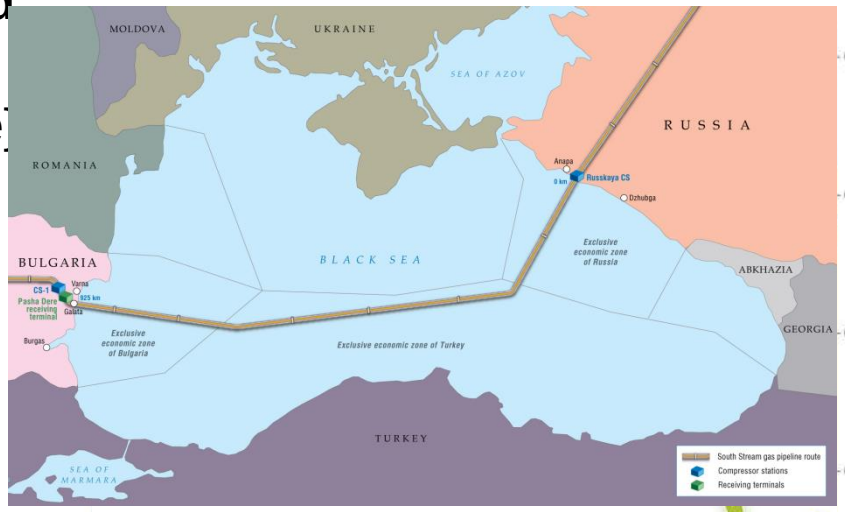
Saipem has stated that the system can be uprated to 3500m by change-out of buoyancy and control pod

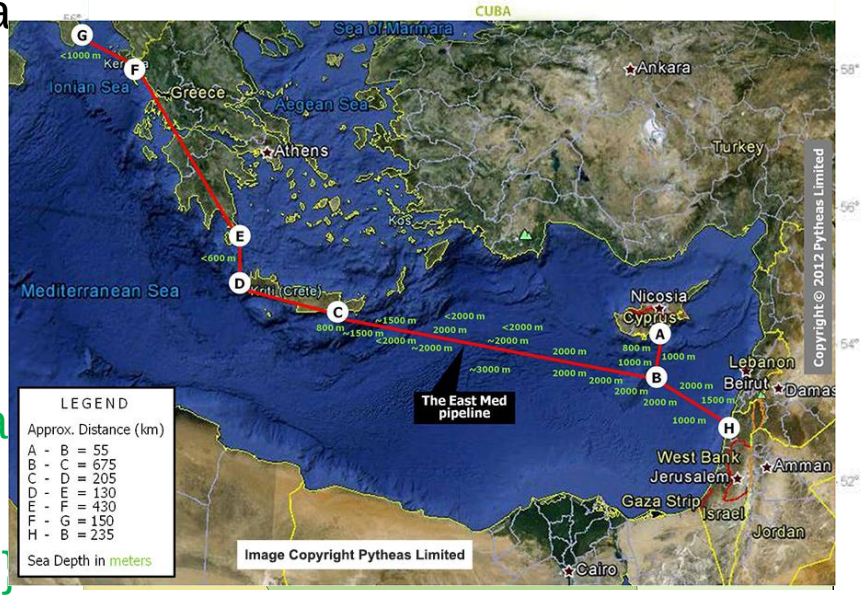
Saipem currently has its Workclass ROV's rated to 4000m WD

Current and Planned Long Distance

Long Distance Subsea Pipelines are Safe and Reliable Worldwide

- FranPipe 840km 42” {Norway → France}
- ZeePipe 1400km 42” {Norway → Belgium}
- Europipe 650km 42” {Norway → Germany}
- Langeled 1170km 42” {Norway → UK}
- Nordstream 1200km 48” 2 off {Russia → Germany}
- Gulfstream 1200km 36” {Alabama → Florida USA}
- West Africa Pipeline 569km 20” {Nigeria → Benin → Togo → Ghana}
- Malampaya 504km 24” {Philippines}
- Polarled 482km 36” {Artic Circle → Norway}
- Southstream 925km 32” {Russia → Bulgaria}
- Galsi 550 km 28” {Algeria → Italy}
- East Med Pipeline 1140km {Cypess Greece}

