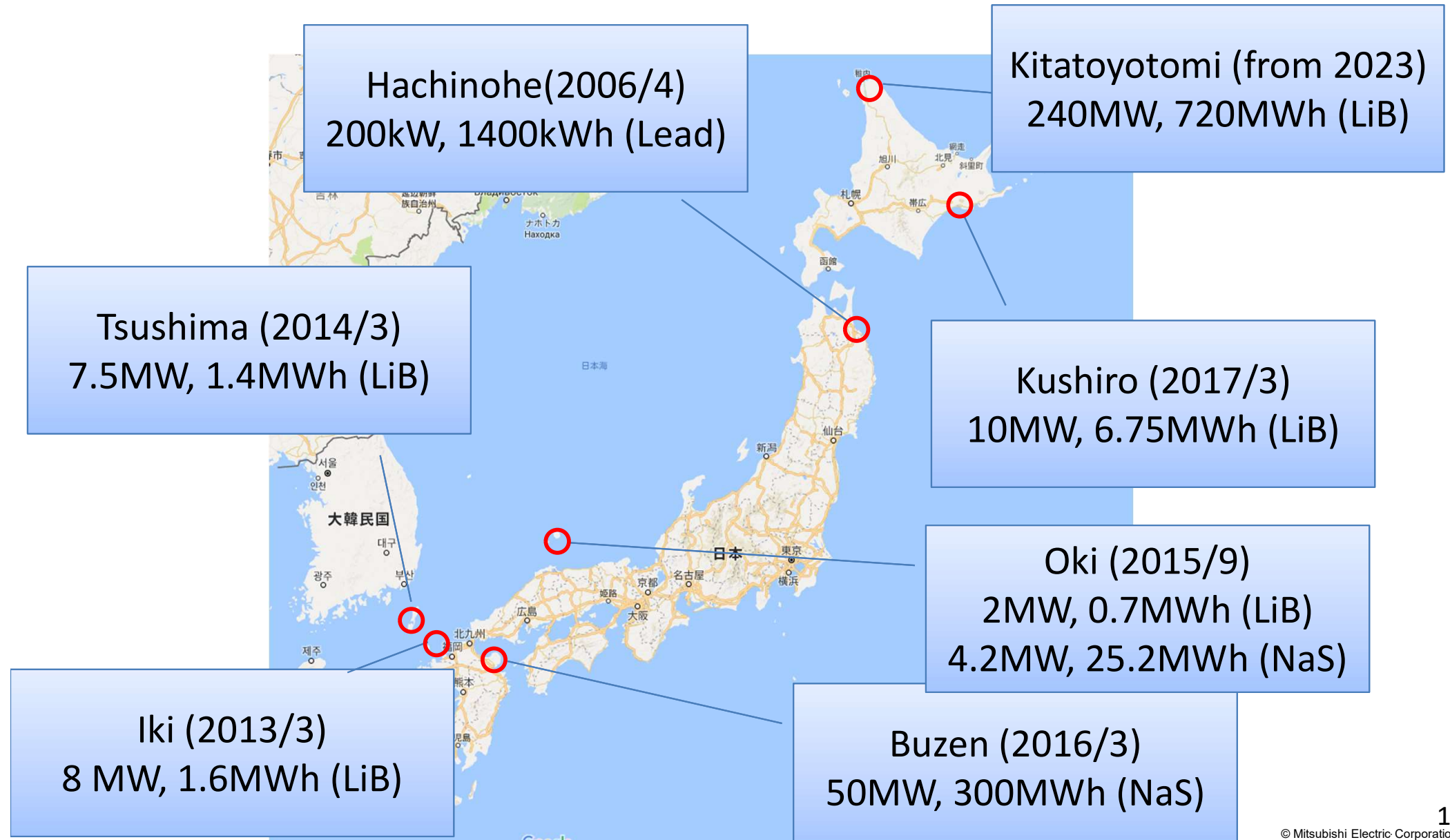


Introduction to BESS system experiences

Mitsubishi Electric Corporation
Energy System Center (Yokohama)
ICT Engineering Section 1
Emi TANABE
2nd November 2022

