AFRICA AS LNG SOURCING POINT : INFRASTRUCTURAL, LOGISTICS AND CONTRACTUAL ISSUES

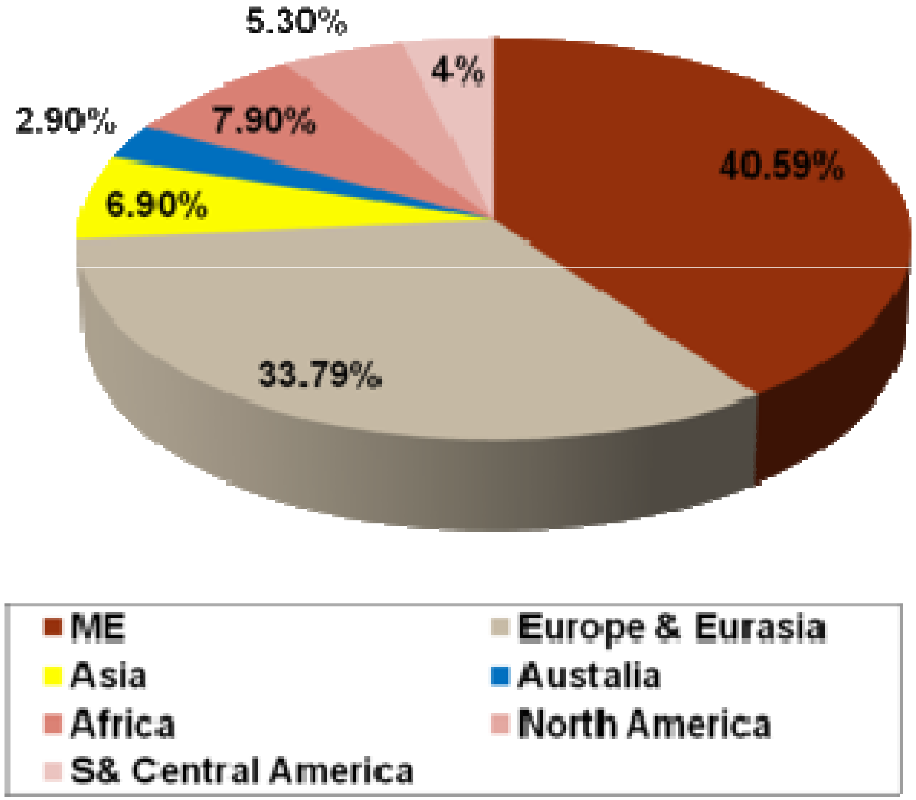
3rd India – Africa Hydrocarbons Conference, New Delhi

PETRONET LNG LIMITED

OVERVIEW

- Global Gas Scenario
- Africa - An emerging Gas Producers/ Seller
- India - An emerging Gas Buyer
- Petronet LNG Limited
- India & Africa Joint Efforts

WORLD – NATURAL GAS PROVEN RESERVES



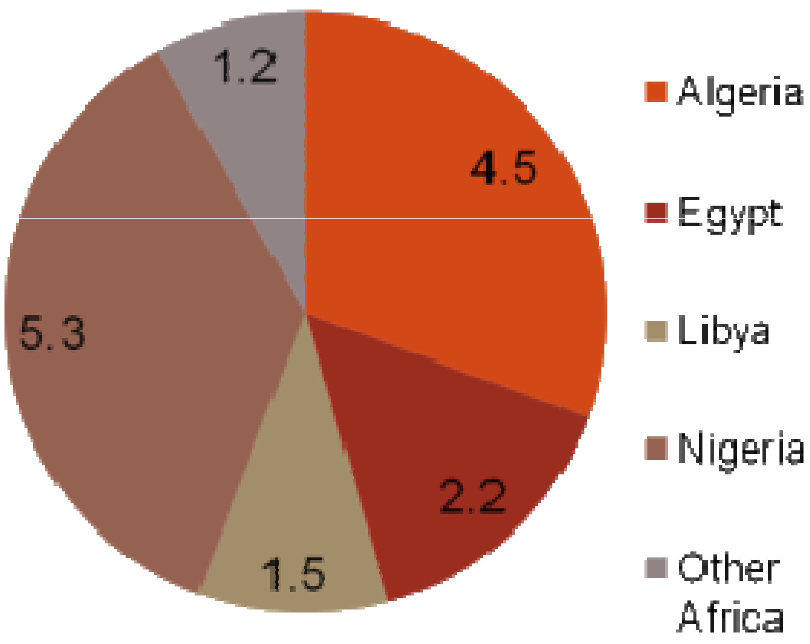
Source : BP Statistical Review June 2011

