ONE NATION ONE GAS GRID

CONTEXT:

- Prime Minister inaugurated the **450-km natural gas pipeline between Kochi in Kerala to Mangaluru in Karnataka.**
- He also set out his government's energy roadmap, **envisaging more than double the share of cleaner natural gas in the consumption basket, diversifying sources of energy, connecting the nation with one gas pipeline grid and bringing affordable fuel to people and industry**.
- He stressed that a **gas-based economy is crucial for Atmanirbhar Bharat** and work is being done in the direction of 'One Nation, One Gas Grid'.

NEED FOR THE GRID:

- The pipeline grid will not only help improve **clean energy access**, but also aid in the **development of city gas projects**.
- India is making attempts to usher a gas-based economy by **increasing the share of natural gas in India's primary energy mix from 6.2 percent in 2017 to 15 percent by 2030 (while the share of gas in the global energy mix was 23.4%).**
- The country is set to **expand the natural gas grid to 34,500 Km** under One Nation One Gas Grid.
- The regasification capacity of existing 42 MMTPA will be expanded to 61 MMTPA by year 2022.
- **City Gas Distribution projects** have been expanded to cover 232 Geographical Areas spread over 400 districts, with a potential to cover about 53 percent of country's geography and 70 percent of the population.
- India will also **spend $60 billion on gas infrastructure till 2024**
- India is adopting **clean mobility solutions**.
- India is boosting rural economy by **waste-to-wealth generation**, under the Sustainable Alternative Towards Affordable Transportation (SATAT) initiatives.
- India targets setting up **5,000 CBG plants by 2023-24** with production target of 15 MMT with an investment of about US $20 billion.
- The **import dependency of natural gas in India has reached to 53%.** Initiative will help in reducing this.

EVOLUTION OF THE GRID:

- Grid management **on regional basis started in sixties**.
- Initially, State grids were inter-connected to form regional grid and **India was demarcated into 5 regions** namely Northern, Eastern, Western, North Eastern and Southern region.
- The **integration of regional grids, and thereby establishment of National Grid, was conceptualised in early nineties**.
- In **October 1991** North Eastern and Eastern grids were connected.
- In **March 2003** WR and ER-NER were interconnected.
- **August 2006** North and East grids were interconnected thereby 4 regional grids Northern, Eastern, Western and North Eastern grids are synchronously connected forming central grid operating at one frequency.
- On **31st December 2013**, Southern Region was connected to Central Grid thereby achieving 'ONE NATION'-'ONE GRID'-'ONE FREQUENCY'.
- The integration of regional grids which began with asynchronous HVDC back-to-back inter-regional links facilitating limited exchange of regulated power was subsequently graduated to high capacity synchronous links between the regions.

- By the end of 12th plan the country had total inter-regional transmission capacity of about 75,050 MW which is expected to be enhanced to about 1,18,050 MW at the end of 2022.
- The objectives of the National Gas Grid thus, are **using a single source for removing regional imbalance with regard to access for natural gas and provide clean and green fuel, connect gas sources to major demand centres and development of City Gas Distribution Networks in various cities for the supply of CNG and PNG, pave way for establishment of vibrant Electricity market facilitating trading of power across regions.**

SCHEMES:

CGD Network

- Under the Petroleum and Natural Gas Regulatory Board (PNGRB) Act 2006, PNGRB grants the authorization to the entities for developing a City Gas Distribution (CGD) network (including PNG network) in a specified Geographical Area (GA) of the country.
- **CGD sector has four distinct segments " Compressed Natural Gas (CNG) predominantly used as auto-fuel, and Piped Natural Gas (PNG) used in in domestic, commercial and Industrial segments".**
  - Jagdishpur " Haldia/Bokaro " Dhamra Pipeline Project (JHBDPL) & Barauni- Guwahati Pipeline project (BGPL).
  - North East Region (NER) Gas Grid
  - Kochi-Koottanad- Bangalore-Mangalore (Ph-II) Pipeline Project (KKBMPL)
  - Ennore-Thiruvallur-Bangalore-Nagapattinum " Madurai " TuticorinNatural gas pipeline (ETBNMTPL).

NE Gas Grid

- The **1,656-km** North-East Natural Gas Pipeline Grid will **connect Guwahati in Assam to major cities in the region such as Itanagar, Dimapur, Kohima, Imphal, Aizwal, Agartala, Shillong, Silchar, Gangtok, and Numaligarh.**
- The pipeline will enable the supply of piped cooking gas to households and CNG to automobiles, besides fuel to industry.
- The North-East pipeline grid is to be implemented by **Indradhanush Gas Grid**, a joint venture of state-owned GAIL, IOC, ONGC, Oil India Ltd and Numaligarh Refinery Ltd.
- This is the **second time that a gas pipeline project in the country will be funded by the government.**
- In 2016, the government provided a capital grant of 40% of the project cost of the 2,655-km Jagdishpur-Haldia and Bokaro-Dhamra (JHBDPL) gas pipeline project, which GAIL is currently executing.

