Shankar 7/Nov/20

Q. The potential of green hydrogen based vehicular fuel looks promising in the city. Examine (200w)

A) Hydrogen is usually considered as an energy carrier (like electricity) as it must be produced from a primary source. Though it is a color-less & odour-less gas, it is color-coded according to the way it is produced.

Eg: Black/Brown hydrogen - produced from coal.

Grey - from natural gas

Blue - from steam methane reformation supported by carbon capture & storage unit.

Green hydrogen is made by using clean electricity from renewable energy technologies which could almost eliminate emissions. The renewable energy powers the electrolysis of water generating hydrogen & oxygen gases.

Promising fuel:

① Hydrogen fuel has
- reduced refuelling time
- higher energy density
- longer range

② Lifecycle GHG emissions from green hydrogen fuel is around 130 g CO_2e per km which is comparitively low as per Deloitte.

③ Direct production of H-CNG avoiding expensive conventional blending (22% ↓ in cost)

③ Versatile nature of the green hydrogen fuel allows it for wide applications.

④ According to Deloitte, the learning rate for green hydrogen fuel is around 17% for passenger vehicles. which is good.

However, the green hydrogen fuel faces limitations like –

① Low energy efficiency rate (25-35%)

② Plentiful supplies of renewable electricity for electrolysis is needed – unavailable in India at present + costly at the moment

③ Electrolysis process is costly + short supply of big electrolysers

④ Being highly flammable, storing & transp -orting of green hydrogen is very difficult given the inadequate infrastructure (dedicated pipelines) in the country.

Moving into emerging fuels like Hydrogen is one of the 7 key pillars of India's energy security plan. In line with the objective NTPC is planning to set up a green hydrogen facility in AP.

Improvements in renewable energy technology, swift R&D in hydrogen electrolysers promises a good future of green hydrogen in India.

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