GLOBAL PROVEN GAS RESERVES (TCM)		
North America	9.9	5.30%
South & Central America	7.4	3.96%
Europe & Eurasia	63.1	33.79%
Middle East	75.8	40.59%
Africa	14.7	7.87%
Australia	2.9	1.55%
Asia Pacific	12.9	6.90%
Total	**186.7**	**100%**

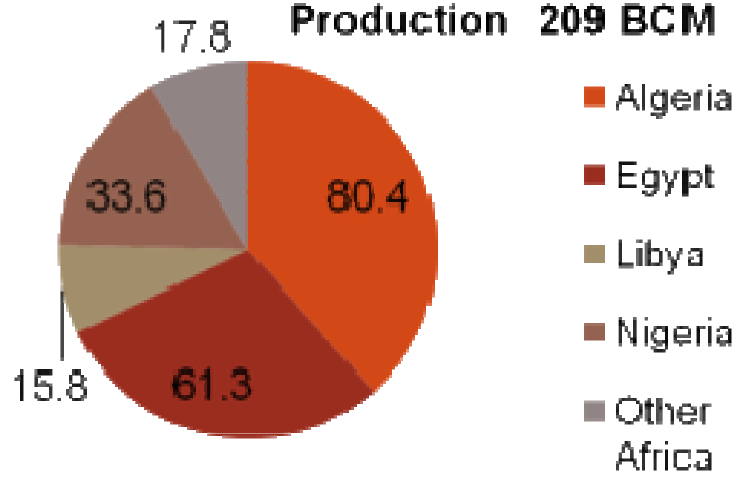
AFRICA - AN EMERGING LNG/GAS PRODUCER

NATURAL GAS SCENARIO – AFRICA

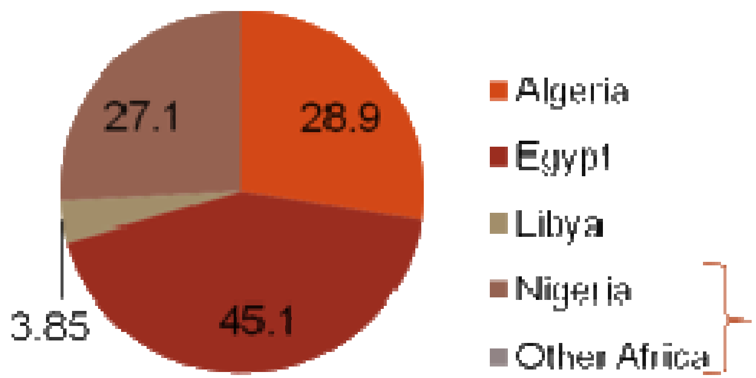
Proven Reserves – 14.7 (TCM)



Production 209 BCM



Consumption – 105.1 BCM



Source : BP Statistical Review June 2011

AFRICA LIQUEFACTION CAPACITY (MMTPA)

Status	2012	2015	2020	2025
Operational	60.7	62.3	59.3	59.3
Under Construction	3.9	9.9	9.9	9.9
Possible	-	-	14.4	22.8
Speculative	-	-	16.8	56.8
Total	**64.6**	**72.2**	**100.4**	**148.8**

Source : Woodmacresearch

OPPORTUNITIES & POTENTIAL

- Existing established reserves with production in countries like Algeria, Egypt and Nigeria with LNG liquefaction capacity
- As per various studies, huge unexplored Reserves with high potential
- New LNG projects like Angola LNG, EG expansion expected to come on-stream
- Significant leads for gas in countries like Gabon, Mozambique, Tanzania, offshore Angola –potential to change LNG map of world
- Potential for Africa to access global markets through LNG route
- Rich gas with relative lower production costs as compared to new finds in Australia

