

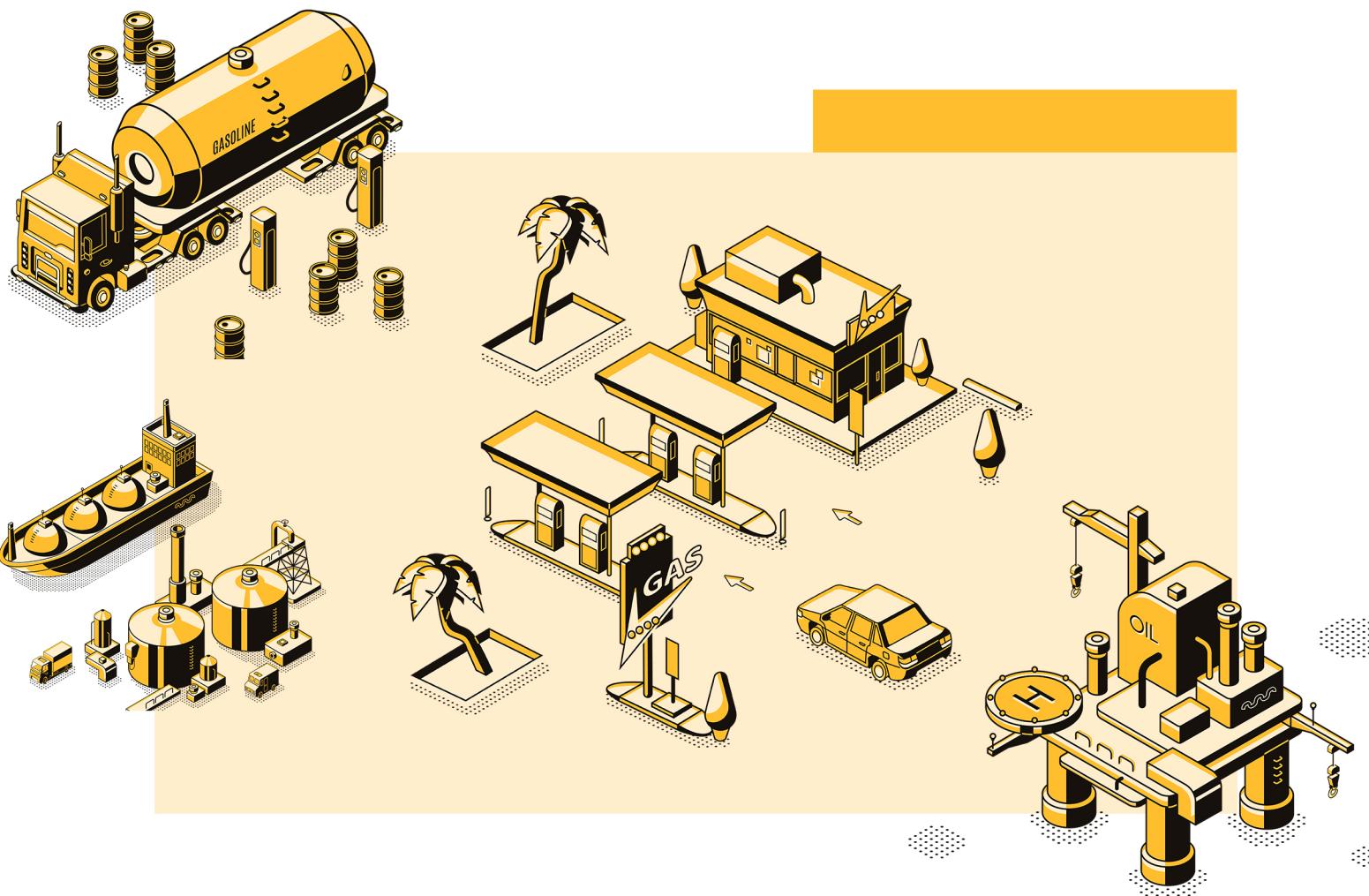


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An Exploratory Survey Report on the Challenges in Indian Gas Industries

2018-19



Feb 11, 2019

Introduction

India has been primarily dependent on fossil fuels for fulfilling its energy needs. The major chunk of fossil fuel we consume are Coal (~57%) and Oil. These fuels impose harsh threats to the environment, making the system unsustainable. Hence the government has decided to give a boost to help India grow towards a gas based economy. Being the second largest populated country in the world, India consumed 142 Million Standard Cubic Meters (MSCM) per day of natural gas in the fiscal year ending March 31, 2018. India was the fourth-largest Liquefied Natural Gas (LNG) importer in 2017 after Japan, South Korea and China. LNG imports increased to 26.11 Billion Cubic Meters (BCM) in 2017-18 from 24.48 Billion Cubic Meters (BCM) in 2016-17.

