

Hydrogen

As the energy demand in India will increase over the years, the potential of various alternative sources will be exploited. Hydrogen fuel will emerge as a powerful and stable source by the year 2020 and will be available for production, storage and supply chain to be used in the transport sector by then. Hydrogen fuel will prove to be a cleaner source of energy once Carbon Capture and Storage (CCS) technology has been fully developed. According to the Hydrogen Roadmap developed by IEA, Biomass Gasification, the technology with the least amount of emissions and maximum accessibility to feedstock will have a major share in the total demand for Hydrogen fuel. Although hydrogen as a fuel has not taken off as yet in India, in the following analysis weighted predictions have been made by taking into consideration the various hydrogen production plans made in the National Hydrogen Energy Roadmap developed by the Ministry of New and Renewable Energy (MNRE) under four scenarios upto 2047 on the demand of hydrogen fuel and its breakdown into the various technologies of production fulfilling the demand.

LEVEL 1

This scenario assumes maximum penetration of hydrogen production methods like coal gasification and natural gas reforming because of the availability of the basic resources in the country and the commercial feasibility of these technologies. 95% of the demand for hydrogen fuel is fulfilled by coal gasification and 50% by natural gas reforming.

LEVEL 3

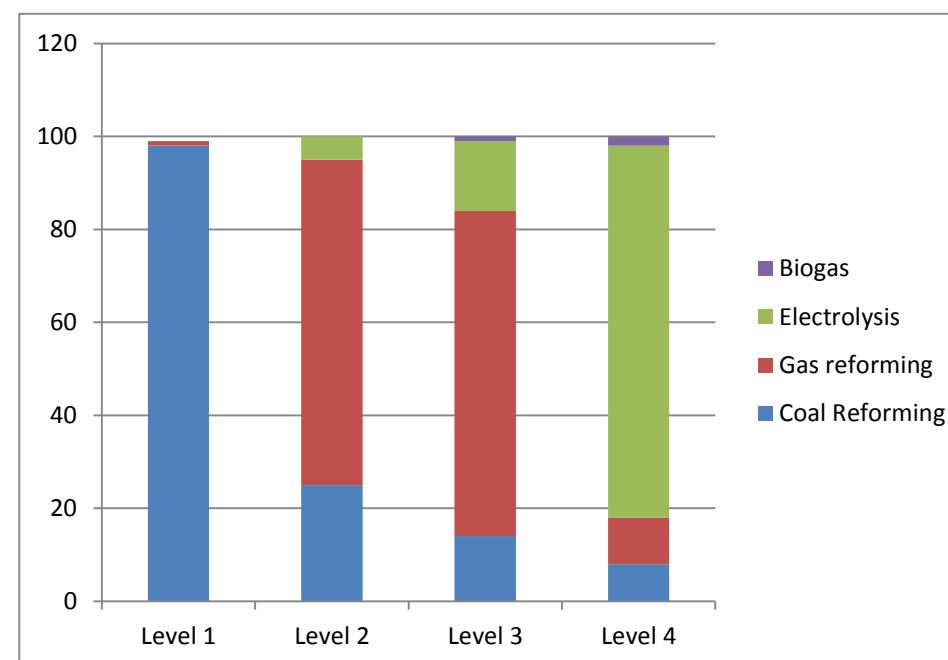
Under this scenario, a higher share of the entire hydrogen fuel demand is fulfilled by electrolysis and electro-chemical technology and a more drastic decline is observed in the usage of natural gas reforming. Electrolysis takes up 50% of the demand while 40% is taken by coal gasification, 5% by natural gas reforming and 5% by Biomass gasification.

LEVEL 2

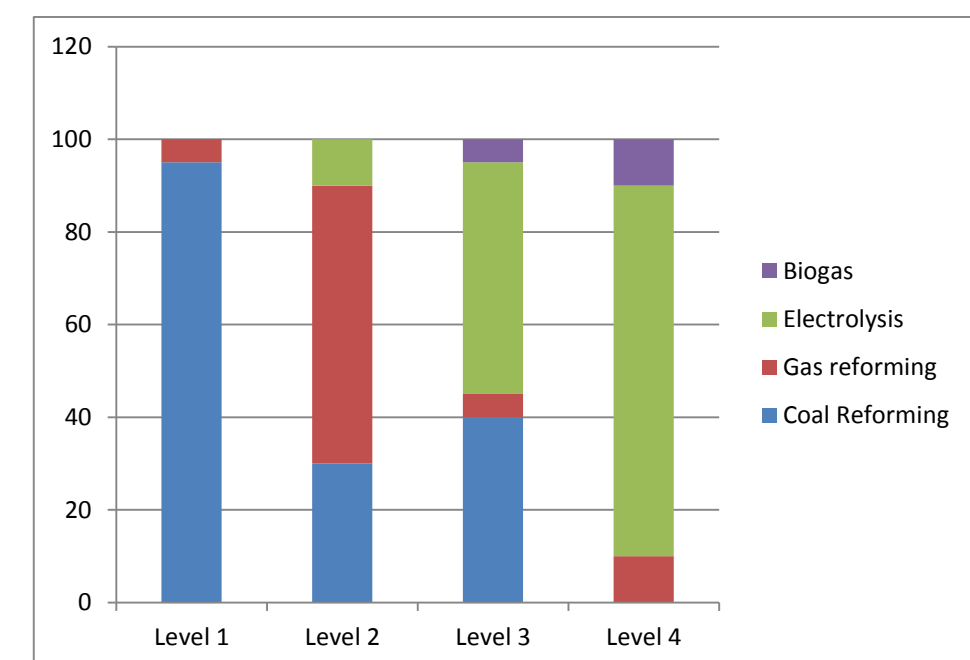
This scenario considers the advent of CCS technology in India and a slight penetration of electrolysis of water and electro-chemical water-splitting technology using renewable resources. At the same time a decline in the usage of natural gas reforming technology to reduce the burden on imports will be observed. 10% of the demand will be taken up by the electrolysis technology, 30% by coal gasification and 60% by natural gas reforming.

LEVEL 4

This scenario considers a high upgradation of electrolysis technology and CCS technology is installed in all coal gasification plants. 80% of the entire hydrogen fuel demand is fulfilled by electrolysis, 5% by coal gasification, 5% by natural gas reforming and 10% by biogas reforming.



Technology Penetration in Year 2022



Technology Penetration in Year 2047