GAS ISSUES IN AFRICA

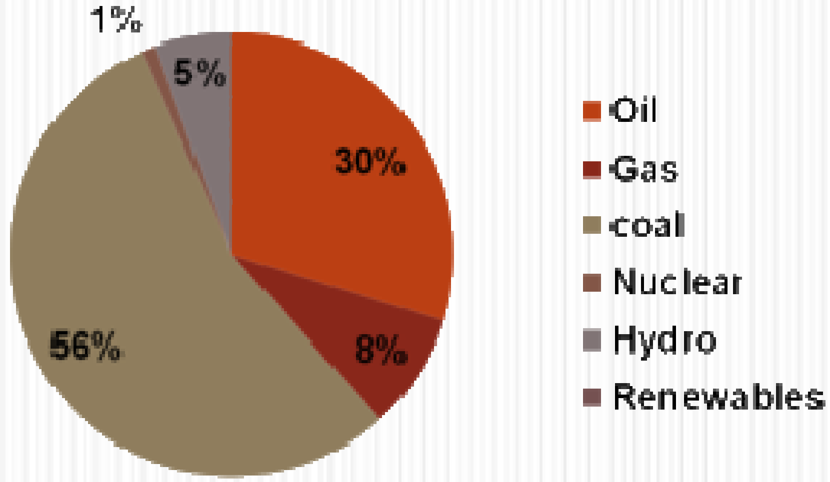
- Infrastructure
  - Lack of pipeline connectivity
  - Domestic Market Development yet to take place resulting in lower internal consumption
  - Access to Technology in areas of E&P, Clean Gas Processing, Liquefaction
  - Capital and Manpower
- Logistic
  - Absence of large transnational pipelines
  - Export to US – non remunerative
  - Availability of LNG vessels in current market
- Contractual
  - Existing contractual arrangement leaning in favour of oil majors
  - Lack of clarity on marketing rights and policy framework
- Other issues like Geo-political, environmental concerns, decision making, political sustainability etc.

INDIA - AN EMERGING LNG/GAS BUYER

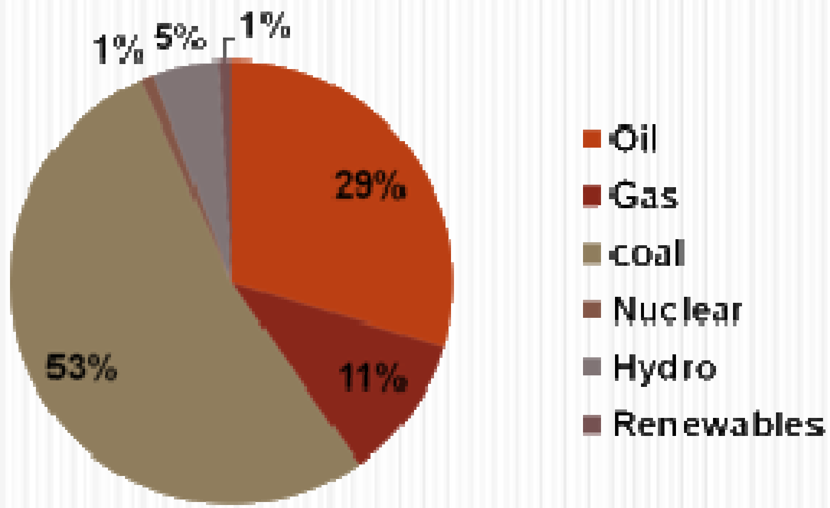
PRIMARY ENERGY CONSUMPTION (MTOE) - INDIA

Fuel	2005	%	2010	%
Oil	116	30	156	29
Gas	33	8	56	11
Coal	213	56	278	53
Nuclear	4	1	5	1
Hydro	22	5	25	5
Renewables	-	-	5	1
Total	**387**	**100**	**524**	**100**

