The trial run of hydrogen fuel cell e-buses in Jorhat by Oil India Limited (OIL) marks a significant milestone in India's Green Hydrogen Mission. Affordability and availability will be two key factors impacting demand, which will also determine the pace of implementation of the mission in the country. Production of green hydrogen through electrolysis of water makes it a cleaner fuel than grey hydrogen, which is produced from fossil fuel. The cost of the electrolysers and the renewable energy used for electrolysis are the two major components of the cost of green hydrogen production. A reduction in the costs of capital investment, supply and treatment of water, storage, and distribution will reduce the cost of green hydrogen, which the mission needs to ensure. The view of the Ministry of New and Renewable Energy is that hybrid renewable energy power plants, comprising solar and wind energy combined with energy storage systems, enhance the reliability and availability of renewable electricity supply and are thereby likely to result in higher capacity utilisation of green hydrogen production facilities, lowering the production cost. The Union Cabinet approved the National Green Hydrogen Mission in January with an outlay of Rs. 19,744 crore with the primary objective of making India a global Hub for the production, usage, and export of Green Hydrogen and its

derivatives. Successful completion of the trial of hydrogen fuel cell electric buses is crucial for their commercial launch and generation of domestic demand, and hence the industry will be keenly watching the developments. The Central Government has set the target of producing 5 million metric tonnes of green hydrogen per annum by 2030, with 70% for export and 30% for domestic consumption. Waiver of inter-state transmission charges for a period of 25 years to the producer of green hydrogen and green ammonia for the projects commissioned before December 31, 2030; notification of the Electricity (Promoting Renewable Energy through Green Energy Open Access) Rules, 2022, which has specified provisions for facilitating the supply of renewable energy through open access for green Hydrogen production. Besides drafting various standards related to green hydrogen, those have been forwarded to the agencies concerned for consideration for adoption. These are some of the key steps initiated under the mission. Besides, the Strategic Interventions for Green Hydrogen Transition (SIGHT) programme, which includes incentives for the manufacturing of electrolysers and the production of green hydrogen, is a key component that needs to be supplemented with an in-depth research and development programme. The availability of

water is critical for the production of green hydrogen, and Assam's abundant water resources can be an important hub for its production. Besides, the push for renewable energy in the northeast region also provides the ecosystem needed to facilitate the production of green hydrogen. The country's first green hydrogen plant, commissioned by OIL in Jorhat, demonstrated the availability of the technical expertise in the region to scale up the mission. The plant produces green hydrogen from the electricity generated by the existing 500 kW solar plant using a 100 kW Electrolyser array, which has found its application in charging the fuel cell of the e-bus on the trial run in the upper Assam town. A hydrogen fuel cell generates electricity by converting green hydrogen into energy, while in a battery-operated electric vehicle, a battery stores energy that is used when needed. The charging time of a fuel cell electric vehicle takes a few minutes, compared to several hours of charging time for an electric vehicle. Thus, fuel cell EVs can be an option to overcome the challenge of long downtime in battery-operated EVs for recharging the battery at charging stations. If the cost of electrolysis can be reduced and the distribution of liquid green hydrogen is cost-effective, then green hydrogen can be a game changer in decarbonizing the transport sector. The high

cost of hydrogen fuel cell vehicles compared to lithium-ion electric vehicles does not allow the automobile market to go for them. The hard reality is that high upfront costs and range anxieties due to a lack of charging stations for EVs have slowed the pace of adoption of lithium-ion electric vehicles. Unless technological breakthroughs are made to bring down the cost of vehicles running on green fuels or with lithium-ion batteries, as well as the easy availability of green fuels at an affordable cost and affordable charging of batteries, India’s phasing out of vehicles running on fossil fuels and replacing them with vehicles running on green fuels or batteries will remain a distant dream even after awareness of the importance of these alternative vehicles is generated to a satisfactory level. The transport sector accounts for 40% of air pollution in the country, and hence decarbonizing the sector is of paramount importance to achieving the climate goals of reducing emissions. While the country pushes missions to make adoption of green vehicles easy and affordable, strengthening public transport is a viable option to reduce the number of vehicles running on fossil fuels and bring down the air pollution level.