Making Hydrogen-based Society a Reality

The Tokyo Hydrogen Museum is a fun day out with educational benefits.

by **Kuv Ahmad**



Young citizens can learn about the cleaner, more sustainable future that they will inherit by engaging with some of the interactive exhibits at the Tokyo Hydrogen Museum.

Hydrogen is a colorless, odorless gas that is found in minute amounts in the air we all breathe. When used as an energy source, the only byproduct is nonpolluting water. This helps to reduce environmental pollution as well as diversifying the national energy mix, with spillover effects on the economy and industry.

The Tokyo Metropolitan Government (TMG) has been promoting the creation of a disaster-resilient city with lower environmental impacts. While analyzing and implementing various strategies for the future utilization of hydrogen energy, the TMG and the Tokyo Environmental Public Service Corporation opened the Tokyo Hydrogen Museum (Tokyo Suiso-miru) in 2016. It is the only facility in the metropolis with the role of increasing awareness of hydrogen energy technology, its significance, and safety profile, as well as the role of defining what it will mean to live in a hydrogen-based society in the future.

The museum is not a traditional museum, but rather an information center. It was designed for children of upper-elementary to junior high school age, when they have developed a sense of themselves as members of society. Here, they can learn about the usefulness of hydrogen as an energy source, and how its use can change society for the better. The museum clearly explains the three main benefits of hydrogen in comparison to other energy resources such as fossil fuels and wind power: namely, that its only byproduct is water, that it can be produced from various other energy resources, and that it can be stored.

The first floor of the museum is split into six zones, each with colorful illustrations showcasing the stages of how this sustainable energy source is made, stored, distributed, and used in daily life. One of several interactive elements in the museum is actual hydrogen production. When a wheel on one of the displays is turned quickly, pure hydrogen is formed inside a clear, water-filled cylinder. Although the gas is colorless, the formation of hydrogen can be seen when bubbles appear inside the cylinder.

Another popular activity available in the museum gives visitors the opportunity to imagine life in a hydrogen-based Tokyo of the future. They have their photograph taken, then select a preferred persona, choose a profession and purpose, and then see their avatar go about its day on an interactive wall map. Finally, a printed residence card is presented for keeping inside the Tokyo Hydrogen Museum's original plastic folder that each visitor receives upon entry: a reminder of their day out at the museum.

The second floor of the museum also houses a life-size model of a hydrogen dispenser and the side of a hydrogen fuel cell vehicle, where visitors are encouraged to enact the filling of the vehicle's tank. Besides certain hydrogen stations, in real life this task would only be carried out by a trained and qualified technician—definitely something for visitors to experience.

An example of how the TMG has been pushing forward with its plans for a hydrogen-based society in partnership with the national government, scientific institutions, and the private sector is parked outside the museum—a hydrogen fuel cell vehicle from Toyota named MIRAI. Water that has been emitted from the car when electricity is generated can clearly be seen. One of the greatest benefits of these cars is the ability to supply electrical power in the event of a natural disaster. The fuel cell of this car can create enough electricity to meet an average-sized family's needs for four to five days.

The move towards a hydrogen-based society is already becoming a reality in Tokyo. Directly in front of the museum is a hydrogen station—one of 22 in the city as of August 2021, including nine stations for buses. Among the TMG's objectives for 2050 is to increase the number of stations to 150 by 2030. As of March 2021, 85 hydrogen fuel cell buses are in service, with over 300 hydrogen and electric buses to be running by 2030.

After the entertaining and informative tour of the Tokyo Hydrogen Museum, visitors leave with a sense of anticipation for a cleaner, greener, low-carbon, hydrogen-fueled society of the future. Many of the younger ones, particularly elementary and junior high school students, will be the bearers of that society in its ascendancy.

There is also interest from overseas visitors who want to know more about the potential of a hydrogen-based future.