Year 2005



Year 2010

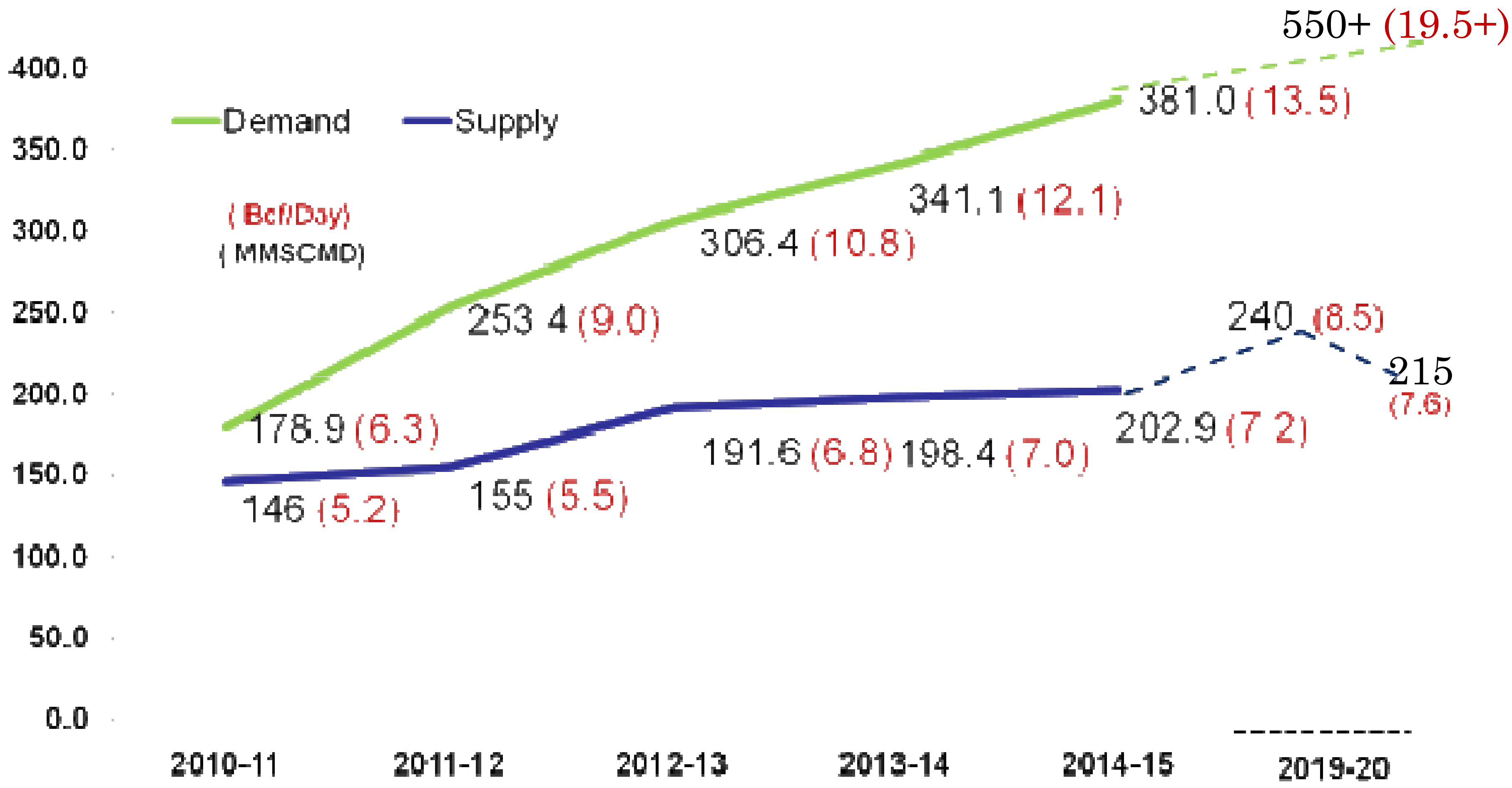


Source : BP Statistical Review

INDIA – A MAJOR GAS/LNG CONSUMER

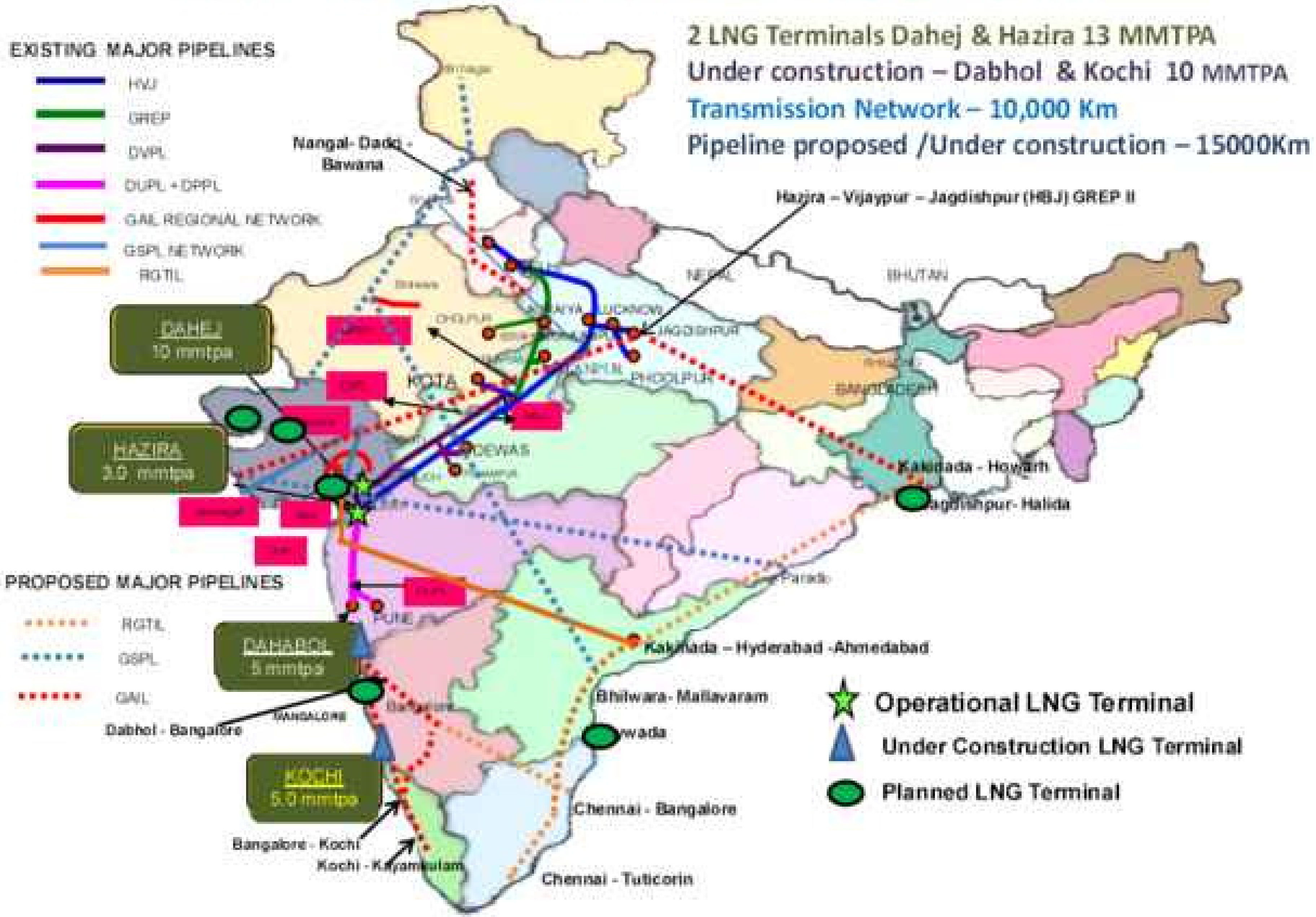
- 13th largest gas consumer – 70 BCM (~190 MMSCMD)
- 6th largest LNG importer – 16 BCM (~44 MMSCMD)
- Economy increasing at CAGR of 7-8% p.a. with similar increase in Energy Consumption
- Share of Natural Gas in Indian Energy basket to increase from 11% to 20% by 2025
- Despite increase in domestic gas production- dependency on imported gas to increase substantially
- Pipeline network- developing into a national grid- needs to grow faster, connecting new markets