Gas infrastructure is being strengthened through national wide gas grid, city gas distribution projects and raising LNG import capacity. The number of Compressed Natural Gas (CNG) stations in the country has gone up by 79% by September, 2018. The domestic Piped Natural Gas (PNG) connections were grown to 47.09 lacs (from 24.72 lacs). Gas pipeline infrastructure in the country stood at 16,771 km at the beginning of September 2018.

Honourable Prime Minister of India Shri Narendra Modi on November 22, 2018, unveiled his vision for transforming India to a gas-based economy by developing the City Gas Distribution (CGD) networks in more than 400 districts, quadrupling piped cooking gas connections to more than 2 core households and also to set up 10000 CNG dispensing stations. This push will increase the share of environment-friendly fuel in the Indian energy basket from 6.2% to 15% by 2030, which will also create employment and help meet India's COP-21 (Climate Change Conference) commitment of cutting emission intensity by 33-35%.

The City Gas Distribution (CGD) projects in India are emerging as an important driver for overall natural gas value chain development. The new bidding parameters, diversity & vastness of the notified geographical areas and government's push for a natural gas fuelled nation are indicating towards an enhanced enthusiasm which was evident during the bidding. Till now, Petroleum and Natural Gas Regulatory Board has organized 9 bidding rounds, in which only 92 geographical areas (covering 15 states) were awarded in the last 8 rounds, whereas in the 9th round, 86 blocks (covering 22 states) were put up for bidding out of which 78 were awarded. The 10th CGD bidding round was launched on November 22, 2018 where 50 Geological areas were put for bidding. By the end of the 10th round, natural gas fuel will cover 400 districts and 70% population of India.

Besides this, over Rs. 22,000 crores are being spent on laying new pipelines that will transport natural gas to unconnected eastern states of Bihar, Odisha and West Bengal and further to north-eastern states, making available environment friendly fuel for the industrial and domestic use.

These developments in India's Natural Gas sector have received a positive response from the industry.

The demand of natural gas in India is expected to depict a healthy growth trajectory till 2029-30. The highest demand will be from the power sector and it is expected to contribute ~ 36% to 47% of the total demand. The share of fertilizer sector is expected to drop from current levels of 25% to 15% due to higher growth registered in other sectors. CGD is expected to register fastest growth in the use of natural gas and is expected to contribute 11% of the total demand by 2030.

PDPU as per the wish of Government of India initiated a collaboration with Gas Technology Institute (GTI), Chicago Illinois, USA for the development of natural gas sector in India. In this regard, in April 2018, PDPU had organized an open house discussion on "India Towards Gas Based Economy" in which Mr. David Carroll, President IGU and CEO GTI, addressed the gathering and shared his thoughts and visions for developing and strengthening India's natural gas sector. Taking this move forward, PDPU and GTI is now organizing a workshop on February 22, 2019 at New Delhi India for the Indian gas industry.

The workshop highlights are as follows:

1. Keynote presentations by Gas Industry Stalwarts
2. Global Perspectives on Natural Gas Development by Mr. David Carroll - President - International Gas Union (IGU)
3. Panel Discussion on India Natural Gas Supply
4. Panel Discussion on India Market Development
5. Participants from International Gas Union

During this conference notable dignitaries and luminaries of Oil and Gas Industry will share their technical prowess through presentations, panel discussions and informal discussions.

Methodology

The methodology adopted was to conduct the exploratory survey about the challenges and opportunities in the Natural Gas Industry and create a collective report on the same.

Various gas industries from all the three sectors that are, Direct Companies, Service Organizations, Regulators and Industry analysts were listed and targeted for the discussion, through phone calls and live interviews in addition to web-based survey tools (e.g. Survey Monkey). The discussion was mainly based on-

1. Opportunities for Indian Gas Industry

The industry professionals were enquired about their perspectives on the future growth of Indian Gas Industry in the upcoming years. They were asked to rate the factors such as increased economic gas supply and gas transmission, government support and incentives, environmental issues, power generation and other demands. Also, the companies were asked to review the market and applications that could increase the growth potential of natural gas in India.

2. Challenges for India Gas Industry growth

The Industry professionals were asked to state the key challenges that can influence the growth of natural gas in India and to rate the factors such as lack of adequate gas supply, pipeline capacity and gas infrastructure, natural gas pricing, renewable energy options, adequate trained workforce and public resistance that can impact the growth.

Survey Structure | 2018 Market Survey of Indian Gas Industry

1. Opportunities for the Indian gas industry:

A. What are your overall perspectives on the future growth potential of the Indian natural gas industry over the next 5-10 years?