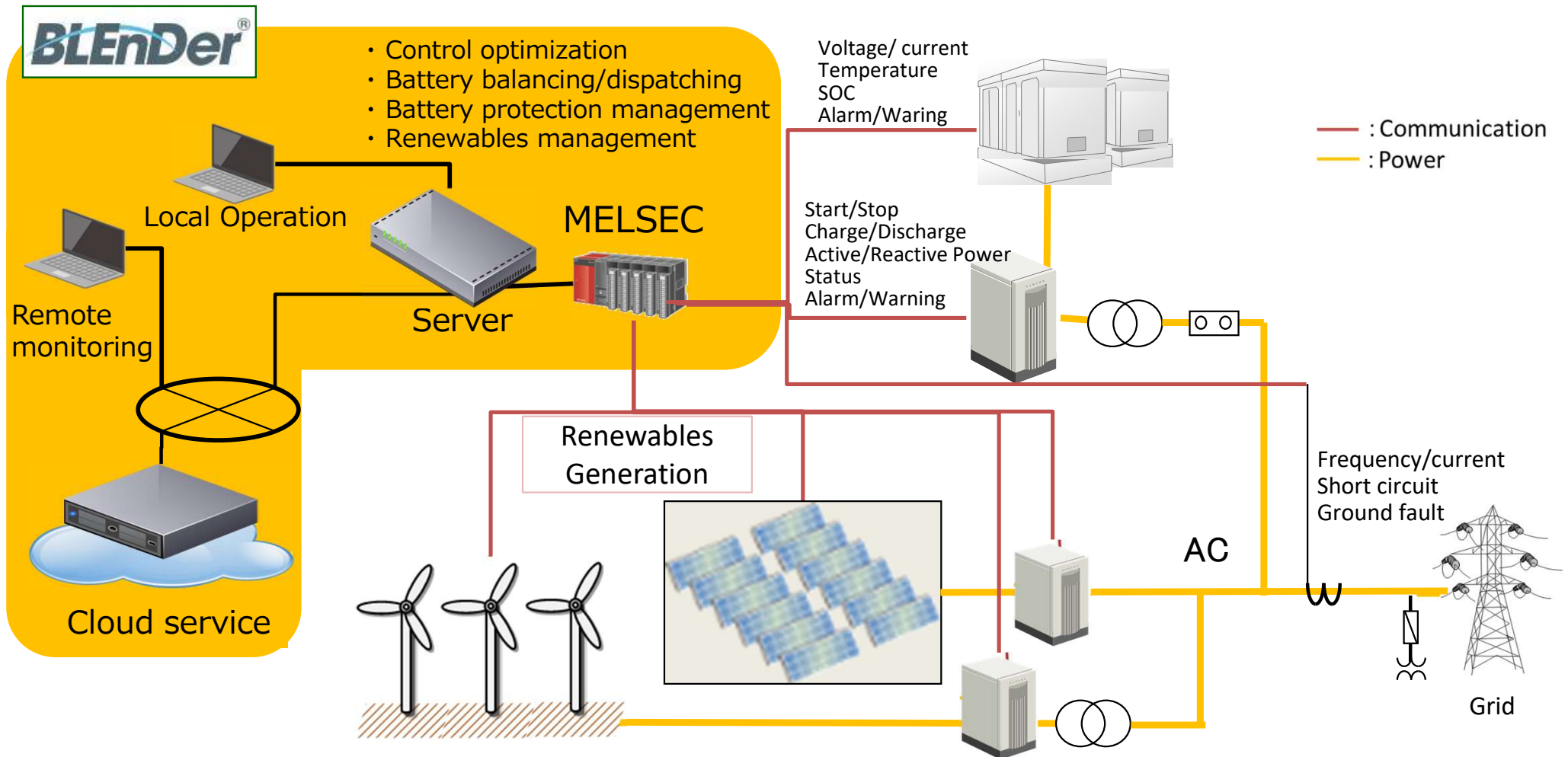
MELCO's Battery projects (Examples)

Since 2006 when Hachinohe microgrid verification project started, MELCO apply its solution to battery systems in islands including Hokkaido for large capacity renewable energy installation.