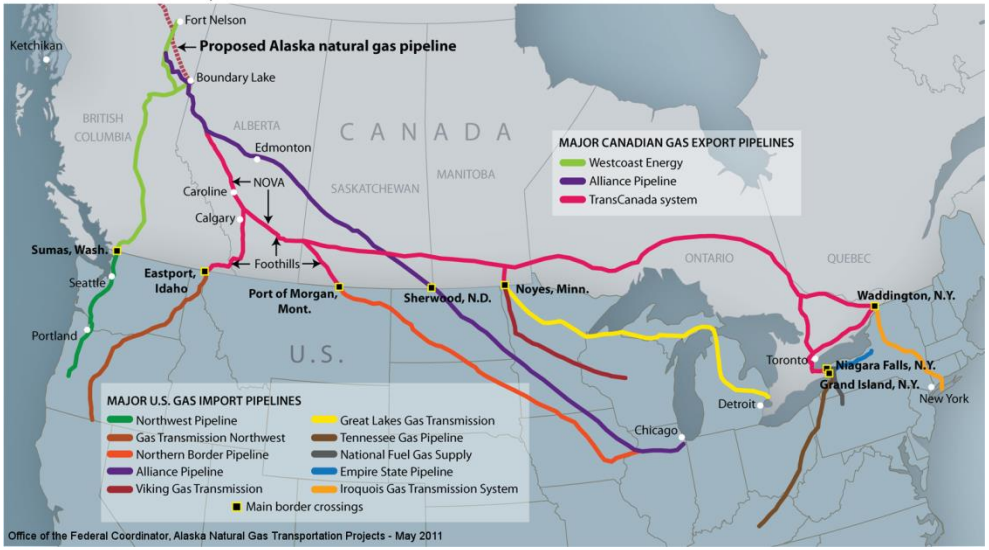




Transnational Gas Pipeline Regions

- Northern Europe
- China
- Russia to Europe
- USA to Canada
- West Africa

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



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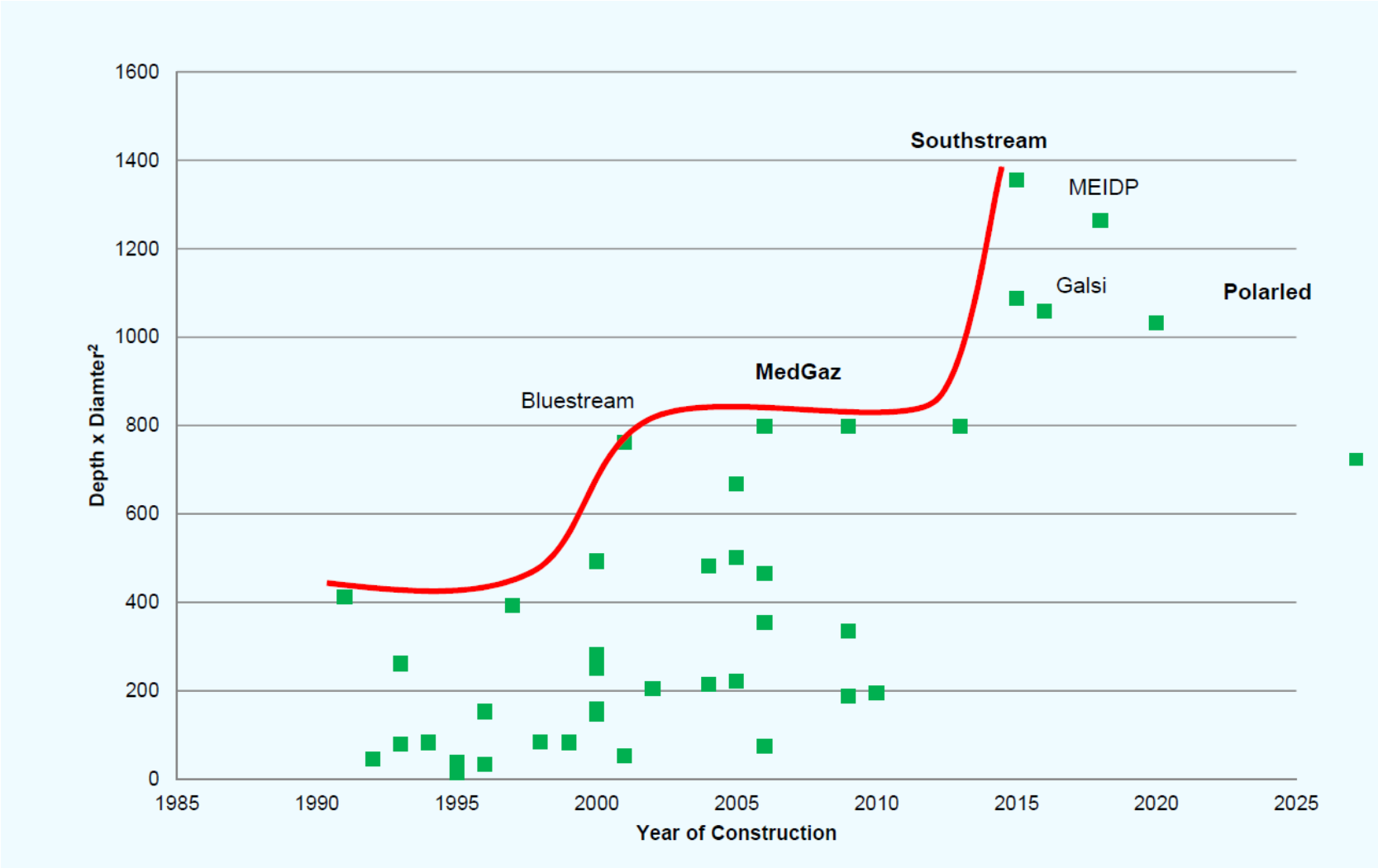
Recent & Planned Deepwater Projects

Project	Location	Year	Water depth (m)	Length (km)	Size	Product
Canyon Express	GOM	2002	2200	180	12”	Gas
Bluestream	Black Sea	2003	2150	385	24”	Gas
Mardi Gras	GOM	2006	2150		16”-30”	Gas
Medgaz	Med	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	Black Sea	2015	2200	925	32”	Gas
Galsi	Med	-	2800	565	26”	Gas
Eastern Med	Med	-	3200	1880	24”-28”	Gas

Industry Progress into Deeper Waters



Design Considerations for Ultradeepwater Pipelines

1) Pre-feasibility Study / Concept Development
- Pipeline system configuration (ND and number)
- Route selection vs. Environment and Geohazard Characterization
- Line-pipe material and wall thickness selection vs. fabrication technology and
- Installation Capability

2) Survey Campaign for Pipeline Route Corridor
- Intervention Work Minimization
- Geohazard Risk Reduction

MEIDP

3) Feasibility Study
- Route Optimisation
- Preliminary Geo-hazards Design
- Operability and Hydrate Formation
- Material Selection
- Installation
- Seabed Intervention Works

4) FEED Phase vs. overall pipeline system design and project schedule
- Route Optimisation
- Detailed Geo-hazards Study
- Seabed Intervention Works
- Pipeline Design for Operation and Installation
- Linepipe material & LLI Procurements
- System Pressure Testing Philosophy
- Maintenance & Repair etc.

5) Detailed Design pre-construction oriented
- Pipeline Configuration Optimization
- Detailed Material & Procurements
- Installation Analysis
- Seabed Intervention Works Optimisation
- Maintenance & Repair Strategy etc.

MEIDP Completed Activities

- 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 2014 work

Planned Work

- Master Project Schedule 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.

Ultra-Deepwater Challenges

The relevant technologies to design, install and operate UltraDeepwater pipelines are:

- Design Framework
- Geohazard Assessments
- Deepwater Pipelay Capabilities
- Accurate Seabed Mapping
- Freespan and Seabed Intervention
- Emergency Repair Technology
- Risk Assessment & Mitigation
- Project Organisation

Depth itself is not the most important

Geohazard Risk and Mitigation

Mitigation measures to achieve acceptable design risk

- Pipeline routing along rather than across slope failure runout routes
- Trenching pipelines in run-out deposition areas
- Do not cross faults at oblique angles
- Add wall thickness to ensure additional strength capacity
- Unburied pipelines & routing gives pipeline flexibility at faults
- Add buoyancy to lighten pipe and lessen lateral restraint
- Ensure bend pull out does not occur at top of steep slopes – add pipeline anchors where required.
- Limit pipeline spans to ensure seismic dynamics are acceptable
- Perform risk base analysis where deterministic analysis fails

Technical Highlights

- During 2011-13, SAGE/Peritus International have conducted a series of Qualification trials in Indian Pipe Mills (Welspun and Jindal Saw) which will enable both these Indian Mills to supply the required thicknesses steel pipe along with other international pipe mills
- After detailed study, DNV Norway have also confirmed that the Pipeline can be laid at such depths using recommended pipe thickness from the latest Design Codes
- Indus Fan pipeline route has moved to the south to mitigate the worst of the deep channels and slopes and is now no more significant than continental slopes and Owen fracture zone

