Regulatory Sandbox for Energy Sector Innovations

(ERC Sandbox)

Rational Criterion

Energy Reform Plan

Competition Enhancement

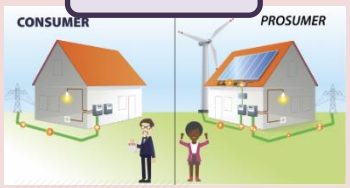
ERC Sandbox

An ERC sandbox is initiated to promote innovations in energy sector by relaxing some rules and regulations within limited area and period.

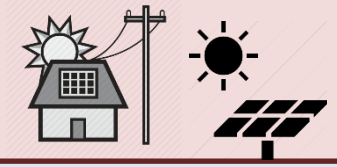
Disruptive Technology

Digital Technology

Prosumer



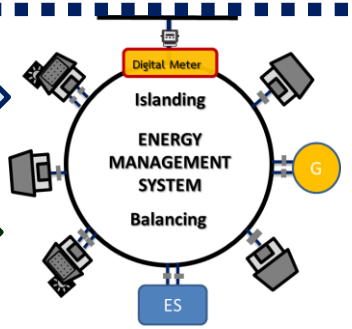
EV & Energy Storage



Objectives	Benefits
To promote the development of innovations	Innovations, New Energy Business Models
To demonstrate the innovations in real situation	New Tariffs (Wheeling Charge, Backup , Ancillary Service)
To develop and revise rules and regulations for innovations	The impact assessment data on innovations, New Energy Business Models
Prepare for the disruptive technology	

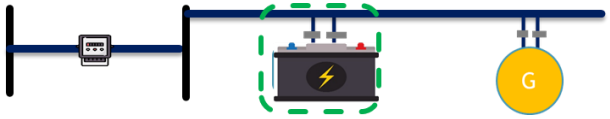
Energy Regulatory Commission Sandbox (ERC Sandbox)

1. **Peer-to-Peer Energy Trading & Bilateral Energy Trading**

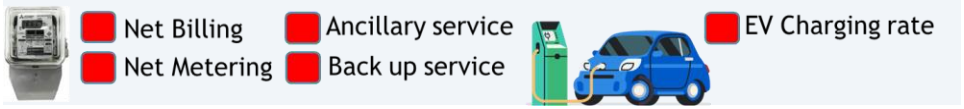


2. **Microgrid**

3. **Battery Storage**



4. **Net Metering / Net Billing**



5. **New Business Model**

6. **Natural gas**

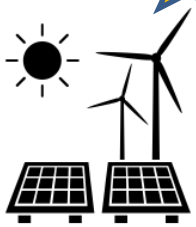
Applications of Battery Storage

Generation

- Electric Energy time-shift
- Electric supply capacity

Renewable Energy

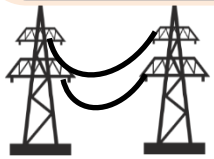
- Renewable energy time-shift
- Renewable capacity firming
- Wind/Solar generation grid integration



System Operator

- Load following and area regulation
- Electric Supply reserve capacity
- Voltage support

Transmission & Distribution System



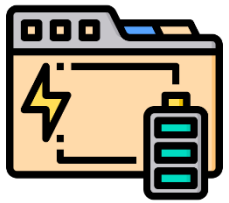
- Transmission congestion relief
- T&D upgrade deferral