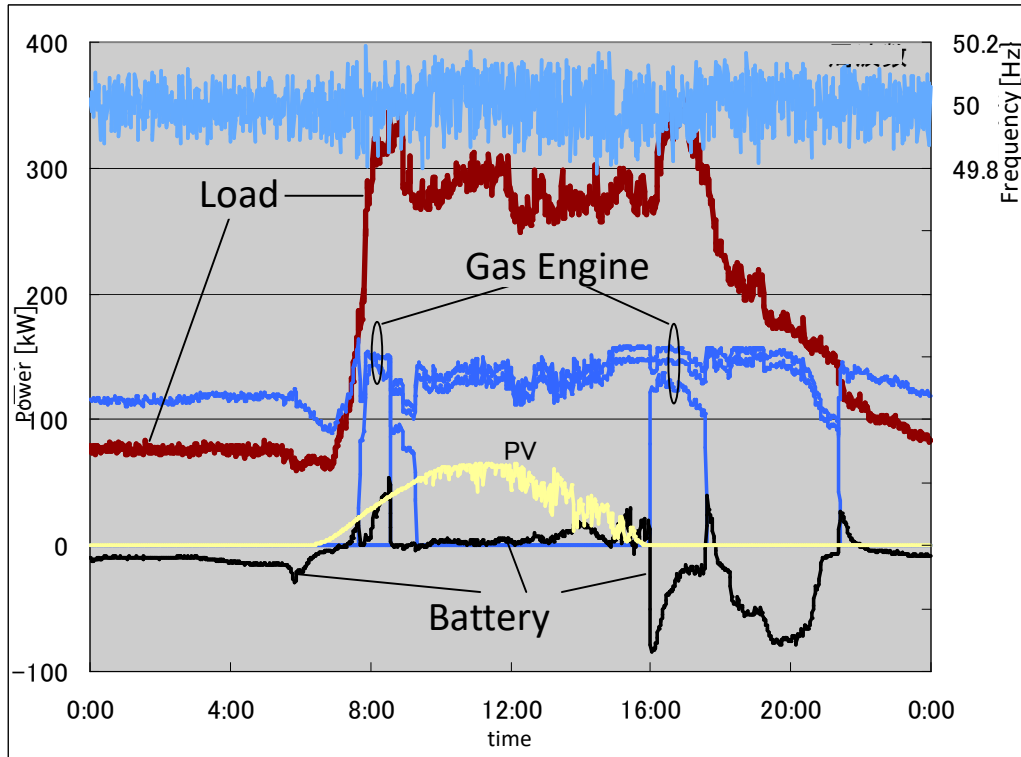
BLEnDer®RE Basic configuration and features

- High-speed charge / discharge control (milliseconds) adopting sequencer.
- Peak shift / energy application cost reduction with single server monitoring and control.
- Real-time monitoring and control from a remote systems via API

