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GEOGRAPHIC INFORMATION SYSTEM ENABLER FOR SMART ENERGY

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Session III: Smart Energy Empowering Cities

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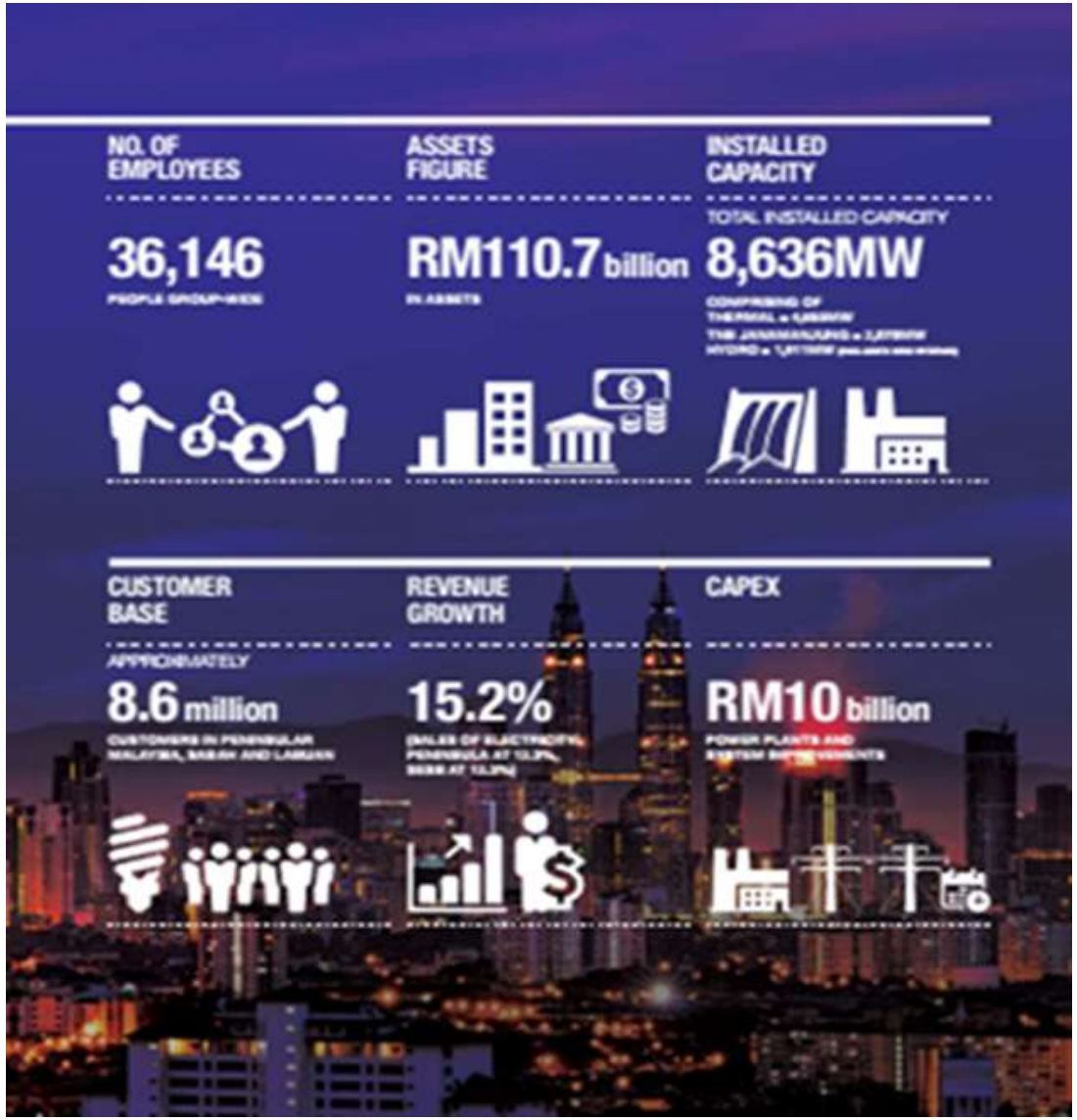
- GIS enabler for other smart technology
- GIS enabler TNB into becoming Smart Utility

