

# HEADWINDS APLENTY IN RENEWABLE ENERGY RACE

In line with the recent net zero carbon target by 2050, promoted by the International Energy Agency, there is a worldwide view that there is a need to significantly reduce the amount of fossil fuels being burnt to reduce carbon emissions.

For Hong Kong, some 65 percent of the carbon emissions can be attributed to electric power generation. It therefore makes sense for our power utilities to reduce the long-term use of fossil fuel power plants.

To recap, the fuel mix of power generation capacity had been about 25 percent nuclear, 50 percent coal-fired and 25 percent natural gas, but with the new natural gas plant commissioned at Black Point, natural gas plant capacity has overtaken coal plants.

But the target of 5 percent renewable energy to further reduce fossil fuel burning will remain a daunting task as we only have a limited amount of land resources available to develop this form of power energy, despite strong promotional efforts to use solar tiles for building roofs.

The larger potential source of renewable energy appears to be wind power.

At present, the only sizable wind power generator in operation here is Hong Kong Electric's Lamma Winds.

It has a power capacity of 1MW but its ability to produce electricity depends heavily on the weather. As wind direction and velocity can affect output, it cannot generate power continuously for 24 hours a day, 365 days a year.

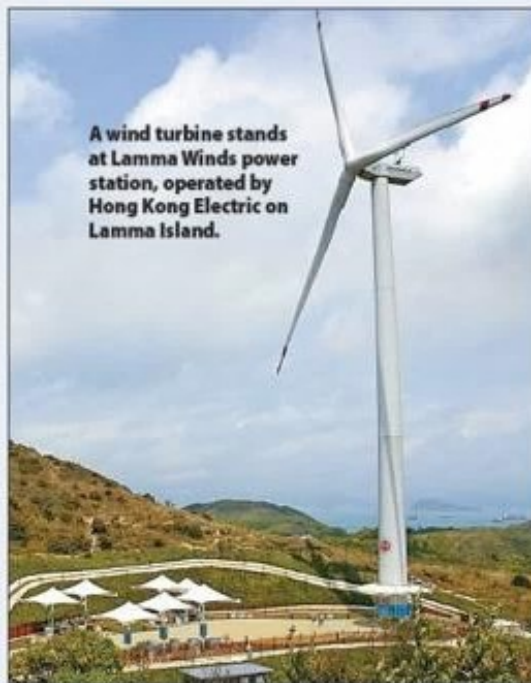
But even with it operating at full capacity, it is still only a tiny proportion of the total 13,000MW generating capacity at present.

A more practical way to increase renewable energy appears to be offshore wind farms.

As an example, CLP Power has a plan to build a wind farm in the eastern part of our surrounding sea, east of the Clearwater Bay Peninsula.

A site of between seven to 12 kilometers on that coast has been earmarked.

With an estimated total of 50 wind turbines, each with a 3MW capacity based on the available technology at the time of the plan, it would generate about



150MW, equivalent to about 1.5 percent of our maximum power demand.

Implementing this project will be challenging as the long distance from the nearest connection point to the near point of the 132kV power transmission grid, probably at Tseung Kwan O, would be a long 10km away from the mid-point of the wind farm power grid. The resulting power loss will be appreciable.

Construction of the foundation of the wind farm may encounter technical issues as well, since the technology for such installation is still in the pioneering stage and will attract significant costs, especially as there is a need to ensure minimum impact to the seabed and fishery activities.

Reassuringly, preliminary studies confirmed that the environment impacts can be controllable and acceptable.

The longer-term effects of wind turbines over their life span also needs to be considered.

The experience in Europe and the US shows some concerns about reliability and the disposal of wind turbine blades at the end of their life cycle. More technological development will be welcome to minimize this form of pollution.

Power engineers still have a lot of work to do to find a long-term solution that meets the zero carbon target, as it must be achieved with minimal environmental impact in their life cycle.

**Veteran engineer Edmund Leung Kwong-ho casts an expert eye over Hong Kong's iconic infrastructure**