

SCIENCEPHOTOLIBRARY

World's 1st Commercial Application of CaFrESS

Rokkashomura-Futamata Wind Power Plant



Rokkashomura-Futamata Wind Power Plant

34MW-NAS Battery Station



Battery yard



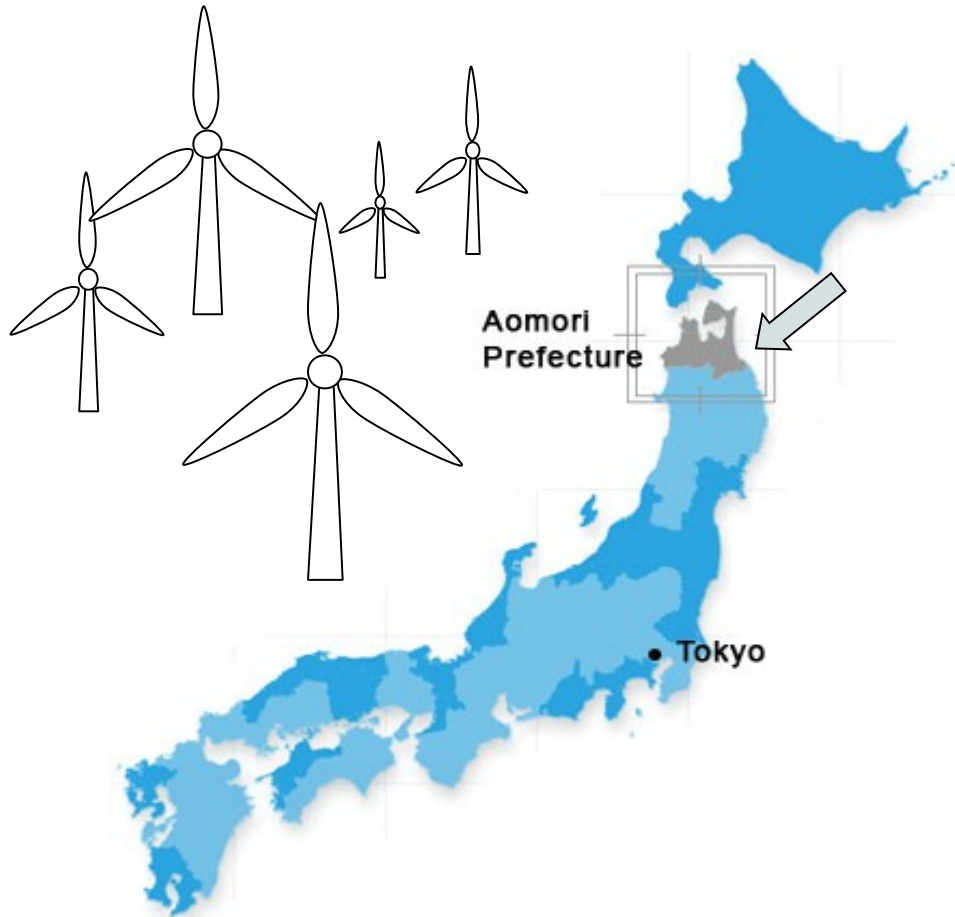
AC/DC Converter



Control building



Rokkashomura-Futamata Wind Power Plant



Wind capacity: 51MW
(Current output level: 40 MW)