GIS in TNB Distribution



- Tenaga Nasional Berhad or TNB is one of the Malaysian Government Linked Companies (GLCs).
- Tenaga Nasional Berhad is the largest electric utility company in Malaysia and also the largest power company in Southeast Asia with MYR 110.7 billion worth of assets.
- TNB serves over 8.6 million customers throughout Peninsular Malaysia, Labuan and also the state of Sabah through Sabah Electricity Sdn Bhd.
- TNB's core activities are in the generation, transmission and distribution of electricity.

GIS in TNB Distribution

Business needs of GIS to TNB

Shape Regulatory Outcome

- To support GSL1 (frequency of interruption) & GSL2 (restoration time)

Exceed Customer Expectation

- Improve customer service and communication by providing fast response
- Providing accurate customer location data

Drive Operational Cost Efficiency

- Strategize planning of new supply / system improvement
- Strategize planning of operation & maintenance
- Platform for easier and faster information sharing, mobile workforce

Transform Organization

- Managing assets geographically
- Improve data management and data gap through Integrating Asset Management
- Improve business process

An overview of GIS

GIS CONNECTS GEOGRAPHY WITH DATA

Geographic Maps

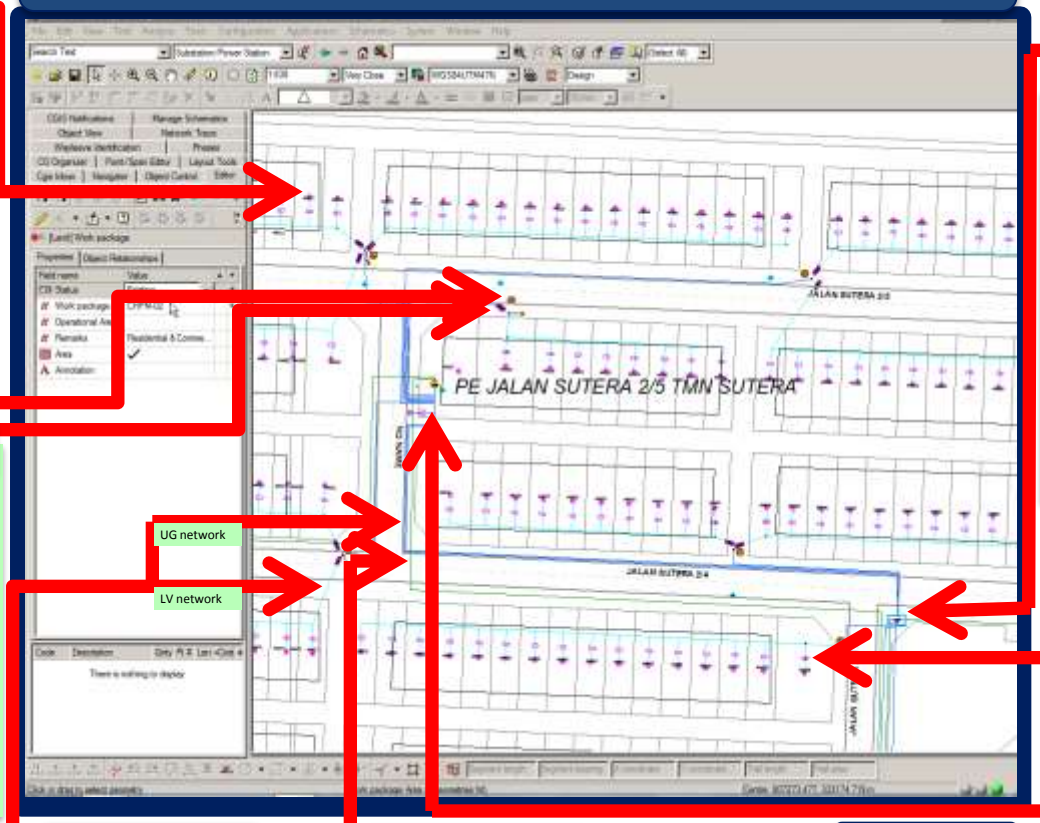
Spatial and Non Spatial

Geospatial Application & Tools (Hardware & Software)

