

## Natural Gas FY19 review

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### Domestic Natural Gas production, consumption and imports during FY19

Domestic natural gas output has increased marginally by 1% during FY19. Increase in production can be mainly attributed to the fields operated by ONGC.

During the year, ONGC has contributed around 75% of the total domestic output while Oil India and Pvt/JV fields have contributed around 8% and 16% respectively.

A major part of the domestic natural gas production is from the offshore fields (78%). The remaining 22% of the production is from the onshore fields (with Assam/Arunachal Pradesh being the leading states followed by Gujarat).

Despite an increase in LNG prices, imports rose by only 2.6% as compared with 6.7% the previous fiscal. India has imported LNG mainly from Qatar (49%), Nigeria (12%), Angola (7%), USA (6%), Oman (6%) and Australia (6%).

Import dependency based on consumption during FY19 has been around 45.7% as compared with being 45.3% during the previous year.

Growth in consumption of natural gas has remained stable at 1.7% as higher imported gas prices limited demand from the power sector and other industries. Stagnancy in fertilizer production also restricted an incremental increase. Natural gas is used as a fuel (energy) and as a feedstock (non-energy) by the respective end user industries. Demand for natural gas in the domestic market is largely dependent on the fertilizer (28%), power (23%), CGD entities (16%), refinery (12%) and petrochemicals (8%) industries.

Table 1: Domestic Production, Consumption and Imports of Natural Gas (BCM)

	Production*	Change (%)	Consumption**	Change (%)	Imports (LNG)	Change (%)
FY17	30.8		55.5		24.7	
FY18	31.7	2.9%	58.1	4.5%	26.3	6.7%
FY19	32.1	1.0%	59.1	1.7%	27.0	2.6%

Source: PPAC

\*The production numbers are net production figures which is gross production less flare and loss by gas producing companies

\*\*Includes internal consumption.

## Review of the Natural Gas Infrastructure

### R-LNG

Petronet's Dahej Terminal has a long term LNG sourcing contact with RasGas and with ExxonMobil for the Kochi Terminal. GAIL (Dhabol) has a 20- year contract with Cheniere Energy. Hazira LNG (A joint venture between Shell Gas BV and Total Gaz Electricité Holdings France) has sourced cargoes from 17 liquefaction facilities across the globe, ranging from Peru LNG at the extreme west to Sakhalin LNG in the extreme east. Unlike Dahej, Kochi and Dhabol, Hazira's business model is geared more towards short and mid-term contracts instead of long-term contracts.

Table 2: Existing LNG terminals and capacity utilization during FY19

Location	Owner	Terminal Capacity (in MMTPA)	Capacity Utilization* (%)
Dahej (Gujarat)	PLL	15	106.5%
Hazira (Gujarat)	Hazira LNG	5	79.9%
Kochi (Kerala)	PLL	5	9.3%
Dhabol (Maharashtra)	JV b/w GAIL & NTPC	1.7	24.4%
		<b>26.7</b>	
	<b>MMSCMD</b>	<b>96.09</b>	

Source: PPAC

Note: Though the existing installed capacity of Dabhol is 5 MMPTA, however, due to absence of breakwater facility the available capacity is 1.7 MMPTA.

\*During 2018-19

**Table 3: Upcoming LNG terminals (MMTPA)**

Location	Company	Capacity
<b>Already Commissioned</b>		
Mundra	GSPC, Adani	5
Ennore	Indian Oil, TIDCO	5
<b>Under Construction</b>		
Dahej Expansion	Petronet LNG	5*
Kakinada	APGDC	2.5
Dhamra	Adani	5
Jafrabad (FSRU)	Swan Energy	5
Jaigarh	H-Energy	2.5
<b>Planned</b>		
Gangavaram	Petronet LNG	5
Kolkata Port	H-Energy	2.5
Chhara	HPCL & Shapoorji Pallonji	5
Krishnapatnam	LNG Bharat	2.5

Source: Company Filings, PPTs, Petronet LNG

\* post the ramp up Dahej capacity will be 20 MMTPA

With the commissioning of the Mundra and Ennore LNG facilities there is an addition of 10 MMTPA (36 mmscmd) RLNG capacity in India. So far all the regasification facilities are located on the west coast side of the country but with the commissioning of Ennore it will be the first R-LNG plant located in the South Eastern part of the country.

