Smart Grid for the Modern City

What is Smart Grid?

-Smart power network that support multi-connection from various types of distributed generation and load demands.

-Self awareness power network that prevents any problem for Power Quality issues such as voltage sag and swell, voltage fluctuation, harmonics etc.

-Self operating and healing network (decentralized control), manage bi-directional power flow, supply demand matching.

-Should be allowed islanding system, when the grid lose of supply

What is Modern City?

The city aims to utilized energy as much as possible with less the environment impacts. It can divide into two main parts: Supply and Demands

Supply Part:

-Small-Scale Distributed Generation (SSDG)
Mostly renewable energy such PV-rooftop wind turbine etc. These types of energy sources are unpredictable, and so the power network will be experienced the bi-directional power flow, particularly the sag and swell voltages.

Demand Parts:

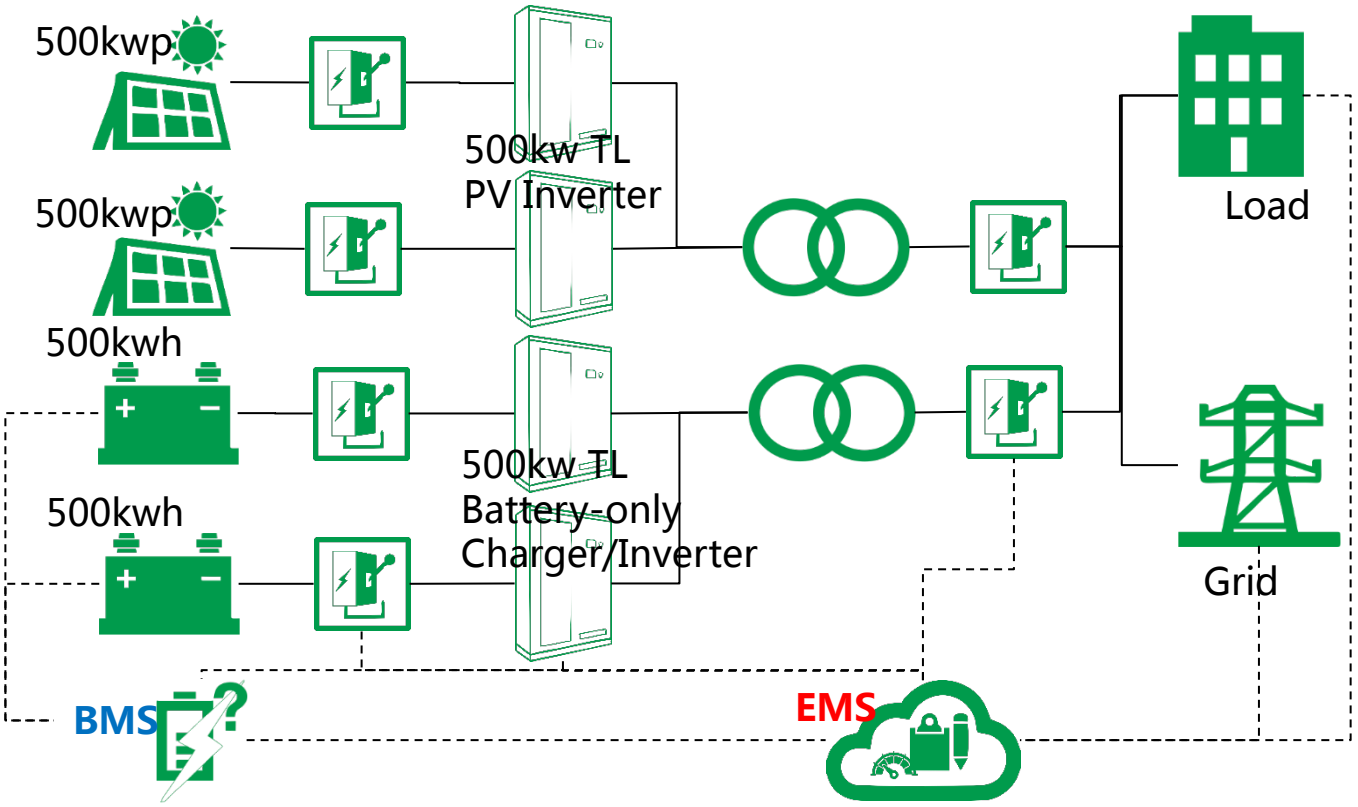
>> Electric Transport

Vehicles and tracks transport such as EV car and metro system. It is known that the use of EV car is needed to consider, especially charging time and how long as it can effect the grid supply.

Moreover, the EV car for modern city will be had a function Vehicle-to-Grid (V2G) to support the power network during the peak demand. And it will become more complicate in the nearly future, if the dynamic electricity tariffs were available. Dynamic tariff will be determine the charging price during peak, off-peak and holiday demands.

>> Green building

Refer to the commercial and living building in that area. This type of building aims to:
Saving energy and maximize its building function performance as much as possible with the lowest consumption on energy and impact to the environment. That means they mostly install renewable SSDG such PV, wind turbine etc. to support their demand. The demand of this building will be depends on the consumer behavior, the generation in that time and its building function or business.



The important in the successful of the Smart Grid for the modern city is the PQ monitoring and control system, which allows the power network become the decentralized control. This figure shows that the Energy Management System (EMS) is work as PQ monitoring system and try to mange power in the network.

In summary

In order to ensure the existing distribution power can become Smart Grid, the PQ monitoring system, support regulations and standards are needed. This is due to all generations and demands are needed to communicate to each other in order to ensure that the voltage that flow in the power network always within the voltage statutory limits, as same as the harmonics.

Thus, the PQ issues in the Smart Grid can prevent by installing PQ monitoring at the decentralized control level, even all the electrical appliances were design follow the regulations and standards.

Thank you for attention
Any question?