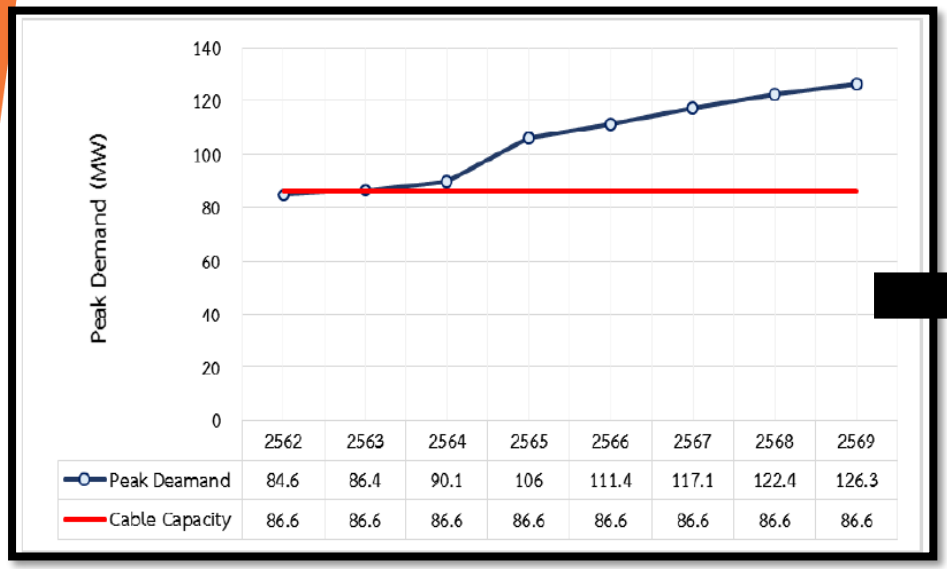
Consumers

- Time-of-use management
- Demand charge management
- Electric service reliability
- Electric service power quality

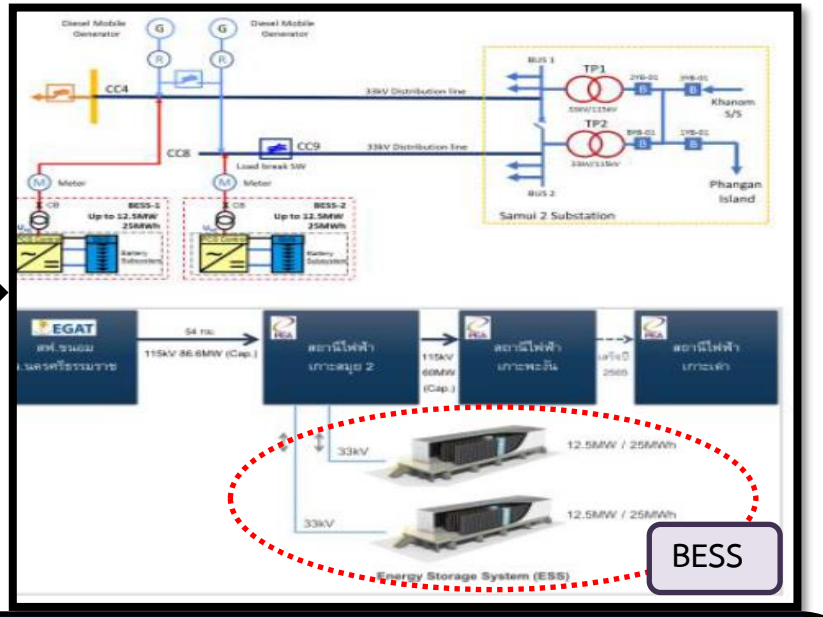
BESS Projects in Sandbox

1. BESS in Samui island





	2562	2563	2564	2565	2566	2567	2568	2569
Peak Deamand	84.6	86.4	90.1	106	111.4	117.1	122.4	126.3
Cable Capacity	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6



Problem

During high season, Samui island may have shortage of electricity in 2564 -2569.

