

# How Smart is Smart Grid?

ELECTRICAL ENGINEERING TECHNICAL DIVISION



reported by  
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The term Smart Grid does not refer to a specific technology. It is an aggregate term that encompasses a set of technologies in modernised electrical network. Through Smart Grid, we can achieve greater efficiency in the system, save money and help reduce CO<sub>2</sub> emissions.

The Electrical Engineering Technical Division (EETD) organised a pre-AGM talk titled "Is The Grid Smart?". It was delivered by Prof. Dr Hew Wooi Ping and chaired by EETD Chairman, Ir. Yau Chau Fong.

## DEVELOPMENTS

Prof. Hew reviewed several major power outages in Northeast US, Italy and India that affected millions of people and led to the development of Smart Grid.

The Smart Grid initiatives started with IEEE Smart Grid Standard development in 2007. IEC formed Strategic Group (SG) 3 to work on Smart Grid Standard in 2008. Beside the effort by IEEE and IEC, several countries also started their own initiatives.

China Smart Grid Initiatives has set a target to reduce carbon emission per unit of GDP to 40-45% of the 2008 level by 2020. United States Smart Grid Initiatives focuses on maintaining a secure and reliable electricity infrastructure by using "smart" technology. Japan Smart Grid Initiatives 2009 aims to develop a low carbon society to reduce carbon emission to 75% of the 1990 level or two-third of the 2005 level by 2020.

## SMART GRID DRIVERS

"The smartness of the grid is measured in term of carbon emission, active consumer participation in energy management and intelligent post fault configuration to avoid cascaded faults", said Prof. Hew. He quoted from IEC on Smart Grid that Smart Grid drivers include ageing infrastructure, integrating intermittent energy sources, lower energy price and security of supply and increasing energy need, sustainability and challenges faced by utility.

In effect, Smart Grid is a concept of electric grid

modernisation covering the whole spectrum of electric grid, from power generation at one end to the consumer at the other. Through the inclusion of Smart Grid technologies, the grid is able to provide real time feedback and hence becomes more flexible, interactive and reliable.

Prof. Hew discussed briefly the six IEC White papers:

1. Orchestrating infrastructure for sustainable smart cities
2. Internet of things: Wireless sensor networks
3. Micro grids for disaster preparedness and recovery, with electricity continuity plans and systems
4. Grid integration of large-capacity renewable energy sources and use of large-capacity electrical energy storage
5. Electrical energy storage
6. Coping with the energy challenge.

The future power system as suggested is shown in Fig 1.

Some questions were raised from the audience. A participant asked whether the carbon emission can be consistently reduced despite the increase in energy utilisation. Another participant asked about consumers' role in deciding on generation and transmission of energy.

In conclusion, Prof. Hew suggested that Malaysia should refer to EU as a benchmark on the carbon emission level per GDP, consumer participation scope, and post-fault reconfiguration capabilities. ■

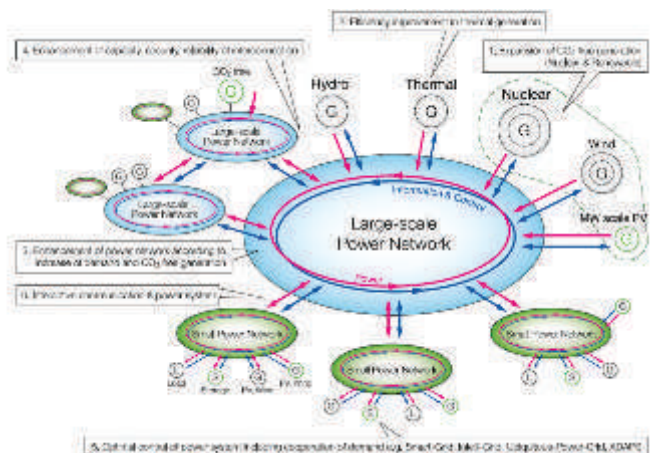


Figure 1: Suggested future power system (IEC White Paper: Coping with the energy challenge)