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Global shift to renewable energy

Malaysia has ample RE sources such as hydro, solar, biogas and biomass

by SHAHEERA AZNAM SHAH

THE limited sources of fossil fuels such as gas, coal and oil have seen utility companies shifting towards renewable energy (RE) to generate electricity.

Apart from the infinite supply of RE, it is also supposed to help reduce greenhouse gas emission as the process of converting it into electricity is said to be of low carbon or carbon free.

The environmental factor of a country plays an integral role in the power generating sector. Malaysia, for example, has ample sources of RE such as hydro, solar, biogas and biomass.

Tenaga Nasional Bhd (TNB), Malaysia's largest power utility, has been adopting the clean technology by utilising more RE sources in its operations.

In its efforts to address global warming and other climate change issues, TNB is focussing on adopting clean and efficient technologies for its power plants, proactively embracing RE, developing innovative solutions and research, as well as carbon footprint assessments, TNB said in its 2016 annual report.

TNB reported that the total RE capacity in Peninsular Malaysia as at end-2016 stood at 2,874.1MW, with hydro being the largest component at 89%. The other sources are solar energy (260MW or 9%), biogas (27.7MW or 1%) and biomass (26.6MW or 1%).

Biomass and biogas are fuel-type RE that can be used to replace fossil fuels, while hydro and solar are naturally-occurring energy that can be converted into electricity.

Hydropower plants have a capacity of 2,559.9MW in Peninsular Malaysia, making it the largest RE contributor.

These plants generate electricity by harnessing the power of flowing water. Malaysia has 20 power plants that generate electricity using hydropower, including the independent power producers.

In balancing the sources of the nation's power generation, TNB is currently building new hydroelectric power stations and are in talks with several companies for more.

"We have added new major hydro plants such as Ulu Jelai Hydroelectric Power Plant with the capacity of 186MW and Hulu Terengganu Hydroelectric Power Plant (250MW). TNB is currently planning with the relevant stakeholders to build new hydro plants namely in Nenggiri, Lebir and Telom, with multipurpose functions including flood mitigation capabilities," the national utility had said in the past.

Although biogas and biomass each contribute only 1% to the country's energy, they are notable for their impact on the environment. Biogas is produced by breaking down the organic resources from landfill and sewage, while biomass is developed from organic materials such as palm oil waste.

However, coal is still the single-largest fuel used in the generation of electricity in Peninsular Malaysia. As at end-2016, TNB statistics showed that coal made up 51% of the total fuel mix, followed by natural gas, including liquified natural gas at 45% and hydro at 4%.

Throughout the years, local coal-fired power producers have imported various types of coal for Malaysia's power plants, namely from Russia, South Africa, Indonesia and Australia.

Now, in 2017, there are four power plants in Peninsular Malaysia that operate solely on coal alone.

TNB's Sultan Azlan Shah Power Plant (Manjung Power Plant) in Perak, for example, produces the highest energy among other plants with the capacity to generate 3,080MW.

In recent years, coal-powered producers globally have begun employing the ultra-supercritical (USC) technology to process coal. TNB emerged as the first power producer in South-East Asia to deploy this method. It is used at the fourth and fifth Manjung Power Plant as well as at Jimah Power Station.

"TNB is improving the efficiencies of its fleet of thermal plants by deploying the latest USC technology for new coal power plants and more efficient large combined cycle gas turbine plants, consistent with the need to comply with more stringent emission limits as prescribed in the Environmental Quality (Clean Air) Regulations gazetted in 2014," said TNB in one public document.

USC is said to be the gold standard in the efficiency as it enables more energy to be converted without compromising the stringent emission standards. On top of that, USC also enables the plant to use less coal for combustion, which resulted in less emission.

Making up 45% of the total sources of power in Peninsular Malaysia, gas is the second-largest contributor to the power generation sector and heavily used in the industrial, commercial and residential areas.

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