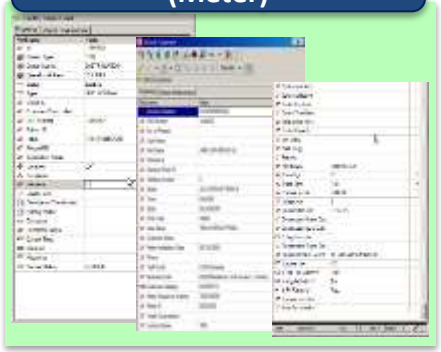
GIS OUTPUTS

Geospatial Information Systems is a computer-based tool that analyzes, stores, manipulates and visualizes geographic information on a map

Sample Of Asset Data From Smallworld



Customer Demand Point (Meter)



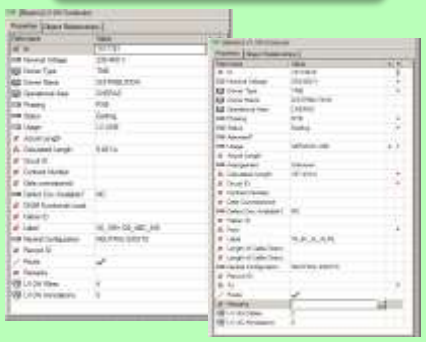
LVDB & Feeder Pillar

Pole

Street Lighting Panel

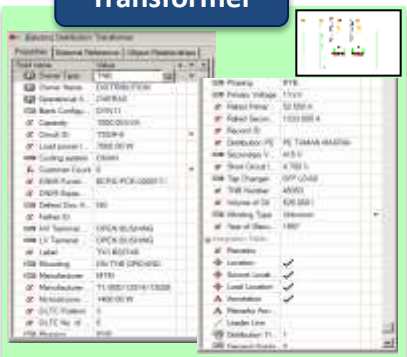
Fuse

LV OH/UG Network

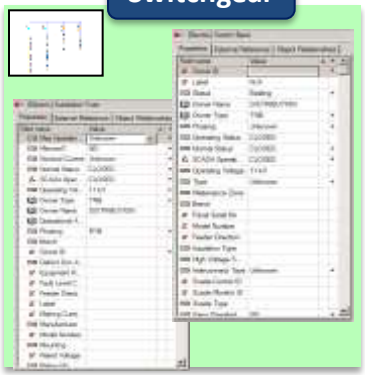


MV Network

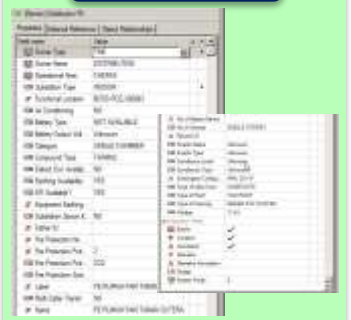
Transformer



Switchgear

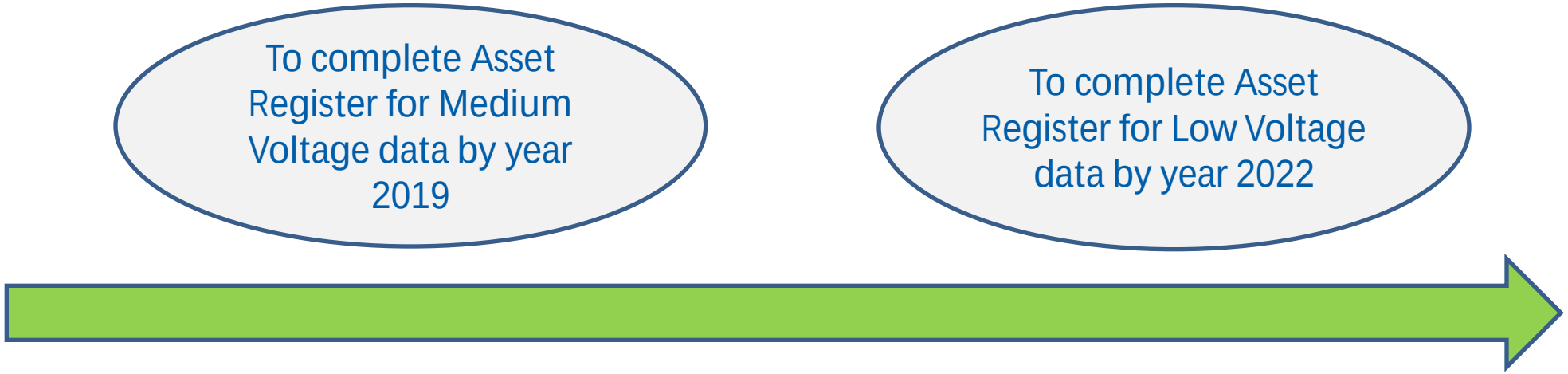


Substation



GIS current achievement in TNB Distribution

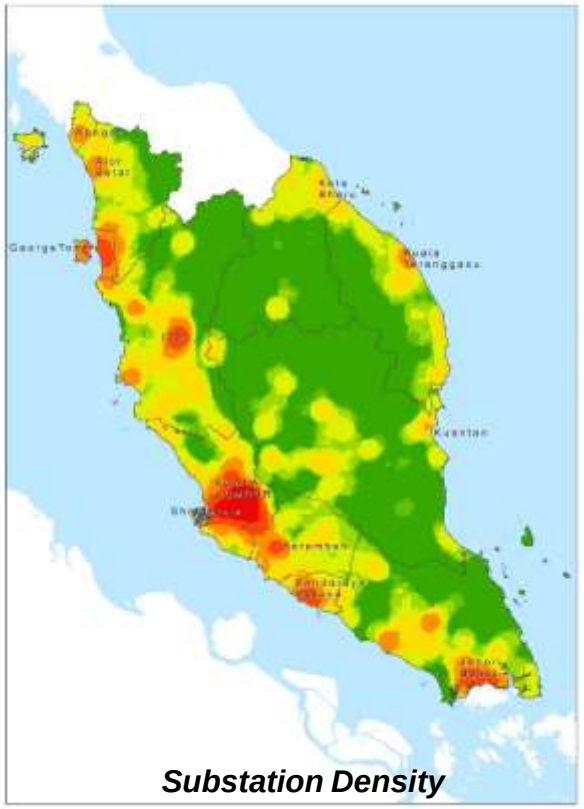