GAIL is also laying a 750-km line from Barauni to Guwahati as part of the ₹12,940 crore JHBDPL project, which is also known as the Pradhan Mantri Urja Ganga' project. This is proposed to be connected to the North-East via the Indradhanush grid.

Pradhan Mantri Urja Yojana

- The ambitious "Urja Ganga" gas pipeline project aims to **provide piped cooking gas to residents in Varanasi within two years and in another year after that, it would cater to needs of people in Jharkhand, Bihar, Odisha, and West Bengal.**
- **It will cater to the energy needs of five states, covering 40 districts and 2,600 villages.**

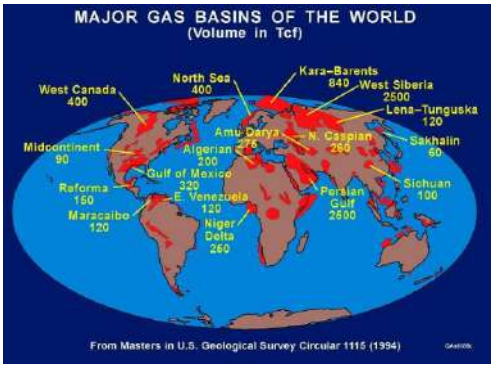
Sustainable Alternative Towards Affordable Transportation (SATAT)

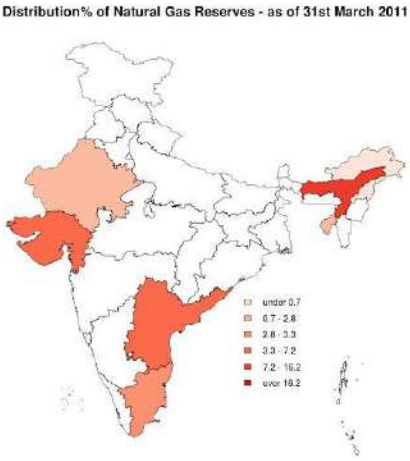
- An initiative aimed at **setting up of Compressed Bio-Gas production plants and make it available in the market for use in automotive fuels by inviting Expression of Interest from potential entrepreneurs.**

NATURAL GAS:

- Consists **primarily of methane and Propane, butane, pentane, and hexane are also present**.
- Natural gas is often **found dissolved in oil or as a gas cap above the oil.**
- Sometimes, pressure of natural gas forces oil up to the surface. Such natural gas is known as **associated gas or wet gas**.
- Some reservoirs contain gas and no oil. This gas is termed **non-associated gas or dry ga**s.
- Often natural gases contain substantial quantities of hydrogen sulfide or other organic sulfur compounds. In this case, the gas is known as **sour gas.**
- Coalbed methane is called **sweet gas** because of its lack of hydrogen sulfide.
- On the market, natural gas is usually bought and sold not by volume but by calorific value.

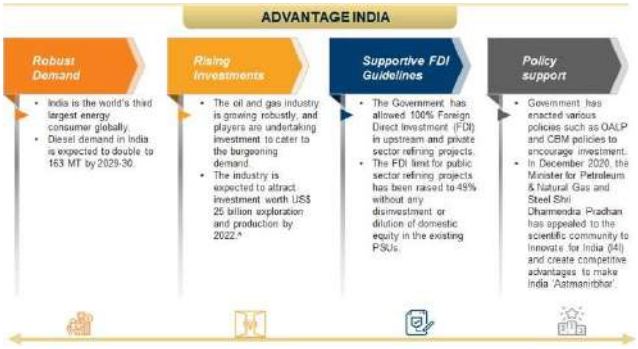
- Natural gas was formed millions of years ago when plants and tiny sea animals were buried by sand and rock. Layers of mud, sand, rock, plant, and animal matter continued to build up until the pressure and heat turned them into oil and natural gas.
- It is used in power generation, Industrial, domestic, and commercial usage, transportation, ingredient in dyes and inks, rubber compounding operations, Ammonia formation.





