Theme 1: The Future of Electricity Network with Disruptive Technologies

Office of the Energy Regulatory Commission (OERC) Thailand

APER 2018, 28 November 2018

Thailand Power Industry Structure – Enhanced Single Buyer (ESB)

Trend: small-scale RE Distributed Generation (DG) with self consumption (Prosumer)

Challenge: power system management and regulation

Trend with Solar Energy in Thailand (1)

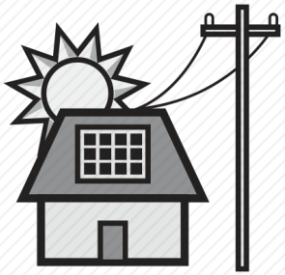
Prosumer (Solar)

- Self-Consumption

- Private Power Purchase Agreement (PPA)

No Sale to Main Grid

Installed capacity of solar prosumer (status as of July 2018):
66 MW (for ≥ 1 MW) and 141 MW (for < 1 MW)
Remark: Installed Capacity ≥ 1 MW required "Electricity Generation License" from *ERC*



Sale to Main Grid
possibly after year 2019
(National Reform Energy Plan)

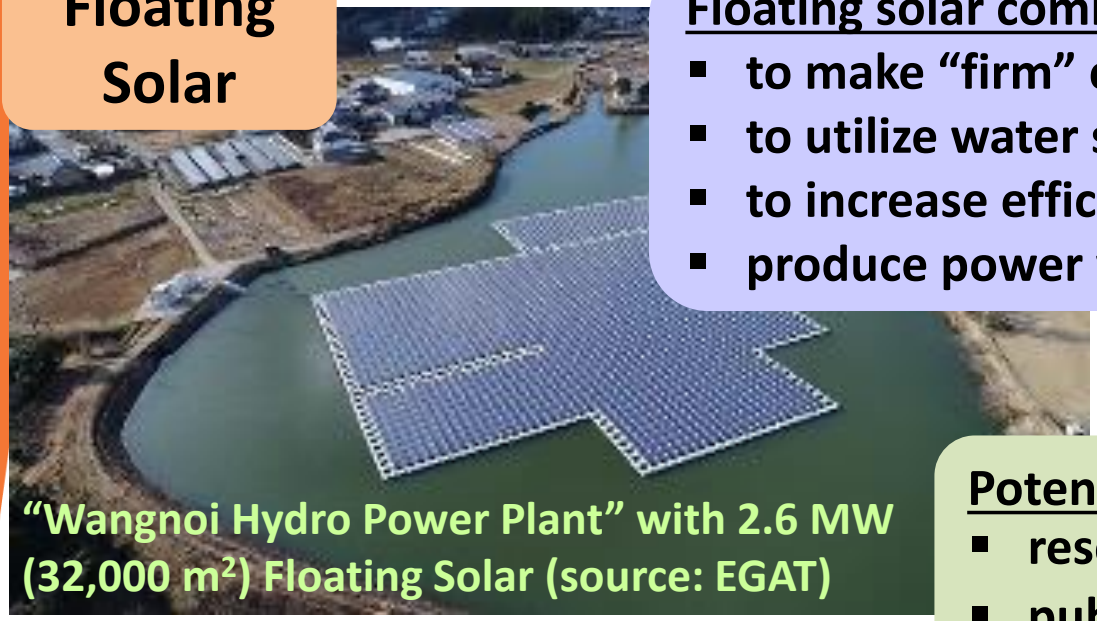
***ERC* together with power utility to revise/improve the code of energy network system code accordingly**

- **Limitation of reverse power flow to upper voltage level**
- **Avoid overvoltage problems at feeders**

Challenge: *ERC* considers to revise criteria for "Electricity Generation License" (minimum required capacity to be < 1 MW) for better regulation purpose.

Trend with Solar Energy in Thailand (2)

Floating Solar



"Wangnoi Hydro Power Plant" with 2.6 MW (32,000 m^2) Floating Solar (source: EGAT)

Floating solar combined with hydro power

- to make "firm" clean power supply
- to utilize water surface efficiently
- to increase efficiency of solar cell (around 10%)
- produce power with zero emission

Potential installation locations

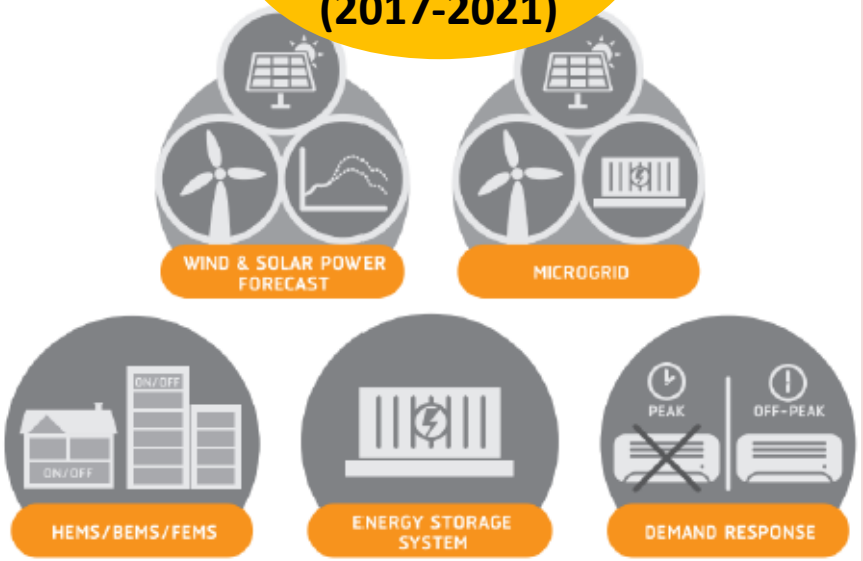
- reservoirs at hydro power plants
- public and private holding ponds

Challenges

- Potential install capacity to be studied
- *ERC* is preparing "Code of Practice (COP)" applied for floating solar ≥ 1 MW covering following issues.
  - environmental impact
  - disposal procedure
  - safety installation

Smart Grid in Thailand

National Smart Grid Action Plan (2017-2021)



Demand Response (DR) and Energy Management System (EMS)

- Peak Reduction 350 MW with automated DR by 2021
- DR control center by 2021
- Possible business model for DR to be studied

RE Forecast Center

- Start to forecast wind and solar energy by 2021 for wind power 476 MW and solar PV 2,993 MWp (AEDP 2015)

Microgrid and Energy Storage System (ESS)

- 3 Microgrid projects by 2021
- Possible business model to be studied
- Research on ESS
- Microgrid and smart city

Electric Vehicles (EV) in Thailand

National Target for 2036

- 1.2 million EV
- 690 charging stations
- EV Smart Charging
- Vehicle to Grid: V2G

Target for 2019:
150 charging stations with partial subsidy

ERC's roles on EV business

- to issue safety installation and interoperability standards for charging stations
- to issue service quality standard for charging station providers
- to regulate charging tariffs
- to regulate data exchange between charging stations and ***ERC***

Thank you for attention