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NextGen Summit 2023: Time for India to take up leadership role in hydrogen

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The fifth session emphasized on need for building infrastructure, indigenous production of raw material, improvement in technologies and building a complete hydrogen value chain

By Rahul Koul

India's ambitious National Green Hydrogen Mission entails the development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonne) per annum with an associated renewable energy capacity addition of about 125 GW by 2030. To further push the efforts, the union budget has allocated US$ 2 billion for implementing the projects in a time bound manner.

The leading industry experts discussed the hydrogen scenario at the fifth session, 'Shift Towards Hydrogen Economy' of NextGen Chemical and Petrochemical Summit 2023 organized in Mumbai by the Indian Chemical News on July 13-14, 2023. The session was moderated by Manish Panchal, Executive Director, Equirus Capital.

Panchal expressed his high optimism about India's hydrogen story while comparing it with the journey of the solar industry. He opined: "We all have seen the progress of renewable energy in India. Between 2008 to 2010, a similar scenario that we are talking about hydrogen was talked about solar then. It was a non-viable model and there was no breakthrough in technology. It was only after 2014 things started changing and an audacious goal was set. Today we have been positioned as global leaders in the solar alliance. We see that what was Rs 18-24 around 18 years back is no Rs 2 to Rs 2.5 per kilo. There is a lot of excitement about the hydrogen, especially at the government end and it is expected to undergo leapfrogging and not just pole vaulting."

"By 2030, the Indian government has committed 500 gigawatt of renewable power and I believe that history might repeat on mission mode as it happened with solar. There is a large opportunity for India to achieve the net zero and sustainability targets much before the target of 2070," Panchal added.

"While the large projects on hydrogen look encouraging and are focused on meeting the energy demands of large industries and transportation, we have to, however, keep in mind that a large number of things need to be put in place. As of now the giga scale projects are missing and it's just the blueprints. The largest project running currently is in the mega scale and I see a lot of potential for green hydrogen at this scale. As we can use them in distinct energy systems. We are moving towards the decentralized energy landscape and green hydrogen can play a crucial role in providing reliable and clean energy solutions to communities, commercial buildings and residential complexes," said

Sturle Pedersen, Chairman, Greenstat Hydrogen India.

‘‘I believe that medium and kilo scale level is important as that is also attractive to consumers and a lot of applications will be developed for the consumer market. With the fuel cells getting more efficient and cost going down, there is a tremendous market opportunity. One of the key challenges before us is to build the infrastructure as the cost is no longer a big issue as many research institutes are working on improving the raw materials and technology. The other areas are transportation and storage are other challenges. India is in a remarkable position to take up the leadership in green hydrogen and green ammonia but need to step up the efforts. India needs to look at attracting investments,’’ added Pedersen.

‘‘It’s an egg and chicken story as infrastructure waiting for the applications and vice versa. We believe that both need to be addressed simultaneously. At Toyota, we are working on the fuel cells and have been able to bring down the cost in the last few decades. We have made plug and play type cells where the module can be installed in any application easily without any connection issues. We have got two modules available, horizontal type as well as vertical type which can meet various application requirements. At a global level, we are talking with many partners to provide such solutions that can maximize applications. Interesting part is how much we can leverage hydrogen and in this context we are focused on both the mobility part as well as the stationary area. We have modules for stationery that could address from 60 kilowatt to mega kilowatt requirements,’’ said Jitendra Goyal, Associate Vice President, Toyota Kirloskar Motor.

‘‘We have 450-470 kilowatt modules that can be directly connected and easily set up. We have taken extreme care in terms of safety and leakage. These modules work in harsh environmental conditions and containment requirements are low. There is a lot of innovation happening to reduce the cost and improve the density. We are also developing small scale 8 kilowatt modules for the telecom industry wherein we are using the methanol to generate hydrogen. It is also applicable for smaller gensets. There are many prototypes that we are working on and these should be ready for commercialization in a few years,’’ added Goyal.