OIL AND GAS SECTOR IN INDIA:

- It is **among the eight core industries in India.**
- India's economic growth is closely related to its energy demand, therefore, the need for oil and gas is projected to grow more, thereby making the sector quite conducive for investment.
- Government has allowed **100% FDI** in many segments of the sector, including natural gas, petroleum products and refineries among others.
- India has been the **fourth-largest Liquefied Natural Gas (LNG) importer** since 2011 after Japan, South Korea, and China.
- India retained its spot as the **third largest consumer of oil in the world** in 2019.
- India is the **second-largest refiner in Asia**.
- Petroleum and natural gas sector attracted FDI worth US$ 7.86 billion between April 2000 and June 2020.



NATURAL GAS IN INDIA:

- Natural Gas consumption is **forecast to reach 143 MT by 2040.**
- **Gas pipeline infrastructure in the country stood at 17,016 kms** as of June 30, 2020.
- **Industry and power generation together accounted for 90% of natural gas consumption in 2017.**
- The remainder is consumed in transport, the residential and services sectors and in oil and gas extraction.
- As of 2018, India has **recoverable conventional natural gas reserves of 1340 bcm**, of which 61% are located offshore.
- Natural gas **production has remained stable at around 30 bcm per year** since 2013.
- The **majority of natural gas exploration and production activities are carried out by two PSUs – ONGC and OIL.**
- **PNGRB** was constituted in 2006 to protect the interests of consumers, to promote competitive markets and to regulate the refining, processing, storage, transport, distribution, marketing and sale of petroleum, petroleum products and natural gas (excluding production of crude oil and natural gas).
- State-controlled **GAIL owns and operates over two-thirds of the gas pipeline network.**
- India has **no international pipeline connections.**
- India has **four LNG terminals** located on the country's west coast and one new LNG terminal (Ennore) on the east coast, all with a total receiving capacity of 34 million tonnes per annum.

CHALLENGES:

- The Achilles heel of India's natural gas sector remains gas-based power generation. **India has a large installed gas power capacity, which is, however, underutilised.**
- **One challenge is gas pricing:** linking domestic gas prices to a basket of (very low) international reference prices has reduced incentives for domestic producers to increase supply.
- **Another challenge is unclear regulatory oversight of midstream/downstream activities**.
- India does not have a **gas security policy.**
- The execution of the gas pipeline project envisioned by the Prime Minister will be an uphill task because the **scope of natural gas is severely limited in India at present**.
- Firstly, the **gas fields are concentrated in only a few pockets across the country**, namely in Bombay high, offshore Mumbai coast, Tripura and Assam in the North East, and Krishna Godavari Basin down south.
- Secondly, the **pipeline system is insufficient**, given that it connects only the northern states.
- It is noteworthy that Petroleum, including natural gas, falls under the Union List. This leads to clashes in land acquisition at the local level, further delaying gas projects.

- **Obtaining permission** to lay the pipelines is only one of the hurdles, following which **safety issues of the workers** become a major concern given the explosive nature of natural gas, including accidents due to human error and technical fault.
- Apart from the impact on human beings, drilling to explore gas can have major repercussions on the **marine habitat.**

WAY FORWARD:

- Gas supply in India started to increase in the 1980s, largely driven by increased demand in the industrial (fertiliser production) and residential sectors.
- The reforms that allow marketing freedom to new supplies might help.
- For natural gas to compete in India, costs have to come down, including through **rationalisation of subsidies for coal and LPG and adjustment of the GST.**
- The **creation of a gas hub** would allow transparent price discovery on the basis of buyers and sellers interacting in an open market, and has the potential to remove the multiple price regimes in India.
- GoI should **clarify roles and responsibilities, and institutionalise lines of communication between administrative bodies**.
- As the share of natural gas is on the rise, it is advisable to embark on **developing a gas security policy** based on a well-functioning domestic gas market and robust gas infrastructure.
- The GoI should therefore promote the **development of a functioning gas market** that can allow supply to meet demand.
- This includes market-based price discovery, robust gas infrastructure, an independent regulator, third-party access to infrastructure, and competition among multiple buyers and sellers.
- The Government of India should **ensure gas is treated on a level playing field with other fuels for taxation and is included under the GST**.

SOURCES:

https://www.ibef.org/industry/oil-gas-india.aspx

https://www.powergridindia.com/one-nation-one-grid

https://youtu.be/wvy_6E2YisY

https://psuwatch.com/india-natural-gas-grid-34500-km-one-nation-one-gas-grid-dharmendra-pradhan

https://www.thehindu.com/news/national/govt-to-provide-5559-crore-funding-to-northeast-gas-grid/article30513102.ece

http://mopng.gov.in/en/natural-gas/about-the-division#

https://niti.gov.in/sites/default/files/2020-01/IEA-India%202020-In-depth-EnergyPolicy_0.pdf