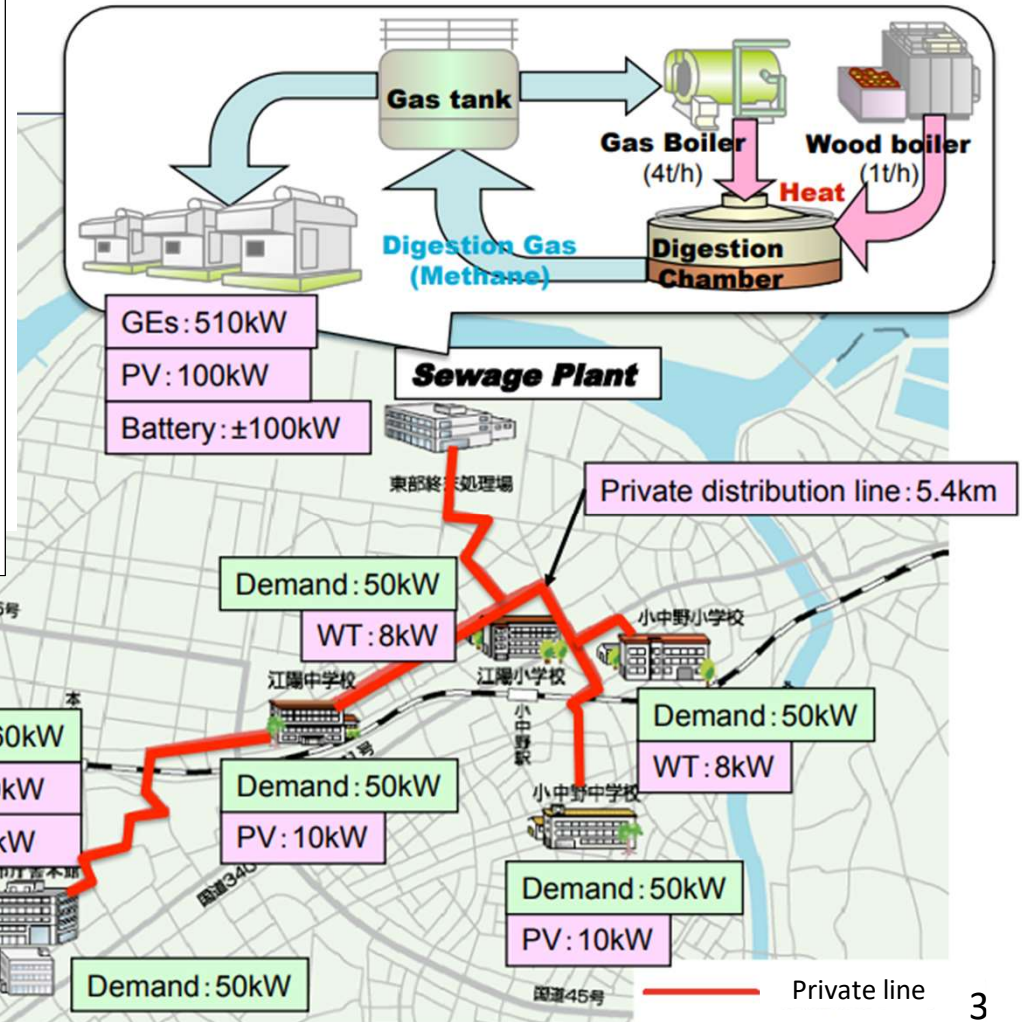


BLEnDer® RE's Track Record "Hachinohe microgrid"

The microgrid consisting of actual demand, 100% renewable energies and private line realized to suppress the fluctuation of the reverse flow on grid condition and 1week islanding operation.