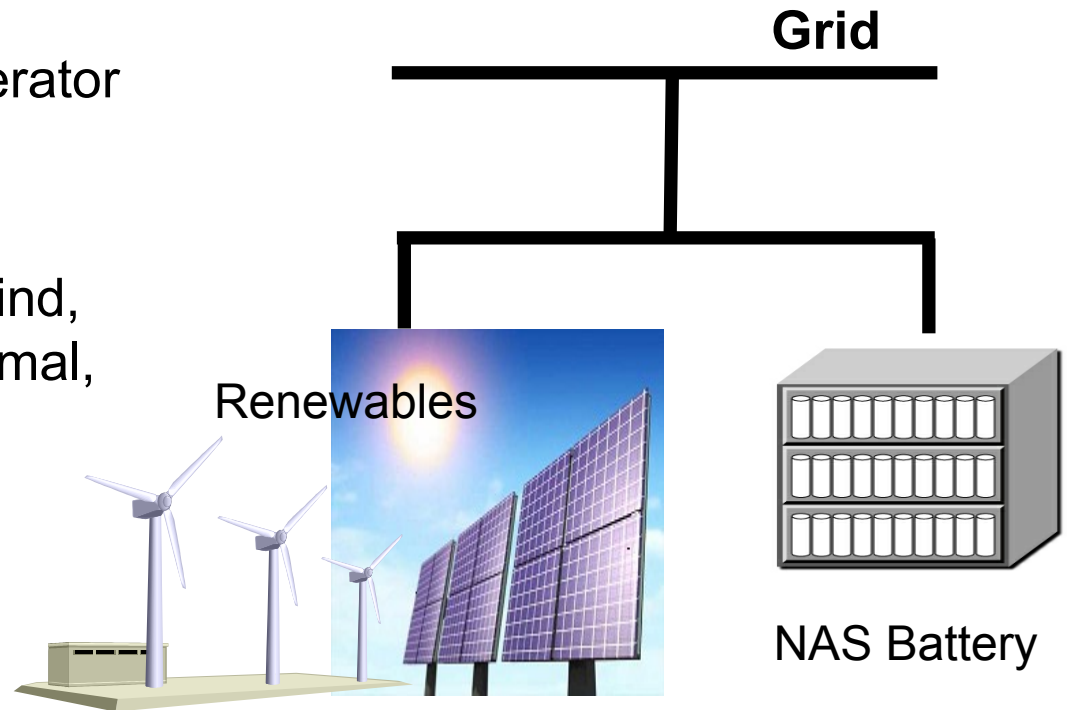
**Storage capacity: 34MW
238MWh**

Started operation: June 2008

CaFrESS is...

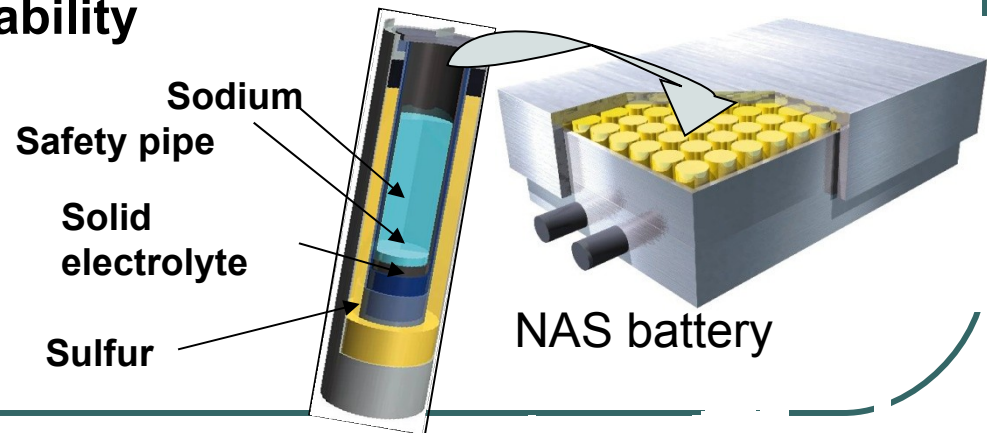
(Carbon Free Energy Supply System)

- Able to control power output by a combination of a renewable power generator and a NAS battery
- Not only suitable for wind, but also solar, geothermal, and wave power