Typical QRA for Deepwater Pipelines

MEIDP QRA Risk Contributors and % contribution

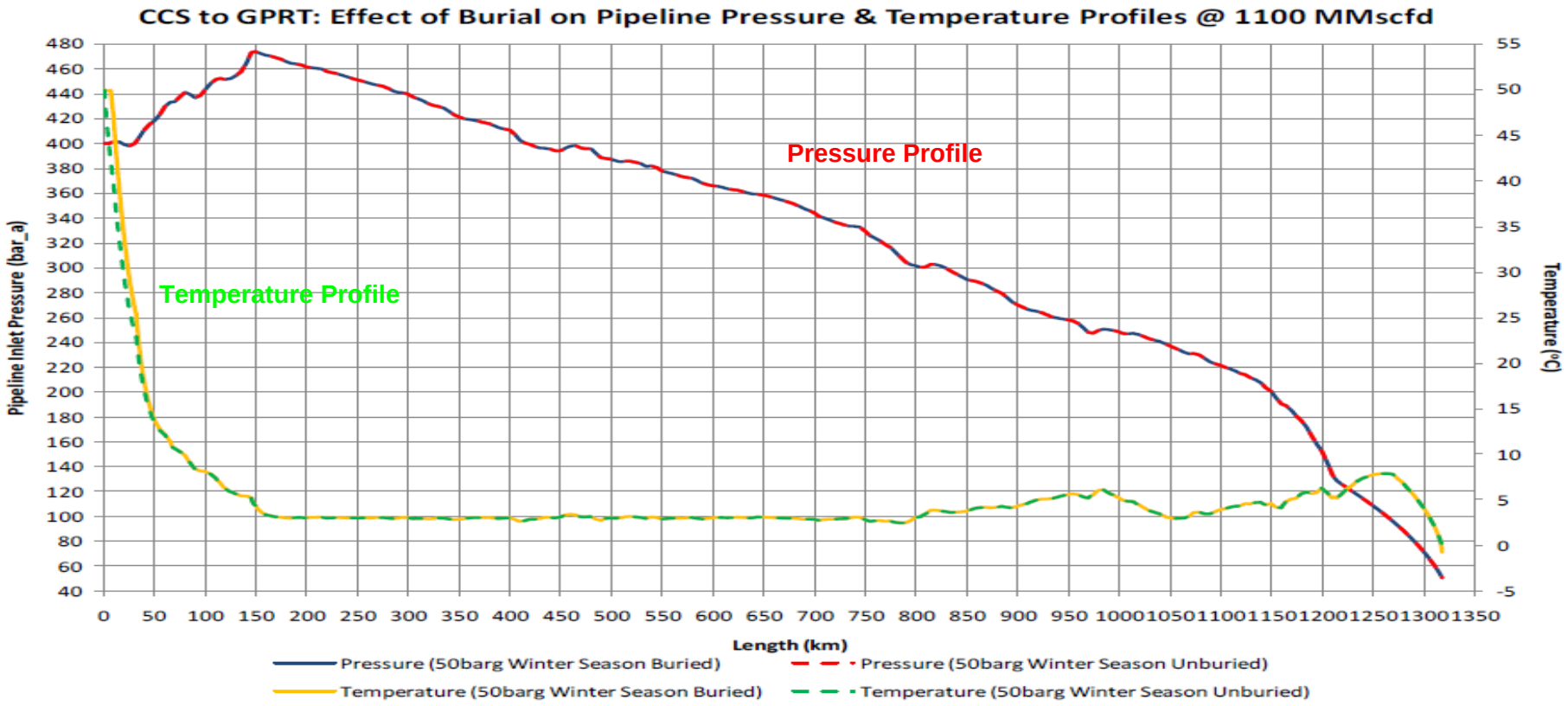
- Ship sinking (40.24%)
- Objects dropped from ships (19.91%)
- Ship grounding (14.07%)
- Material and construction defects (11.17%)
- External corrosion (10.62%)
- Anchoring (3.23%)
- Internal corrosion (0.63%)
- Trawling (0.12%)

These risks are similar to all (Shallow and Deep water pipelines)

Geohazard risks are assess based on 1in 500yr event incurring no damage to the pipeline

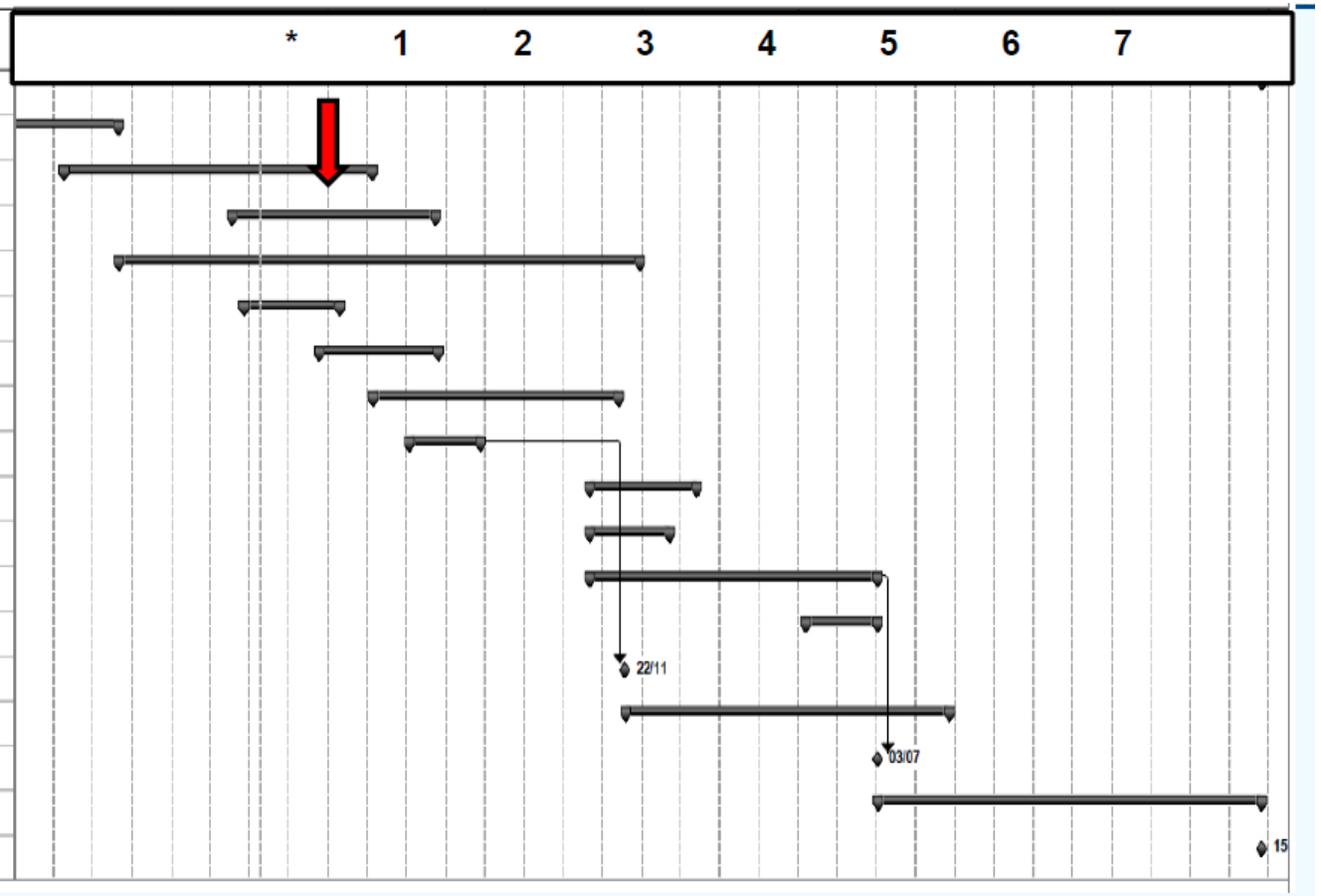
MEIDP Temperature and Pressure Profile

Seabed Profiles, Temperatures and Pressures (MECS to GPRT)