(Open ended question)

B. What factors will influence the growth of the Indian gas industry?

(1-5 scale; 1-no influence to 5-major influence)

- i. Increased economic gas supply (including additional LNG imports)
- ii. Increased gas transmission and distribution infrastructure
- iii. Government support and incentives
- iv. Urban air quality and other environmental issues
- v. Power generation demand
- vi. Industrial, commercial and other consumer gas demand
- vii. Other factors (please specify) _____
Other comments: _____

C. What markets and applications offer near term growth potential for natural gas in India? (would use 1-5 scale for each market application)

(1-limited growth potential; 3-moderate potential; 5 high growth potential)

- i. Power generation
- ii. Industrial applications (steam generation and process heating)
- iii. Fertilizer production and other feedstock's
- iv. Institutional, commercial and domestic equipment
- v. Transportation (LNG and CNG)
Other comments: _____

2. Challenges for India gas industry growth

A. What are the key challenges influencing the growth potential of the Indian gas industry over the next 5-10 years?

(Open ended question)

B. What factors represent key challenges impacting growth of the Indian gas industry

(1-5 scale; 1-no challenge to 5-major challenge)

- i. Lack of adequate gas supply

- ii. Lack of pipeline capacity and gas infrastructure
- iii. Natural gas pricing
- iv. Environmental concerns
- v. Renewable energy options
- vi. Competition from other energy sources (e.g., coal, oil, other)
- vii. Regulatory compliance issues
- viii. Adequate trained workforce
- ix. Public resistance
- Other (please specify) _____

3. Do you have other comments or thoughts related to the future development of Indian gas industry?

(Open ended question)



Responses | 2018 Market Survey of Indian Gas Industry

1. Gujarat State Petroleum Corporation

Shri Sanjay Sengupta, Sr. Vice President – Operations, GSPC LNG was approached by PDPU to share his views on the on-going opportunities and the challenges faced by the Indian gas sector. According to him, the overall perspectives on future growth of the gas industry over next 5-10 years are:

- a. Natural Gas industry in India is poised to grow. Govt. of India has ambitious plans to transform India into a gas based economy. Efforts are being taken to ensure that the percentage of Natural Gas in India increases from existing 6.5% to 15% in the overall Energy basket in next few years.
- b. There are key developments taking place to develop new LNG terminals and pipelines on the Eastern side of India. Several refineries, fertilizer projects and City Gas Projects are being developed.
- c. Efforts are in progress through various City Gas bid rounds to cover almost 75% of India through CGD networks. The Government is also working to develop a Gas Hub/ Exchange to bring in further transparency in the system.
- d. Domestic Natural Gas production is expected to receive a big boost from several natural gas fields coming on stream along with new and upcoming LNG projects as well as removal of bottlenecks from a few of the existing LNG projects which does not function at full capacities.

The following are the factors that influence the growth of gas industry:

- a. Availability of gas sourced from domestically produced sources such as deep-water blocks, CBM and shale gas plays etc.
- b. Govt. thrust towards adoption of gas as a transport fuel of choice especially in urban areas in form of CNG and LNG.
- c. Other technological developments and rate of adoptions for alternative technologies like battery operated vehicles etc.

According to him following are the key challenges influencing the growth potential of Indian gas sector:

- a. In order to further expand the usage of natural gas in India we need to develop pan India infrastructure to transport and distribute natural gas.

- b. There should be consistency in planning and policy-making from Government side to support the move away from polluting fuels to natural gas /LNG in next 5-10 years. An example which India can emulate is the way China has progressed in managing its pollution challenges by adopting natural gas in a huge way.
- c. There would be obvious financial costs and other logistical challenges of moving away from legacy systems. However, the way we deal with such challenges will decide the role of natural gas plays going forward in our future.

2. Asian Oil Field Private Limited

Mohammad Zeeshan, Instrument Observer, Asian Oil Field Private Limited in the survey stated that consumption of natural gas is increasingly being promoted by the Government of India, given the fuel's affordability, accessibility, and low carbon profile. LNG and CGD are one of the segments in which the Indian Gas Industries are augmenting the consumer base and trying to switch large number of population from petroleum to natural gas. Indian gas market is one of the fastest growing and developing country in the world.

3. Chennai Petroleum Corporation Limited

Mr. G. Aravindan, Director Operations, Chennai Petroleum Corporation Ltd. when asked about the overall perspectives on future growth potential of Indian natural gas industry during the survey, he stated that growing urbanization and CGD network developments in different GAs across India is creating a new potential market that can be explored by LNG and CGD players. The modified natural gas policy has helped to increase industrial and domestic consumers.

Land availability and allocation, health and safety, subsidy on LPG and HSD, irregular gas supply are the key challenges and issues influencing the growth potential of natural gas sector immensely.

4. Duke Offshore

Mr. Avik Duke, Director of Duke Offshore industry stated that there is a great potential in Natural Gas Industry due to government support given factors like

affordability, accessibility and carbon profile. He predicted that houses will be equipped with PNG facilities, while vehicles will be switching to CNG in next 5-10 years. The challenges that the industry will face will be demand-supply gap, inadequate manpower, gas subsidies, under-recovery of LPG.

5. GSPL India Transco Limited (GITL)

With the great correspondence of **Mr. N. Bose Babu; CEO, GITL** and **Mr. Shailendra Ram, General Manager, GITL**, our team gathered information regarding the perspective related to growth of Indian Natural Gas industry with respect to its challenges, opportunities and strategic approaches.