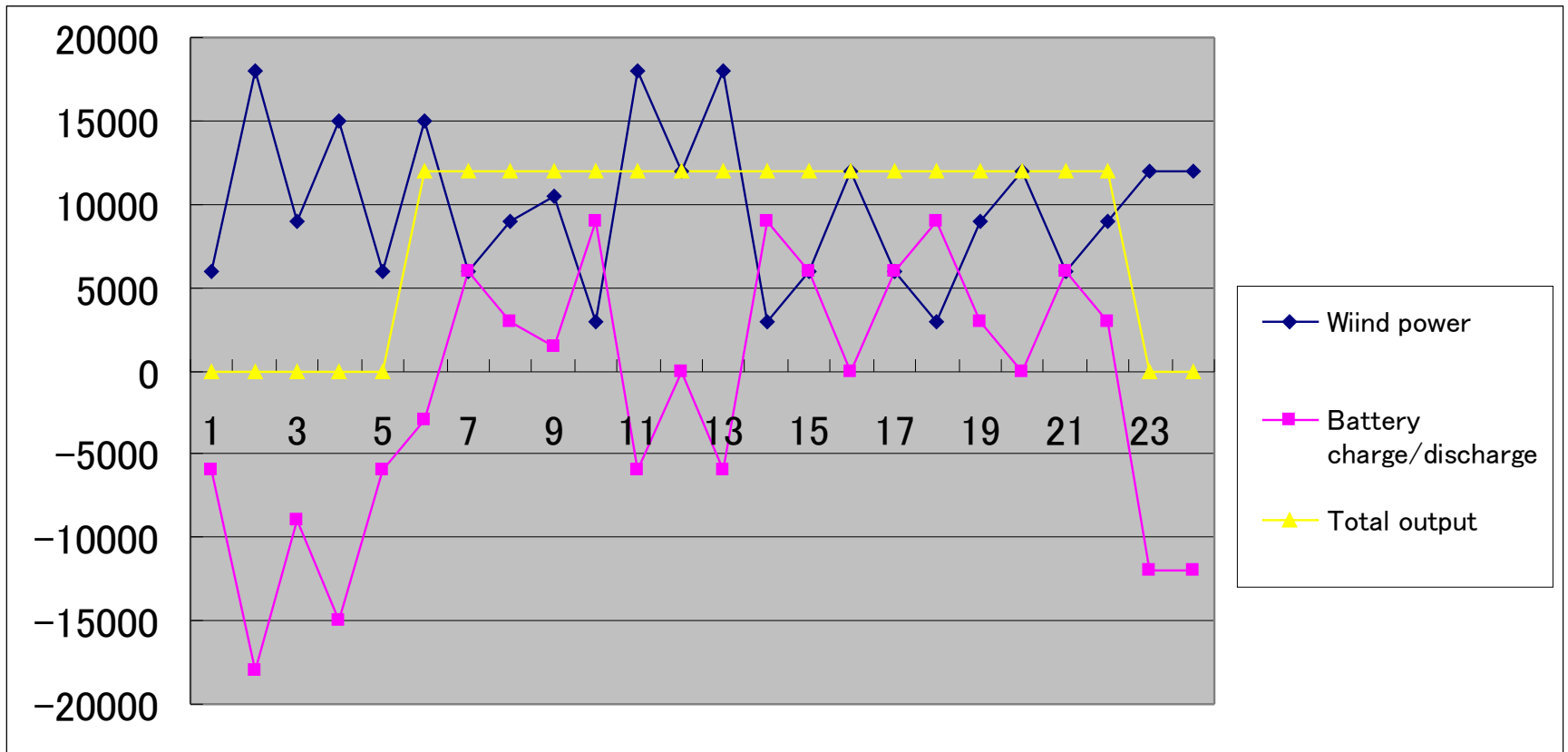


Characteristics of CaFrESS

- **Environmentally Friendly**
- **Lower cost than fossil fuels in isolated area**
- **Control total output of the wind generator and the NAS battery charge and discharge**
- **Solution to the frequency and voltage fluctuation**
- **Power source is highly responsive to supply/demand fluctuations (Quick Charge/Discharge)**
- **Large energy storage availability**