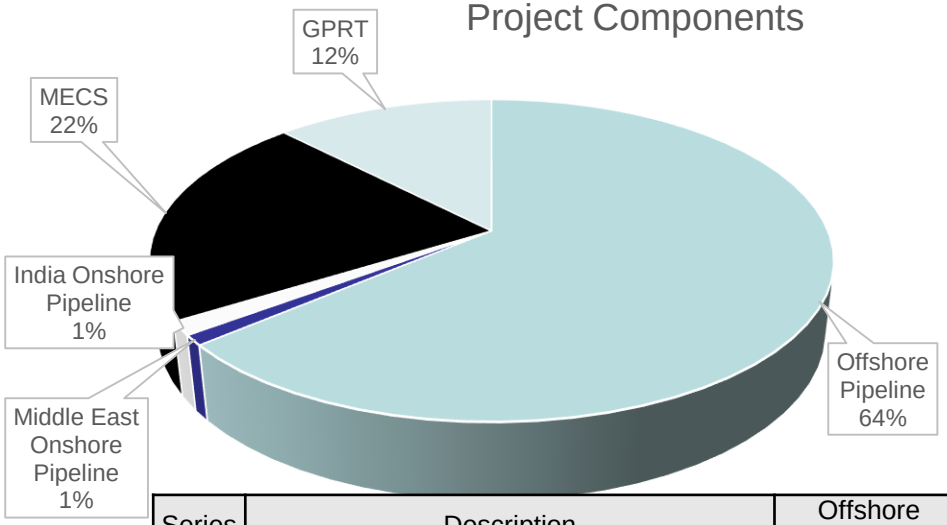
Project Development Schedule

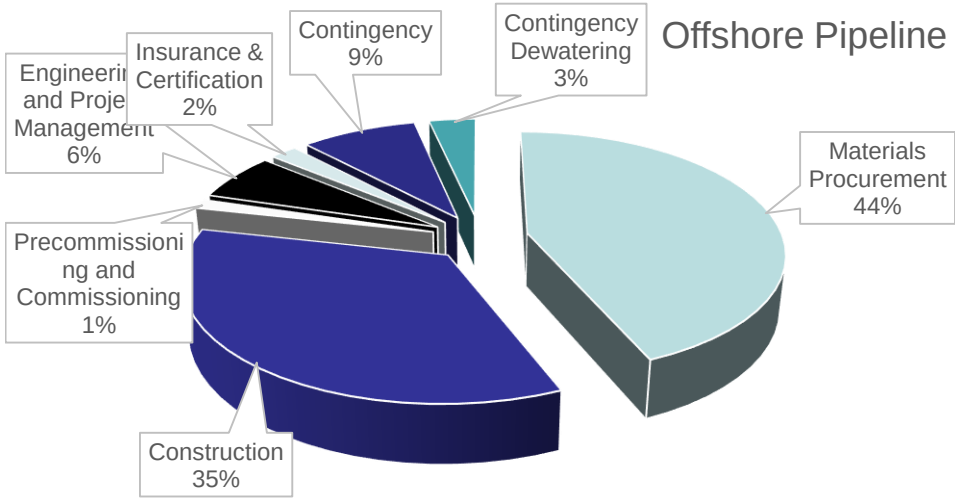
ID	Task Name
1	SAGE Project
2	Project Launch
6	Feasibility Studies
28	Prequalification Acticities
38	Financing, Third Parties and Stakeholders
41	Continue economic modelling to:
45	Surveys (Recognesance)
52	FEED
60	Prequalify Indian pipe mills for pipe manufacture,
63	Investigate and conduct equipment trials:
67	Surveys (Detail)
85	Detailed design
95	Tendering
98	Firm Investment Decision FID (Procurement)
99	Procurement
105	Firm Investment Decision FID (Construction)
106	Project Execution (Construction)
118	Start-Up First Gas



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

Project Costs ($-2011)





Series	Description	Offshore Pipeline	ME Onshore Pipeline	India Onshore Pipeline	MECS	GPRT	TOTALS
		USD	USD	USD	USD	USD	USD
100	Materials Procurement	864,818,500	6,345,570	6,546,430	204,130,000	99,980,000	1,181,820,500
200	Construction	687,441,900	9,814,100	14,773,700	196,718,000	118,198,000	1,026,945,700
300	Precommissioning and Commissioning	24,690,500	-	-	8,850,000	5,250,000	38,790,500
400	Engineering and Project Management	124,731,900	7,770,000	10,730,600	49,951,500	40,041,500	233,225,500
500	Insurance & Certification (2.5%)	39,423,800	242,400	319,900	10,242,500	5,585,700	55,814,300
600	Contingency	170,168,300	7,179,000	9,615,300	197,649,400	113,292,000	497,904,000
	Contingency Dewatering	68,252,000	-	-	-	-	68,252,000
	TOTAL	1,979,526,900	31,351,070	41,985,930	667,541,400	382,347,200	3,102,752,500

Economic Pipeline Metrics

Project	Length (KM)	Capacity (BCM)	No. -	Diameter (inch)	Depth (Meter)	Cost (m' US$)	Unit Cost (US$/Inch/m)	Unit Cost (US$ m'/km)
Medgaz	210	8	1	24	2165	806	160	3.8
South Stream	925	63	4	32	2200	12800	108	3.5
Nord Stream	1222	55	2	48	210	11264	96	4.6
ITGI	217	10	1	32	1800	640	92	2.9
Blue Stream	396	16	2	24	2200	1700	89	2.2
Europipe 1	670	18	1	40	70	3400	140	5.1
Europipe 2	642	24	1	42	354	1690	6.3	2.6
Franpipe	840	19	1	42	70	1866	53	2.2
Langeled	1166	24.5	1	44	385	2720	53	2.3
MEIDP	**1300**	**11**	**1**	**27**	**3500**	**4000**	**113**	**3.1**

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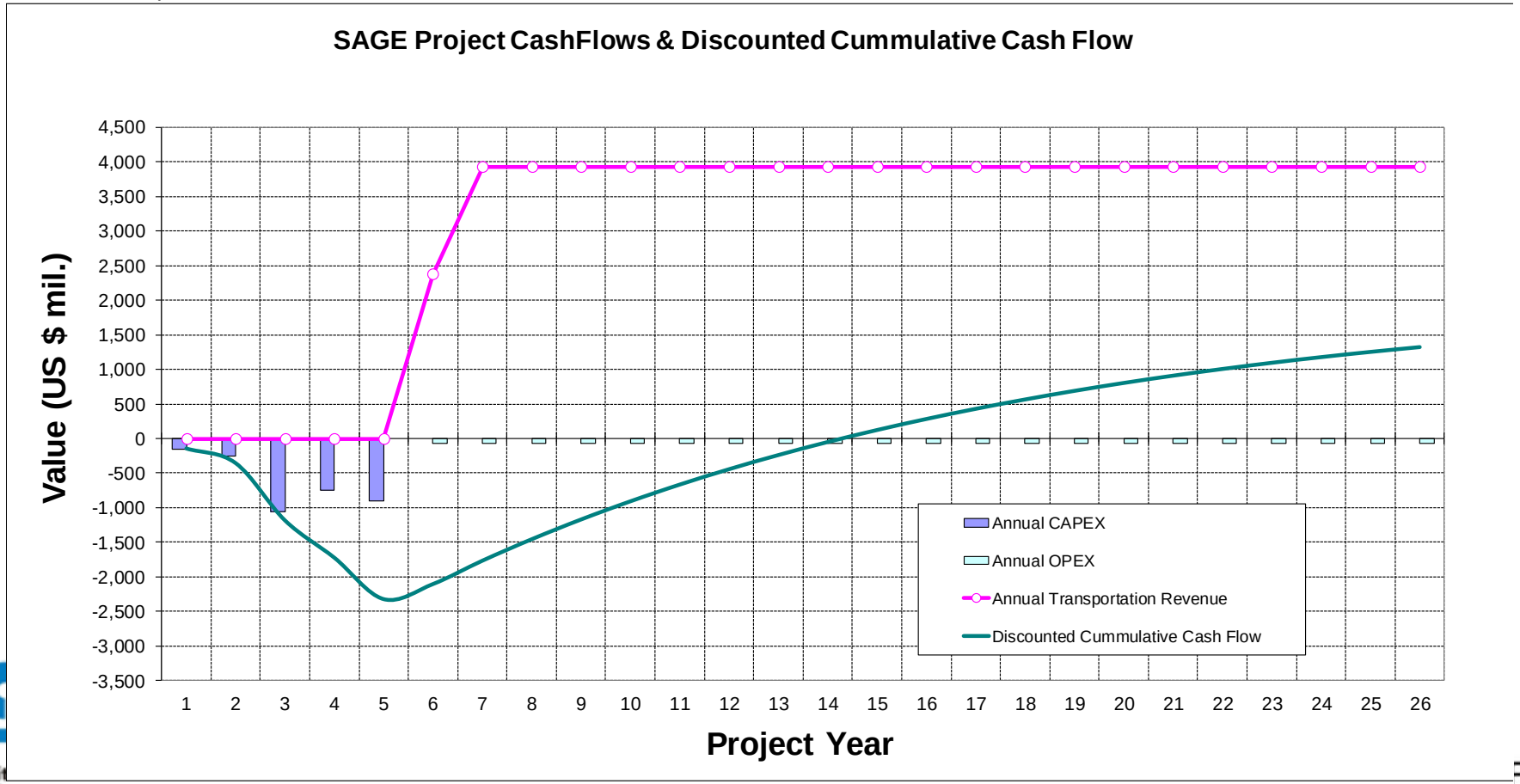
Project Financial Model

