

## **Note on Gas Availability<sup>1</sup>**

### **Indigenous production of natural gas**

The average indigenous production of natural gas in the country in 2007-08 was around 89 mmscmd. Out of this, around 68 mmscmd was produced by the National Oil Companies, viz., ONGC and OIL, from their nominated blocks. Details are as follows:-

<b>Firms</b>	<b>Quantity (mmscmd)</b>
ONGC	61.30
OIL	6.35
Ravva 1	1.05
Ravva Satellite	1.02
Canaro	0.01
PMT	15.8
Cairn	1.00
Niko/GSPCL	2.10
<b>Total</b>	<b>88.63</b>

The total natural gas available in the country is 114.74 mmscmd. After internal consumption and flaring, the natural gas available for distribution in the country is 102.68 mmscmd as follows:-

<b>Sector wise breakup</b>	<b>Avg Supply (in mmscmd)</b>	<b>Percentage</b>
Power	36.52	36
Fertilizer	29.66	29
Sponge Iron	5.33	5
PC + LPG + IC	10.20	10
City Gas & CNG	4.43	4
Industry & others	16.54	16
<b>Total</b>	<b>102.68</b>	<b>100</b>

The average demand of natural gas is around 179 mmscmd. So the shortfall of natural gas is around 76 mmscmd.

It is expected that production from RIL's offshore field Dhirubhai would commence from the 3rd quarter of 2008. The level of production is expected to be 40 mmscmd. This would meet the current

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<sup>1</sup> <http://www.infraline.com/ong/naturalgas/gasdemsup/DemandSupplyIntro1.aspx>

shortfall of 76 mmcmd to a significant extent. Further, DGH has certified that the production from Dhirubhai field would increase to 80 mmcmd by 2011-12.

### Gas supply projections during XIth Plan (MMSCMD)

Sources	2007-08	2008-09	2009-10	2010-11	2011-12
ONGC + OIL (A)	57.28	58.42	55.69	54.67	51.08
Pvt./JVs(As Per DGH) (B)	23.26	61.56	60.28	58.42	57.22
Total Projected Supply (Conservative Scenario) (A+B)	80.54	119.98	115.97	113.09	108.3
Additional Gas Anticipated (C)	0	0	74	84	94
Total Projected Supply (Optimistic scenario) (A+B+C)	80.54	119.98	189.97	197.09	202.30

Here, 'C' represents the projected production from RIL's D6 & NEC and GSPC's KG block discovery.

Over the next 10 years, the supply from different Pvt./JV fields is given below:

(Does not include production through CBM and through transnational pipelines, Capacity of Hazira LNG Terminal also not included)

Fields / Blocks	Operator	State / Region	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17
Bheema (Lean)	Niko	Gujrat	0.06	0.0337	0.009							
NS (Lean)	Niko	Gujrat	0.2	0.093	0.071	0.057	0.045	0.017	0.015	0.013	0.011	0.01
Hazira (Lean)	Niko	Gujrat	2.55	1.87	1.3	0.91	0.54	0.11	0.09	0.07	0.05	0.01
<b>Total Gujarat</b>			<b>2.81</b>	<b>1.9967</b>	<b>1.38</b>	<b>0.967</b>	<b>0.585</b>	<b>0.127</b>	<b>0.105</b>	<b>0.083</b>	<b>0.061</b>	<b>0.02</b>
Gauri (Lean)	Cairn	Western Off	1.800	0.895	0.598							
Lakshmi (Lean)	Cairn	Western Off	0.57	0.887	0.887	0.7						
Panna - Mukta (rich)	BG	Western Off	5.2	3.27	3.24	3.2	3.16	3.13	3.1	2.9	2.7	2.5
Tapti (lean) #	BG	Western Off	9.97	12	12	12	12	12	9.5	8.5	8	7
<b>Total western</b>			<b>17.540</b>	<b>17.052</b>	<b>16.725</b>	<b>15.9</b>	<b>15.16</b>	<b>15.13</b>	<b>12.6</b>	<b>11.4</b>	<b>10.7</b>	<b>9.5</b>