- We had just completed our Pilot project in a small station in Cheras in July 2017 and given the green light to proceed nationwide.



Distribution Asset Data in GIS as at Jun 2017

Distribution Data as at Jun-17

Area / State	Distribution Data
Cheras	PMU, PPU, SSU, PE, (1,262) LV & MV Connectivity (LV=3,299km, MV=1,290km) Customer (134,000)
Kuala Selangor, Sg.Besar, Putrajaya	PMU, PPU, SSU, PE (2,275) Some data on LV & MV connectivity (MV=3,237km, LV=4,291km) Customer
Others	PMU, PPU, SSU, PE (58,076)

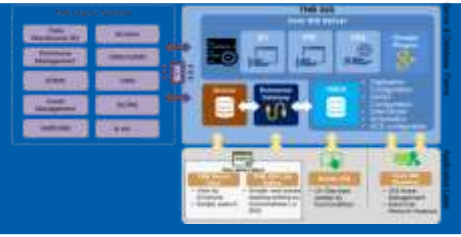


Substation Density

Distribution of Substation

Source: Data as of 30 Jun 2017
Source for Substation Location outside Klang Valley: Mapserver

The Solutions for TNB GIS



The GIS involves four (4) main solutions, namely *Core GIS Desktop, Lite Editor and Mobile GIS.*