‘‘We have commissioned a hydrogen blending and natural gas pipeline project in January 2023. We are going full-fledged and have increased the blending ratio from 5% to 10%. This is fully green hydrogen and the first kind of such project in India. So we are very excited as everything including the whole design has been made in-house. In green hydrogen, we are building hydrogen filling stations and 10 hydrogen buses are coming. Another project we are excited about is green methanol where we are extracting C02 from flue gas that is commissioned in August 2022. The hydrogen part is yet to be commissioned,’’ said DMR Panda, General Manager Hydrogen, NTPC.

Panda added: Though there are small bottlenecks, it is expected that these will be overcome. For example, earlier the concern was that things are getting too costly but many things are being unfolded by the ministry, such as SITE 1 And SITE 2 where a lot of incentives are being given. NHM has triggered many actions in various ministries.’’

‘‘There are many bold things that are happening. Government and industry are now looking at the domestic market as well. While the exports are always exciting, the domestic projects are equally important but difficult. Unless we are doing the upscale plants of 100 megawatt electrolyzer capacity, we will not be taken seriously. Two weeks back JSW announced a green hydrogen plant at their steel plant. It is a real project on the ground and not waiting for financial approval for off-take,’’ Amrit Singh Deo, Senior Managing Director, FTI Consulting.

‘‘On NGHM front, policies have been framed. The site scheme is there and NGHM has been launched and though secretariat has been formed, a few meetings have taken place. Government is fully backing this ambition and it’s a clear signal from the government that green hydrogen matters and all the areas that we have spoken about are important. But this is just an enabling factor but the real work will start when the private industry and developmental

sector come in. The stage has been set in terms of policies set but the project development will begin soon,'' Deo added.

''At the moment, a lot of the projects are at the pilot scale and I think when we are doing pilots, there are always avenues to find what works and what doesn't. There are quite a lot of sectors where as far as the right derivatives are concerned, ammonia is in the usage. There are practically many industries where it is in vogue. The case studies of applications and how you produce ammonia through cleaner means would slightly differ from industry to industry. For a certain specific set of chemical industries such as refineries it is different vis a vis some others in the space such as processing plants which also consume ammonia. I think it is very difficult to just take one case study as it varies for various verticals and here pilot scale projects are a good way to know where to focus more in the future,'' said Vish Iyer, Global Chief Commercial Officer, Jakson Green.

''Green ammonia might potentially be the fastest scale up of any bulk chemical in human history. Today we have about US$ 120 million of green ammonia production, in 25 years time, that could be US$ 35 billion to US$ 50 billion. So such a huge annual revenue will be created in the next 25 years and that's a reasonable certainty. The projection, though uncertain as of now, is that ammonia might be the shipping fuel of choice and for the first time India will not be feedstock disadvantaged. The country is 70% solar power and second most competitive in space after the Middle East. In such a scenario, the industry and government must work together to make the country the second most competitive destination for Green Hydrogen,'' said Viswanathan Rajendran, Partner, Kearney.

Rajendran added further: ''We cannot have a US$ 20 billion hydrogen industry with electrolyzers from China, solar panels from China. If India has to become US$ 35 billion green hydrogen industry in the next 25 years, we need to look at building the ecosystem. 2-3 conglomerates will have to take up big projects in terms of 2-3 gigawatts. There has to be the indigenous production of captive industrial scale electrolyzers, end to end solar panel and energy storage. Infact India has a competitive edge over China due to labor cost. We need to make the start and the announcements are a step in the right direction but deployment is the way forward.''

NextGen Chemical and Petrochemical Summit 2023 themed 'Innovation, Self-reliance and Sustainability' witnessed attendance by a huge number of stakeholders from the chemical and petrochemical industry across India.

The Summit was supported by the Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers and co-partnered by DCM Shriram. The Gold Partners of the event were Premier Tech, Ingenero, Rieco, ABB, PIP, Deepak Group, Dassault Systemes, Moglix and Siemens. Associate Partners were Tata Chemicals, Anupam Rasayan India, Sealmatic, Godavari Biorefineries, Huntsman, Tranter, Source.One,IPCO,and Aeroflex. The Lanyard Partner was Jakson Green. Industry Association Partners were AMAI, Gujarat Chemical Association, CropLife India, Chemicals and Petrochemicals Manufacturers Association, India and, AgroChem Federation of India.