India: Green Hydrogen - 'Fuel Of The Future'

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by Pallavi Bedi and Ashita Bali

Phoenix Legal

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On its 75th Independence Day (15 August, 2021), India launched the National Hydrogen Mission ("**Mission**") to meet its climate targets and with an aim to make India the global hub for manufacturing of, and largest exporter of, green hydrogen.

Interestingly, India had realized the potential of hydrogen early on, and sometime in 2006, the then Government had issued the 'National Hydrogen Energy Road Map'. The idea of this initiative was to achieve sustainable energy security with the focus on hydrogen being used as a green fuel for transportation and in power generation. This road map envisaged the development of hydrogen to be in public private partnership model. However, much did not materialize post that.

Subsequent to the launch of the Mission, the Indian Government ("**GoI**") issued the Green Hydrogen Policy on 17 February, 2022 ("**Policy**"). Unfortunately, the Policy (though in line with the past practice of the Ministry of Power) was bare bones and sketchy; and did not offer the details, which the industry was expecting.

The Policy

The Policy defines green hydrogen/ green ammonia as - '*hydrogen/ ammonia produced by way of electrolysis of water using renewable energy; including renewable energy which has been banked and the hydrogen/ ammonia produced from biomass*'. Some of the key features of the Policy are:

- Grant of waiver of inter-state transmission charges for a period of 25 years to the producers of green hydrogen and green ammonia for the projects commissioned before 30 June, 2025;
- Grant of open access to green hydrogen and green ammonia plants for the purposes of sourcing renewable energy within 15 days of receipt of an application;
- Connectivity at the power generation end and manufacturing facility end to be granted on priority basis;
- Banking of renewable energy to be permitted for 30 days for manufacture of green hydrogen and green ammonia;
- Setting up of manufacturing zones for green hydrogen and green ammonia;
- Setting up of bunkers by the manufacturers of green hydrogen/ green ammonia near ports for storage of green ammonia for export/ use by shipping. The land for the storage purpose would be provided by the respective port authorities on payment of applicable charges;
- Establishment of a single portal for all statutory clearances and permissions required for manufacture, transportation, storage and distribution of green hydrogen and green ammonia, and grant of clearances and permissions within 30 days from the date of application.

In order to further incentivize, the Policy envisages that the renewable energy consumed for the production of green hydrogen and green ammonia would count towards the renewable purchase obligation of the consuming entity. And, the renewable energy consumed beyond the obligation of the producer would count towards the renewable purchase obligation of the DISCOM (distribution utility) in whose area the project is located.

Probably because the Policy was devoid of details, a month after the notification of the Policy, the GoI (through the Ministry of New and Renewable Energy) in March 2022 reiterated its plan to issue the National Hydrogen Energy Mission ("**Mission Document**"). The Mission Document aimed to set out (i) the specific strategy for the short term (4 years) and broad strokes principles for long term (10 years and beyond); (ii) a framework to promote manufacturing of green hydrogen through suitable incentives and facilitate its demand creation/ volume in identified segments such as fertilizer, steel, petrochemicals etc.; (iii) step-plan on (a) promoting infrastructure development required for providing the impetus to growth of green hydrogen, and (b) promoting research and development; (iv) facilitate policy support; and (v) putting in place a robust framework for standards and regulations for hydrogen technologies.

It appears that once notified, this Mission Document would act as a primer for the development of green hydrogen ecosystem. And, more importantly effective implementation of the same would be critical to achieve the objectives envisaged by GoI over a year ago.

Where do we stand currently?

Considering the GoI's push to promote this sector, a number of public sector undertakings launched pilot projects to explore viability of green hydrogen projects. Additionally, some government companies have also floated tenders for the development of green hydrogen generation project at their existing refineries. The private players in the energy sector (both global players and large domestic players) are also very keen in participating in the Indian green hydrogen and green ammonia growth story. This interest is being demonstrated by a number of private players signing 'memorandum of understanding' with various state governments (such as, Tamil Nadu and Karnataka) for development of green hydrogen/ammonia projects.

While it seems that the initiatives of the GoI have created good interest in this sector, if our ambitious target (of becoming a green hydrogen hub) is to be achieved, then an action plan needs to be prepared and implemented right away. Now, we briefly discuss below some of the steps/interventions that may be required to attract the much-needed investment for the development of this sector.

Interventions

- ***Well defined regulatory framework*** - as a first step, the much-awaited Mission Document should be issued by the GoI. Hopefully, this Mission Document would provide clarity on a number of factors, such as, how manufacturing of green hydrogen would be pushed, what all manufacturing zones are being contemplated, how would the demand of green hydrogen be created, how technological development (for manufacturing green hydrogen/ammonia) in India would be promoted, the steps to promote research and development activities in India for green hydrogen, etc.

