

# National Hydrogen Energy Mission

February 8, 2021

**In news:** Recently, the Union finance Minister, during her budget speech announced the National Hydrogen Energy Mission that will capitalise on one of the most abundant elements on earth.

## Key updates on the National Hydrogen Energy Mission

For a green and sustainable future, the Finance Minister proposed to launch a comprehensive National Hydrogen Energy Mission in 2021-22 for generating Hydrogen from green power sources fulfilling the announcement made by the Prime Minister in November 2020.

## Prime Minister's announcement

- In November 2020, Prime Minister announced plans to launch a National Hydrogen Energy Mission, buttressing India's green energy credentials with the carbon emission-free next-generation fuel.
- He had said that India plans to build green hydrogen plants that will run on electricity produced by green energy sources and help reduce dependence on fossil fuels for mobility. They will provide grid-scale storage solutions, and provide feedstock for ammonia production.

## India and Hydrogen energy

- India is already keen on developing a hydrogen economy.
- It is a participant, one among 16 nations or groupings, in the Mission Innovation Renewable and Clean Hydrogen Challenge.
- A report titled '**India Country Status Report on Hydrogen and Fuel Cells**', launched by the Department of Science

and Technology in mid-October last year, outlines the benefits of hydrogen in comparison to conventional fuels and with respect to tackling challenges in the energy sector.

- The report says that Hydrogen with its abundance, high energy density, better combustion characteristics, nonpolluting nature etc, have vast advantages over the conventional fuels.
- It also says that the use of hydrogen can reduce the CO<sub>2</sub> related emissions significantly at the point of use and if green hydrogen is used then there is capability to decarbonize the entire value chain, enabling reduced emissions and climate change threats. It can even decarbonize the sectors where it is difficult to reduce emissions
- There is a wide variety of primary and secondary energy sources of hydrogen that can help to accommodate the local context in different parts of India and eventually help to cut the country's dependence on imports and move towards improved energy security.
- Agencies such as the Ministry of Science and Technology, CSIR laboratories, Ministry of Petroleum and Natural Gas, Defence Research and Development Organisation, Indian Space Research Organisation, and oil and gas companies are supporting projects centred around hydrogen production, storage, and utilisation for power generation and transportation applications.
- A '**Hydrogen Valley Platform**' is also in the works, courtesy the Department of Science and Technology.
- As per the Potential Role of Hydrogen in India report, by 2050, nearly 80% of India's hydrogen is projected to be 'green' – produced by renewable electricity and electrolysis
- According to the report, compiled by The Energy and Resources Institute, "green hydrogen will become the most competitive route for hydrogen production by around

2030”.

- Currently, 30 research projects in India are supported under the hydrogen and fuel cell programme of the Department of Science and Technology.

### **What is Hydrogen energy?**

It involves the use of hydrogen and/or hydrogen-containing compounds to generate energy to be supplied to all practical uses needed with high energy efficiency, overwhelming environmental and social benefits, as well as economic competitiveness.

### **How does Hydrogen fuel cells produce electricity?**

Hydrogen fuel cells produce electricity by combining hydrogen and oxygen atoms. The hydrogen reacts with oxygen across an electrochemical cell similar to that of a battery to produce electricity, water, and small amounts of heat.

Hydrogen fuel is a zero carbon fuel burned with oxygen. It can be used in fuel cells or internal combustion engines. It has begun to be used in commercial fuel cell vehicles, such as passenger cars, and has been used in fuel cell buses for many years. It is also used as a fuel for spacecraft propulsion.

### **Hydrogen Valleys**

- The Department of Science and Technology (DST) participated in Mission Innovation Hydrogen Valleys Workshop, Antwerp, Belgium focusing on the concept of ‘Hydrogen Valleys’ as a pathway for demonstrating the significance of hydrogen in the energy transition.
- ‘Hydrogen Valley’ is a geographical area – a city, a region, an island or an industrial cluster – where several hydrogen applications are combined together into an integrated hydrogen ecosystem that consumes a significant amount of hydrogen, improving the economics behind the project.

- It should ideally cover the entire hydrogen value chain: production, storage, distribution and final use.