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Diversifying Malaysia`s green energy beyond solar

The Edge, Malaysia

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STORIES BY **INTAN FARHANA ZAINUL** AND **ADAM AZIZ**

Since the introduction of the National Energy Transition Roadmap (NETR) last August, attention has been focused on the renewable energy (RE) market. For one, RE installation projects are worth billions of ringgit. For another, the development of the entire RE value chain is set to create a new growth engine for the country.

Under the NETR, the government has set an ambitious target of 70% RE capacity by 2050, which requires at least RM637 billion in investments to upgrade the grid, install RE capacity and enhance energy storage, among others.

At present, Malaysia's RE installed capacity of 25% accounts for only 6% of the country's total electricity generation.

Nonetheless, solar has been the most talked-about when it comes to RE, as it reaches record-breaking capacity installation in the country.

Solar capacity is set to grow, with the recently announced fifth round of the large-scale solar programme (LSS5) to offer a total electricity generation capacity of 2GW (2,000MW) — the largest capacity under the LSS programme so far.

The discussion on RE should not focus solely on solar, says Datuk Hamzah Hussin, CEO of the Sustainable Energy Development Authority (Seda), the agency leading Malaysia's green energy diversification efforts. If Malaysia is serious about achieving its net zero target by 2050, other RE sources must be nurtured, he tells *The Edge* in an exclusive interview.

"I can see that when everyone is talking about RE, they probably are looking at solar. They don't see hydro, bioenergy and other resources.

"The other resources are very hard and costly to develop ... [but] this is similar to the situation 10 years ago, when people weren't interested in RE because solar panels were expensive. When we talk about RE, we cannot talk about solar alone," he stresses.

Seda, which was set up in 2011, is akin to an incubator that supports an RE industry until it reaches maturity.

The agency had a critical role in developing Malaysia's solar industry into what it is today. In the last decade, when the solar energy ecosystem and technology were still developing, Seda contributed to the tremendous growth in the industry by awarding projects through its Feed-in Tariff (FiT) programme, which subsidises commercially challenging RE projects.

Since the FiT mechanism was introduced, a total of 1,429.94MW in RE capacity has been approved across 10,464 projects nationwide. Of that, 97.7%, or 10,220 projects, were for solar, which highlights how significant the programme was for the energy source that is now so commonly available.

The same programme is now driving other non-conventional RE sources such as biomass, biogas and small hydro. Seda is still exploring other potential sources of RE such as geothermal and wind, Hamzah says.

The agency has so far awarded 154 projects, or 272.56MW, for the development of biogas plants; 21 projects, or 159.07MW, for biomass; and 69 projects, or 676.88MW, for mini-hydro.

Biogas, biomass gaining traction

Attention is now increasingly focused on biogas and biomass, two types of bioenergy sources deemed renewable.

Last year, the Ministry of Plantation and Commodities launched its National Biomass Action Plan 2023-2030.

At present, the Federal Land Development Authority (Felda), together with its listed plantation arm FGV Holdings Bhd (KL:FGV), is taking on a massive exercise to deploy biogas from its mills. FGV has seven Seda-approved biogas projects under the FiT.

FGV, which has 67 mills, is also in the midst of developing its bioenergy segment. It has a biomass power plant in Lahad Datu, Sabah, and another in Jengka, Pahang, with a total capacity of 12MW. The group estimates that it can achieve up to 200MW in power-generation capacity from bioenergy.

Interestingly, even though solar energy is growing at the fastest pace globally, bioenergy is currently the largest source of RE, accounting for 55% of RE and more than 6% of global energy supply, according to the International Energy Agency (IEA).

As the world's second-largest palm oil producer, Malaysia is well placed to develop the bioenergy sector.

In a nutshell, biomass comprises organic waste such as empty fruit bunches (EFB) from oil palm cultivation. Biogas is produced when biomass such as EFB, farm animal manure and landfill gas decomposes. As biogas such as methane is more harmful to the environment when released, it is burnt off to generate electricity.

Hamzah says: "The next [source of RE after biomass] is biogas. The ecosystem is starting to mature; that's my reading. The sector is seeing a higher take-up rate and our quota awards are oversubscribed ... This is possibly because there is no other use for methane gas."

