

## Hydrogen can power our push for zero emissions

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Continuing my examination of our electrical power supply system, I would like to share with you some technical aspects that I have learned from an international conference that I helped to organize early this month.

The conference, organized by the Energy Institute (Hong Kong Branch), looked at the potential of hydrogen and clean energy in helping us reach net zero carbon emissions and covered many aspects that can affect our daily lives.

We would be inclined to believe this can be achieved through extensive use of renewable energy.

That might be true in theory, but Hong Kong, with its limited land resources, will find it not easy to achieve this target. But by using hydrogen as an energy carrier, it may be a practical way forward.

Peak power demand here these days has changed from a twin-peak of mid-morning and mid-afternoon to an evening peak around 8 pm.

This is because we no longer have large-scale industrial activities.

Our power use now mainly flows from commercial and domestic activities.

With commercial activities involving crowds as well as people going home for dinners and family gatherings, the power peak is now in the evenings with air-conditioning systems in full blast.

What is worth shining a light on is that, unlike many cities elsewhere, we cannot depend on renewable energy such as solar power to meet our peak demands, as its output would normally only be abundant in mid-afternoon.

Our major power source, therefore, lies in imported fuels.

We are already replacing coal plants with LNG plants, and hopefully with combined-cycle gas turbines of much higher thermal efficiencies, we can burn natural gas as fuel with far less emissions and reasonable costs, thanks to our utilities being prudent in buying forward contracts at fixed prices, thus avoiding the geopolitical fluctuations that most countries are experiencing recently.

Our long-term policy, helped by the Scheme of Control system, ensures that power utilities can make long-term plans to use the most efficient plants and a flexible choice of fuel.

Some of the plants can burn a variety of fuels from coal to oil and gas, ensuring that power supply can continue even in the event a particular fuel sees a shortage.

For the longer term, hydrogen will likely be much more widely used for power plants, as some gas turbines can be converted to burn hydrogen as fuel.

Critics will claim hydrogen fuel can never compete with LNG on costs, but I am optimistic that with increased installation of large-scale renewable plants in its western region, China will become a large producer of hydrogen.

When transportation systems for hydrogen improve, either by road transportation or by pipeline, we will be able to burn hydrogen in our power stations.

Increasing use of battery electric vehicles may see them connected to the grid for charging as well as to feed power back to the grid to augment peak demand.

With advanced AI control systems, these vehicles can be supplementary power suppliers early in the evening and be charged up later at night.

Hong Kong does not have the land needed to build new power stations, but with new technology, and eventually a reliable connection to the south China power grid, we should be able to continue to enjoy reliable power supply at an affordable tariff, ensuring that our future economic and social activities can grow without the risk of power insecurity.

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