They believe that the future growth potential of the natural gas sector in India will be mainly driven by the development of CGD networks, timely development of pipeline infrastructures, LNG Terminals and availability of domestic gas.

When asked about the challenges that can impact the growth potential of Gas Industry, Mr. Shailendra Ram and Mr. N. Bose Babu answered the following:

- a. Falling cost of power generation from solar and wind puts a huge challenge to gas based power sector.
- b. Electric vehicles pose another major challenge to CNG demand.
- c. Depressed price for domestic gas which is not encouraging companies to explore difficult fields and thereby obstructing availability of domestic gas in required quantity. This is very important as Indian fields are not only challenging & costly to develop but they also suffer from low productivity.
- d. High RLNG price.
- e. Encourage more players for development of pipeline infrastructure across the country, government shall ensure suitable rate of returns by providing anchor loads on the new network or by providing financial assistance by way of providing low interest funds from World banks/IFC/AIIB/JIB etc.

6. Gujarat State Petronet Limited

Mr. K. P. Radhakrishnan, DGM, stated his view in survey that currently gas supply plays peripheral role in India's energy mix. Approximately 55% of required gas is being imported. The demand of gas far outstrips the supply and there is potential for increase of share of gas in the energy mix.

Bringing natural gas under the GST regime, implementation of stringent laws, construction of long-distance pipelines to import and transfer gas are some of the few factors influencing the growth of the industry.

Mr. Radhakrishnna believes that a paradigm shift is required for future development of Indian Gas Industry. Several new LNG terminals need to be constructed to cater the existing Gas demand. CGD developments and industrial use likely to emerge as key drivers. Use of gas for new applications like LNG Locomotives, LNG vehicles, Distributed Power Generation, Combined Head and Power Generation Industry can increase the gas demand further.

7. Hindustan Oil Exploration Cooperation Limited

In the views of **P. Elango, Managing Director**, Natural Gas industry in India is on the cusp of major growth. The Indian government is focusing on increasing the natural gas share in the energy basket to 15% by developing the infrastructure, which promote the use of CNG, LPG, PNG facilities etc. depicting transformative growth in coming 5-10 years.

Mr. Elango believes that formulating a policy framework, that encourages the switch to gas-based economy and development of required LNG, Gas Grid pipe line infrastructure are the key challenges impacting the growing Indian gas sector.

8. IRM Energy Private Limited

According to **Mr. Karan Kaushal, Vice President, Business and Strategy, IRM Energy Private Limited**, there is tremendous potential of growth of Indian Natural Gas Industry. The share of natural gas in the energy mix is hitherto 6% which is poised to raise to double digits in the next 5 years. The Government of India is providing necessary impetus by cutting bottle necks both at the policy and the execution level. The growth of natural gas will be manifolds sooner than expected.

On the question regarding the key challenges which are influencing the growth potential of the Indian gas sector, Mr. Karan stated that government policy towards cutting emissions, Pricing of Domestic Gas and its priority towards CGD sector, ROU and Regulatory Bottlenecks for pipeline laying are few key challenges that must be focused.

9. Central U.P Gas Limited

Mr. Vipin Singh Rawat, Assistant Manager, HSE, stated in the survey that Government and public are solely responsible for growth and development of Indian Gas sector. He believes that Government should take initiative and make stringent regulations for using Gas as a primary fuel.

10. Oil and Natural Gas Corporation Limited

Dr. Prashanth Singh, DGM (M) in the 2018 Market Survey of Indian Gas Industry, stated that the future growth potential on year to year, if looked in percentage wise is immense, as very little of gas consumer market has been tapped. He believes that the entrepreneur industry is yet to gear up to for creating facilities in their units for gas based power source for greener environment.

Dr. Prashanth believes that transmission of Gas to consumer, gas pricing are the key challenges which are influencing the growth of gas sector. Due to heterogeneity in the factors affecting gas production price, it is a huge challenge for companies to meet the present gas pricing cap by government. This issue must be addressed by the government.

11. Adani Gas Limited

PDPU explained about the survey to **Mr. Naresh Poddar, CFO, AGL**. The following response were received

- a. Mr. Poddar suggested that PDPU being an energy focused institute, can develop video training modules for industry professionals (safety management during the PNG connection, high rise plumbing, operations in the CNG stations etc.) and consumers (safety awareness) in lieu of subscription fees.
- b. Development of incubating start-ups to work towards consumer interface can be looked into.
- c. To work towards the scope in the field of demand simulation (efficiency and optimization) with the help of integrated technologies supported by geospatial
- d. knowledge & GIS that will probably help in the proper planning of CGD.
- e. Requirement of CNG kit cost optimization to improve efficiency.
- f. Ponder over converting small vehicles (passenger cars, MCVs) from diesel to CNG with latest technological advancements.
- g. As a team, collaborate and work together to help facilitate:

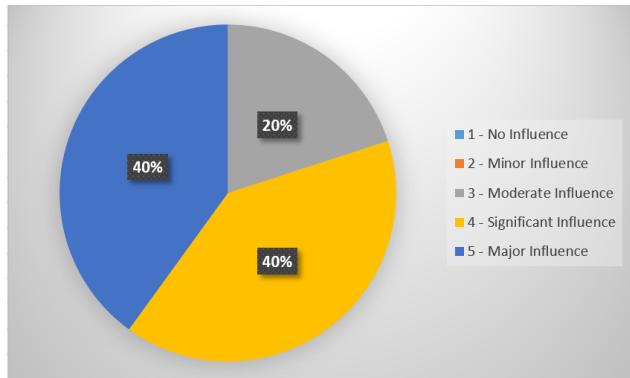
- Technology to convert auto-rickshaws from LPG to CNG
- Study the possibility to execute a centralized monitoring system for CNG stations throughout the city

12.Torrent Gas Limited

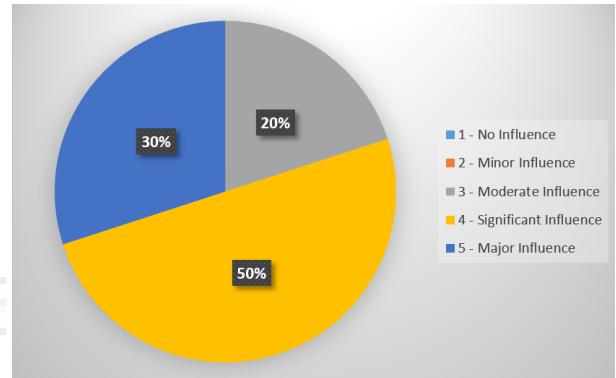
Our team met **Mr. Shah, Head-HR, Torrent Gas Limited**, at their headquarters in Ahmedabad, which ended on a positive note and the discussions are summarized as follows:

- a. Torrent needs immediate training on overall CGD perspective
 - He insisted **Prof. Anirbid Sircar (Chief Coordinator (GTI Workshop) Director General, GERMI)** and **Mr. Darshan Soni (Founder of Neet-Vasant Pvt. Ltd & ex-employee of Gujarat Gas Ltd.)** to deliver the same to the mid-level executives (15-20 executives, in number).
- b. The following topics can be considered for EDPs in the future:
 - To involve vendors in field training (as CGD is vendor intensive industry), helping them to understand the industry in a better manner.
 - Training sessions for fillers, plumbers, technicians, supervisors.
 - Techno-Commercial programs that can add value to the mid-senior workforce
 - Other gas industry experts may be invited to provide training for the same as well.

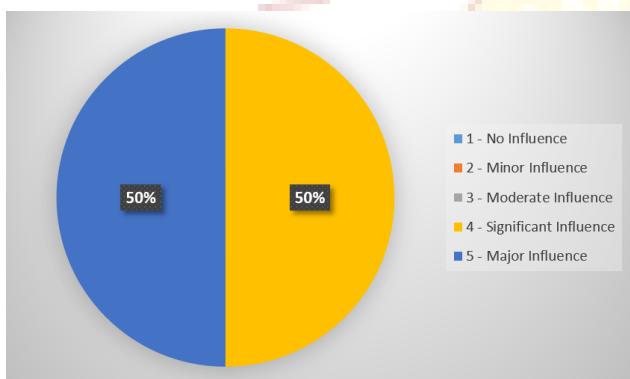
Responses | Identified key factors influencing the growth of the Indian gas industry



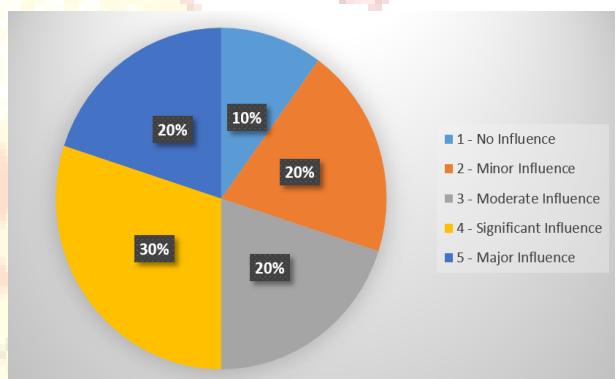
Increased Economic Gas Supply



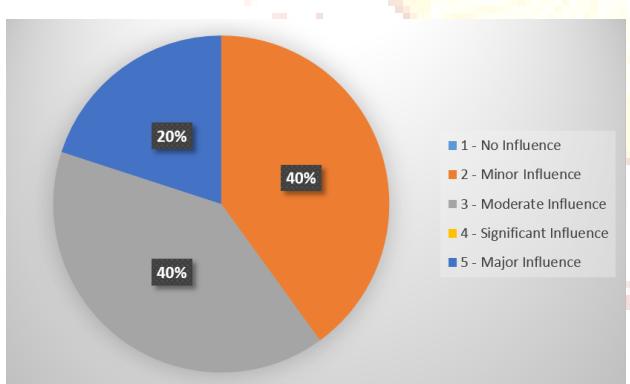
Increased Gas Transmission and Distribution Infrastructure