Conversely, EFB from oil palms — used for biomass — fetch higher prices when they are exported to Japan, South Korea and the US to produce items such as paper and pellets. Competition for biomass puts the consistency of feedstock supply at risk.

Successful biomass power plants are usually owned by the plantation that owns the palm oil mills, Hamzah explains. Those that do not own the mills often face a challenge, as millers usually give short- to mid-term supply contracts.

To establish a better ecosystem, Seda is leading a pilot project under the NETR: biomass clustering.

"The more than 100 mills all over Peninsular Malaysia can be clustered into eight to 10 mills. We are looking at the potential of producing 44MW from bioenergy," Hamzah says, adding that each cluster will have a one-stop power plant to take on the feedstock.

"Based on studies, you can have a biomass power plant with 20MW to 30MW capacity [in each cluster]." He says the concentration of resources could help reduce tariffs for such biomass projects.

To ensure consistent supply of feedstock, Seda is considering offering mill owners equity in the biomass plant.

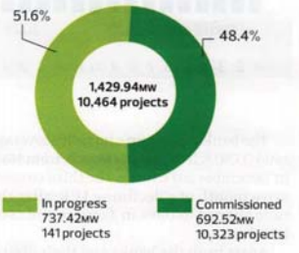
"We are in the process of finalising the terms of reference, and will start the study in 2H2024. It will take about a year to finish. Once we are done, we will start the pilot for another year. After that, we will overcome any shortcomings and implement the same model across the states," Hamzah says.

SUHAIMI YUSUF/THE EDGE

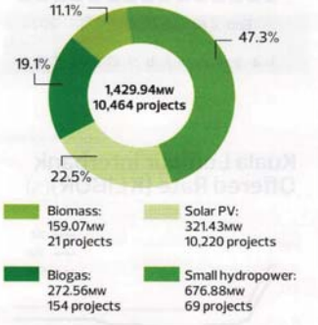
Hamzah: When we talk about renewable energy, we cannot talk about solar alone

CHARTS: SEDA

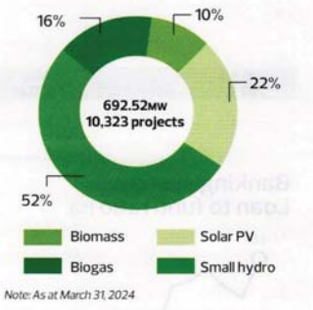
FiT project status



FiT projects by RE source



Operational FiT projects



Note: As at March 31, 2024

WTE in vogue but more to iron out

Another highly anticipated segment of RE on Seda's radar is waste-to-energy (WTE), which is categorised under biomass. For example, Cypark Resources Bhd's WTE plant in Ladang Tanah Merah, Port Dickson, reached commercial operations in December 2022.

WTE covers multiple aspects. In some cases, rubbish is incinerated to create energy, and some dumping sites have facilities to collect the biogas produced from the waste.

Across the segment, however, issues concerning WTE projects have been flagged — from the quality of waste collected as feedstock to the availability of feedstock supply and the jurisdictions involved. As a result, a few projects were tendered, cancelled and retendered.

"When I say the WTE plant has to shut down because there is not enough waste, people laugh. But it depends on the quality of waste. Some incinerators are not working because of this problem," Hamzah explains.

There are also situations in which the rights for gas and waste from one landfill are given out to two parties, owing to overlapping jurisdictions.

"In one case, the local government awarded the landfill contract [to operate the landfill] to one company. At the same time, it awarded the gas produced from the landfill to another company. This gas owner applied for the quota from Seda," Hamzah says.

"The owner of the landfill found out and applied as well; now, the landfill owner is questioning why it owns the waste but cannot own the gas.

"Interesting. A small incident shows the competition for the gas produced by the landfill waste."

In Cypark's case, it has Seda-approved rights to manage both the solid waste and the biogas produced.

There are different types of WTE plants in Malaysia — depending on the feedstock — such as Khazanah Nasional Bhd's unit Cenviro, which has a power plant that takes in scheduled (controlled) waste as feedstock; and Berjaya Energies Sdn Bhd's 10.5MW power plant that takes in landfill gas from its Bukit Tagar landfill. Companies such as YTL Power International Bhd and Malakoff Corp Bhd are also taking on WTE projects in Selangor and Melaka respectively.