<b>offshore</b>												
PY-1 (Lean)	HOEC	Easter n Off	0	1.3	1.3	1.3	1.3					
Dhirubhai (Lean)	RIL	Easter n Off	0	40	60	60	80	80	80	80	80	80
Ravva Existing (Rich) #	Cairn	Easter n Off	1.03	0.68	0.5	0.255	0.174	0.145	0.12	0.1	0.08	0.07
Ravva satellite (Lean)	Cairn	Easter n Off	0.9	0.53	0.37							
Ravva Total		Easter n Off	1.71	1.21	0.87	0.255	0.174	0.145	0.12	0.1	0.08	0.07
<b>Total Eastern offshore</b>			<b>1.71</b>	<b>42.51</b>	<b>62.17</b>	<b>61.555</b>	<b>81.474</b>	<b>80.145</b>	<b>80.12</b>	<b>80.1</b>	<b>80.08</b>	<b>80.07</b>
CBM Production (Lean)			0.15	1.11	2.29	3.61	5.35	7.41	8.1	8.5	9	9.5
<b>Total Natural Gas</b>			<b>22.21</b>	<b>62.67</b>	<b>82.57</b>	<b>82.03</b>	<b>102.57</b>	<b>102.81</b>	<b>100.93</b>	<b>100.08</b>	<b>99.84</b>	<b>99.09</b>
		<b>Anticipated Additional Gas Production from Dhirubhai &amp; GSPC discoveries</b>										
		RIL (NEC)	0	0		0	2	3.2	3.2	3.2	3.2	3.2
		GSPC	0.00	0.00	0.00	3.50	4.50	4.20	7.00	7.00	5.60	4.50
<b>Grand Total (Projected + Additional)</b>			<b>22.21</b>	<b>62.67</b>	<b>82.57</b>	<b>85.53</b>	<b>109.07</b>	<b>110.21</b>	<b>111.13</b>	<b>110.28</b>	<b>108.64</b>	<b>106.79</b>

