



Utility of the Future: Powering Smart Energy in ASEAN



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Panelists

- Brian Finkel, Product Manager, Software & Analytics, Energy Business Unit, **Analog Devices**
- Pisanu Tantitavorn, Assistant Governor, Technology and Material Management, **Metropolitan Electricity Authority (MEA), Thailand**
- Pathatai Dharmasaroj, Chief of Microgrid and Energy Storage Sector, Smart Grid Planning Division, **Provincial Electricity Authority (PEA), Thailand**
- Dr. Zainal Arifin, Executive Vice President, Engineering and Technology, **Perusahaan Listrik Negara (PLN), Indonesia**
- Sim Ko Sin, Vice President, Information and Communications Technology, **Sarawak Energy Berhad (SEB), Malaysia**
- Azmady Abdul Aziz, Head, Telco Access Network, ICT Division, **Tenaga Nasional Berhad (TNB), Malaysia**
- Ir. Ismail Bin Lam Din, Head, Asset Management, Distribution Network Division, **Tenaga Nasional Berhad (TNB), Malaysia**
- Hai Le Phuoc, Deputy Director, Information Technology, **Vietnam Electricity (EVNHCMC), Vietnam**

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Takeaways from AIBP Focus: Utility of the Future: Powering Smart Energy in ASEAN

In lockstep with strong economic growth, Southeast Asia is one of the fastest-growing regions in the world in terms of electricity demand. Driven by the growing ownership of household appliances and air conditioners, as well as increasing consumption of goods and services, demand has grown more than 6% annually for the past 20 years. Of the region's ten countries, the four largest by electricity consumption, Indonesia (26%), Vietnam (22%), Thailand (19%) and Malaysia (15%), make up more than 80% of total demand in the region. Smart meters and grid modernisation have become the top priority for these countries.

In our focus group discussion this week hosted by Stalin (AIBP) and Brian (Analog Devices), we had the opportunity to address key issues faced by utility leaders in their challenging, and increasingly diverse, roles within their organizations.

TLDR; Recurring themes throughout the discussion (Thank you Brian for summarising this nicely!):

1. The ability to keep the grid stable and decentralized as the base for new ventures like renewables, EVs, etc.
2. Continuing to improve performance (outage/ downtime management, metrics improvements, etc.)
3. Utilising data analytics for fraud detection and meter tampering reduction

Today's Agenda: Powering Smart Energy in ASEAN Moving Towards Efficient Power Distribution



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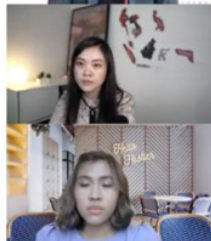
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Participants:



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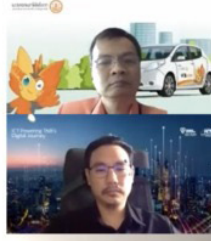
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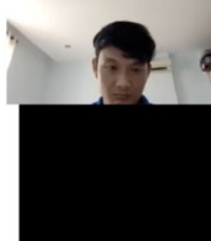
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Focus Discussion:

- AMI and smart metering developments in Southeast Asia
- Challenges faced in efficient power distribution
 - Opportunities for sustainable utility

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On Data Analytics

Ko Sin, VP ICT for Sarawak Energy Berhad (SEB) spoke passionately about the current (under)utilization of data. “Often, conservative utility companies tend to value physical assets over strategic assets such as data. Thus, many companies do not have adequate systems and human resources to handle large amounts of data when it comes to digitalisation - which is the first step to transform any organisation digitally.”

The challenge in power distribution and retail lies in non-technical losses, and utilities can use data analytics to detect faults and abnormalities early for revenue protection. To add on, as SEB runs predominantly on hydropower, utilising data analytics in managing water levels is critical to optimise the power plant performance.