INDIA CURRENT GAS DEMAND & DOMESTIC SUPPLY SCENARIO



Demand – Mercados Analysis
Supply – Directorate General of Hydrocarbons (DGH)

INDIA'S GAS INFRASTRUCTURE



LNG IN INDIA- REGAS CAPACITY

LNG terminals in India -Likely Regas Capacity addition					
	Location	*Capacity MMTPA*			*Owned by*
		2011-12	*2015-16*	*2019-20*	
A	*Existing*				
	Dahej	10.00	15.00	17.50	Petronet LNG
	Hazira	3.50	5.00	5.00	Shell & Total
	TOTAL	**13.50**	**20.00**	**22.50**	
B	*Under Construction*				
	Kochi	-	5.00	7.50	Petronet LNG
	Dabhol (revival)	-	5.00	5.00	RGPPL (GAIL & NTPC)
	TOTAL	**-**	**10.00**	**12.50**	
C	*Proposed*				
	East Coast	-	5.00	5.00	Petronet LNG
	Mundra	-	5.00	5.00	Adani along with GSPC
	Ennore	-	5.00	5.00	IOCL
	TOTAL	**-**	**15.00**	**15.00**	
D	*Possible*				
	West Coast	-	-	2.50	Hiranandani
	Jamnagar/Kakinada	-	-	5.00	RIL- BP JV
	Pipavav (FSRU)	-	2.50	5.00	Swan Energy
	TOTAL	**-**	**2.50**	**12.50**	
	GRAND TOTAL	**13.50**	**47.50**	**62.50**	

PETRONET LNG LIMITED

Dahej Terminal

- Current capacity 10.0 MMTPA
- Further capacity expansion to 15 MMTPA by 2015/2016
- 7.5 MMTPA long term LNG Supply contract with Qatar and balance through spot/short term contracts
- Connected with major gas pipeline network such of GAIL and GSPC

Kochi Terminal

- Constructing LNG Terminal in Kochi of 5.0 MMTPA capacity (> 90% construction completed),
- Scheduled commissioning 3rd Qtr 2012-13
- Tied up 1.44 MMTPA LNG from Exxon Mobil's Gorgon Project for Kochi Terminal

Third Terminal

- Exploring opportunities of setting up 3rd LNG Terminal at the East Coast of India with capacity of 5 MMTPA
- Shortlisted few locations and in process of commercial negotiations
- DFR to be commissioned shortly

DAHEJ LNG TERMINAL

KOCHI TERMINAL

INDIA – AFRICA – A JOINT EFFORT

- Strategic partnership & Collaboration between Indian and African Companies for development of projects in upstream, midstream and downstream sector – A way to address infrastructure, logistic and contractual issues
- Equity Participation by India in upcoming LNG Liquefaction projects esp. in East African projects (Mozambique, Tanzania, Gabon etc) and similarly by Africa in Indian upcoming Regasification terminals
- Sharing of best practices, regulations, policy framework for development and operations of E&P, pipeline etc.
- Participation in Farm-in opportunities in Africa with roles clearly defined
- Training & development of manpower in various sectors by Indian companies
- A consortium approach by Indian Companies for broad based development in Africa like road, power & water, pipelines etc.

Thank You

AFRICA LNG CAPACITIES- A SNAPSHOT

LIQUEFACTION CAPACITY (OPERATIONAL + UNDER CONSTRUCTION)				
Country	**2012**	**2015**	**2020**	**2025**
Algeria	19.4	25.7	22.7	22.7
Angola	3.9	5.2	5.2	5.2
Egypt	12.2	12.2	12.2	12.2
Equatorial Guinea	3.7	3.7	3.7	3.7
Libya	3.2	3.2	3.2	3.2
Nigeria	22.2	22.2	22.2	22.2
Total:	**64.6**	**72.2**	**69.2**	**69.2**