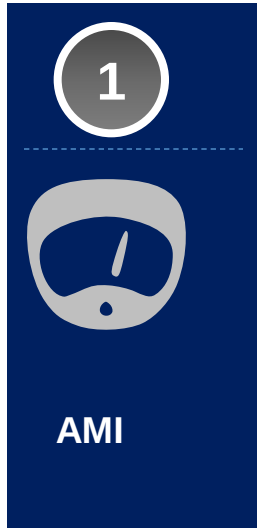
"POWER" user, Is the main GIS application that serves as the backbone system and source of data to other applications.

"Site" user, A on-site data update by functionalities (offline mode)

"LITE" GIS user, A simple web based desktop editing by functionalities

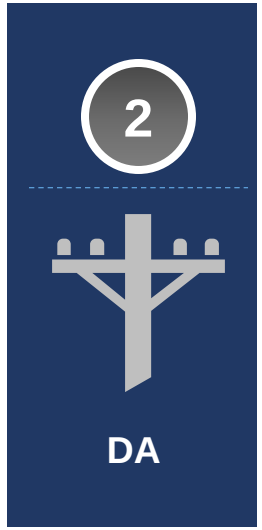
"SmartView" Used for Map Viewing and Simple search.

GIS enabler for other smart technology



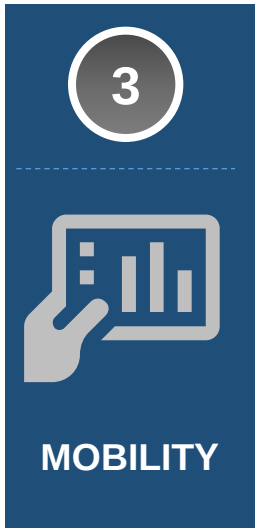
AMI – *Advanced Metering Infrastructure*

- Empower the Customer to manage their usage, load profiling info and participation in new service offerings (i.e Demand Response program)
- On time / prompt billing
- Planned outage and restoration notification to customers
- Facilitates the introduction of RE / Distributed Generation



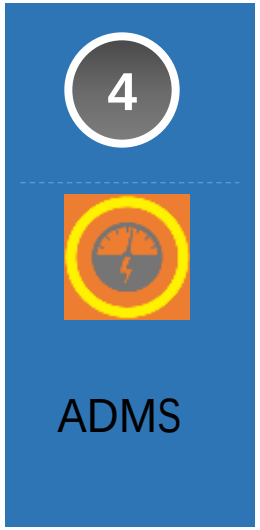
DA – *Distribution Automation*

- Outage duration reduction – by automatically re-switching the network
- As a grid sensor –sense and control the network dynamically
- Improve network management
- Enhanced customer satisfaction – by minimising outage frequency and duration.



MOBILITY SOLUTIONS –*Empowering the field*

- Mobility enables business process automation increasing productivity
- Improves data collection eliminating replication of data and errors
- Makes the field worker situationally aware
- Enhanced customer satisfaction by reducing time to repair



ADMS – *Advanced Distribution Management System*

- automate outage restoration and optimize the performance of the distribution grid.
- fault location, isolation and restoration
- volt/volt-ampere reactive optimization
- conservation through voltage reduction
- peak demand management
- support for microgrids

GIS enabler TNB into becoming Smart Utility

Grid of the future Function	Automated Reading & Billing/Prepaid	Anti Tampering/ Outage Management	Customer Empowerment /Load profile	Home Energy Management	Time Of Use/ Demand Response	Remote Connect/ Disconnect	Solar on roof	Faster location of faults, people and assets	Optimising field work	Reduction of Grid Losses
										
AMI	✔	✔	✔	✔	✔	✔	✔	✔		✔
DA								✔	✔	✔
Mobility								✔	✔	
GIS								✔	✔	

GIS values to TNB Distribution:

Getting Electricity in New Supply Application

1. Currently TNB in rank 8th of World Bank Rank
2. Aim for rank 5th by 2018
3. Using GIS to identify nearest source of supply