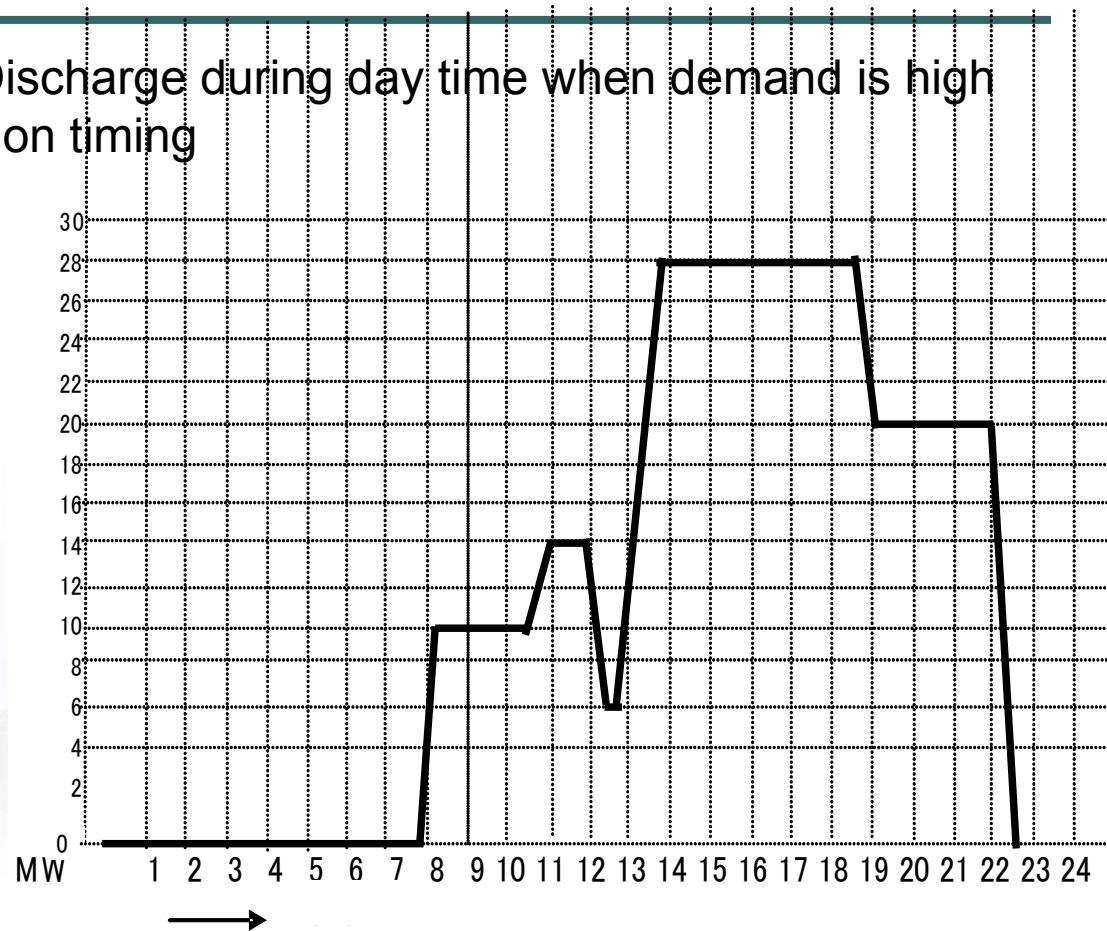


Leveling Electric Output Using NAS Battery



Schedule Power Transmission Timing Using NAS Battery

- Charge during night time/ Discharge during day time when demand is high
- Able to schedule transmission timing



How Can CaFrESS be applied...

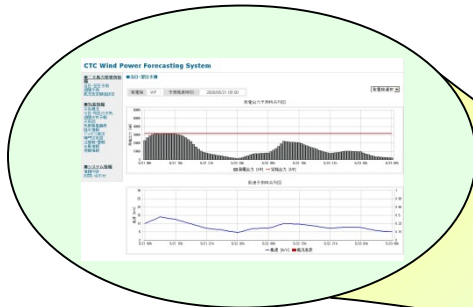
- **Tradable on the power market**
- **Maximize Renewable Energy Value**
- **Cost & CO2 saver for ancillary uses**

How Can CaFrESS be applied...