Dhamra, Kakinada, Gangavaram, Kolkata Port and Krishnapatnam will all be located on the East Coast of the country.

### Natural Gas pipelines

At present, India has a gas pipeline network length of 16,226 km having capacity of 369 MMSCMD spread over 15 States & UTs. GAIL is operating Hazira-Vijaipur-Jagdishpur (HVJ) pipeline which was India's first cross country pipeline and DVPL trunk Pipeline to evacuate gas like domestic gas/ joint venture gas from ONGC and R-LNG from PLL. Overall GAIL has a pipeline network of about 11,410 km (about 70% market share of current pipelines in operation) including Dabhol-Bengaluru Pipeline.

Reliance Gas Transportation Infrastructure Ltd is operating 1784 km (about 11%) East West Pipeline (EWPL) to evacuate gas from KG-D6 in Andhra Pradesh. This pipeline passes through Andhra Pradesh, Maharashtra and Gujarat and integrated with GAIL's and GSPL's network to reach Northern and Western Indian market. GSPL is mainly focused in the state of Gujarat consisting about 2,593 km (about 16%). In addition GAIL also operates regional gas pipeline networks across India in Maharashtra, K.G.Basin, Cauvery Basin and South Gujarat.

Table 4: Gas Pipeline Network as on 01.04.2019

Entity	Length (kms)	Design Capacity (mmscmd)
GAIL	11,410	230
Reliance	1,784	84
GSPL	2,593	43
AGCL, DNPL	299	3
IOCL	140	10
<b>Total</b>	<b>16226</b>	<b>369</b>

Source: PPAC

^ excludes CGD pipeline network

Table 5: Gas Pipeline under Execution / Construction as on 01.04.2019

Network/Region	Entity	Length Sanctioned (kms)	Design Capacity (mmscmd)
Kochi - Kottanad - Bengaluru - Mangalore	GAIL Ltd	1,056	16
Dabhol -Bengaluru (DBPL) Spur Lines, Phase-2	GAIL Ltd	302	16
Jagdishpur- Haldia-Bokaro-Dhamra (JHBDPL) (Phase-I, 755 Km, 7.44 MMSCMD Capacity)	GAIL Ltd	2,539	16
Mallavaram - Bhilwada*	GSPC India Transco Ltd	1,881	78.3
Mehsana - Bathinda *	GSPC India Gasnet Ltd	2,052	77.1
Bathinda -Jammu-Srinagar*	GSPC India Gasnet Ltd	725	42.4
Kakinada - Vizag-Srikakulam *	AP Gas Distribution Corporation.	391	90
Ennore- Nellore*	Gas Transmission India Pvt	250	36
Ennore-Thiruvallur-Bengaluru-Puducherry-Nagapattinam-Madurai-Tuticorin*	Indian Oil Corporation Ltd	1,385	84.7
Jaigarh-Mangalore*	H-Energy Pvt Ltd	635	17
<b>Total</b>		<b>11,216</b>	

Source: PPAC

\*Competitive bidding

The existing trunk pipeline (excluding dedicated pipelines) capacity in India is 369 MMSCMD with a total length of 16,226 Kms, with the pipeline projects under execution, this is expected to cross 28,000 kms in the next few years.

### City Gas Distribution

The CGD system supplies gas to various consumers like industrial, domestic, commercial and transportation. Gas supplied to industrial, domestic and commercial customers is known as Piped Natural Gas (PNG), while gas dispensed through CNG refuelling stations to CNG vehicles (transportation) is known as Compressed Natural Gas (CNG).

The government has recently handed over the letters of intent to the bidders of the 10<sup>th</sup> round of CGD bidding which covered 50 geographical areas (GAs) spread over 14 states and 124 districts (112 full and 12 part), covering 24% of India's population and 18% of its area.

As per the commitment made by the various entities in 10<sup>th</sup> CGD Bidding Round, 2.02 crore domestic PNG connections and 3,578 CNG stations would be installed in the period of 8 years.

