

<b>Headline</b>	TNBR's foray into technical solutions and innovation pays off		
<b>MediaTitle</b>	The Edge		
<b>Date</b>	08 Apr 2019	<b>Language</b>	English
<b>Circulation</b>	25,910	<b>Readership</b>	77,730
<b>Section</b>	Corporate	<b>Page No</b>	29
<b>ArticleSize</b>	939 cm <sup>2</sup>	<b>Journalist</b>	N/A
<b>PR Value</b>	RM 48,504		

# TNBR's foray into technical solutions and innovation pays off

**T**NBR Research Sdn Bhd (TNBR), a wholly-owned subsidiary of Tenaga Nasional Bhd, has seen its foray into technical solutions and innovation bear fruit, as seen by the value creation of about six times its investment in the field last year.

"We measure our value creation in terms of RM1 million spent and the value created. For example, last year, the value created was about six times the value spent — in terms of process, efficiency and so forth. Last year, we invested about RM120 million in research and development," TNBR chief strategy officer Dr Mohd Fadzil Mohd Siam said at a press conference at the company's Open Day 2019 event in Kajang on March 12.

TNBR Open Day 2019 was organised to create an awareness and understanding of the research done by the company among the stakeholders and also to provide opportunities for collaboration with different government agencies, research institutions, local universities, private companies and the media. The theme of the Open Day was "Energizing Research, Enlivening Innovation".

The Edge talked to the brains behind some of the researches that were showcased in booths at the event to better understand TNBR's work. Of special interest were the carbon capture and utilisation (CCU) programme, the introduction of Internet of Things (IoT) solutions to manage energy demand through the smart grid, the development of "green" sediment bricks and the forensic engineering group of TNBR wholly-owned subsidiary TNBR IQATS Sdn Bhd.

In an exclusive interview, TNBR's head of unit in renewable energy and green technology, Ir Noraziah Muda @ Omar, reveals that the company embarked on its carbon dioxide (CO<sub>2</sub>) capture research programme in 2011 as part of its advanced research programme.

"As you know, power plants, especially coal-fired, are among the largest emitters of CO<sub>2</sub> and it is our responsibility to reduce its emission by capturing and utilising it. The programme began in 2011 with a lab study on understanding how we could reduce CO<sub>2</sub> through two approaches — biological and chemical," she says.

In the biological approach, CO<sub>2</sub> is fed to the micro-algae system but the slow rate of carbon capture by the plants is one of the challenges faced.

"The challenge in the biological approach is that it is slow. The capture rate of the plants is less than 10%," Noraziah says.

"We started the chemical approach in 2011. We can capture



Deputy Minister of Energy, Science, Technology, Environment and Climate Change Isnaraissah Munirah Majlis seen here with (from left) TNB Head of Asset Management, Generation Division, Azman Talib; TNB Head of Grid Maintenance, Grid Division, Kamalor Zaman Radzak; TNB Head of COE-Project, Energy Ventures Division, Ahmad Faraid Mohd Yahaya; TNB Research Chief Strategy Officer Ir Dr Mohd Fadzil Mohd Siam; MESTECC Principal Assistant Secretary, Malaysian Electricity Supply Industries Trust Account (AAIBE) Unit, Nuballah Arshad; and Senior General Manager of Transformation, Distribution Network Division, Mohd Adibi Ambak, at the awards presentation on TNBR Open Day 2019



**We measure our value creation in terms of RM1 million spent and the value created."**

— Mohd Fadzil

all the CO<sub>2</sub> produced by power plants using this method. The project that we worked on was a pilot," she adds, pointing out that while it is effective, the method could add about 20% to 30% to the cost of the power plant.

The CO<sub>2</sub> capture programme was completed in 2015 and resulted in three patents on it.

According to Noraziah, the CO<sub>2</sub> that is captured is like a building block that can be utilised for other purposes. "For the CO<sub>2</sub> utilisation to be practical, there must be demand for the products. In TNBR's case, the CO<sub>2</sub> is converted into methane, which can be fed to gas turbines," she says, adding that the cost can be lowered if the utilisation of the CO<sub>2</sub> translates into other valuable materials.

Apart from that, TNBR also looks at IoT as part of a solution to manage energy demand for utilities and power consumers.

"For Smart Grid, our major client is actually TNB itself, which is moving towards smarter substations. With more data available at the substation level, we can deliver better grid visibility. This is very important when renewable energy becomes a major factor," Dr Looi Hui-Mun, principal researcher with smart

grid, tells The Edge on the sidelines of TNBR Open Day 2019.

He adds that the IoT solution or 'Internet of Energy' solution provided can give real-time information to customers so that electricity costs can be reduced.

"The initial stage is to monitor and understand the load profile usage. After that, analytics will also be available to users to study their load time and know how to best optimise usage based on the data available.

"We then transition the building into something smarter. Once the integration with other systems, such as the air conditioning, lighting, chiller and so forth, is done, we can set a target where the engine can optimise for a rule-based kind of optimisation approach using AI or big data analytics."

Looe adds that the final objective is to achieve a net zero-energy building.

On the cost of implementing the Internet of Energy, Looe says TNBR has brought it to a desktop level as the system operates on an open platform, making it more accessible.

"The IoT is easier to implement. There is no need for a special consultant to come to you since the system runs on an open platform. This helps to lower costs as there are more suppliers and players. End-users can choose the best quality solutions that they think is suitable for them."

The smart grid team has already commercialised its research with software and hardware

solutions for its clients, especially non-TNB large power consumers. Looe points out that the research has already borne fruit and was profitable at the time of writing.

TNBR Open Day 2019 also showcased research on brick development by the civil and geoinformatics team.

According to Nor Aishah Abbas, researcher at the civil and geoinformatics department, the objective of the research is to utilise the raw materials or sediment from Cameron Highlands' reservoirs.

"Sediment bricks are better than cement bricks and are also cheaper," she says, adding that the cost of cement bricks was 33 sen in 2012 compared with 13 sen for sediment bricks, which could be sold for about 20 sen each.

However, the research has yet to be commercialised, although it was done way back in 2010. "We are targeting to commercialise it by the end of this year or the beginning of next year," says Nor Aishah.

Another technical expert, Norul Rafiq Namas Khan, is with the forensic engineering team and involved in some of the large-scale solar tests that are being conducted to ensure the stability of the national grid.

He says although there is a shift towards renewable energy plants because the cost of production using solar is lower than for thermal plants, connecting the former to the grid is a challenge. "We expect this to cause a shift in trend when it comes to connection with the grid. We need to ensure the stability of the grid when connecting with renewable energy plants. If there are any faults at the plants, we need to ensure that they will not affect or trip the grid. Otherwise, we might see a repeat of the catastrophe in the 1990s when the entire nation went offline."



Isnaraissah signs a poster at the event. Looking on is TNBR's Mohd Fadzil.