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Electrifying windows of opportunity in Sabah



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The right policies, collaborations, and strategies can turn emerging opportunities into victories for all parties in Sabah.

By Datuk Haji Beroz Nikmal Mirdin

Chief Minister Datuk Seri Panglima Hajiji Noor's 2021 Hala Tuju Sabah Maju Jaya Plan and the Sabah Economic Development and Investment Authority (SEDIA) have laid out a road map to an exciting future for all Sabahans, with a target of increasing Sabah's income levels and GDP per capita from about RM 23,000 to about RM 40,000 by 2030.

Reliable, affordable, and sustainable power generation have however always been a prerequisite for Sabah's industrialisation and economic development ambitions.

An important step towards achieving this was taken in January 2024, when decision making power regarding the regulation of SESI was devolved from the federal level Energy Commission to the state level Energy Commission of Sabah (ECoS).

Chief Minister Hajiji and his team was responsible for this achievement, completing work that was begun by his predecessors, and demonstrating his commitment to doing what is best for Sabah and Sabahans no matter where or who an idea comes from.

With this change, the parties involved in making key decisions are now closer to the ground and have a better understanding of Sabah's consumers and their needs. This newly streamlined governance and regulatory process for SESI provides fresh hope that change is coming.

In this new era, there are five key challenges that we should be looking to meet, to build a resilient, efficient, and green power industry for Sabah.

First is the high true cost of the diesel-fueled generation and fossil fuel generators in general; second is our over reliance on subsidised gas; third is power transmission bottlenecks from the west coast to the east coast; fourth is Sabah's high System Average Interruption Duration Index (SAIDI); and fifth is Sabah's inability to adjust its electricity tariff rate to more closely match the cost of generation.

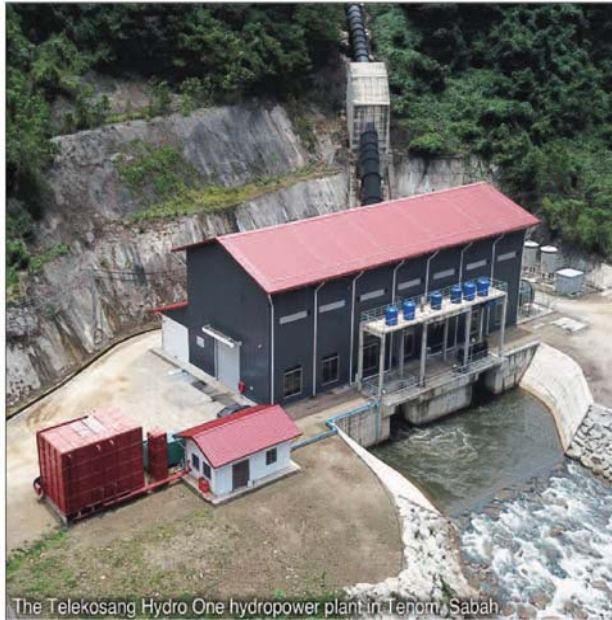
Transitioning away from diesel-fueled generation

Firstly, the current cost of power generation in Sabah is very high, given Sabah's reliance on outdated diesel-fueled power generation.

A simple comparison of costs of generation as illustrated in the chart will give a clear picture of the problem.

We estimate that diesel generators in particular sell power to Sabah Electricity Sdn Bhd (SESB) at about RM 1.50 - 1.72 per kWh, based on the rates for diesel subsidies, and displaced costs.

Renewable sources of energy however can sell power to SESB at a much lower rate. Upcoming hydropower projects for example can sell power at about RM 0.34 - 0.35 per kWh, while upcoming Solar plus Battery Energy



The Telekosang Hydro One hydropower plant in Tenom, Sabah

Storage Systems (BESS) can sell power at about RM 0.42 - 0.46 per kWh.

Fossil fuel sources like diesel and gas are a dwindling resource, with tariffs bound to go up over time.

Many renewable energy projects on the other hand are able to lock in long term tariffs at a relatively low rate once they have been approved, because they are not tied to any fluctuating fuel price.

Some renewable technologies like solar can come down in price over time due to technological advances, but other types of projects that involve large scale construction like hydropower will experience escalating costs over time.

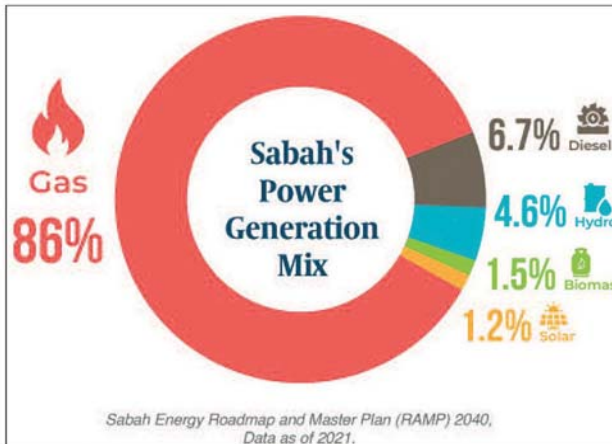
For example, my team and I started construction on the 40 MW run-of-river hydropower project Telekosang Hydro in Tenom, Sabah in 2019. These types of

hydropower projects do not require the construction of large dams, and have minimal lasting impact on the environment due to reforestation efforts.

