



## News &amp; Views

# The US hydrogen fuel industry today and future

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In December 2021, the US Department of Energy (DoE) unveiled the Office of Clean Energy Demonstrations with \$21.5bn in federal funding to deploy the advanced green technologies. The most significant portion of the budget, \$9.5bn, has been dedicated to renewable hydrogen to commercialize innovative technologies and establish four regional hubs and a recycling and manufacturing program. Green hydrogen is already the focus of the DoE's energy initiatives, which aims to mitigate the cost of renewable hydrogen production by 80% over the next decade.

The US government has dedicated \$9.5bn to develop green hydrogen as a part of the \$1.2 trillion Bipartisan Infrastructure bill. The bill includes \$8bn budget for the large-scale regional renewable hubs; at least one hub would employ fossil fuels, one would apply renewable energy, and one would use nuclear power. The DoE offered \$1bn of this funding for research and development (R&D) in green hydrogen electrolysis, and the remaining \$500m was allocated to the manufacturing and recycling of hydrogen. The bill requests the federal government to deploy the first-ever national hydrogen roadmap and strategy for the US. It is expected that the bill will help DoE to play a crucial role in the climate agenda by obtaining 100% carbon pollution-free electrical power generation by 2035 and net-zero carbon emissions by 2050 [1]. Additional financial support for green hydrogen, including a \$1.85 trillion budget, is being negotiated by the Democratic-controlled US Congress to enact the bill. The bill would include \$3.5bn in grants for domestic manufacturing of hydrogen fuel cell and battery electric vehicles, along with \$200m to support hydrogen fueling equipment. But the considerable part of the hydrogen budget would dedicate to the tax credit for hydrogen production technologies that are significantly cleaner than the traditional steam methane reforming (SMR) method. Analyses have indicated that tax credit could make renewable-based hydrogen production cost-competitive or cheaper than SMR-based hydrogen production techniques in certain US markets [2]. The renewable hydrogen market has an incredible potential to grow substantially across the next two decades. The zero-carbon emission hydrogen utilization in transportation,

maritime and heavy industry will speed up the decarbonization targets in the US. The total hydrogen production addressable market has the potential to pass \$1 trillion by 2050 compared to around \$125 billion today. Nevertheless, today green hydrogen production is extremely more expensive than the grey hydrogen produced from unabated non-renewables, which account for 95-99% of the world's hydrogen demand. The cost of green hydrogen is \$3-8/kg, while the grey hydrogen cost is \$0.50-1.70/kg. Currently, just 200 MW of electrolyzers are developed globally, and not all of them are using green energy. The world's largest operating renewable hydrogen project today, in Quebec, Canada, is just 20MW. Over the past 20 years, the feed-in tariffs and national tenders have dramatically mitigated the cost of wind and solar power generation, and it is believed that renewable hydrogen could trace a similar path. The consensus view is that the US government should subsidize green hydrogen in short to medium term to reduce its overall cost and make it affordable to achieve a sustainable market for green hydrogen [3]. In this context, Oklahoma has formed a partnership with Louisiana and Arkansas to accelerate the hydrogen economy and create a regional hydrogen hub to consider tax credits for individuals and businesses producing and utilizing green hydrogen fuel. These states are situated to illustrate the entire value chain of hydrogen fuel and are situated to tackle the hard-to-decarbonize sectors such as transportation, industrial sectors and manufacturing. To develop hydrogen utilization in heavy-duty transportation, the US senate works on "hydrogen for trucks act" and "Hydrogen for ports Act" proposals to incentivize heavy-duty

vehicle owners to buy hydrogen-fuelled trucks and deploy the use of hydrogen-related technologies in shipping applications and ports. Approximately 25% of all transportation greenhouse gases are emitted by heavy-duty vehicles while accounting for only a small portion of vehicles on the road. However, hydrogen fuel cell-powered vehicles release no tailpipe emissions, making cleaner transportation without sacrificing range or reliability. The "Hydrogen for Trucks Act" program would enable fleet owners to switch to zero-emission hydrogen fuel cell vehicles, and the "Hydrogen for Ports Act" program would develop hydrogen-fuelled equipment at ports and in shipping applications in a single location that can share hydrogen infrastructure [4].

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