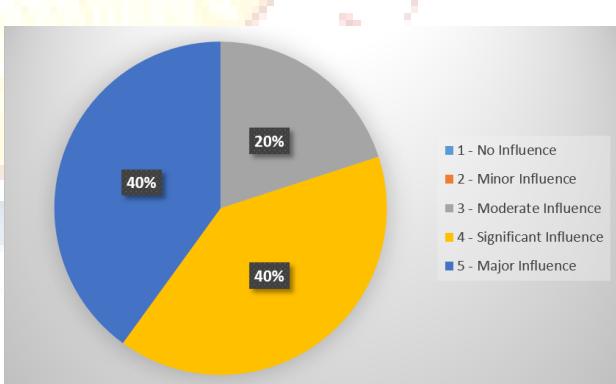
Government Support and Incentives



Urban Air Quality and Other Environmental Issues



Power Generation Demand

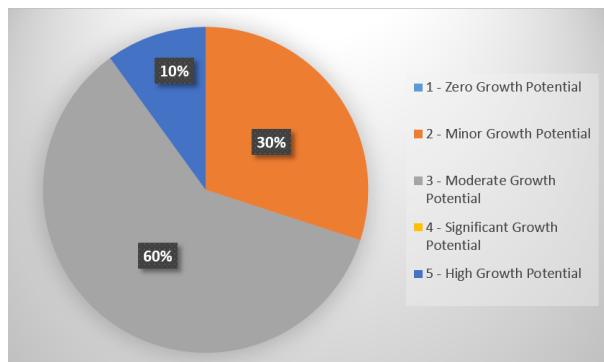


Industrial, Commercial and Other Consumer Gas Demand

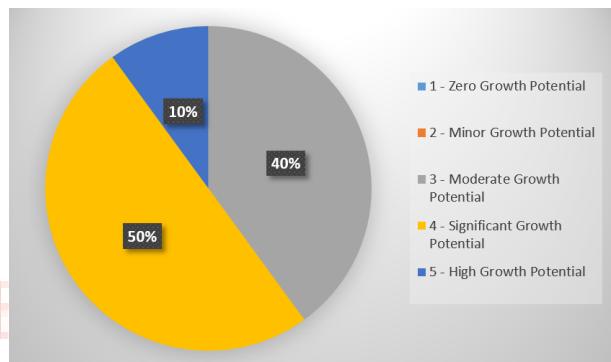
Following are the identified key factors influencing the growth of Indian Gas Industry:

- Increased Economic Gas Supply
- Government Support and Incentives
- Power Generation Demand
- Increased Gas Transmission and Distribution
- Urban Air Quality and Other Environmental Issues
- Industrial, Commercial and Other Consumer Gas Demand

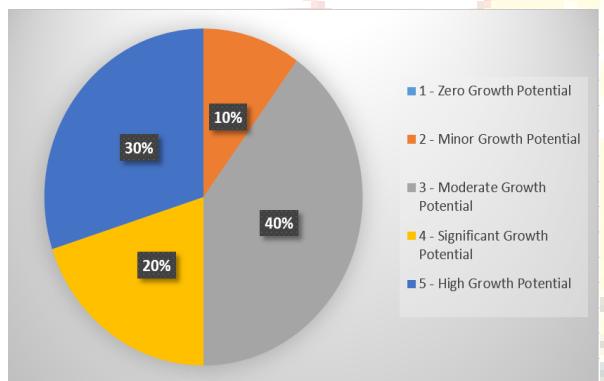
Markets | Offering near term growth potential for natural gas in India



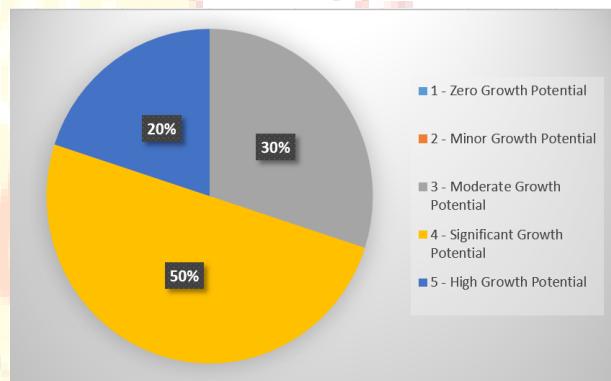
Power Generation



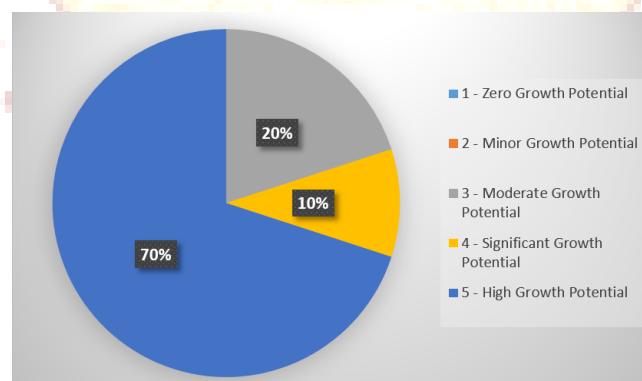
Industrial Applications
(Steam Generation and Process Heating)