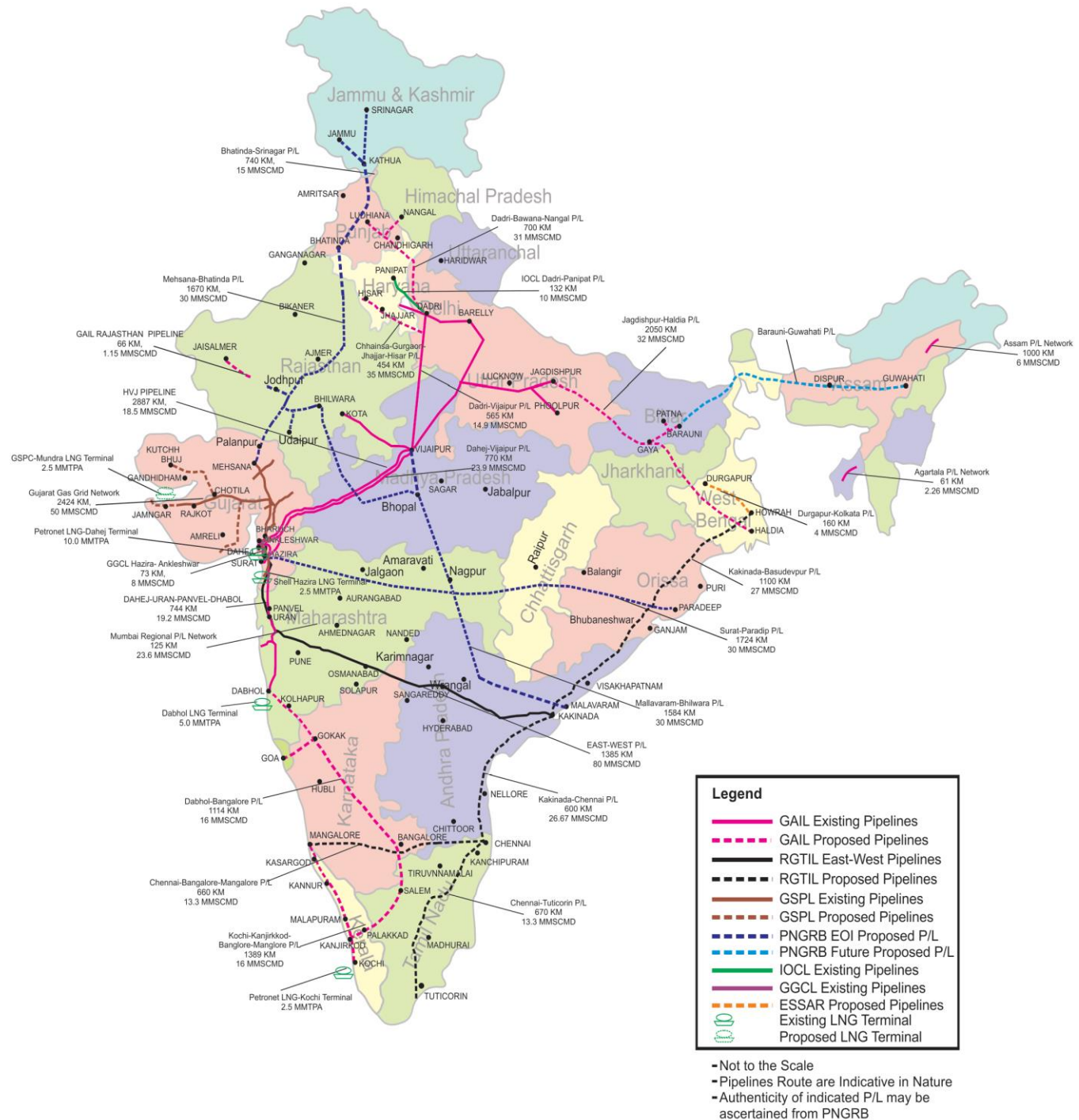
### Natural Gas Pipeline Network

The existing trunk line network<sup>2</sup> is approx. 10,800 km (excluding city gas distribution networks) and is having a capacity to carry 270 MMSCMD of natural gas. Further, natural gas network with capacity to handle 340 MMSCMD covering 15300 km is in various stages of implementation as notified by MoP&NG.

<sup>2</sup>

<http://www.infraline.com/ong/naturalgas/pipelines/GASPIPELINENETWORKININDIA.aspx>

Graphical representation of existing and future planned gas pipelines both by the government and private parties are indicated above<sup>3</sup>.



**Existing pipeline network across the country<sup>4</sup>:**

Pipeline	Design Capacity (MMSCMD)	Length (km)
Hazira-Vijaipur-Jagdishpur (HVJ)/Gas Rehabilitation Expansion Projects (GREP)	33.4	3397
Dahej-Vijaipur Pipeline (DVPL)	23.9	770
Gujarat Region	19.5	742
Maharashtra Region	23.6	125
Dahej-Uran pipeline (DUPL)/Dabhol-Panvel Pipeline (DPPL)	24	581
Andhra Pradesh Region	15.99	834
Tamil Nadu Region	8.66	260
Tripura	2.26	61
Assam	2.5	8
East West Pipeline (EWPL)	80	1375
Gujarat State Petronet Ltd. (GSPL) (Including spur lines)	28	2025
Assam Gas Company	8	622
Total	269.81	10,800

**Proposed gas pipeline networks across the country by both private and public players.****1. GAIL**

S. No.	Name of the Pipeline	States covered and pipeline length	Potential sources for upstream tie-up
1.	Dadri-Bawana-Nangal Pipeline	The approximate length = 610 km  States covered  <ul style="list-style-type: none"> <li>• U.P</li> <li>• Delhi</li> <li>• Haryana</li> <li>• Punjab</li> </ul>	R-LNG from Dabel and Hazira and gas from KG basin
2.	Chainsa-Gurgaon-Jhajjar-Hissar Pipeline	The approximate length = 310 km  <ul style="list-style-type: none"> <li>• Haryana</li> </ul>	R-LNG from Dabel and Hazira and gas from KG basin

<sup>4</sup> <http://www.infraline.com/ong/naturalgas/pipelines/GASPIPELINENETWORKININDIA.aspx>