Pipeline Design Factors:		Gas Factors		Economic Parameters	
Pipe OD (in.)	28	Gas Sales Price (US$/MMBTU)	8.85	Cost of Equity	10.0%
No. of Pipelines	1	Gas Purchase Price ($US/MMBTU)	7.00	Cost of Debt	8.0%
Wall Thick (mm)	40.5	Max Gas Transfer (MMMMBTU/yr)	444.5	D/E Ratio	2
Steel Cost ($/mT)	$1,800	Caloric Content (BTU/SCF)	1107	WACC	8.7%
Lay Speed (km/day)	2.00	Max Flow Rate (BSCFD/line)	1.100		
Day Rate ($/day)	$1,000,000	Max Allowed Flow Rate (BSCFD/line)	1.108		
Offshore Compression	No				



Financial Highlights

- Project Cost: USD $3.5-4 Billion from Omani or Iranian coast to Indian Gujarat West Coast
- Ernst & Young, London and Crisil, Mumbai have reviews/ recommended various feasible financing options
  - Cost of equity in the range 2% to 10%.
  - Debt at 5%
  - Debt to Equity Ratio 4:1
  - Project Internal Rate of Return (IRR) of 12-15%
- A SAGE cost estimate gives a gas transport tariff in 2011 prices between $1.6/MMBTU - $2.0/MMBTU

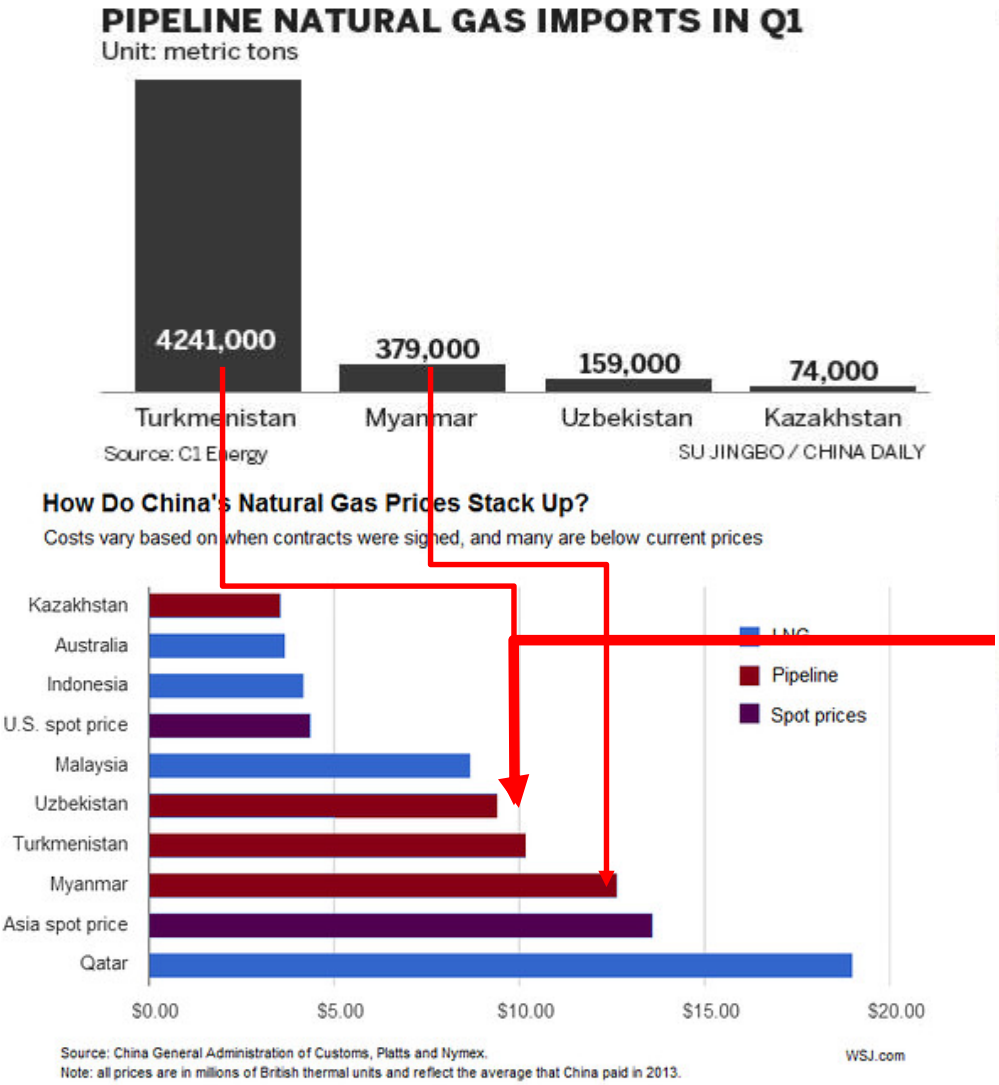
Indicative Overall Economics Today

IPI Agree Gas price was $4.93/mmbtu at Pakistan Boarder!!
Russia – China Gas Agreement was ~$9.9/mmbtu at China Boarder

	Costs $/mmBtu			
	Pipeline from Iran Direct	Pipeline Via Oman	LNG from Iran	LNG from Asia
Assumed price of dry gas at port	7	7	7	8
Liquefaction Cost			3	3
Transit Fee 3rd Part Country		0.5		
Transportation cost	2	2	0.5	1
Re-Gasification			1	1
Total costs gas landed in India West Coast	9	9.5	11.5	13