The Results

- ▶ **Phase 1 Goal:**
Detect **70%** of tamper events supported by ADI Energy Analytics Studio
- ▶ **Actual Results:**
ADI Energy Analytics Studio detected **over 90%** of supported tamper events
- Including intermittent tampers and difficult to detect **Double Bypass** Tampers*

Tampers Detected

- ▶ Double Bypass
- ▶ Electrical Discharge
- ▶ Live Bypass
- ▶ Live/Neutral Swap & Earth Return
- ▶ Live/Neutral Swap & Earth Return Bypass & Neutral Magnetic
- ▶ Live Direct Connect (Single Load)
- ▶ Live Direct Connect (Dual Load)
- ▶ Live Polarity Swapped (Reversed Current)
- ▶ Live Polarity Swapped (Reversed Voltage)
- ▶ Neutral Magnetic
- ▶ Neutral Bypass



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Slide taken from Brian’s presentation on ADI mSure field tests with a utility company in North Africa to tackle revenue protection & loss prevention.

Read: **Combating Energy Theft** (Courtesy of Brian!)

On Revenue Loss

Following up on Ko Sin’s point on non-technical losses, Dr Zainal, EVP Engineering and Technology for Perusahaan Listrik Negara (PLN), Indonesia, shared PLN’s move to a prepaid metering model which is used to tackle non-payment, electricity theft, and save on labour costs. The model is a simple yet effective approach to prevent electricity theft whereby consumers are required to make utility payments through online banking or ATMs before usage. However, he did acknowledge that this is an interim commercial workaround to energy fraud and a more permanent solution would probably need to involve more technology usage.

Tn. Ismail, Head of Asset Management within the Distribution Network Division of Tenaga Nasional Berhad (TNB), Malaysia, mentioned that they have started their distribution losses prevention initiatives since 2015 and have managed to lower the loss from 8.6% to 6.7% in 2020. They employed a task force called the Special Engagement Against Losses (SEAL) Team to manage sampling tests and perform remote inspections.

Azmady, who is leading the Telco Access Networks for TNB ICT Division, added that his company also deployed drone services used for condition monitoring/visual inspection on LV and HV electricity lines. Thermal cameras attached to drones detect either hotspots or visible faults, and then capture and analyse the system with automated and customised reports. Coupled with advanced analytics and the deployment of drones, the SEAL

Team can quickly identify targets, such as bitcoin farming and conduct timely raids effectively.

For the Provincial Electricity Authority (PEA), Thailand, Khun Pathatai Dharmasaroj, Chief of Microgrid and Energy Storage Sector, Smart Grid Planning Division, mentioned that PEA employs a meter data management system (MDMS). The MDMS collects and stores meter data from a head-end system and processes that meter data into information that can be used to detect fraud and alert relevant officers.

Listening to the different approaches, Dr Zainal highlighted that there is no one-size-fits-all technology that can combat energy theft. The approaches will depend on the objectives and nature of the region the Utility is operating in.

On Efficient Distribution

Dr Zainal went on to share PLN’s approach towards deploying Smart Grid technology, focusing on the three drivers of change: Digitalisation, Decarbonisation and Decentralisation. These drivers serve as a framework to achieve their objectives of delivering electricity at an affordable price, providing reliable connectivity and moving towards sustainable power generation sources.

Thailand’s Mae Hong Son province experienced high outages as it only had a small hydropower plant and Solar PV systems. Due to the province’s remoteness and mountainous terrain, instead of large submarine or transmission cables, PEA installed microgrids with battery storage while utilising local energy sources to generate power. The project received overwhelmingly positive response from the residents of Mae Hong Son as the grid’s reliability improved significantly. Key performance indexes such as System Average Interruption Frequency Index (SAIFI) dropped from 11.47 to 5.3, whilst the System Average Interruption Duration Index (SAIDI) reduced from 270 hrs to 210 hrs.

Khun Pisanu Tantitavorn, Assistant Governor, Technology and Material Management from Metropolitan Electricity Authority (MEA), Thailand, shared the smart grid roadmap and the challenges of maintaining smart meters. He mentioned that in the past, Bangkok used Remote Meter Reading, an older technology that only collects households’ energy consumption and transfers that data to the Utility (one-way communication). Currently, the Metropolitan area is rolling out a Smart Grid Roadmap in three phases as part of the Smart City Thailand initiative to facilitate the adoption of renewable energy and electric vehicles. It consists of preparation for infrastructure such as the Advanced Metering Infrastructure (AMI), Transformer Load Monitoring (TLM) Project, Outage Management System (OMS) Project, Load Aggregator Management System. Afterwhich, the plan is followed by integrating smart grids into the smart community and is expected to reach full scale participation within the next ten years.