		<ul style="list-style-type: none"> <li>Rajasthan</li> </ul>	
3.	Jagdishpur-Haldia Pipeline	The approximate length = 876 km  <ul style="list-style-type: none"> <li>West Bengal</li> <li>Jharkhand</li> <li>Bihar</li> <li>U.P</li> </ul>	Gas from Mahanadi basin and KG basin
4.	Dabhol-Bangalore Pipeline	The approximate length = 730 km  <ul style="list-style-type: none"> <li>Maharashtra</li> <li>Karnataka</li> </ul>	R-LNG from Dhabol and gas from KG-Basin
5.	Kochi-Kanjirakkod-Bangalore/Mangalore Pipeline	The approximate length = 822 km  <ul style="list-style-type: none"> <li>Kerala</li> <li>Tamil Nadu</li> <li>Karnataka</li> </ul>	R-LNG from Kochi and gas from KG basin

## 2. RGTIL

The east-west pipeline is the second single largest project undertaken in India. Implemented by Reliance Gas Transportation Infrastructure Ltd (RGTIL), a company promoted by the promoters of Reliance Industries Ltd (RIL), at a cost of about \$4 billion, the east-west network has been laid to ferry gas from RIL's prolific Krishna Godavari Basin Block.

S. No.	Name of the Pipeline	Approximate length (km)	Capacity (MMSCMD)	States
1.	Kakinada-Basudebpur-Howrah Gas Pipeline	1,100 km	20	<ul style="list-style-type: none"> <li>Andhra Pradesh</li> <li>Orissa</li> <li>W.B</li> </ul>
2.	Kakinada-Nellore-Chennai Pipeline	557 km	10	<ul style="list-style-type: none"> <li>Andhra Pradesh</li> <li>Tamil Nadu</li> </ul>
3.	Chennai-Tuticorin Pipeline	670 km	10	<ul style="list-style-type: none"> <li>Tamil Nadu</li> </ul>
4.	Chennai-Bangalore-Mangalore Pipeline	660 km	10	<ul style="list-style-type: none"> <li>Andhra Pradesh</li> <li>Tamil Nadu</li> <li>Karnataka</li> </ul>

### 3. GSPL

S. No.	Name of the Pipeline	Approximate length (km)	Capacity (MMSCMD)	States
1.	Mehsana -Bathinda	1,670 km	30	<ul style="list-style-type: none"> <li>Gujarat</li> <li>Rajasthan</li> <li>Haryana</li> <li>Punjab</li> </ul>
2.	Bhatinda-Srinagar	740 km	15	<ul style="list-style-type: none"> <li>Punjab</li> <li>Jammu and Kashmir</li> </ul>
3.	Mallavaram-Bhilwara	1,584 km	30	<ul style="list-style-type: none"> <li>Andhra Pradesh</li> <li>Maharashtra</li> <li>Madhya Pradesh</li> <li>Rajasthan</li> </ul>
4.	Surat-Paradip	1,724 km	30	<ul style="list-style-type: none"> <li>Gujarat</li> <li>Maharashtra</li> <li>Chattisgarh</li> <li>Orissa</li> </ul>

### 4. OIL/AGCL/DNPL

S. No.	Name of the Pipeline	Approximate length (km)	Capacity (MMSCMD)	States
1.	Duliajan-Numaligarh	194 km	2	<ul style="list-style-type: none"> <li>Assam</li> </ul>
2.	Kumchai-Dumduma	78 km	NA	

### Gas Demand

Natural gas is the fastest growing primary energy source amongst fossil fuels. It is projected to grow around 3-4 times in the next 20 years. The gas available from the domestic sources is not sufficient to meet the demand. Import of natural gas/Liquefied Natural Gas (LNG) is one of the options to bridge the gap between demand and supply. To augment the shortfall, the country is pursuing imports of natural gas, both through the LNG route and transnational route. As against the present gas availability of around 93 MMSCMD, the gas demand by the terminal year of the 11<sup>th</sup> Five Year Plan is estimated to be around 280 MMSCMD.