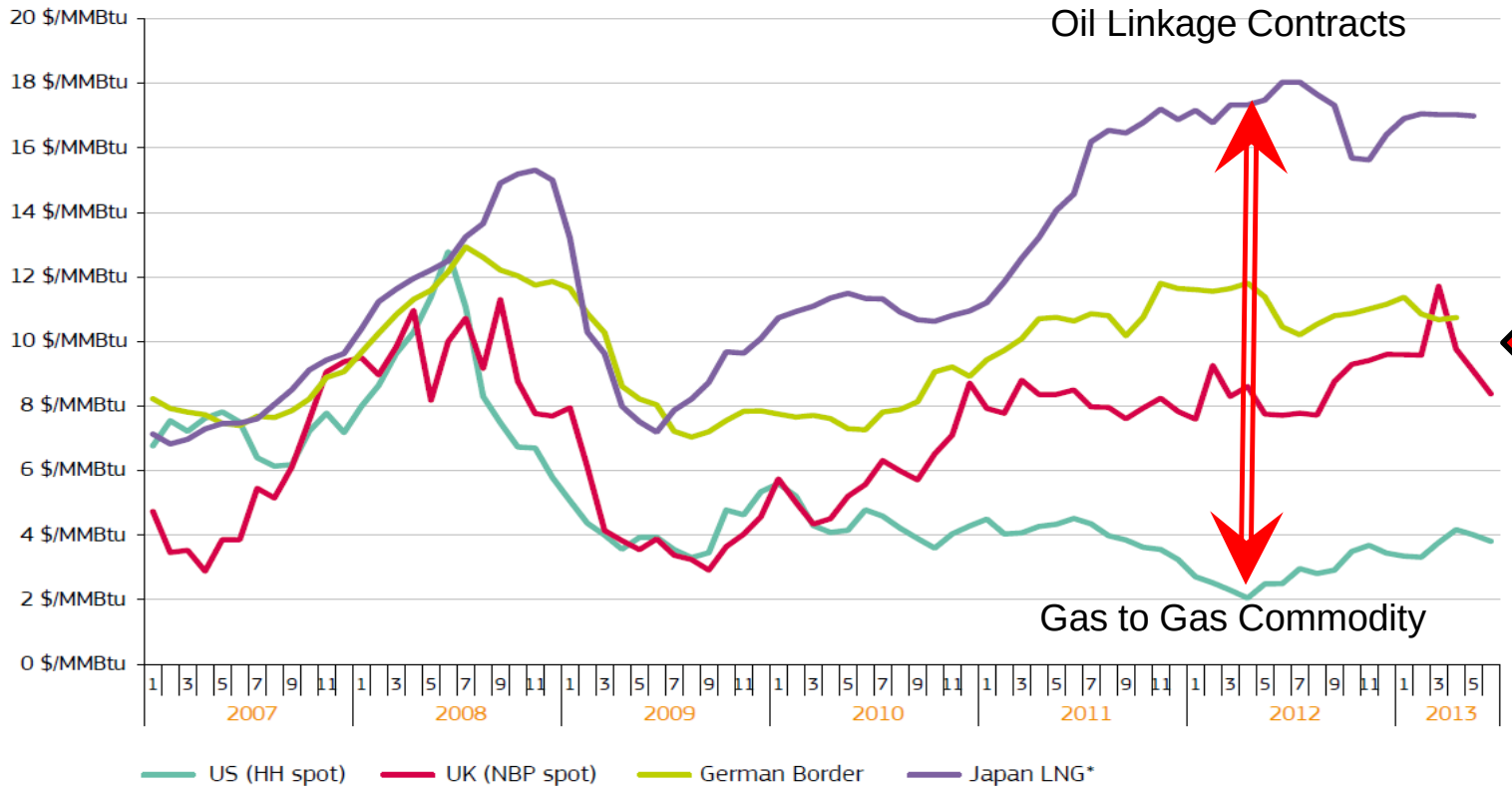
CONCLUSION: MEIDP will save at least $2/MMBTU in transportation costs over LNG and possibly more.

Recent Russia – China Gas Pipeline Agreement



Duration: 30-year
Start Date 2018
100mmscmd
Value $400bn
Investment $55bn/$20bn

Regional Gas Price Behaviour Since 2007



Landed Regional Prices in March 2013

- U.S. Prices at Henry Hub - $4.0
- U.K. Prices at the NBP - $9.9
- German Imports at Waidhaus - $10.6
- LNG US GOM (as Liquid) - $3.01
- LNG UK (as Liquid) - $9.94
- LNG Japan(as Liquid) - $19.75

European Commission
Quarterly report on Gas Markets
June 2013

Worldwide Landed LNG Prices

Natural Gas Overview: World LNG Prices

Federal Energy Regulatory Commission • Market Oversight • www.ferc.gov/oversight

World LNG Estimated March 2013 Landed Prices

Source: *Waterborne Energy, Inc.* Data in $US/MMBtu

February 2013

Updated: February 7, 2013

SBI Capital Markets Limited

इंजीनियर्स इंडिया लिमिटेड ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

LNG Delivery Costs to Asia

Table 8. Selected LNG liquefaction projects existing and under construction

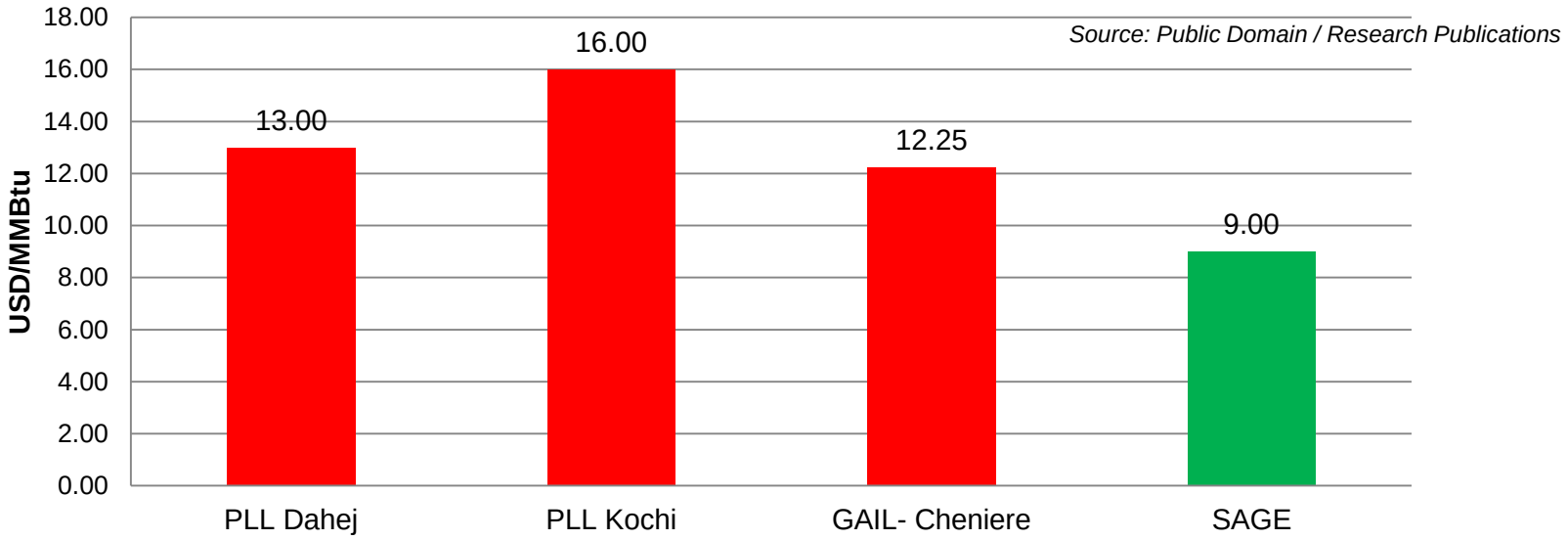
Project	Country	Capacity (million metric tons per year)	Delivered cost to Asia (dollars per million Btu)	Scheduled start date
Sakhalin 2	Russia	9.6	8.70	2009
Pluto	Australia	4.8	13.50	2012
Angola LNG	Angola	5.2	9.90	2013
PNG LNG	Papua New Guinea	6.9	10.50	2014
Queensland Curtis	Australia	8.5	10.80	2014
Australia Pacific LNG	Australia	9.0	11.20	2015
Gladstone LNG	Australia	7.2	11.40	2015
Gorgon	Australia	15.6	12.30	2015
Sabine	United States	18.0	9.90[a] 14.40[b]	2015
Ichthys	Australia	8.4	10.20	2016
Wheatstone	Australia	8.9	12.20	2016
Prelude	Australia	3.6	10.40	2017

[a]$4 Henry Hub price.
[b]$8 Henry Hub price.
Note: 1 million metric tons of LNG is equivalent to approximately 48 billion cubic feet of natural gas.