When we secured the power purchase agreement (PPA) at that time, the costs of constructing and financing a run-of-river hydropower project was RM 14.75 million per MW. This was one key factor that allowed us to set the tariff at RM 0.24 per kWh.

In determining these costs, we floated a transparent, international open tender, in which some of the largest and most prominent companies in the world that construct hydropower plants participated. This gave us a high level of confidence that the costing and price discovery we landed on was competitive and on par with global standards.

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The winner of the tender served as an Engineering, Procurement, Construction and Commissioning (EPC) company, and was not required to invest in the project. This ensured no mixing of roles and no cross support, which in turn ensured true cost.

Telesang Hydro is just one example of how the economics of hydropower plant development make it a very attractive way to help solve Sabah's power supply problems in the long term.

While capital intensive, once a hydropower plant is built, it is able to provide a very large amount of power over a very long period of time. This particular source of renewable energy provides power 24 hours a day, 365 days a year, without any fluctuating fuel costs.

The way power purchase agreements (PPAs) are structured also allow for long term tariff rates to be locked in from the start, providing stability and predictability over decades, compared to other sources of energy.

This is why Chief Minister Hajiji's announcement in January 2024 that renewable energy projects that fit in to the Sabah Energy Roadmap and Master Plan (RAMP) 2040 will be fast tracked is especially welcome.

One benefit of fast tracking projects is that it allows for a locking in of costs of construction as well. These costs tend to increase significantly over time, so earlier approvals translate to lower costs.

Any kind of fast tracking must of course be done in a transparent, ethical manner, in accordance with the highest possible standards of integrity.

When done correctly, fast tracking is a reflection of the state's commitment to resolving urgent problems faced by the rakyat with the lowest cost possible. This way, solutions that benefit the people can be delivered faster, cheaper, and without any compromise whatsoever on questions of transparency.

In looking at Sabah's future generation mix, we need all stakeholders to support the state government's efforts to make SESI sustainable by introducing lower cost and greener power generation, while displacing aging fossil fuel based generation.

As we have shown in our Telesang example, with the right prioritization of projects, Independent Power Producers (IPPs) can play a very significant role in increasing Sabah's generation capacity while lowering of the true cost of power and delivering a win-win situation for SESB, IPPs, and SESI as a whole.

Relying less on subsidised gas
The second key challenge we need to meet is our heavy reliance on subsidised gas, which makes up 86% of Sabah's power generation mix.

This high percentage is also problematic due to fuel risks and over-dependence on a single source of fuel. To address this, we need to gradually reduce this percentage and replace it with renewable energy sources.

This will enable us to then rechannel Sabah's gas to higher value-add activities instead, such as using gas as feedstock for downstream industries like the petrochemical industry.

Such rechanneling generates a much greater multiplier effect for the state's income - increasing revenue and encouraging greater reinvestments into the upstream gas sector. At present, Petronas sells gas directly to IPPs for the purpose of power generation at RM 6.40 per MMBtu. Gas sold for other purposes however can be sold for as high as RM 35-41 per MMBtu.

The Sabah state government earns a 10% sales and service tax for all these sales. If the gas that was being used for power generation was sold to industry instead, the state government would make approximately RM 70 million annually in additional tax revenue.

If the state owned Sabah Energy Corporation (SEC) was given the role of buying the gas from Petronas earmarked for power generation at RM 6.40 per MMBtu, the state would then be even more greatly incentivised to transition away from gas powered generation. This is because such a transition away from using gas for

Key challenges for Sabah's power industry	Potential solutions
High cost of fossil fuel based generators	Accelerated transition to renewable energy (RE)
Overreliance on subsidised gas	Transition to RE will allow state to sell gas to industry instead of for power, generating more income
Power transmission infrastructure	Construction of the Southern Link Transmission Line
High SAIDI	Investment into improving distribution infrastructure
Tariff Rates	Justifying any increase in tariff with improved service

power generation would enable SEC to sell that same gas for other purposes at prices all the way up to RM 35-41 per MMBtu.

All this extra income for the state can then be rechannelled as development funds, support for lower income communities, tariff subsidies, and other long delayed projects like the Southern Link Transmission Line.

In order to make all this happen, we come back to the same key step: accelerating Sabah's transition away from fossil fuel based power generation to renewable energy.

Improving power transmission
The third key challenge we are facing involves power transmission.

Sabah's grid design currently resembles a horseshoe, instead of a closed loop transmission ring. We also over-concentrate our power generation in a single geographical area - the west coast, primarily around the Kimanis area.

These factors expose Sabah's grid to considerable risks.

Overreliance on a single source of power in the west coast means two things. First, that any major mishap there could have dire consequences grid-wide; second, that the east coast generally has poorer access to power.

The horseshoe design meanwhile means that if one link in the grid goes down, everyone beyond that link will be seriously affected.

The solution we need is investment into building the Southern Link Transmission Line.