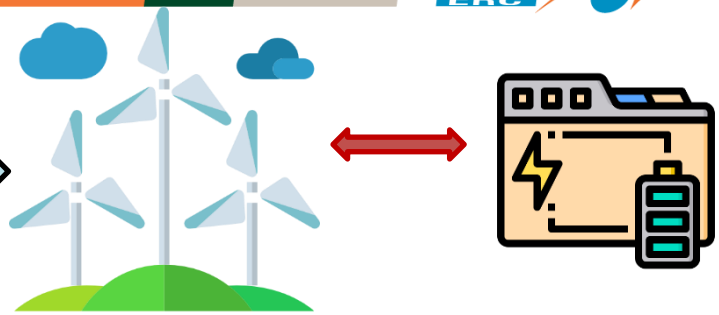
Solution

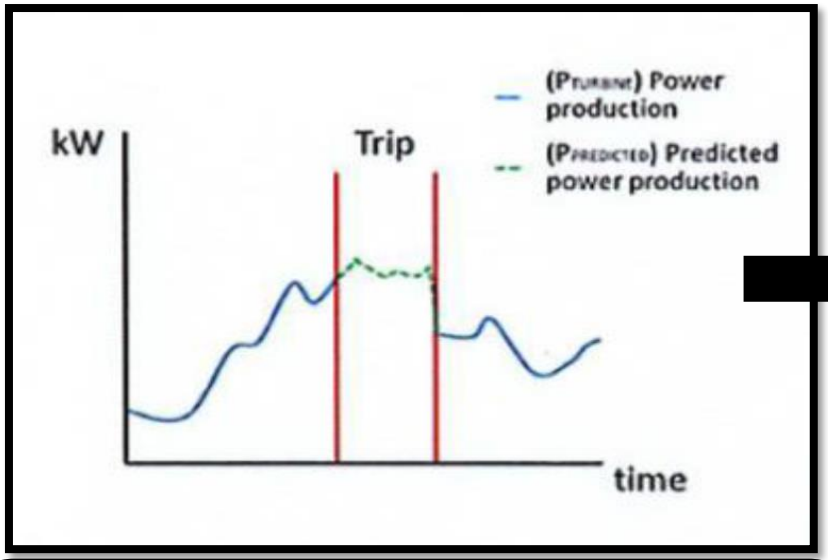
Lithium-Ion battery connected with distribution system

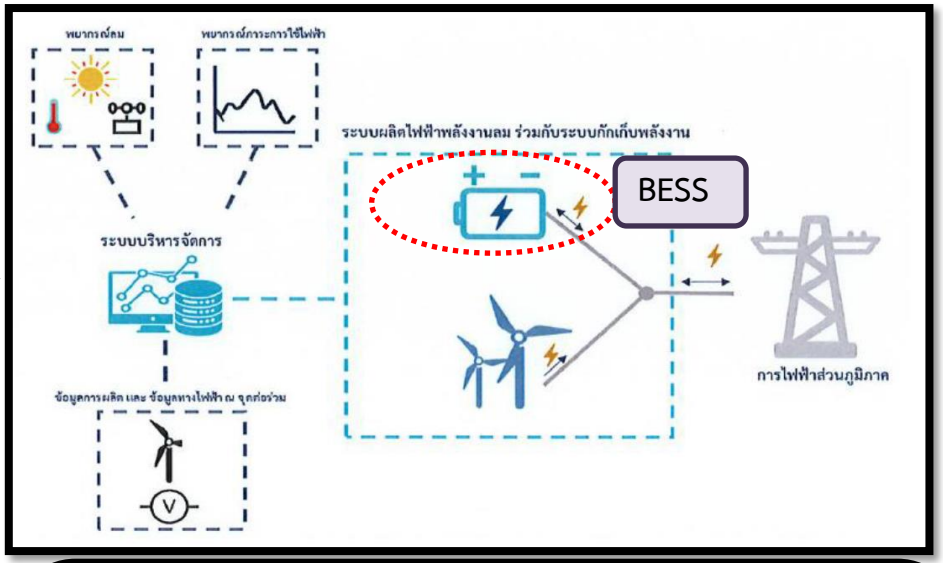
- ✓ Voltage Support for power quality control
- ✓ Energy Time Shift for electricity arbitrage
- ✓ Spinning Reserve for power backup and transmission upgrade deferral

BESS Project in Sandbox

2. BESS to improve power quality and increase reliability of wind power plant







Problem

Renewable energy, e.g. wind energy has unstable power generation that affects voltage fluctuation. As a result, the wind power plants are often disconnected from the network system.

Solution

Lithium-Ion Battery installed with wind power plant that:

- ✓ Renewable capacity firming
- ✓ Voltage support for decrease power plant shutdown and feeder trip

BESS Regulations (Discussions)

- Definition: Generator or Load ?
- License required ?
- Regulations
  - Engineering and Safety Standard
  - Connection Code
  - Tariffs
  - Quality of Service

Thank you for your attention