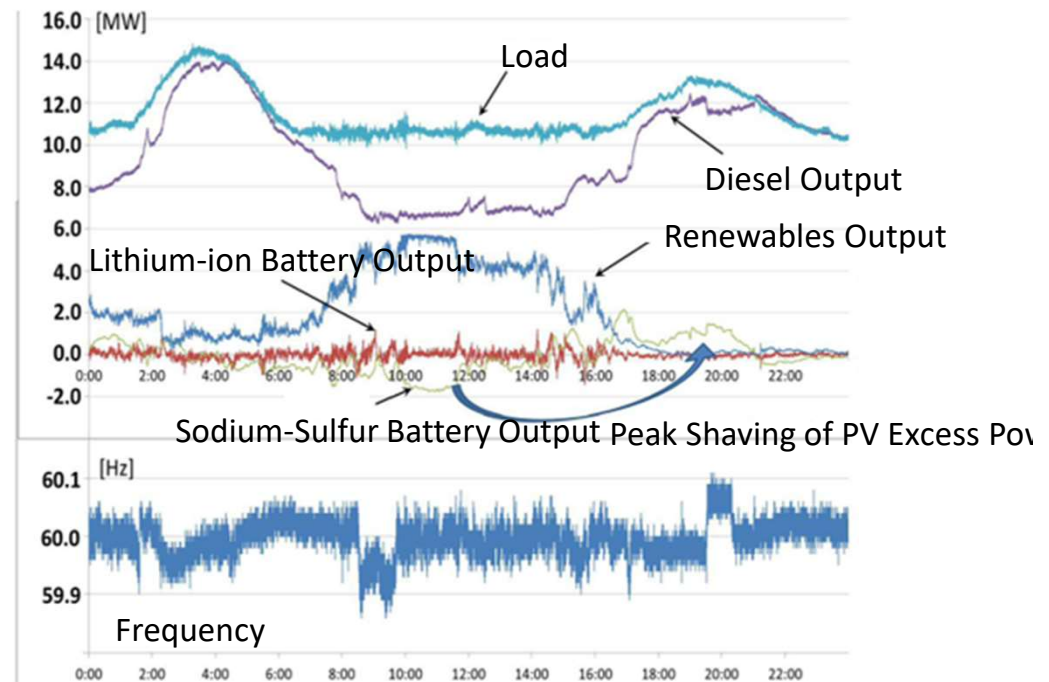
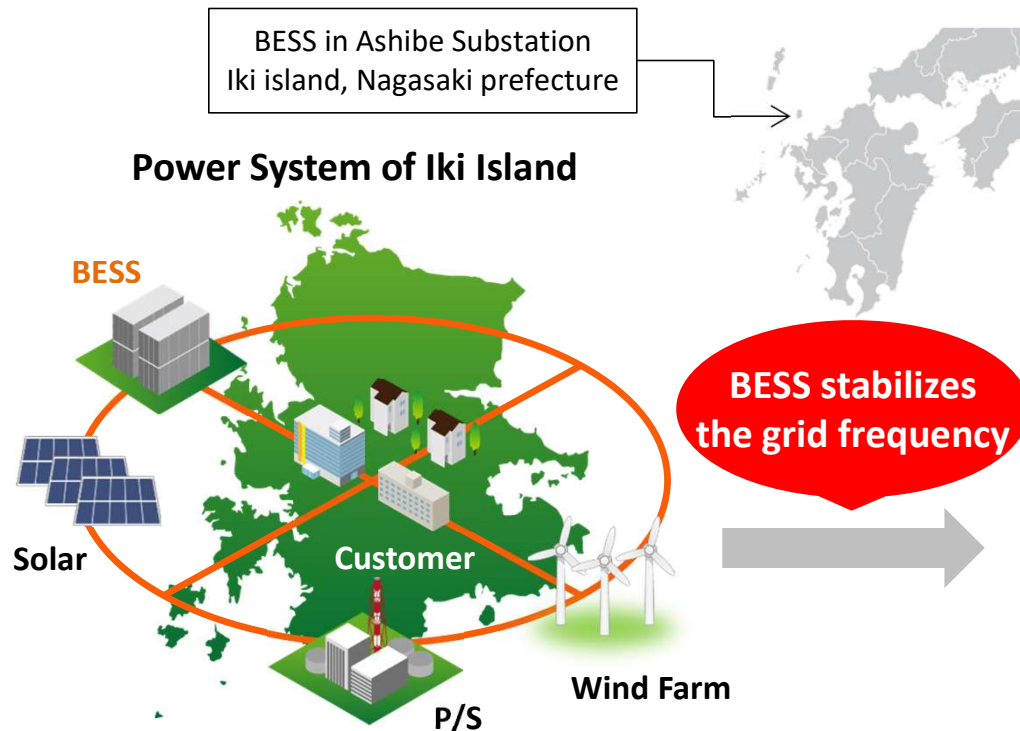
Weekdays



BLEnDer® RE's Track Record "Iki BESS" and "Oki BESS"