With AMI in place, MEA can collect, analyse and detect abnormalities from meter tampering. However, in cases where historical data is unavailable, (for example: a new customer has just installed smart meters in their commercial property) there may be some lag time between facing non-technical losses and detecting fraud.

Read: **Can Smart Meters be Smarter?**

On-Cloud or On-Premise; Security and Risks Associated

A key question from the floor which garnered significant interest among the panellist revolved around data infrastructure:- To scale up smart metering projects, utilities have to decide whether they want to store their data on the cloud or on-premise.

Azmady (TNB) noted that both options have pros and cons. For TNB, uptime of systems is the biggest concern hence capacity management needs to be governed and managed internally. As such, they prefer to keep their systems on-premise. Additionally, if cybersecurity is the primary concern for the Utility, the on-premise option is perceived to be the safer one. Similarly, for PLN, the concern for security overrides all other factors due to strict government regulations. Therefore, PLN utilises one single platform on-premise to protect the data of its 78 million users.

Brian (ADI) shared that customers from Northern and Central Europe are more open to cloud MDMS. These utilities trust that their cloud service providers, e.g. Amazon Web Services, Microsoft Azure, are sufficiently secured and can perform analytics quicker. Furthermore, the privacy regulations in such countries do not require smart meter data to remain in the country. Therefore the choice depends on how the Utility views privacy and performance. In some cases, Utilities may choose to have a mix of both, for instance, using on-premise data storage for AML, while billing application and retail data are uploaded to the cloud.



On the Future

In ending the discussion, the group shared their upcoming focus for their respective countries/organisations.

Indonesia: Pak Zainal shared that for the next five years, PLN has six key initiatives: increasing efficiency, distribution automation to improve quality, distribution grid management for quick response recovery, building the infrastructure for EV and e-mobility, implementing smart micro grid, and AML implementation by phase.

Malaysia: Tn Ismail shared that TNB has embarked on a future-looking Smart Utility 2025 concept, exploring how TNB can ease into changing roles from today’s traditional electricity supplier to the preferred operator of the network, facilitator of the energy transition, enabler of customer empowerment. The master plan includes five domains: grid operation, asset, work, energy and customer management. To achieve this, they have started with their AML, distribution automation, and advanced analytics to provide support in balancing the three core dimensions of the energy trilemma: affordability & access, energy security.

En. Azmady added that TNB is exploring energy storage and how to enhance the system to become more efficient and reliable. Furthermore, they are expanding smart metering to the northern parts of Malaysia, including Kedah, Perak, and Penang. However, these operations are subject to local authority approval and require support from stakeholders.

Similarly, SEB is scaling up their smart metering project and is also expanding to smart grids, energy storage, hydrogen EV, and stabilising the grid.

Thailand: Khun Mai shed light on PEA’s plans to continue developing AML and demand response systems for the demand side; whilst for distribution, projects like Microgrids, virtual power plants and EV are in planning. PEA intends to roll out smart metering as part of smart city developments in Phuket, Chiangmai and Nakhon Ratchasima. The challenge is to integrate the AML system with the existing SCADA to employ big data analytics.

MEA, on the other hand, does not have problems with accessing remote areas as their main area of operation is in the city. Khun Pisanu highlighted that Smart Grids will be a focus to enhance the efficiency of power

distribution and integrate it into their Smart Community initiative in the future.

Vietnam: EVN is exploring POCs for AML in the area of Smart Meter, Communication and data collection system, Data mining management system, Customer care system.

Food for thought - how long will ASEAN take to keep up with global efficiency level, (and hence returns)?



We will expand on this in upcoming conversations as part of the region’s journey in creating the “utility of the future”.

About AIBP

AIBP serves as an avenue for public and private organisations in Southeast Asia to access and exchange information about growth and innovation within the B2B space. With a current network of over 30,000 stakeholders in Southeast Asia, AIBP continues to develop ecosystems by engaging in activities which create value-adding information for our stakeholders seeking to make transformative impacts within their organisations.



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Resources

Presentations



- Overview of ASEAN Utilities Sector - *Industry Platform*
- Case Study in North Africa: Revenue Protection through Edge-to-Cloud Utility Metering - *Analog Devices*

Session Summary & Recording



- Moving Towards Sustainable and Efficient Power Distribution

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