From publicly available information, it seems that to create demand for green hydrogen/ammonia, the concept of green hydrogen purchase obligation is being considered akin to 'renewable purchase obligations' used to promote renewable energy growth in the country. This certainly would be a good policy initiative.

It seems that green hydrogen may be an option to address the issue of integration of renewables with the grid. The GoI is probably considering this already, however establishing technical certainty of the same and then putting together a step plan of how in fact the various stakeholders can adopt using green hydrogen to achieve grid stability while injecting greater renewable energy in the grid, may be another means of demand creation.

Further, it would be imperative to issue specific regulations/ rules (or amendments to the existing rules/regulations or notifications) to ensure that the incentives contemplated by the Policy (such as, faster grant of open access or connectivity, banking facilities) are recognised by our regulatory regime. This would assist in ensuring that the same are then smoothly implemented by the relevant regulatory authorities. One of the biggest issues that the power industry has grappled with is issuing policies

which are either not blessed by the parent legislation or inconsistent with the existing policies/ regulations.

Another aspect which requires clarity is the manner of export of green hydrogen, the process for land allocation and charges for building the infrastructure at ports for storage, the incentives that would be provided to exporters, etc. The good part is that the Policy contemplates (*albeit* without any details) setting up of bunkers near ports for storage of green ammonia for onward exports; with the land to be provided by the port authorities at applicable charges.

- ***Land support*** - the GoI's support for development of green hydrogen/ ammonia production plants, such as assistance with land allocation and grant of approvals would be critical. The pet peeve of the foreign investors has been procurement of land for their projects and obtaining approvals in India. While, broadly the Policy suggests that the GoI would set up manufacturing zones and also allocate land in renewable energy parks for the development of green hydrogen plants, no detail has been provided. It would be helpful if the regulations under various state statutes can be issued detailing the process for setting up manufacturing zones, identifying and demarcating the land bank for the same, setting out the process of land allocation (if it would be on long term lease basis or would be sold), streamlining the process for obtaining the various land use and zoning approvals for developing hydrogen plants, defining the developer's right to create mortgage over the said land in favour of its lenders, etc.

- ***Financial Support*** - currently, the biggest concern of this sector is the commercial viability of green hydrogen and green ammonia development projects. Unless the cost of production of green hydrogen and green ammonia is reduced, the transition from fossil fuels seems to be an uphill battle. One incentive that may be considered to control the cost of green hydrogen would be viability gap funding support that may be provided by the GoI to developers.

It appears that majority of the production cost of green hydrogen is the cost of electrolysers (i.e., a device used to extract hydrogen from water). And, considering this, it seems that the GoI plans to launch a production linked incentive scheme worth INR 15,000 crore for manufacturing of electrolysers. Policies like this would not only assist in controlling the cost of green hydrogen but also making India a manufacturing hub.

Additionally, the GoI may consider other financial incentives that can be granted to developers of green hydrogen, such as, concessional goods and services tax on manufactured electrolysers or initially reducing or exempting customs duty on import of the equipment required for manufacture of green hydrogen/ ammonia.

- ***Renewable energy availability*** - the low cost of renewable energy is a huge advantage and makes India well placed to become a leader in the green hydrogen/ ammonia development. However, continuing the development of renewable energy at low prices and at the same pace would be crucial to achieve

the development of green hydrogen. Unexpected regulatory changes (such as those in relation to basic customs duty, safeguard duties, approved list of models and manufacturers requirements) and recent increase in module prices have impacted a number of renewable energy projects. The GoI would need to equally consider the requirements and support/incentives that are needed for the continued development of the renewable energy sector.

- ***Water requirement*** - as production of green hydrogen requires substantial amount of water (about 9 litres of water for 1 kg of production of hydrogen[1]), availability of water would be essential for this sector. Thus, may be useful for the GoI to examine the sources of water and the support it can provide in ensuring water availability. Of course, this would have its challenges as India is a water stressed country. One option to consider may be to require developers to set up desalination plants as part of the green hydrogen project to treat the waste water (to be supplied by relevant regulatory authorities) and then use such water for electrolysis.

Clarity on the aspects discussed above would perhaps provide some comfort and certainty to investors keenly looking at the Indian green hydrogen/ ammonia sector (and consequently boost the overall growth of the sector).

Way forward

The GoI seems to recognize the importance of green hydrogen and green ammonia in achieving India's decarbonization and net-zero emission targets. However, we need more concrete steps (and fairly soon) to be taken if 'green hydrogen' is to become the fuel of the future and if we genuinely want to transition from fossil fuel/ fossil fuel-based feed stock. Hopefully, we can act in time and capitalize on this opportunity.

Footnote

1 ACS Energy Letters 2021 6 (9), 3167-3169.