Introduction to POSCO ICT Smart Renewable Test Site at Jeju Smart Grid Test-bed

Seaseung Oh, Yujin Song, Suyong Chae, Hyungmin Cho*, Suhwan Kim*

Korea Institute of Energy Research   POSCO ICT *

Overview

In this project, a microgrid is demonstrated in the smart grid real environment, where distributed generation systems, energy storages and loads constitute a highly reliable energy network system using IT to control the supply and the demand of power optimally and improve power quality.

Purpose of the Research

Wind Turbine Output Stabilization Test

Implementation / test of intelligent power output stabilization system for Large wind turbine
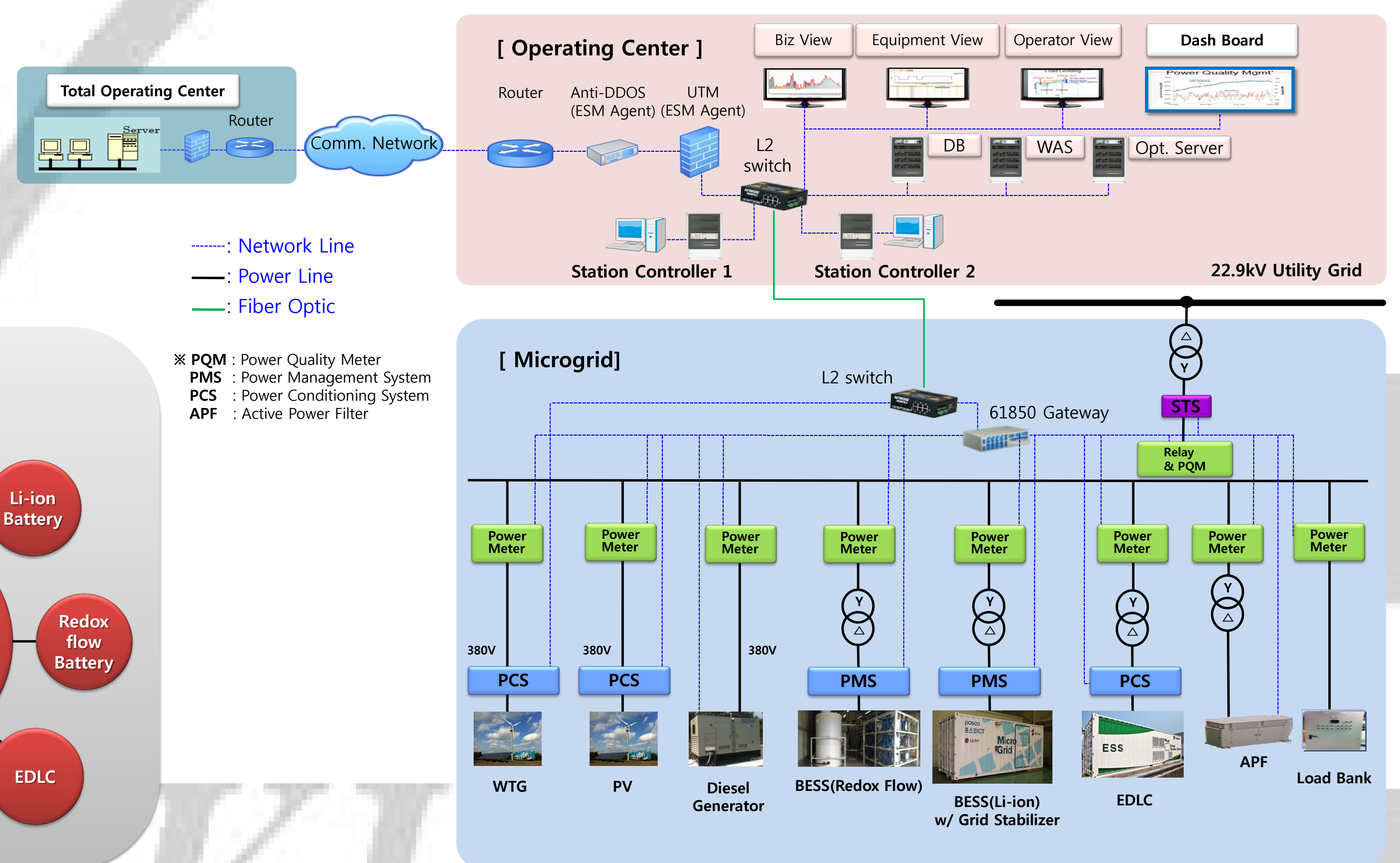
- Stable Output Control by EMS & PQ compensator
- Active / Reactive Power Control for Stable Grid Connection
- Validation of Performance and Reliability of Various type of ESS
- Implementation of Power dispatch function for Wind generator using Weather / Operating Status

