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Harnessing the power of nature

By NGEH CHEE YEN

IN March this year, Environment Minister Yeo Bee Yin announced that the Government is looking into peer-to-peer (P2P) energy trading schemes and virtual net metering to expand solar energy uptake in Malaysia.

pv magazine, an international publication focused on the global photovoltaics (PV) community, published an article in March titled *Malaysia mulls P2P energy trading and renewable energy certificates*. It reported that the Government is currently working on a Renewable Energy Transition Roadmap through 2035 that will include strategies and action plans to reach its renewable energy target of 20% by 2025.

With the abundance of renewable energy sources in the country such as solar, biomass, biogas, solid waste and mini hydropower, things are looking promising that Malaysia will reach this goal. However, are we adequately prepared to go for and sustain this form of energy harnessing for the long term?

Breaking barriers

Malaysia's location is advantageous to harness renewable energy, but there are several reasons preventing the country from using this energy to its full potential. Efforts by the Government to encourage the use of solar energy in Malaysia have increased significantly over the past decade, with the introduction of capital subsidies through the SURIA 1000 Programme, feed-in tariff and progression of solar PV from the feed-in tariff to large-scale solar, net energy metering and self-consumption programmes.

However, there is still need for greater commitment from companies towards environmental, social, and governance values as corporate organisations are driving the growth of renewable energy, especially variable ones such as solar and wind power. Other obstacles include the higher cost of electricity sourced from renewable energy and the lack of ability to handle potential technical issues.

Prof Lim Yun Seng, Centre for Power Systems & Electricity chairperson at Tunku Abdul Rahman University, says, "Currently, Tenaga Nasional Berhad still produces cheaper electricity through established means. Besides that, the integration of PV systems with the distribution networks can create a number of technical issues such as voltage rise, imbalance and stability. Existing power systems are not equipped with the facilities to solve technical issues created by the penetration of renewable energy sources."

Nevertheless, some issues can be resolved and renewable energy is starting to gain traction.

On the education front, universities are starting to incorporate sustainability and renewable energy studies into their courses to equip a new generation of researchers and engineers.



Advancing the renewable energy ecosystem should start from the grassroots at schools and universities, in the form of subjects and courses targeted at instilling awareness of the need for sustainable energy generation.

“Students should learn techniques to control the operation of renewable energy sources for the protection and stability of the power systems. Any emerging technologies should be included in the syllabus to facilitate the penetration of renewable energy sources of up to 20% or more of total energy generation.”

Integrating new knowledge

As Malaysia shifts towards a more sustainable future, new technologies and policies need to be incorporated into postgraduate syllabi to develop experts of the future.

Prof Dr Nasrudin Abdul Rahim from

University of Malaya's Power Energy Dedicated Advanced Centre says the Government and universities are already working together to achieve the Renewable Energy Transition Roadmap target.

As the Government works to stabilise the policy side of the spectrum, universities can contribute to the renewable energy ecosystem by offering courses, training programmes and workshops. At the postgraduate level, there is dire need for extensive research on this industry to provide students with comprehensive knowledge and experience on renewable energy.

Prof Nasrudin is hopeful that the possible research and application of the results in the field of renewable energies can introduce renewable applications, solve current issues, improve efficiency, analyse economic feasibility and reduce environmental impact.

He says, "Universities can be the inner source of producing research ideas and funding. These funds can be distributed to postgraduate students for their independent research projects in hopes of achieving the renewable energy target in Malaysia."

Prof Lim opines that postgraduate syllabi need to include more technical subjects on integrating renewable energy sources into the power grid as well as the regulatory and commercial aspects of trading renewable energy.

He elaborates, "Students should learn techniques to control the operation of renewable energy sources for the protection and stability of the power systems. Any emerging technologies should be included in the syllabus to facilitate the penetration of renewable energy sources of up to 20% or more of total energy generation."

What lies ahead

The contribution of postgraduates is crucial to the long-term success of the renewable energy industry.

Being a sunrise industry, postgraduates can contribute in direct and indirect sectors. There is a need for widespread support from engineers, researchers, bankers, legal advisors, energy economists, energy policy, digital services (for the digitalisation of the electricity sector), investors and educational institutions.

However, challenges are bound to arise when implementing something new. Prof

Nasrudin lists the challenges faced by universities in training engineers in the sustainability and renewable energy field:

- Adapting to changing cultures and innovation
- Preparing for a technology-enabled future
- Transforming educational institutions for a technology-assisted future
- Combining teaching methods of online courses and traditional in-classroom instruction modes
- Customising students' education based on interests and job market

Prof Lim looks forward to the implementation of the smart grid as he believes it is the future of all power grids. He says many universities are already familiar with the teaching of the conventional power systems such as power electronics, power system analysis and electrical machines, so it should not be too difficult for them to adapt to this change.

Nevertheless, he says, "Universities have not been involved much in the development of cloud computing and home automation, among other new technologies. This can be a challenge universities face in training engineers in the areas of smart grid and Industry 4.0."

A balance of economics and resources

The Government's goal of having 20% of the total national energy output sourced from renewable energy may feel too lofty. However, with the right changes and cooperation from all parties, it can be done.

We can see encouragement in the form of the Energy Transition Index released recently by World Economic Forum, which listed Malaysia as a leading country among developing and emerging Asian countries for improvements towards universal access to electricity.

It is quite exciting to see what the Government, renewable energy industry and higher learning institutions have in store for all of us in building a healthier, greener and more efficient Malaysia. For engineers who are passionate about climate change, a postgraduate engineering degree in renewable energy can be a good start to making the world a better place.

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The pursuit of renewable energy could still negatively impact the environment, thus the need to develop experts in the field who can ensure the nation is heading down the right path.