Sector wise gas demand projections for the 11th Five Year Plan are indicated below:-

Demand/Years	2007-08	2008-09	2009-10	2010-11	2011-12
Power	79.7	91.2	102.7	114.2	126.57
Fertilizer	41.02	42.889	55.899	76.26	76.26

City gas	12.08	12.93	13.83	14.8	15.83
Industrial	15	16.05	17.17	18.38	19.66
Petrochemicals/ Refineries/Internal Consumption	25.37	27.15	29.05	31.08	33.25
Sponge iron/Steel	6	6.42	6.87	7.35	7.86
<b>Total</b>	<b>179.17</b>	<b>196.639</b>	<b>225.519</b>	<b>262.07</b>	<b>279.43</b>

Currently about 93 MMSCMD gas is being supplied in the country, out of which 18 MMSCMD is from LNG imports in 2007-08, the demand for natural gas has been estimated at 179.17 MMSCMD, whereas the domestic production is estimated at 81.54 MMSCMD. The deficit could be made up by way of imports.

According to the 10<sup>th</sup> Meeting of the Energy Coordination Committee, Natural Gas Demand for **City Gas, Power & Fertilizer Sectors** in the Period 2007-12 & 2012-17 have been estimated.

As per the Hydro-Carbon Vision 2025, the estimated demand in the country for natural gas is as below:-

<b>Year</b>	<b>Demand (MMSCMD)</b>
2006-07	231
2011-12	313
2014-15	331*
2019-20	361*
2024-25	391
*These have been interpolated	

Of the above estimated demand of 231 MMSCMD of natural gas for 2006-07, around 43% is being met from indigenous gas and rest from imported RLNG/Spot RLNG.

The supply of natural gas in the country is around 99 MMSCMD based on secondary information.

Of the above, GAIL supplied around 68 MMSCMD of natural gas upto 3<sup>rd</sup> Qtr in 2006-07. Breakup of supply by GAIL is as given below:

Indigenous Gas	55.7 MMSCMD
RLNG (PLL)	10.5 MMSCMD
Spot RLNG	1.3 MMSCMD



### **Demand - Supply Gap For Natural Gas**

Analyzing the projected position of demand and supply, it is expected that there would be a demand - supply gap (shortfall in supply) to the extent of 68.18 MMSCMD in 2007-08. This gap is calculated taking in account both domestic production and LNG. The overall demand - supply balance is presented below:

#### **Overall Demand Supply Balance**

<b>Years</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>
<b>Total Demand</b>	<b>179.17</b>	<b>196.639</b>	<b>225.519</b>	<b>262.07</b>	<b>279.43</b>
Total Supply (Conservative scenario) - Indigenous	110.99	153.58	168.47	183.09	191.425
Total Supply (Optimistic scenario)	110.99	153.58	242.47	267.09	285.425
<b>Demand Supply Gap I</b>	68.18	43.059	57.049	78.98	88.005
<b>Demand Supply Gap II</b>	68.18	43.059	-16.951	-5.02	-5.995

There is expected to be a broad match between demand and supply of natural gas, if LNG is also taken into account, which would permit the operation of free market conditions. In such conditions, it is expected that a fair discovery of price would be possible.

Government of India has adopted a multi pronged strategy to augment gas supplies and bridge the gap between supply and demand for the domestic market. These cover:-

1. Intensification in domestic E&P activities;
  2. Exploitation of unconventional sources, like coal bed methane;
  3. Implementation of Natural Gas Hydrate Programme (NGHP) for evaluation of hydrate resources and their possible commercial exploitation;
  4. LNG Imports
  5. Gas sourcing through transnational gas pipelines.
- The E&P activities have been intensified following the New Exploration Licensing Policy and, so far, 5 bidding rounds have been successfully undertaken. A total of 108 blocks have been awarded in shallow water, deep waters and on land areas to PSUs, JVs and foreign companies till date. The initial results have been very encouraging with gas discoveries in Cambay basin, KG offshore and Mahanadi basin. Similarly, significant oil reserves have been discovered in Rajasthan. It is expected that more hydrocarbon discoveries would materialize in the coming years as more and more investment is attracted in E&P activities. The NELP-VI is already successfully underway, offering 55 blocks (25 onshore, 6 shallow water and 24 deepwater blocks).
  - Government of India has also formulated Coal Bed Methane (CBM) Policy and so far 2 bidding rounds have been successfully undertaken. A total of 16 CBM blocks have been awarded to PSUs and private companies for exploitation of CBM gas. The total production from these 16 blocks is estimated to be around 23 MMSCMD at their peak production level. To increase the pace of exploration and development of CBM. The Government has identified 10 additional blocks in different coalfields of the country for offer under CBM-III round of international bidding for exploration and production of Coal Bed Methane. The commercial production of CBM gas is expected in 2007.
  - Pursuant to LNG coming under 'OGL', a Joint Venture Company, viz., M/s. Petronet LNG Limited (PLL), promoted by ONGC, GAIL, IOCL & BPCL, was formed in order to import