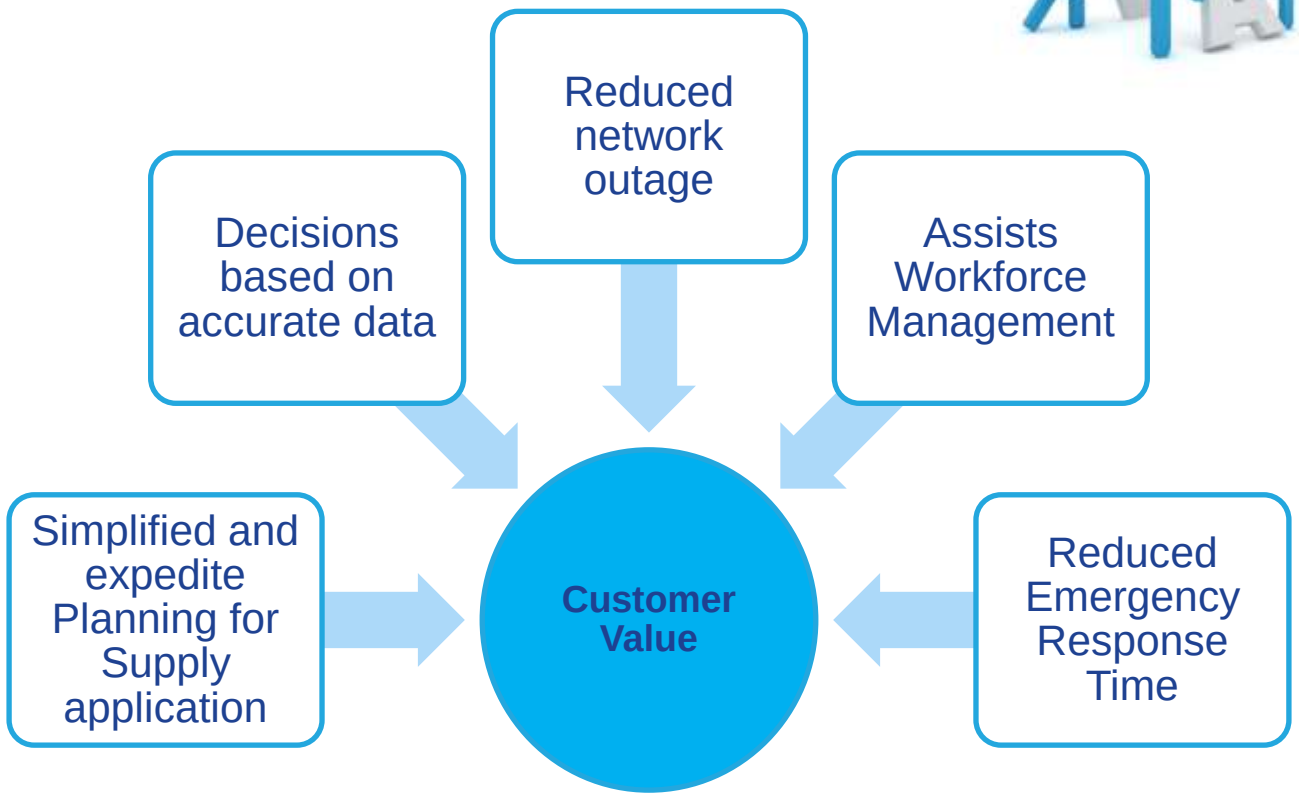
SmartView for all

1. WCCC – improve customer experience
2. LVSM – faster response time
3. Searching for substations location by technical staffs
4. Identification of substation location security level by Security Unit

GIS New Requirement (Few samples)

1. 33kV online approval by Network Planning
2. GIS as enabler for ADMS
3. Pre-determination of Boundary Area in myTNB portal
4. Planning of RE Plant & Customer
5. Future integration with Smart Meter to Support NTL data analytic

GIS- Customer Value for Smart Utility



Thank you

GIS Distribution

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