This transmission line will allow us to send power that is generated on the west coast of Sabah at relatively high efficiency and low cost, to areas on the east coast which need it the most.

The Southern Link Transmission Line will also enable a closed loop transmission system within the Sabah network, improving the grid's

resilience and reliability and offering more failsafes to the grid.

This can also be the first step towards introducing a bigger loop that encompasses the whole island of Borneo. The interconnection from Sarawak to Sabah is already being built, and the next step can then be to expand the loop to Kalimantan, especially in view of the Indonesian capital being moved there.

Reducing SAIDI and adjusting tariff rates
The fourth and fifth key challenges are closely related.

The fourth challenge is the high System Average Interruption Duration Index (SAIDI) experienced by Sabah. SAIDI is the average outage duration for each customer served and is an index of the reliability of Sabah's electrical grid. Sabah's current SAIDI stands at the still high number of 266.35 minutes. In comparison, Peninsular Malaysia's SAIDI is only 46.1 minutes.

The fifth challenge meanwhile is SESB's inability to adjust the tariff it charges to more closely match the cost of power generation.

When SESB was privatised in 1998, Sabah's electricity tariff was set at about RM 0.24 per kWh. 26 years later, the base tariff is still only RM 0.34 per kWh, with the last major increase in tariff taking place in 2014.

The situation is further exacerbated by losses due to the theft of power. SESB chairman Datuk Seri Panglima Wilfred Madius Tangau recently stated that SESB loses around 7% of its power due to theft, which translates into losses of about RM 210 million.

There is constant resistance to any raising of the tariff because the quality of service for Sabah's power supply is perceived to be poor. In other words, Sabahans are not willing to

pay more for a utility or service they often view as substandard.

Sabah's SAIDI is caused primarily by SESB's lack of financial resources to upgrade and improve the distribution network.

These constraints also are forcing SESB and the state government to turn to renting diesel generators as an interim solution in order to reach a 30% reserve margin. Short term measures such as encouraging large consumers to invest in their own fossil fuel generating facilities are also inefficient in the long term.

Ultimately, a sustainable reserve margin of 30% will actually require far more investment and plantup - ideally using renewable sources of energy.

On the whole, these problems constitute something of a chicken and egg situation - SESB cannot raise tariffs because people are not willing to pay for what they perceive to be poor service; but SESB cannot raise funds to improve their service and reliability because they cannot raise tariffs.

Given that Chairman Madius has also stated that SESB has needed approximately RM 850 million annually in federal subsidies just to stay afloat, it is unsurprising that SESB has not been able to invest in improving the reliability of the grid.

The Sabah Energy RAMP 2040 specifically identifies capital heavy, advanced technology as being key to lowering the SAIDI numbers.

By addressing the first three key challenges above, we can achieve the all important goal of transforming the economics of SESI and SESB. This is vital in order to provide SESB the resources it needs to invest into improving the distribution network and bringing the SAIDI number down, without burdening consumers.

In other words, if we can meet the

first three challenges the right way, SESB will be in a much better position to invest in improving its service, ensure less blackouts and brownouts in Sabah, and justify any adjustments of tariff rates.

A reliable power industry will also enable more industrialisation and foreign direct investment into Sabah, as businesses have previously been reluctant to invest in and set up operations in Sabah because of the unreliable and insufficient power supply.

For reference, Sarawak has a smaller population than Sabah, but a generation capacity of 5 GW, which is 5 times what Sabah has. This has enabled the kind of economic growth and foreign investment that we are seeing in Sarawak.

Once the necessary improvements to Sabah's power industry has been made, we can look forward to an era of economic growth that will ultimately increase the income and spending power of everyday Sabahans as well as stimulate local businesses - ultimately outweighing any potential burden caused by adjusted tariff rates.

Stakeholder synergy
As we look to build on these many key opportunities, there are some important mistakes we must also be careful to avoid.

Firstly, we must resist any attempt to turn the situation into a zero sum game between the public and private sectors.

I firmly believe that there is a formula for healthy value-added roles and relationships between the state government, the federal government, SESB, and IPPs, where every stakeholder is a contributor towards the betterment of Sabah's power industry.

With regards to the tariff rate in Sabah, global factors make it impossible for the end user tariff to stay at the artificially low rate of RM 0.34 per kWh indefinitely. There are too many external pressures, and the RM 850 million in annual subsidies from the federal government is simply unsustainable.

Instead of finger pointing, it's time to pool our resources and our strengths to map out how we can provide greater value to consumers and industries for each ringgit they spend on power.

In the long run, this is the most viable way to invigorate Sabah's economy, increase earning power for Sabahans, and set the right foundations for a sustainable, reliable power industry in Sabah.

If we do this right, we will finally build a Sabah we can all be proud of.

Datuk Haji Beroz Nikmal Mirdin is Executive Chairman of Jentaya Sustainable Berhad, a public listed renewable energy company with particular strengths in constructing run-of-river hydropower plants in Sabah. He was born and raised in Tawau and has over 20 years of experience in the power industry, having worked for TNB, MyPower, Khazanah Nasional as well as PJM Interconnection LLC in the USA.