Fertilizer Production and Other Feedstocks



Institutional, Commercial and Domestic Equipment

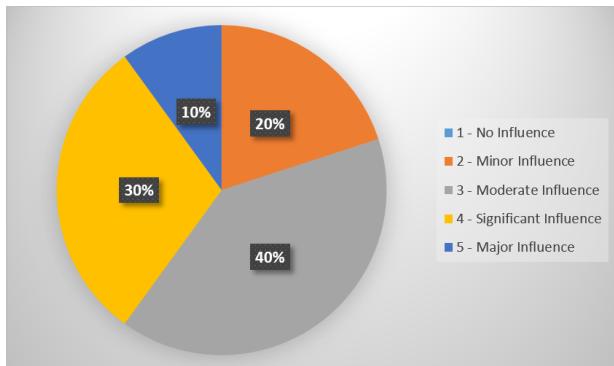


Transportation (LNG and CNG)

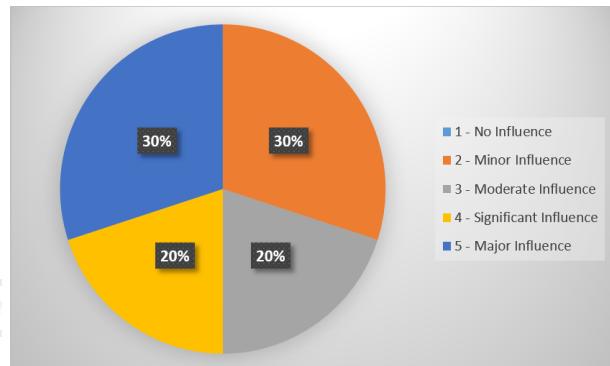
The markets that are offering near term growth potential for natural gas in India:

- Power Generation
- Fertilizer Production and other
- Power Generation Demand
- Industrial Applications
- Institutional, Commercial and Domestic Equipment

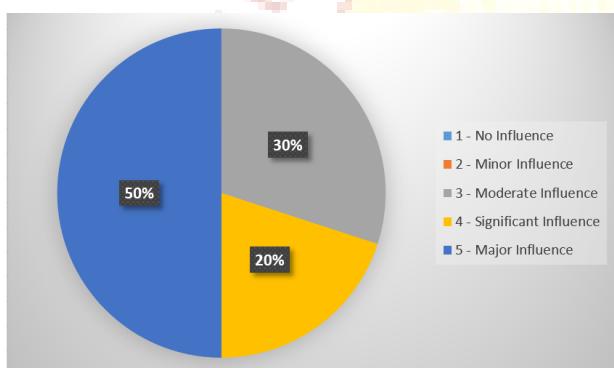
Responses | Identified key challenges influencing the growth potential of the industry



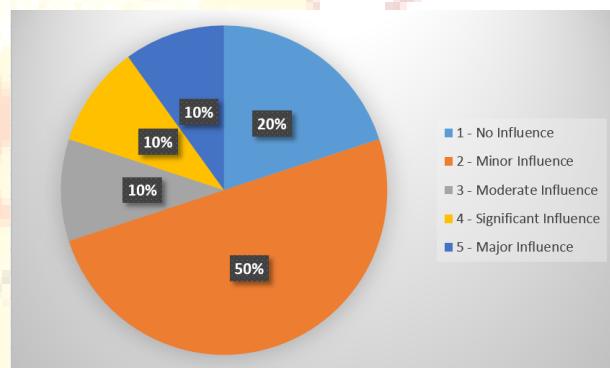
Lack Of Adequate Gas Supply



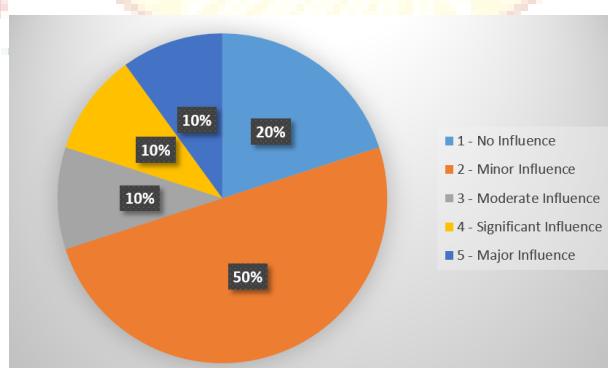
Lack Of Pipeline Capacity and Gas Infrastructure