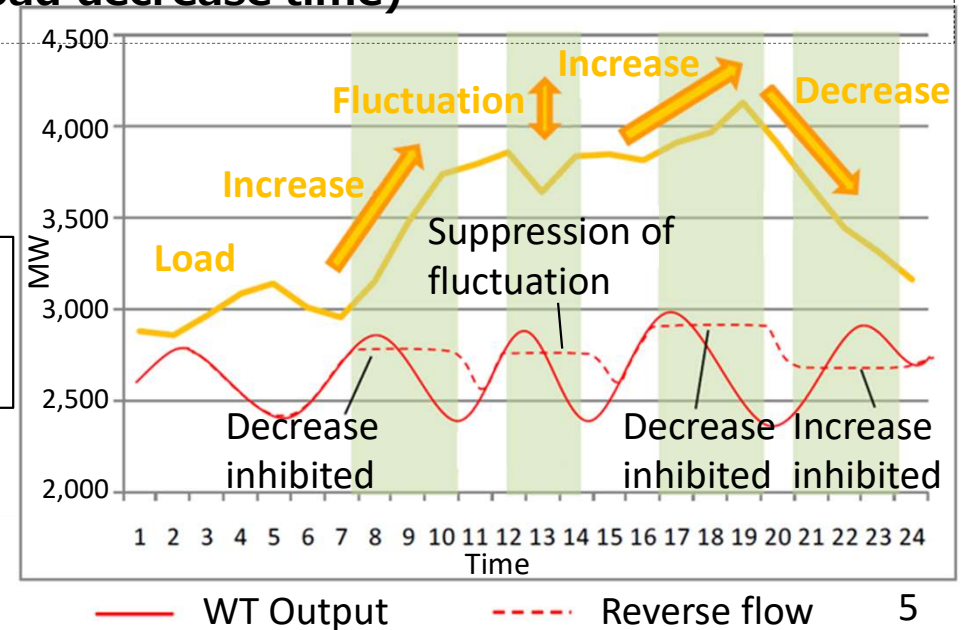
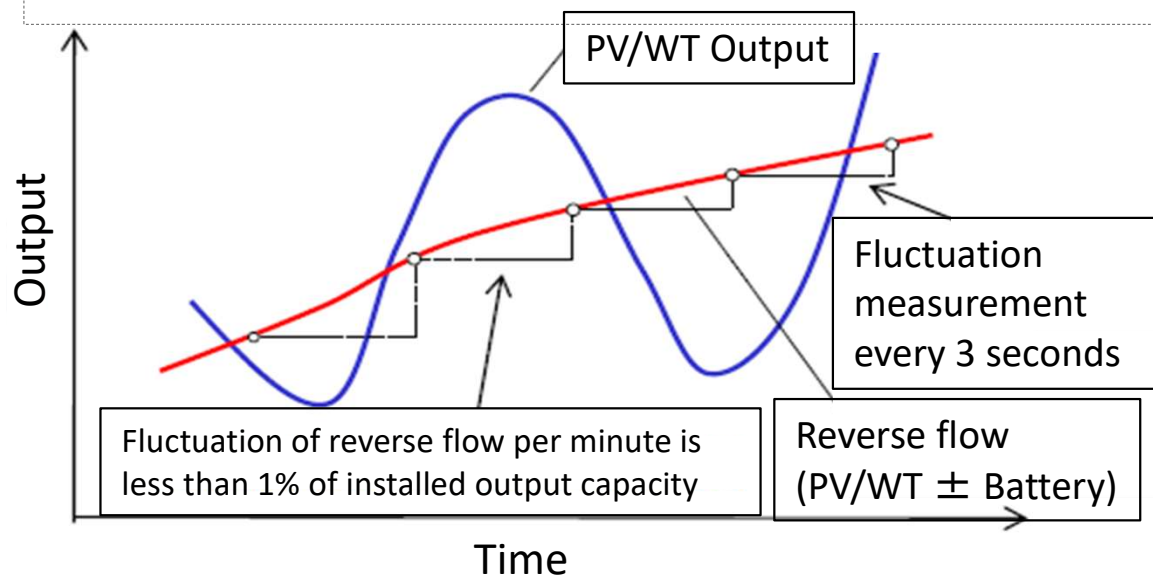
Microgrid projects for islands where the installation of renewable energy affect much to the grid.

	Iki	Oki
Capacity	PV 8MW , WT 2MW, Load (min.)10MW	PV 8MW , WT 2MW, Load (min.)10MW
Control	Short-period($\Delta P + \Delta F$)	Short-period($\Delta P + \Delta F$) Long-period(ELD+EDC)
Battery	LiB 4MW x 0.4hr	LiB 2MW x 0.35hr NAS 4.2MW x 6hr



HEPCO's Grid Code for RES The severe condition of Grid code is required in Hokkaido which grid size is relatively small.

- ✓ Short term grid code (PV, WT)
 - ❑ Fluctuation of reverse flow per minute shall be less than $\pm 1\%$ of installed output capacity
 - ❑ Fluctuation should be measured every 3 seconds
- ✓ Long term grid code (WT)
 - ❑ Prohibition of reverse flow increase/decrease at specified time period
 - 7:00 – 10:00 Decrease prohibited (Load increase time)
 - 11:30 – 13:30 Increase and decrease prohibited (Lunch Time)
 - 16:00 – 19:00 Decrease prohibited (Load increase time)
 - 20:00 – 23:00 Increase prohibited (Load decrease time)



BLEnDer® RE's Track Record "Kushiro BESS"

The battery system which comply with the Grid code of PV connection in Hokkaido operates in stable since 2017.

Kushiro BESS

Status: Operation since April 2017

Customer: Obayashi Clean Energy
(PV IPP)

Purpose: PV fluctuation smoothing



Installation Facilities

- ✓ PV: 17.9MW
- ✓ Battery: 6.75MWh
- ✓ Battery-PCS: 10MW
- ✓ EMS: BLEnDer RE

BLEnDer RE Function

1. Smoothing of renewable energy output
2. Battery management