- It is reasonable to assume that LNG price landed in India including regasification will be ≈$13/mmBtu
- Note US Shale Gas does not significantly effect this price
- HH Price in Feb 2014 = $5.97/mmbtu

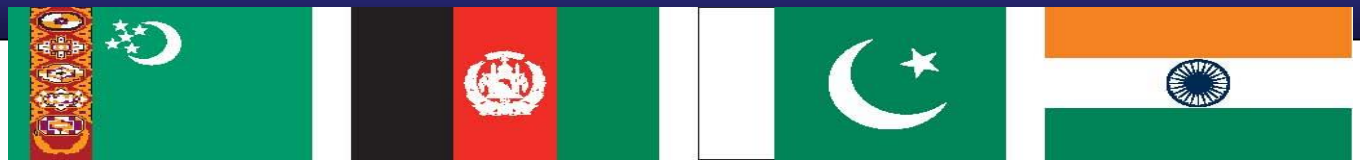
Comparison of Landed Cost of LNG to India

- The Landed Cost of Gas through SAGE Pipeline works out to 9 USD/ MMBtu
- Landed Cost of LNG as per existing Contracts for Gorgon Australia, Ras Gas, Cheniere-US is higher, as shown below



The Landed Cost of Gas transported through the proposed Pipeline is COMPETITIVE as compared to other existing contracts

OTHER SIMILAR PROJECTS IN REGION - TAPI



- Turkmenistan-Afghanistan-Pakistan-India Natural Gas Pipeline Project
- Project aims to export up to 33 billion cubic meters (bcm) of natural gas per year
- Proposed length ~ 1,800 km with Project cost estimated ~ $7.6 billion (as in 2008)
- Present Status –
  - ✓ Gas Pipeline Framework Agreement (GPFA) – Signed (Dec 2010)
  - ✓ Inter-Government Agreement (IGA) – Signed (Dec 2010)
  - ✓ Heads of Agreement (HoA) forming basis for commercial agreements – Signed (Sep 2010)
  - ✓ Gas Sales and Purchase Agreement (GSPA) – Signed: PAK/TKM and IND/TKM (23 May 2012), AFG/TKM is pending
- Expected landed price of natural gas on Indian border is approx. $13.91 per mmBtu *

*(*Calculated as 55% of Brent Crude @ 110 $/barrel, taking 5.992 as BOE and loading $3.82 as fixed transit tariff)*

Pipeline	Year	Description	Length (km)	Diameter (inch)	Capex USD Mn	Capex USD Mn per inch km
TAPI	Exp. 2017	Turkmenistan to India	1736	56	7600	0.08

Source: Public Domain/ Research Publications

OTHER SIMILAR PROJECTS IN REGION - IPI

- Iran-Pakistan-India Natural Gas Pipeline Project
- Project was envisaged for export up to 55 billion cubic meters (bcm) of natural gas per year
- Length ~ 2,775 km with Project cost estimated ~ $7.5 billion (as in 2005)
- Present Status –
  - ✓ India decided to back-pedal on the project as it saw various stumbling blocks and because of geopolitical reasons
  - ✓ Pakistan has also kept the project as off the table citing international sanctions are the serious issue
  - ✓ Iran plans to abandon the project as per April 2014 news article
- Expected landed price of natural gas on Indian border is approx. $12.2 per mmBtu *

*(*Calculated as 10% of Brent Crude @ 110 $/barrel, without indexation and loading $1.2 as fixed transit tariff)*

Pipeline	Year	Description	Length (km)	Diameter (inch)	Capex USD Mn	Capex USD Mn per inch km
IPI	Was Exp. 2014	Iran to India	2775	56	7500	0.05

Source: Public Domain/ Research Publications

Regional Demand for Gas

- Regional demand for gas will drive up LNG prices
- India will become increasingly unimportant to the LNG Market

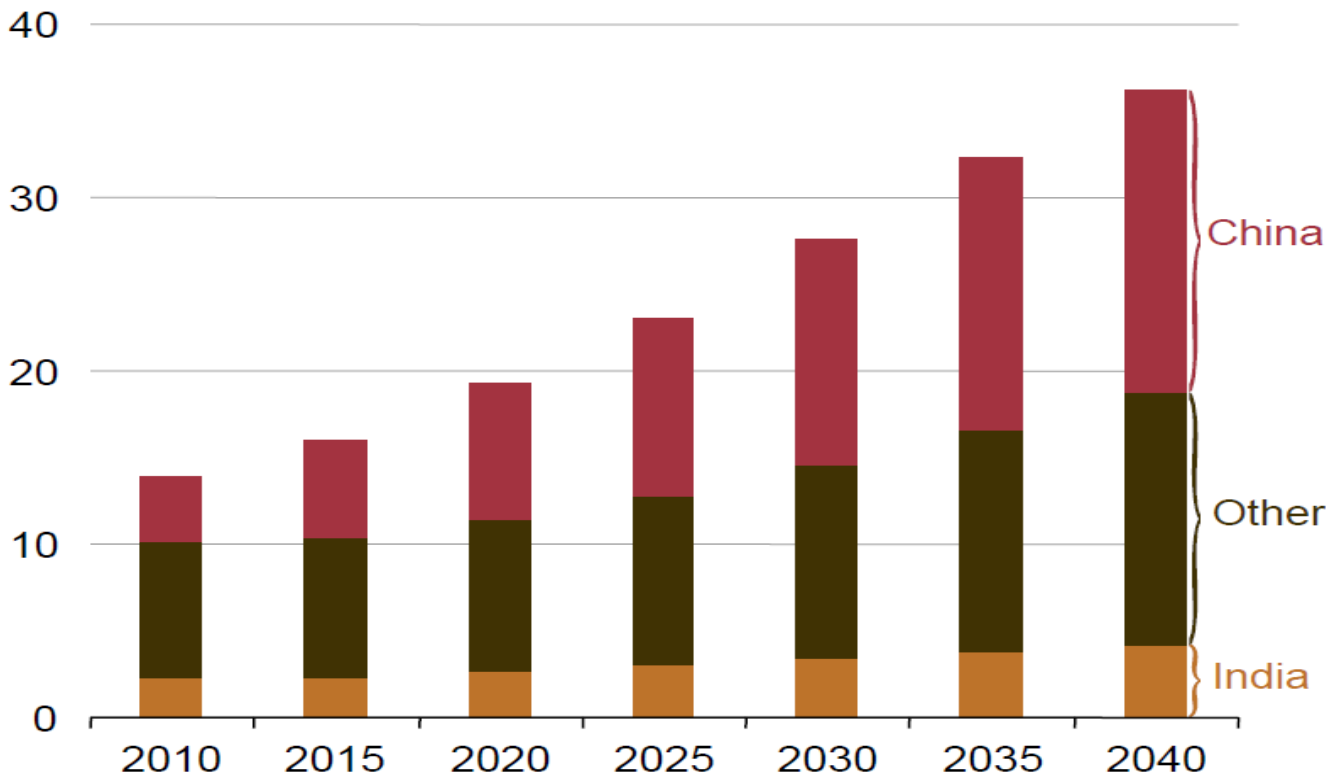


Figure 48. Non-OECD Asia natural gas consumption by country, 2010-2040 (trillion cubic feet)

Funding Options for Proposed Pipeline

- Long Gestation Period => Long Term Funding requirement (at least 15 years)
- Multiple Sources of Funding required for Optimal Mixture of Project Financing
- Various Funding options include:
  - Multilateral Agencies viz. ADB, IFC, World Bank etc.
    - Though availability is low, however, directly lend to the project
    - Typical period: 10- 15 years with LIBOR linked Interest Rates
  - Export Credit Agencies (ECA): US EXIM, JBIC, Ex Dev Canada, etc.
    - Low availability but competitive pricing lower than Commercial Banks
    - Typical period: 10- 15 years
  - External Commercial Borrowing: Foreign Banks or Foreign branches of Indian Banks
    - Typical Tenor 7-10 years with LIBOR linked Interest Rate
    - IIFCL
  - Rupee Term Loan from Indian Banks
    - High availability with period of around 15 years
    - Linked to Base Rate of the Bank
    - RBI could be approached to allow 25-30 year financing through rollover option after 10-12 years

