

## Carbon Market: Certification is the Missing Link in India's Green Hydrogen Ambitions

The Union Cabinet approved the National Green Hydrogen Mission (“**NGHM**”) in January, aiming to make India a global hub for the production, use, and export of green hydrogen (“**GH**”). Yet, despite the lofty ambition, India does not have a framework for GH certification. To boost global procurement, the tracking system should guarantee the origin of GH.

A certification framework could be introduced for GH as well, to facilitate trading of hydrogen as a commodity on national and international markets. Further, the large-scale deployment and uptake envisaged under NGHM, as well as the coordination between national, regional, and international markets, will depend on the global acceptance of credible instruments to certify the origin of GH. While national certification must align with international markets, robust tracking systems are needed to trace attributes across the value chain, create transparency, bolster demand, and sustain markets.

GH molecules are identical to those of grey hydrogen (produced from methane). Accordingly, once hydrogen has been produced, a certification system allows end-users and governments to ascertain the origin and quality of such hydrogen. Further, the price of hydrogen produced from fossil fuels is different from that of green hydrogen (produced through electrolysis of water using renewable energy). However, it is impossible to determine the precise extent of embedded emissions from the final hydrogenated product. Accordingly, the system must address the information asymmetries between GH buyers and sellers by creating a transparent hydrogen market. This, in turn, requires a certifying mechanism. Further, the strength of a certification framework can determine the likelihood of investments in RE for producing additional clean hydrogen.

India could learn from the use of tracking certificates for energy products such as European biofuels. For example, such certification considers how, and how far the biofuels and feed stocks are transported. Similarly, GH certification could factor in mode of transport and distance travelled, since hydrogen delivered in diesel trucks may have a

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greater carbon footprint than when distributed through a pipeline. Another example is the CertifHy project, which ensures that GH certificates are compatible with EU legislation, including the recast Renewable Energy Directive (RED II).

There are two main ways to classify hydrogen. One is color-coded (for example, the Green Hydrogen Policy (GHP) announced by the Power Ministry last year had defined 'green' hydrogen as that produced via water electrolysis using RE or from biomass).

However, this approach does not provide information regarding greenhouse gas ("GHG") content. For instance, GHG emissions may be related to the distribution of electricity for GH production. Tracking certificates should mention the GHG content in each produced unit of GH along the value chain, namely from production to transport. Thus, the second way to classify GH is quantitative, based on GHG emissions. Hydrogen produced with a certain percentage of carbon footprint may be certified under a specific label (such as low- or high-carbon).

The hydrogen value chain includes production, transportation, storage, and end-use. Each stage involves underlying processes, requiring energy leading to emissions. Thus, defining the boundaries of a value chain in the accounting and certification process will have a major impact on creating a robust GH market.

In a report published in June last year, NITI Aayog had recommended a GH labelling program, including harmonized frameworks based on government-to-government and industrial partnerships for hydrogen-embedded products, such as green steel. NITI Aayog also suggested a digital tracing mechanism to ascertain the green credentials of GH.

According to the International Renewable Energy Agency (IRENA), four key regulatory foundations are necessary for GH policymaking. While three of these have been covered under NGHM, the fourth involves guarantees of origin. At the very least, India could explore the advisability of integrating RECs with GH certificates over the short term.

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