LNG and to set up LNG regasification plant at Dahej, Gujarat. PLL has already tied up LNG import with RasGas of Qatar for 5 MMTPA. As on date, around 18 MMSCMD of regasified LNG is supplied by PLL out of the import of 5 MMTPA from Qatar. Another 2.5 MMTPA of LNG would be available from Qatar from 2009 onwards. RasGas has agreed in principle to supply 1.2 MMTPA of LNG from 2007-2009 which will be supplied to Dabhol Power Project. Further, discussions are at advanced stage with Gorgoan project, Australia for supply of 2.5 MMTPA of LNG for Kochi LNG terminal. GAIL is also under active discussions with Sonatrach, Algeria for supply of 2.5 MMTPA of LNG for Dabhol Power Project. In addition, concerted efforts are being made for sourcing additional LNG from countries such as Qatar, Iran, Malaysia, Indonesia, Nigeria, etc.

- India is in a geographically advantageous position, because of huge gas deposits to its North-West in Russia and Central Asian Republics, in West Asia in Iran, Qatar and Abu Dhabi, and finally towards its South/South East in Myanmar and Bangladesh. These reserves are at such a distance that it is economically viable to lay a gas pipeline.

#### **Transnational natural gas pipelines:<sup>5</sup>**

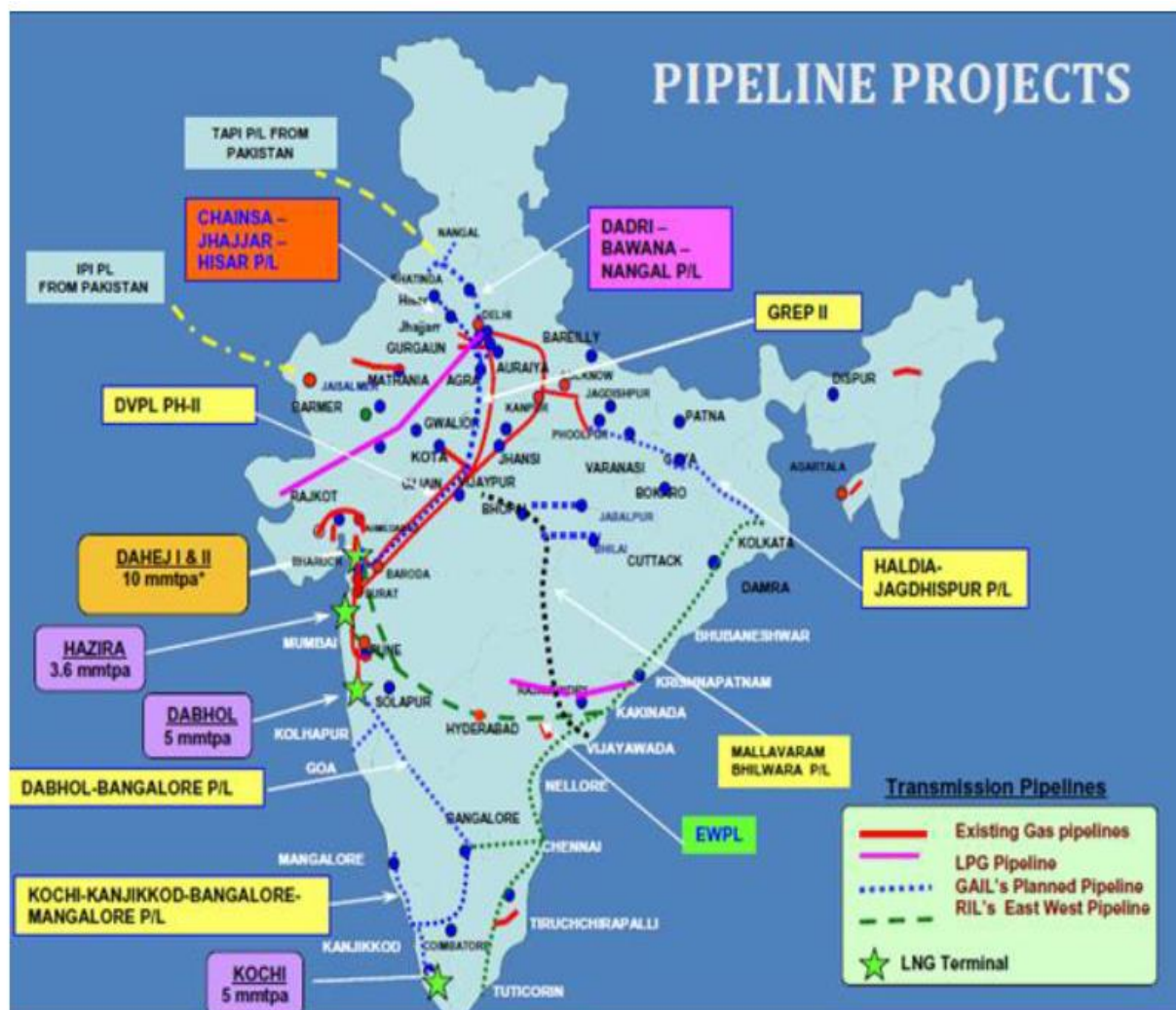
- Heads of Agreement for the proposed gas sales purchase agreement for the 1680 Km Turkmenistan-Afghanistan-Pakistan-India (TAPI) Pipeline has been signed by Partner countries. The project envisages building 1680 KM of pipeline with a total gas capacity of 90 MMSCMD with funding support from Asian Development Bank. India would get approximately 38 MMSCMD.
- Iranian Khatam-ol-Anbia Construction will carry out the second phase of the proposed Iran-Pakistan-India (IPI) gas pipeline project, dubbed as the Peace Pipeline. The first phase of the project has already been put into operation in July-2010. The IPI pipeline would carry 2.4 BCF (~70 MMSCMD) of gas a day, to be shared equally by Pakistan and India<sup>6</sup>.

