

Gas Power Stations

Gas based generation in India got impetus in the eighties when HVJ (Hajira-Vijaypur-Jagdishpur) gas pipeline was commissioned by GAIL, after discovery of gas in the west coast of India. This led to a number of Gas based CCGTs getting commissioned along the HVJ pipeline in the western and northern parts of India. The present analysis deals with pipeline Grid connected Gas based plants as these plants are dependent on gas supply infrastructure. The outlook on gas pipelines is not clear as a number of approved projects have not come up. Most gas based capacity is centred (and may be the case in future) in South India, close to offshore gas fields and LNG terminals.

Natural gas based power generation capacity of India was about 24.2 GW by the end of 11th plan i.e. by 2012, out of which, about 18.3 GW was utility and 5.9 GW was captive power plants. Considering the drop in production of domestic natural gas, PLFs of about 54.5% in 2012 of gas-based plants has come down. However, it is expected that the situation is likely to improve in the coming years / decades.

Gas based power will be vital not only to meet peaking demand but also to balance RE. The price of LNG will be a major determinant in growth of this source. This lever examines gas based power generation scenarios until 2047.

LEVEL 1

Level 1 assumes that only the 12th plan's under construction capacity of about 12 GW will be added, though only by 2027. There will be no gas-based capacity addition later on due to domestic fuel shortage, expensive imports, lack of infrastructure etc. Considering the addition, the total capacity will remain at 36.5 GW from 2032 to 2047 which was 24.2 GW in 2012. The PLF of gas-based power plants will come down at 40.7% in 2047 from 54.45 % in 2012 due to lower gas availability and conversion efficiency will be about 58% by 2047, which is same as that in 2012. The electricity generation will rise from 115 TWh in 2012 to 130 TWh in 2047.

LEVEL 2

Level 2 assumes that the expected capacity at the end of the 13th five year plan under high gas scenario will be added by 2047 . The average CAGR will be about 2.1% and PLF will increase slowly from 42.5% in 2017 to 45% in 2047 due to slightly improved gas availability and conversion efficiency will be about 62% by 2047. As a result, the corresponding cumulative capacity will be 50.2 GW and electricity generation will be 198 TWh in 2047.

LEVEL 3

Level 3 assumes that the expected capacity in Natural Gas Pipeline Vision-2030 Document by Petroleum and Natural Gas Regulatory Board (PNGRB) will be added by 2047. Total capacity will be about 83 GW by 2047. PLF will increase from 45% in 2017 to 55% in 2047 due to improved gas availability. Conversion efficiency will improve to about 64% by 2047 due to technological advancements. As a result, the corresponding electricity generation will be 400 TWh in 2047.

LEVEL 4

Level 4 assumes that the expected capacity by 2032 as per forced gas scenario of Integrated Energy Policy (IEP) by Planning Commission will be achieved by 2047. Total capacity will be about 132 GW by 2047. The average CAGR under this scenario will be about 5%. PLF increases from 48% in 2017 to 60% in 2047 due to improved gas availability from both domestic and imported sources and conversion efficiency will be about 66% by 2047 due to improved technologies. As a result, the corresponding electricity generation will be 696 TWh in 2047.