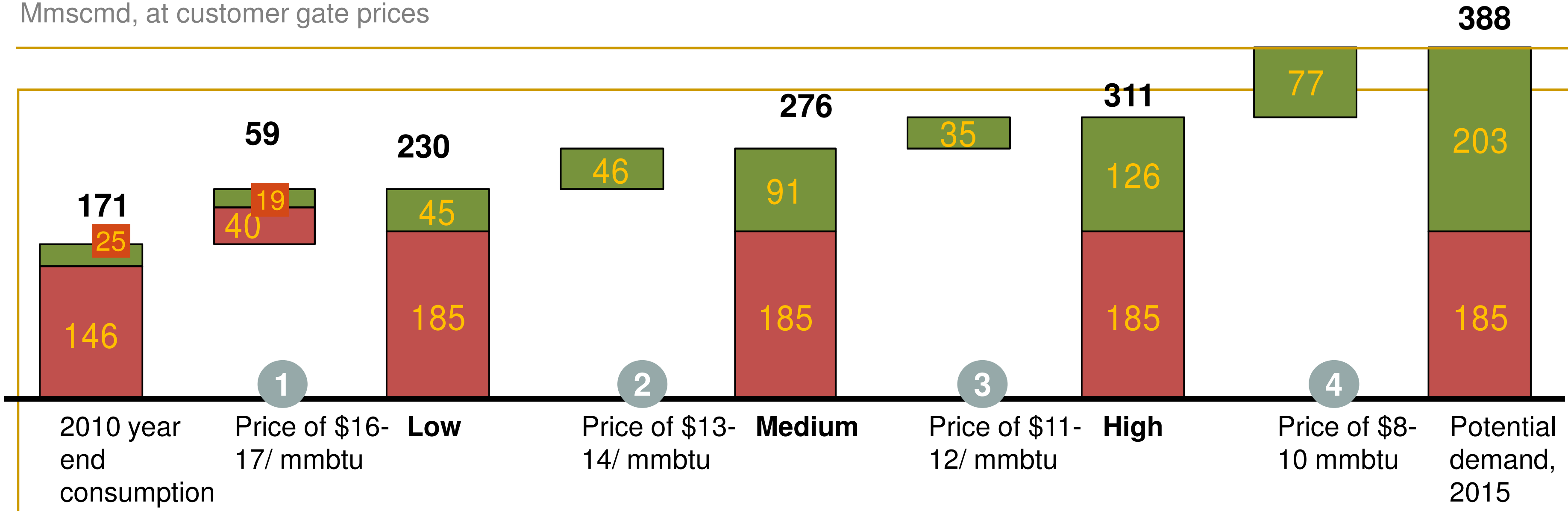
LIQUEFACTION CAPACITY (POSSIBLE)				
Country	**2012**	**2015**	**2020**	**2025**
Algeria	-	-	-	-
Angola	-	-	-	-
Egypt	-	-	-	-
Equatorial Guinea	-	-	4.4	4.4
Libya	-	-	-	-
Nigeria	-	-	10.0	18.4
Total			**14.4**	**22.8**
Grand Total:	**64.6**	**72.2**	**83.6**	**92.0**

AFRICA CAPACITIES- A SNAPSHOT

LIQUEFACTION CAPACITY (OPERATIONAL + UNDER CONSTRUCTION + POSSIBLE + SPECULATIVE)				
Country	**2012**	**2015**	**2020**	**2025**
Algeria	-	-	-	-
Angola	-	-	-	5.0
Cameroon	-	-	3.5	3.5
Egypt	-	-	-	5.0
Equatorial Guinea	-	-	-	-
Libya	-	-	1.3	2.5
Mozambique	-	-	8.0	8.0
Nigeria	-	-	-	24.8
Tanzania	-	-	4.0	8.0
Total			**16.8**	**56.8**
Grand Total:	**64.6**	**72.2**	**100.4**	**148.8**

LARGE DEMAND BUT SENSITIVE TO PRICE

Gas demand and supply, 2015
Mmscmd, at customer gate prices



Sectors with demand

- Industries
- CNG transport

- Refineries
- Industries
- Power cogen

- Peaking power plants

- Baseload power
- New fertilizer plants

Imports
Domestic supplies

Prices at Crude of $ 100/Bbl

1 Based on estimated LNG supply of 8 mtpa in 2015 including RasGas (7.5 mtpa) and 1.5 mtpa from Gorgon LNG in 2015

SOURCE: Indianpetro; DGH; Company annual reports; Expert interviews; McKinsey analysis