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<sup>5</sup> <http://www.tehrantimes.com/NCms/2007.asp?code=223655.htm>

<sup>6</sup> <http://www.livemint.com/Articles/PrintArticle.aspx?eat=tp&artid=2494D26A-8C10-11DF-8A04-000B5DABF613>

Below presented map<sup>7</sup> gives the details about the natural gas pipelines across India, trans-national pipelines, including the LNG terminals along with their indicative handling capacities.



**LNG:**

#### **A. Dahej terminal**

Petronet LNG Ltd (PLL) has already expanded its regasification capacity to 10 MMTPA (approx 40 MMSCMD) from initial capacity of 5.0 MMTPA. PLL has signed a fuel supply agreement with Rasgas of Qatar for supply of 7.5 MMTPA (approx 30 MMSCMD) for a period of 25 years. PLL is in negotiation with various parties including Rasgas of Qatar for sourcing additional 2.5 MMTPA of LNG (approx 10 MMSCMD) for the aforementioned expanded capacity.

#### **B. Kochi terminal**

PLL is also setting up a facility for receiving and regasification capacity of 2.5 MMTPA (approx 10 MMSCMD) of LNG in Cochin which is expected to commission by 2013. Further, PLL

<sup>7</sup> [http://www.infraline.com/pdf/Oil\\_Gas\\_KB\\_Presentation.pdf](http://www.infraline.com/pdf/Oil_Gas_KB_Presentation.pdf)

has already signed a long-term contract with Exxon Mobil for LNG from the Gorgon field in Australia and there is a possibility of sourcing more quantity<sup>8</sup>.