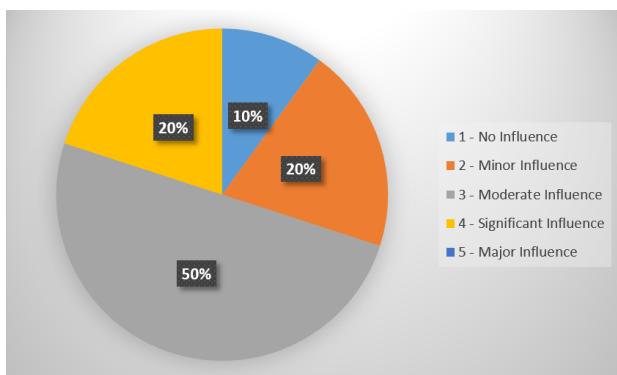
Natural Gas Pricing



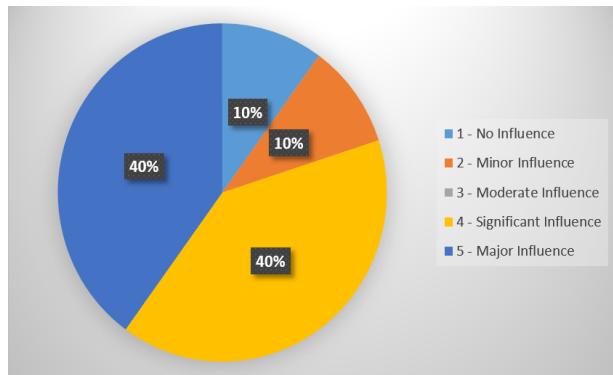
Environmental concerns



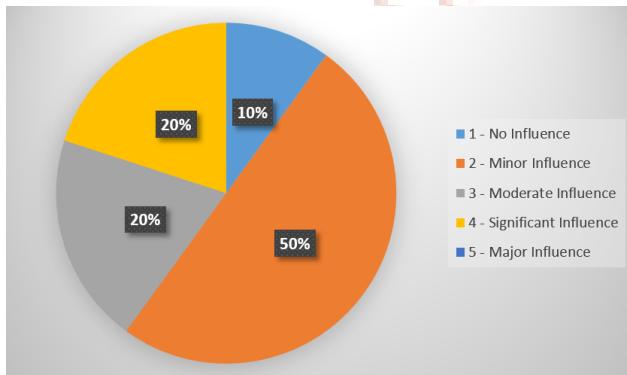
Renewable Energy Options



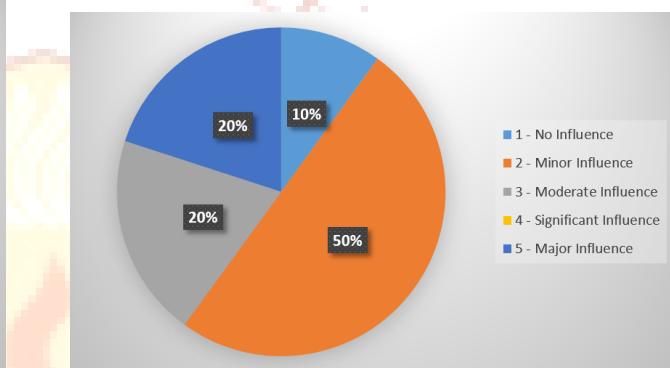
Competition From Other Energy Sources



Regulatory Compliance Issues



Adequate Trained Workforce



Public Resistance

Identified key challenges influencing the growth potential of the industry:

- Lack of adequate gas supply
- Natural Gas pricing
- Renewable Energy options
- Regulatory Compliance issues
- Public Resistance
- Lack of pipeline capacity and gas infrastructure
- Environmental concerns
- Competition from other energy resources
- Adequate trained workforce

Conclusions | 2018 Market Survey of Indian Gas Industry

The interaction from the industry experts provided great insight into the developments, government initiatives and impediments in the Indian gas industry. In the process of interacting with great minds of the industry, various valuable inputs were received.

From the above responses, we can conclude that the veterans of the industry have credence in government efforts, to transform India into a gas based economy that will increase the share of environment-friendly fuel in the Indian energy basket from 6.2 per cent to 15 per cent by 2030.

Following are the factors that will highly influence the growth of India towards Gas Based Economy:

- Urbanization
- Development of pipelines to import and for the transmission of natural gas
- Construction of LNG terminals
- Bringing the natural gas under GST regime
- Regulatory Compliance Issues

There would be increased use of natural gas in industrial applications, transportation sectors.

Natural gas pricing, use of other energy sources (coal, oil), availability of adequate trained workforce are the key challenges impacting the growth of Indian gas industry.

Many company representatives suggested the urgent need of formulation of new policies, campaigns from the government to support the use of natural gas and move away from polluting fuels.

It is expected that this PDPU-GTI Indian Gas Industry 2019 would be a common roof for the Industry doyens to review and analyse the market survey, understand the challenges, initiate collaborative research and field projects that would foster the Indian Gas Sector.



IMAGE COURTESY: THE FISCAL TIMES

Companies are showing drift in their methodology with changing needs, hence it is high time to break the stereotypes, change the trends and boost India towards Gas Based Economy.