- **Compressed Natural Gas (CNG)**

**Table 6: No of CNG Stations**

State	As on 1.04.2018	As on 1.04.2019	Increase in absolute terms
Gujarat	457	545	88
Delhi / NCR	444	482	38
Maharashtra	275	313	38
Andhra Pradesh / Telangana	55	89	34
Rajasthan	3	5	2
Uttar Pradesh	79	130	51
Tripura	6	9	3
Madhya Pradesh	31	43	12
Haryana	47	66	19
West Bengal	7	7	0
Karnataka	5	13	8
Chandigarh	4	5	1
Daman	2	3	1
Kerala	4	4	0
Dadra & Nagar Haveli	3	3	0
Odisha	2	6	4
Punjab	-	6	6
Uttarakand	-	1	1
All India	1424	1730	306

Source: PPAC

As per table no 6 all over India there has been an increase of additional 306 CNG refuelling stations during FY19 with Gujarat leading across all the states. Gujarat also has the most number of CNG stations as of a date. Nearly 97% of India's CNG vehicles ply in the 5 states: Delhi (including Noida and Ghaziabad), Gujarat, Maharashtra, UP and Haryana. Around 87% of these are in the 3 states of Delhi, Gujarat and Maharashtra.

There has also been an incremental increase by 2.6 lakh CNG vehicles all over India (as of 1.04.2019 there are 33.5 lakh CNG vehicles). **CNG is 60% cheaper than petrol and 45% cheaper than diesel and given the volatility in petrol-diesel prices more vehicle users are making a shift to CNG powered vehicles.**

- **Piped Natural Gas (PNG)**

PNG is supplied to residential, commercial and industrial users through extensive network of pipelines. Gas sales to commercial and industrial users are achieved through long-term gas sales agreement, whereas residential users are

charged on usage basis. Supplying PNG to industrial users can further be categorized into large-scale industries and small/medium-scale industries.

**Table 7: Number of Piped Natural Gas connection data as of 1.04.2019**

State	Domestic connection	Commercial connection	Industrial connection
Haryana	98,893	281	486
Andhra Pradesh	29,435	120	4
Telangana	10,579	12	17
Assam	32,469	1,074	402
Gujarat	20,38,881	18,701	4,882
Madhya Pradesh	56,110	133	189
Maharashtra	14,52,902	4,064	260
Delhi/NCR	10,92,223	2,561	1,751
Rajasthan	2,160	12	14
Tripura	39,743	415	49
Karnataka	16,860	124	75
Uttar Pradesh	1,57,503	495	651
Chandigarh	9,598	-	1
Kerala	1,032	10	1
Dadra & Nagar Haveli	2,676	18	15
Daman and Diu	506	22	9
Odisha	225	-	-
Uttarakhand	993	3	6
Punjab	400	1	11
Total	50,43,188	28,046	8,823

Source: PPAC

As on 1.04.2019 (50.8 lakh connections) the total number of PNG connections has increased by 18.2% as compared with the PNG connections on 1.04.2018 (there were 42.9lakh connections in the start of the fiscal year). Domestic connections, commercial connections and industrial connections have increased by 18.2%, 7.3% and 16.1% respectively. Out of the total PNG connections domestic connections constitute 99.3% share followed by commercial connections having a 0.6% share and industrial connections having a 0.2% share.

**PNG is gaining popularity amongst the masses as is cheaper by 40% when compared with the market price of LPG and the price of PNG almost matches with that of subsidised LPG (based on prices in Delhi).**

### Investments in the Natural Gas domain

- The Oil Ministry plans to set up bio-CNG (compressed natural gas) plants and allied infrastructure at a cost of INR 7,000 crore (USD 1.10 billion) to promote the use of clean fuel.
- The government plans to spend INR 70,000 crore to spread natural gas pipelines across the country and working out to expand gas networks to Myanmar through Bangladesh.
- Oil and Natural Gas Corporation (ONGC) plans to invest USD 11 billion in exploration and development of blocks in the Krishna Godavari (KG) basin, which is expected to increase gas production by around 30% over the next three-four years.

- ONGC has signed an agreement with the Government of Andhra Pradesh to invest around INR 78,000 crore (USD 11.7 billion) in the Krishna Godavari basin for producing hydrocarbons by FY22.
- The Adani group has entered into an agreement with France's Total to jointly develop multi-energy offerings in the Indian market which include fuel retail and liquefied natural gas. Total and Adani will create a joint venture with an objective to build a retail network of 1,500 service stations over a period of 10 years. Adani is also building a 5 million tonne LNG import terminal at Dhamra in Odisha at a cost of INR 5,100 crore.
- As of March 2019, Brookfield is going to acquire Reliance Gas Transportation Infrastructure, now known as East West Pipeline (EWPL) for INR 13,000 crore (USD 1.80 billion).
- A gas exchange is planned in order to bring market-driven pricing in the energy market of India.