Risk & Insurance

- Significant Risks include;
  - Political Risk – dispute among transit or producer countries may affect the Project at any stage of implementation/operation
  - Disruption Risk – any damage to the pipeline system that restricts or stops gas flow can have severe consequences.
- Mitigation;
  - Route under finalization for the proposed pipeline will have minimal political risk;
  - Deepwater Repair systems (SIRCOS, Chevron PRS, Statoil PRS) are in place and have been tested to 3100m (Further Qualification is required)
  - Long lead items and implementation for PRS need to be in place in advance and maintained over project life
- Political Risk Insurers (PRIs) are there to provide adequate Insurance Cover, like
  - World Bank agencies (MIGA- Multilateral Investment Guarantee Agency)
  - Berne Union (International Union of Credit and Investment Insurers)- having 49 Insurance Companies including ECGC of Govt of India
- Insurance cost will be significant (~1-2% of Total Cost) for project of this nature.
- Political, Marine, Liability & Property damage insurances can be obtained subject to removal of Sanctions on Iran.

Draft of Framework Agreement – Salient Points

- Post discussions with various agencies a Draft Framework Agreement has been finalised
- 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/Coast
- SAGE as a Transporter will implement the Project and provide transportation of ~30 mmscmd of Iranian Gas to India through Oman Sea & Arabian Sea for 25 years (Pipeline designed for 50year life)
- The Framework Agreement would provide a head- start to the Project in view of the probable uplifting of the Sanctions on Iran
- 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 Technical summary

- MEIDP are no longer a giant leap forward, but rather **the logical next step**
- The development of deepwater **pipelay vessels capable of installing MEIDP** due by 2014
- Studies performed in 2009-2013 **prove feasibility of the MEIDP project**
- Fabrication technologies exist within **current mill capacities** for MEIDP size/wall
- Based on 2013 Reconnaissance Survey. Pipeline routes established to **avoid the worst features of the Indus Fan**, minimising project technical risks

MEIDP Conclusions

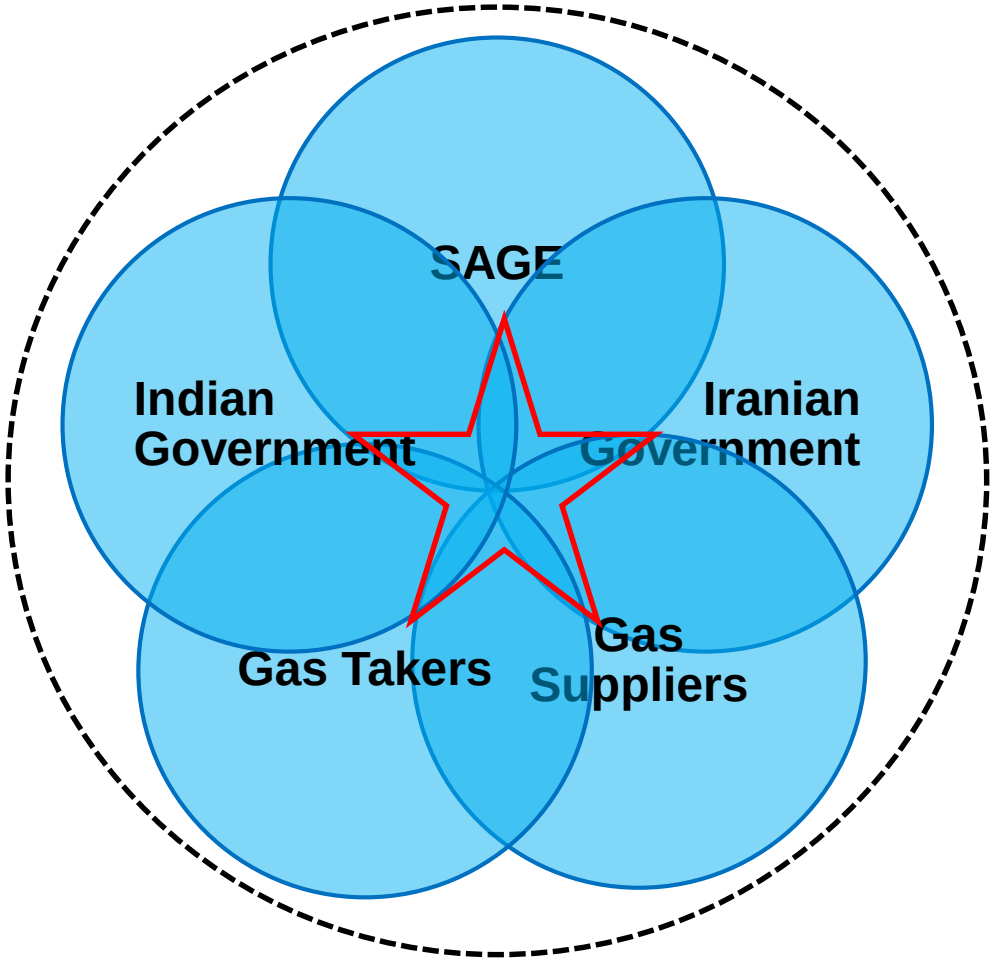
- Indian gas demand and supply balance **shortfall** continues to increase from 100mmscmd in 2014 to 270 mmscmd in 2030 as per PNGRB vision 2030 study.
- Iran is willing to provide 31 mmscmd gas Gas. Available as planned for this pipeline. Iran is also willing to consider to provide Gas for a 2nd SAGE Pipeline.
- Project will add to energy **security by diversification** (do not put everything in the LNG basket).
- Provides an **economically competitive** method of gas supply significantly less that the cost of LNG .
- The **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 which utilise the Gas (eg., Power / Fertilizer Plants).

Action Plan

- Activities to be completed
  - Intervention assessments based on 2013 Survey Data
  - Updated Feasibility Study and Cost Estimate
  - Preparation for Onshore and Offshore FEED's
  - Metocean Survey Data Gathering
- Way Forward
  - Framework Agreement to be signed to get first mover advantage in view of probable upliftment of the sanctions
  - FEED and detailed Geo-Physical survey is to be completed
  - Other interrelated agreements like GSPA, GTA to be executed so as to finalize financing arrangement for the Project
  - Indian gas buyers need to work closely with SAGE
- MoPNG Support
  - GOI should take the project "On record" and provide political & diplomatic support and sign MOU with Supplier Countries
  - MEIDP project be treated as an infrastructure project for funding
  - Intergovernmental Agreements required between India and Iran
  - MoPNG to support the project and establish a consortium of agencies like GAIL, IOCL to support this Private Sector Project.

MEIDP Stakeholders

All interest parties must be stakeholders for Large Infrastructure Projects



The SAGE Project – Key team members

Mr. T.N.R. Rao	▪ 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	▪ 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	▪ Director: South Asia Gas Enterprise PVT Ltd ▪ Director: VerdErg Ltd, London ▪ Former Project Director of original Oman-India Pipeline
Dr Herman Franssen	▪ 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	▪ Senior Vice President, Saipem Energy Services, Milan. ▪ Sealine and Subsea Manager, Saipem Energy Services, Milan.
Ian Nash	▪ 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	▪ 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)	▪ Leading Onshore Pipeline and Facilities Engineering

Thank You

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