In the market, talk of WTE projects was fuelled by the Ministry of Housing and Local Government (KPKT). The ministry has identified 18 WTE sites nationwide, its minister Nga Kor Ming was quoted as saying on May 6.

In total, KPKT has been given a WTE quota of more than 300MW by the energy ministry (currently the Ministry of Energy Transition and Public Utilities, or Petra) to be awarded, with projects expected to commence operations across two batches (by 2025 and 2030). This quota is different from the ones that Seda awards under the FiT, Hamzah explains.

Nonetheless, Seda is working closely with the National Solid Waste Management Department (JPSPN), part of KPKT, to chart the way forward. It is also considering separating WTE from biomass FiT awards in the future.

Indeed, the rollout of the WTE will require a more hands-on approach. JPSPN, for example, already has its own National Solid Waste Management Policy published in 2016, which seeks to minimise waste generation.

WTE development — part of efforts to address landfill availability — should be carefully planned. "Perhaps we don't want waste to become a commodity in the future, to the point where we import waste into the country to fire WTE plants," says Hamzah.

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Seda mulls carving out WTE quota from biomass

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Need for concerted effort

While green energy is considered costly, there are a multitude of reasons to increase adoption, including to utilise existing resources (in the case of biomass), reduce emissions (biogas), and diversify electricity supply for energy security purposes.

Earlier this month, Minister of Economy Rafizi Ramli flagged rising gas imports by Malaysia, a net gas exporter, to sustain electricity demand in the country. Efforts to achieve the early decommissioning of thermal power plants are hindered by rising electricity demand and slow development of alternative supply such as the RE championed by Seda.

"We need to diversify," Hamzah stresses. "We cannot depend on solar, as solar power is intermittent. Its capacity factor is less than 30%, while that of biogas and hydro is around 70%. It's good to have multiple sources of RE."

The urgency emphasises a need for a more coordinated approach to RE adoption efforts, which are currently segregated between ministries and agencies.

While Petra recently launched the 2,000MW LSS5 awards, some are still awaiting clarity on other flagship projects such as Tenaga Nasional Bhd's 500MW solar park announced in the NETR, which is spearheaded by the Ministry of Economy. In between, companies have also announced potential collaborations with outside parties such as Abu Dhabi-based Masdar.

It is unclear how these proposed projects fit into the government's capacity planning, led by the Planning and Implementation Committee for Electricity Supply and Tariff (JPPPET), as well as policy documents such as the Malaysia Renewable Energy Roadmap (2021), National Energy Policy (NEP) (2022) and, most recently, the NETR.

Hamzah explains that the different policy papers have differing targets and scope. The NETR focuses on energy transition that includes coal, hydrogen and electric vehicles, and not just green energy. While the Malaysia Renewable Energy Roadmap (MyRER) has a 2025 RE adoption target of 31% in 2025 and 40% in 2035, the NEP's goal is more long term, at 70% by 2050, he adds.

Some have also raised the question as to the difference between the roles of Seda and the Energy Commission (EC), which distributes the quota for the LSS and Corporate Green Power Programme (CGPP), on top of conventional gas, coal and hydro power plant projects.

"Seda and EC have distinct roles," Hamzah says. "Seda uses the FiT programme to catalyse the development of the RE sector. Once a technology matures, EC, as custodian of the Electricity Supply Act, takes over, overseeing the broader picture of electricity supply, including RE.

"On the one hand, it is good also to absorb Seda under EC as a department and [instil] the DNA of RE into EC — because, except for LSS, the biggest electricity supply comes from fossil fuel.

"But some say it's better for Seda to stand alone so that it can focus 100% on RE ... Even so, we need a single agency to facilitate RE growth more efficiently.

"For now, small hydro, biogas, biomass, maybe geothermal, wind, which are still very expensive, still need to be done under the FiT. Without it, no one will take up these projects.

"Developing the entire RE industry — not just solar — is still very challenging in this country because of many factors. Combined effort between the federal and state governments, their multiple agencies and the private sector is crucial." E