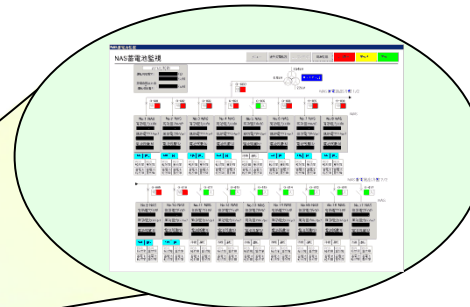
- **Supply power on demand**
- **Solution to the frequency & voltage fluctuation issues**
- **Economic solution in isolated areas**

CaFrESS Example in Rokkashomura-Futamata Wind Power Plant

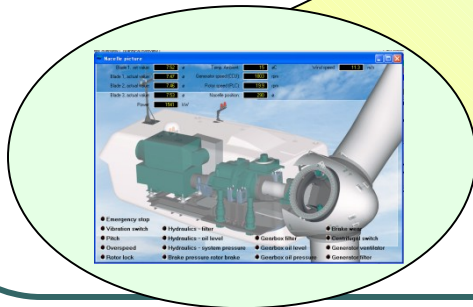
Micro-Weather Forecast System



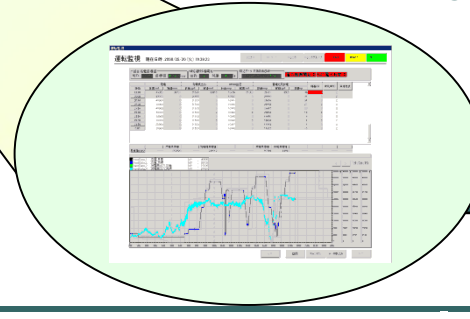
Energy Storage Management System



Wind Farm Management System



Power Management System



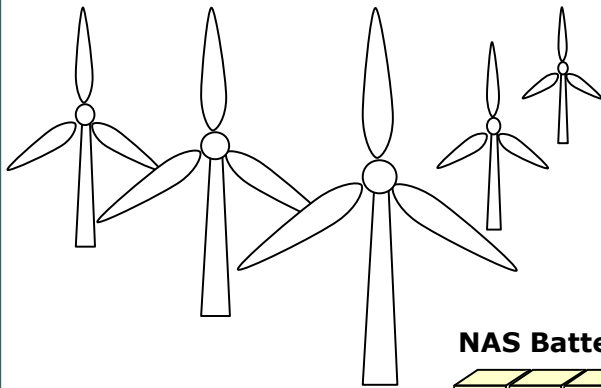
Grid

Direct Power Supply to G8 Energy Conference

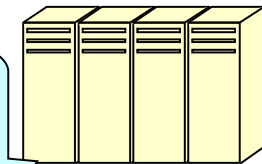
7-8th June 2008 Aomori, Japan

Carbon-Free Energy Conference

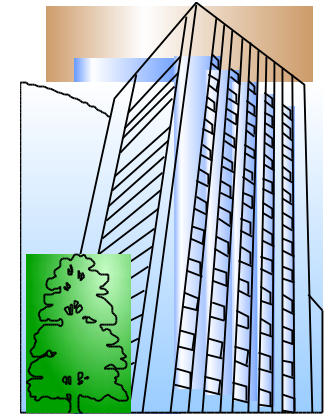
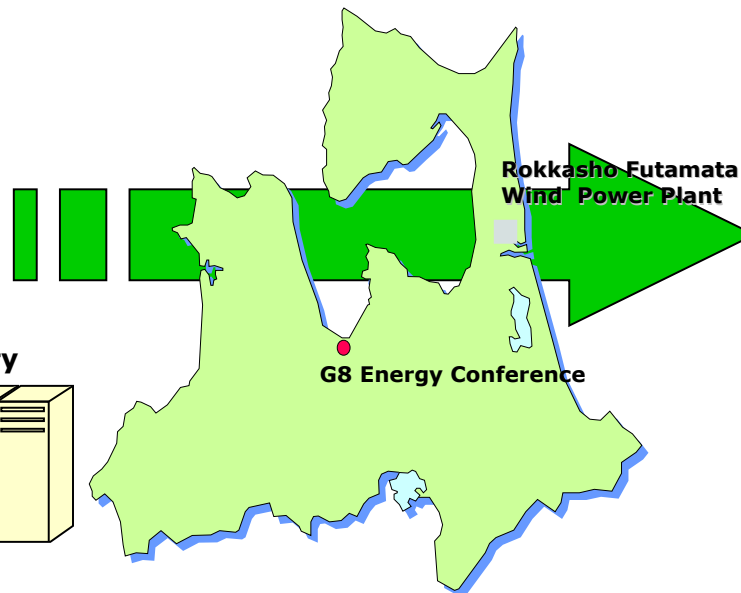
Wind Power Plant
with NAS Battery



