

GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY
LOK SABHA
UNSTARRED QUESTION NO. 1170
ANSWERED ON 09.02.2023

HYDROGEN AS AN ECO-FRIENDLY FUEL

1170. SHRI SHRIRANG APPA BARNE
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SHRI DULAL CHANDRA GOSWAMI
SHRI SANJAY SADASHIVRAO MANDLIK

Will the Minister of New and Renewable Energy be pleased to state:

- (a) whether the Government proposes to develop hydrogen as an eco-friendly fuel in the place of Petroleum, Diesel and Compressed Natural Gas (CNG) and if so, the details thereof;
- (b) whether the Government has enacted specific rules for the regulation of hydrogen fuel or fuel cells in the country and if so, the details thereof;
- (c) whether any research has been initiated in the country by the Government to introduce any new way of hydrogen manufacturing and if so, the details thereof;
- (d) the time by which the use of hydrogen as an eco-friendly fuel is likely to be started in the country;
- (e) whether research and development in the field of Hydrogen Internal Combustion Engines, Hydrogen based CNG and diesel engines along with the development of Hydrogen-powered vehicles are being initiated and if so, the details thereof; and
- (f) whether hydrogen fuel based motorcycle and three wheeler scooters are manufactured and demonstrated and if so, the details thereof?

ANSWER

THE MINISTER OF NEW & RENEWABLE ENERGY AND POWER

(SHRI R.K. SINGH)

(a) On 4th January 2023, the Union Cabinet approved the National Green Hydrogen Mission with an outlay of ₹ 19,744 crore. The Mission aims to decarbonise industrial and mobility sector through use of Green Hydrogen as a fuel and industrial feedstock.

(b) Ministry of Road, Transport and Highways has notified some regulations regarding use of Hydrogen as fuel. Detailed list is placed as **Annexure**.

(c) Traditionally, Hydrogen is being manufactured/produced using Steam Methane Reforming and Coal Gasification process. Hydrogen can also be produced through electrolysis and biomass conversion.

The Ministry of New and Renewable Energy, under the “Renewable Energy Research and Technology Development Programme”, has inter alia supported the following projects:

- i. Hydrogen generation using biomass gasification for fuel cell application.
- ii. Hierarchical composite nano-structure photo-catalysts for efficient water splitting under solar light irradiation.
- iii. Studies on novel semiconductors towards increasing the efficiency of Photo-electro-chemical (PEC) water splitting for hydrogen generation.

CSIR- Central Electro-Chemical Research Institute has developed Polymer Electrolyte Membrane Electrolyzer and Electrode for Alkaline Electrolyzer technology, which have been transferred to industries for scaling up. CSIR launched Hydrogen Technology Program in April 2022 and R&D efforts are underway across CSIR laboratories, on all aspects of hydrogen, namely Production, Storage and Utilization.

(d) The Mission envisages various policy initiatives and several other financial and non-financial interventions for deployment of Green Hydrogen across certain sectors by 2030.

(e) Yes

Under a Research & Development project supported by Ministry of New and Renewable Energy, three Hydrogen Internal Combustion Engines (ICE) and two Hydrogen ICE based mini buses have been developed.

Further, DST has supported the following projects:

- i. Development and testing of Nano-doped hybridized biodiesel as pilot fuel for hydrogen dual fuel operation in a Compression Ignition engine
- ii. Development of Compressed Hydrogen-Fuel Cell Integrated System Suitable for Light Duty Vehicles
- iii. Design, Development, Testing and Evaluation of a Lean Premixed Swirl-Stabilized Gas Turbine Combustor for Stationary Power Generation using High-Hydrogen-Content Fuel

DST has also supported a project titled ‘Development of high-efficiency opposed-piston engine for hydrogen and Hydrogen-Compressed Natural Gas (HCNG) fuels.’

Additionally, a hydrogen powered fuel cell bus, based on the technology developed by CSIR, has been demonstrated last year by an industrial partner in Pune.

(f) Under Research & Development projects supported by Ministry of New and Renewable Energy, hydrogen powered three-wheelers and motorcycles have been developed by Indian Institute of Technology Delhi and Banaras Hindu University respectively.

Regulations notified by Ministry of Road, Transport and Highways:

- i. MoRTH has Notified the use of hydrogen as automotive fuel for fuel cell vehicles vide GSR 889 (E) dated 16th September 2016. The specifications for Hydrogen as a reference fuel have been incorporated in Annexure IV-W of Central Motor Vehicle Rules (CMVR) 1989.
- ii. MoRTH vide notification, GSR 885(E) dated 16th December 2022, has indicated the specifications of Hydrogen as a reference fuel for ICE BS IV vehicles.
- iii. The Government vide GSR 1151(E) dated 29th November, 2018 had already notified norms for dual fuel use of CNG/Bio-CNG/LNG in Construction Equipment Vehicles (CEV). Further, the Government has notified GSR 336(E) dated 4th May, 2021 to amend the Central Motor Vehicles Rules, 1989 to include retro fitment option for Construction Equipment Vehicles for dedicated CNG/Bio-CNG/LNG operation either by conversion of diesel engines or by replacing the engines.
- iv. In order to promote vehicles operating on hydrogen fuel, MoRTH has issued a notification, vide G.S.R. 889(E), dated 16.09.2016, for use of Hydrogen as an automotive fuel in the country. The specifications for Hydrogen for Internal Combustion Engine have been mentioned in Annexure IV-W of the said notification.
- v. Further, 18% blend of Hydrogen with CNG (HCNG) has been notified by this Ministry vide GSR 585(E) dated 25th September 2020.
- vi. MoRTH, vide GSR 579(E) dated 23rd September 2020, has notified norms regarding hydrogen fuel cell motor vehicles with at least four wheels.