## Prices

The domestic natural gas price is determined by the formula which has been decided according to the New Domestic Gas price formula, which considers the prices of natural gas in USA (Henry Hub), UK (New Balancing Point), Canada (Alberta Gas) and Russia (Russian Natural Gas). Prices of gas in these hubs are market linked.

**Table 8: Domestic Gas price (USD /mmBtu) on a Gross Calorific Value (GCV) basis**

	Domestic Natural Gas Price	Change (+/-)
1 <sup>st</sup> Nov'14 – 31 <sup>st</sup> Mar'15	5.05	-
1 <sup>st</sup> Apr'15 – 30 <sup>th</sup> Sep'15	4.66	-7.7%
1 <sup>st</sup> Oct'15 – 31 <sup>st</sup> Mar'16	3.82	-18.0%
1 <sup>st</sup> Apr'16 – 30 <sup>th</sup> Sep'16	3.06	-19.9%
1 <sup>st</sup> Oct'16 – 31 <sup>st</sup> Mar'17	2.5	-18.3%
1 <sup>st</sup> Apr'17 – 30 <sup>th</sup> Sep'17	2.48	-0.8%
1 <sup>st</sup> Oct'17 – 31 <sup>st</sup> Mar'18	2.89	16.5%
1 <sup>st</sup> Apr'18 – 30 <sup>th</sup> Sep'18	3.06	5.9%
1 <sup>st</sup> Oct'18 – 31 <sup>st</sup> Mar'19	3.36	9.8%
1 <sup>st</sup> April'19- 30 <sup>th</sup> Sep'19	3.69	9.8%

Source: PPAC

**Table 9: Domestic Gas price for gas produced from difficult fields (USD/mmBtu) on a Gross Calorific Value (GCV) basis**

	Ceiling Prices for Gas from HP-HT/Deep/Ultradeepwater	Change (+/-)
1 <sup>st</sup> Apr'16 – 30 <sup>th</sup> Sep'16	6.61	
1 <sup>st</sup> Oct'16 – 31 <sup>st</sup> Mar'17	5.30	-19.8%
1 <sup>st</sup> Apr'17 – 30 <sup>th</sup> Sep'17	5.56	4.9%
1 <sup>st</sup> Oct'17 – 31 <sup>st</sup> Mar'18	6.30	13.3%
1 <sup>st</sup> Apr'18 – 30 <sup>th</sup> Sep'18	6.78	7.6%
1 <sup>st</sup> Oct'18 – 31 <sup>st</sup> Mar'19	7.67	13.1%
1 <sup>st</sup> Apr'19 – 30 <sup>th</sup> Sep'19	9.32	21.5%

Source: PPAC

The government has revised the domestic natural gas price as per the New Domestic Gas policy, 2014. Currently the price for gas produced from local fields is USD 3.69/mmBtu a 9.8% increase from USD 3.36/mmBtu and the ceiling price for gas produced from difficult fields is USD 9.32/mmBtu a 13.1% increase from USD 7.67/mmBtu.

The current domestic natural gas prices prevailing in the markets have been the fourth consecutive increase in the domestic natural gas price since the inception of the New Domestic Gas Price Policy.

Rise in the natural gas price results in an increase in the cost of manufacturing of urea and petrochemicals where it is used as a feedstock. It also leads in the rise of prices of CNG and PNG which directly affects the consumers. Increase in price of natural gas also affects the margins of the power sector and sponge iron industry where it used for the generation of energy.

### Concluding Remarks

- Most of the pipelines and R-LNG terminals are to start operations in FY20 thus abetting in the improvement of the natural gas infrastructure of the country.
- We can further expect development of more CNG fuelling stations and PNG connections which will expedite the natural gas demand. It is envisaged that with the completion of 10<sup>th</sup> CGD Bidding Round, CGD would be available in 228 GAs comprising 402 districts spread over 27 States and Union Territories covering approximately 70% of India's population and 53% of its geographical area.
- With the proposed new plants which will be set up on the east coast of India and increase in pipeline connectivity the disparity between the supply of LNG to its end users in all parts of the country should be diminished.
- A key risk posed towards the R-LNG players is under-utilization of the terminals due to low/limited availability of gas.

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