NAS Battery

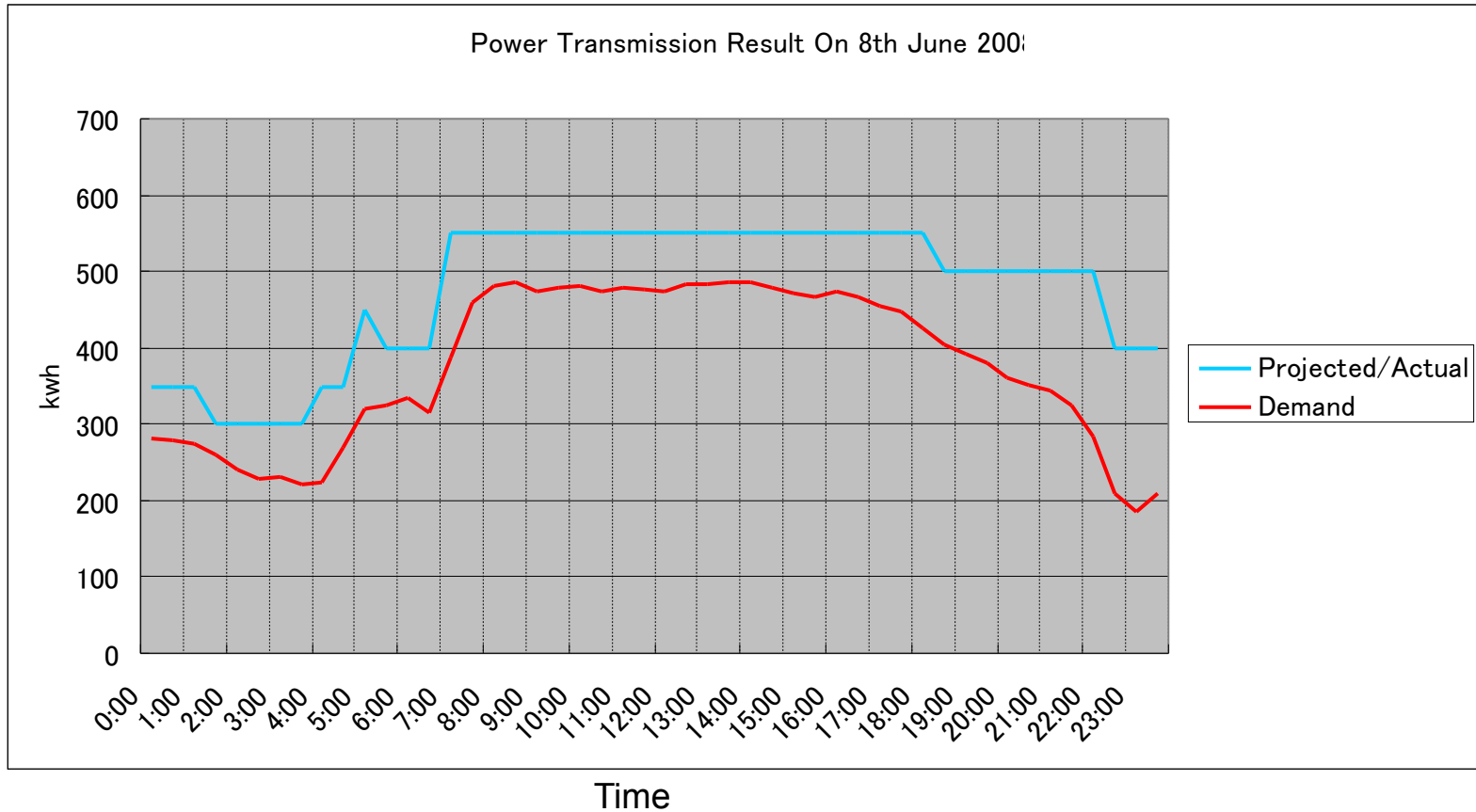


The Output Control of
Wind Power Electricity is
made by NAS Battery



**G8 Energy
Conference**

At G8 Energy Conference...



Thank you!

**Japan Wind
Development
Co., Ltd.**

