

Hydrogen supply not far up the road

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I have been promoting hydrogen as our fuel of the future for vehicles because it is clean. But there are hurdles to overcome before they can be used commercially.

These have to do with commercial production, efficient transport and safety.

For production, I have described how Towngas can assist in producing hydrogen by adsorption. Apart from that, a most common method is by electrolysis using renewable energy.

The Water Supplies Department is trying a small floating solar system in Plover Cove Reservoir that can produce 100kW. If we can scale it up to cover 10 percent of the reservoir's surface, it can potentially produce 100MW, capable of producing 7,000 kg of hydrogen a day.

This can power about 300 doubledecker three-axle buses.

For comparison purposes, 100MW is about 1 percent of the total electricity generated in Hong Kong at present. For large volumes, we can import hydrogen from Guangdong in tube trailers.

The present production capacity in the mainland is about 35 million tonnes.

According to Guangdong plans, supply capacity could be more than 100,000 tonnes per year in 2025.

Tube trailers carrying hydrogen at high pressure are already in operation here to cool generators at power plants.

At 200 bars, each trailer can deliver around 200 kg of hydrogen to users.

Reinforcing larger-size tube tanks with carbon fiber to withstand pressure of up to 300 bars, we can increase capacity more than twofold, making them efficient as bulk transport over long distances.

With a traveling distance of less than 120 kilometers, well within the practical limit of road transportation to Hong Kong, a plant in Guangdong can easily supply us with bulk hydrogen.

Better still, the route will be through open highways all the way without any tunnels whatsoever, further minimizing any risks of incidents in confined space.

As for distribution to users, the plan is that vacant sites in the New Territories or bus depots can be used as filling stations.

Apart from using tube trailers, these stations can also be supplied by the Towngas network. The other hurdle is safety legislation.

At present, there is no regulation, which makes it difficult for the Transport Department to allow hydrogen fuel cell vehicles to run on public roads.

But I understand Hong Kong is planning to conduct a trial of hydrogen fuel cell buses and heavy vehicles and may enact new regulations or amend existing ones using the Gas Safety Ordinance as a model, specifying responsible bodies such as gas supply companies, owners, contractors and end users, and emphasizing training and giving competent persons the appropriate responsibilities.

Hopefully such legislative changes can be made in the next few years in time for hydrogen fuel cell vehicles to be commercially used, as we already have some 30 years of successful experience with LPG vehicles with minimal incidents.

We all look forward to the day when hydrogen can replace fossil fuels, supplementing and replacing electric vehicles and solving the battery disposal problem.

The quicker charging cycle and the much lighter weight of hydrogen will help to make it more efficient and more convenient for daily use, significantly reducing carbon emissions.

For a century, our vehicles depended on fossil fuels, but it looks like we may not have to wait too long to see a cleaner means of road transport happening.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over features of modern life