Power to Grow

Sarawak Energy Planning and Layout of Smart Grid

Sarawak Energy And Taiwan SmartGrid Exchange Symposium,
NTUH International Convention Center

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Power System in Sarawak

Power Station

EHV Transmission Lines
275/132kV

Transmission Main Intakes
275/132/33 kV

Distribution Main Intakes 33/11kV

Industrial customers
Commercial customers

Distribution Substation 11/0.4kV

Small Industrial, Commercial and Domestic customers

11kV circuits
33kV circuits
415V OHL/UG system
SEB Distribution SmartGrid Initiatives

- Hand written Switching Procedure
- Transmission EMS Extension
- Manual Operation
- Current Operational Practice

Moving Forward

Advanced Distribution Management System

- Incorporate SCADA with DMS, GIS
- Reduce SAIDI and CAIDI
Capabilities Requirement for SmartGrid Project

Create

- **Devices**: to capture, monitor, and control information

Collect

- **Communication equipment and infrastructure required to communicate with devices**

Manage

- **Software**: enables utilities to manage and connect to the devices

Utilize

- **Applications**: that use the information generated by devices for business functions
SEB’s ADMS SmartGrid Pilot Project Domain

- Power Generation
- Transmission Line
- Transmission Main Intakes 275/132/33 kV
- Distribution Main Intakes 33/11 kV
- Ring Main Unit 11/0.4 kV
- Distribution Line
- 415 V OH/UG Line
- Domestic / Commercial / Industrial Customers
- Commercial Customers
- Industrial Customers
ADMS Pilot Project – Selected Functions

Distribution SCADA

Geographical Information System (GIS) based Network Information System (NIS)

Selected ADMS Functions

Distribution Management System

Online Gathering of Distribution System and Equipment Performance Data
ADMS Pilot System Architecture

ADMS integration with SEB Environment

- Feeder Automation
- Substation Automation
- Transmission SCADA

Real Time Service Bus
- IEC, DNP, ICCP

Integrated ADMS Solution
- SCADA
- DMS
- OMS

Service Infrastructure
- Platform Products

Enterprise Service Bus
- IEC / CIM / XML

- CIS
- GIS
- AMI/MDM
- Other Systems
ADMS Function Interface

GIS based NIS (Network Information System)

Fault Location Isolation and Service Restoration (FLISR)

Distribution SCADA
ADMS Functionality
SmartGrid and Telecommunication System

Advanced Distributed Management System Pilot Project
✓ Distribution SCADA and automation with GIS integration

Telecommunication Proof-of-concept
✓ Power line communications (broad & narrow band)
✓ Radio frequency communication
Pilot Project – Telecommunication Infrastructure

SEB Fiber Optic Backbone

SEB HQ

33kV Sub #1

33kV Sub #2

33kV Sub #n

Field Device

Field Device

Field Device

UHF Radio

PLC

SEB Existing Telecommunication Infrastructure

Last Mile Telecommunication technology to be tested in Pilot Project
Power Line Communication Solution
Radio Solution

Remote Data Acquisition

- Valve Position
- Flow Rates
- Tank Level
- Pressure
- Temperature
- Monitoring
- Control
- Metering

Serial

Fixed Remote

Up to 50 miles

Ethernet

Master Station (with Redundancy)

Data Control Center

Serial

Ethernet
GPRS/3G Solution

SEB HQ

Field Device and GSM Modem

Field Device and GSM Modem

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Field Device and GSM Modem
Transportation Electrification Potential in Sarawak

• 70% of the state’s electricity is generated from renewable sources i.e. hydropower.

• A high renewable energy percentage in the generation mix means that the emission reduction benefit of EV adoption in Sarawak is higher than that in Peninsular or Sabah.

• The carbon emission from transportation may be compared to the electricity grid emission to justify greater EV adoption in Sarawak.
CO2 Emission from Transport vs Power Generation

• According to a research completed recently by Sarawak Energy with assistance from UNITEN in 2015, the carbon emission from the Transportation sector in the state is already superseding that of Electricity Generation since 2012
Barriers limiting greater uptake of EV

• Relatively higher purchase prices compared to equivalent petrol and diesel vehicles
• Limited variety of EV models available in Malaysia
• Perceived limited travelling range of EV
• Lack of convenient charging facilities in the public areas
• Lack of awareness about EV, resulting in uncertainty in cost of ownership, expected battery life and misconceptions about EV.
Initiatives to Improve Uptake of Electric Vehicles

• EV information sharing, promotion campaign with strategic EV adoption targets
• Allocation of funding to public for the purchase of EV under certain criterions
• Tax and surcharge exemption or rebate for the EV early adopters
• Demonstration of EV adoption in government fleets such as a financial ‘kick-starter’ for the purchase of EV by government and its agencies
• Joint procurement across the government and private sector fleets
• Development of public charging infrastructure
SEB role in promoting EV

• EV information and promotion campaign
• Supporting the development of public charging infrastructure
• Electricity rebate for EV users at the initial stage
• A demonstration of EVs in the corporate fleets
Vehicle to Grid: EV as energy storage
Public Transport Modernization

Sarawak Energy involvement to develop charging infrastructure for electric buses and fuelling stations for fuel cell buses in meeting the expectation from the state government to modernize public transportation in Sarawak.
Sarawak Digital Economy Programmes

• Establishing Sarawak Digital Economy Corporation
• Boosting the speed of internet and telecommunications infrastructure,
• Making Sarawak as a place of hosting data centre
• Setting up of the digital village
• Promoting e-learning
Smart Cities: All you need to know
Way forward for collaboration work with TSGIA

- Power feeder automation
- Integrated communication
- AMI and sensoring system
- EV charging infrastructure
- Home and large scale energy storage system
- Renewable distributed generation
- Smart city and digital economy development
Thank You