The LNG supply for the two is detailed below:

(MMTPA)

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
<b>Dahej terminal</b>										
Long term - tied	5.00	5.00	6.25	7.50	7.50	7.50	7.50	7.50	7.50	7.50
Long /Medium Term - to be-tied				2.00	2.50	2.50	2.50	2.50	2.50	2.50
Spot/Short term	1.50	1.50	1.50	2.00	2.00	2.00	2.50	2.50	2.50	2.50
<b>Total</b>	<b>6.50</b>	<b>6.50</b>	<b>7.75</b>	<b>11.50</b>	<b>12.00</b>	<b>12.00</b>	<b>12.50</b>	<b>12.50</b>	<b>12.50</b>	<b>12.50</b>
<b>Kochi terminal</b>										
<b>Term &amp; Spot/short term</b>	-	-	-	-	2.50	2.50	2.50	3.75	3.75	5.00

### C. Hazira LNG Port Ltd. (Promoted by Shell Ltd.)

Hazira LNG Port Ltd. (HLL) promoted by Shell and currently owned by Shell and Total has a regasification capacity of 3.5 MMTPA (approx. 14 MMSCMD) at Hazira. HLPL has plans of increasing this capacity to 10.0 MMTPA (approx. 40 MMSCMD), depending upon demand in India. The capacity utilization in this terminal is currently reported to be low as users are not willing to pay the market price applicable globally<sup>9</sup>. Hazira LNG Terminal, is regarded as a key foreign direct investment (FDI) project and represents one of the largest international investments in India in the energy sector. The Hazira LNG terminal was the first to introduce Spot LNG supplies into India. The Hazira LNG Terminal is now interconnected with the Hazira-Vijaypur-Jagdishpur line (HVJ), Dahej-Uran pipeline (DUPL), Gujarat State Petronet Limited (GSPL) and East West pipelines at Mora, enabling us to supply gas to North, West, Central and even South India.

### D. Mundra LNG Terminal (Adani-GSPC Group)

Adani-GSPC (Gujarat State Petroleum Corporation) consortium has planned to set up a capacity of 5 MMTPA and 6.5 MMTPA in peak period in the first phase, GSPC LNG would add re-gasification hardware that will ramp up the capacity to 7.5 MMTPA LNG terminal at Mundra Port<sup>10</sup>.

### E. Dabhol LNG

Dabhol LNG with a regasification capacity plans to double the capacity to 10 MMTPA (approx. 40 MMSCMD). GAIL is targeting to receive first spot LNG cargo at Dabhol by 2012, thereafter, LNG would be sourced through regular tie-up<sup>11</sup>.

<sup>8</sup> <http://www.thehindubusinessline.com/todays-paper/article1013908.ece>

<sup>9</sup> <http://www.thehindubusinessline.com/2005/04/22/stories/2005042202690300.htm>

<sup>10</sup> <http://www.business-standard.com/india/news/gspc-adani-to-pump-in-rs-500-cr-for-lng-terminal-land-in-%20mundra/355191/>

<sup>11</sup> <http://www.naturalgasasia.com/gail-may-double-dabhol-lng-terminal-capacity-5003>

## F. IOCL Ennore LNG

Tamil Nadu Industrial Development Corporation Ltd. (TIDCO) has entered into a joint venture with Indian Oil Corporation Ltd. (IOCL) to set up a 5 MMTPA (approx. 20 MMSCMD) LNG terminal close to the Ennore Port, to the north of Chennai<sup>12</sup>.

### Overall LNG supply projections (different from above table because of different assumptions)

LNG Supply Source	2007-08	2008-09	2009-10	2010-11	2011-12
Dahej	5	5	7.5	10	10
Hazira (sporadic utilisation)	2.5	2.5	2.5	2.5	2.5
Dabhol (Uncertain)	1.2	2.1	5	5	5
Kochi	-	-	-	2.5	5
Mangalore (partial commissioning assumption)	-	-	-	-	1.25
<b>Total LNG Supply (MMTPA)</b>	<b>8.7</b>	<b>9.6</b>	<b>15</b>	<b>20</b>	<b>23.75</b>
<b>Total LNG Supply (MMSCMD)</b>	<b>30.45</b>	<b>33.6</b>	<b>52.5</b>	<b>70</b>	<b>83.125</b>

**Assumptions:** Hazira expansion to 5.0 MMTPA is not considered in XI plan. Mangalore terminal is expected to be partially commissioned in 2011-12.

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<sup>12</sup> <http://www.iocl.com/Aboutus/NaturalGas.aspx>