Microgrid Test

Implementation and Test of micro-grid for island, industry and metropolitan area
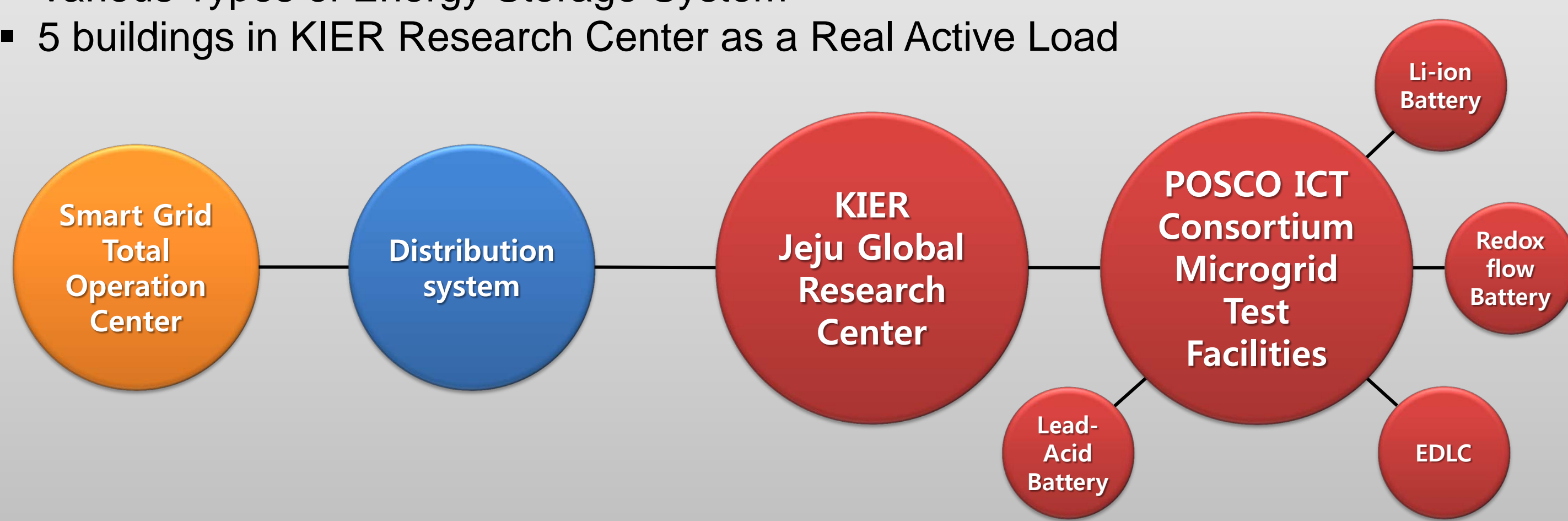
- Design and Implementation of Operating System
- Operation of WT/PV/Diesel
- Power quality Enhancement and Power Output Stabilization
- Validation of Performance and Reliability of Various type of ESS
- Load Following Capability under Island Operation Mode

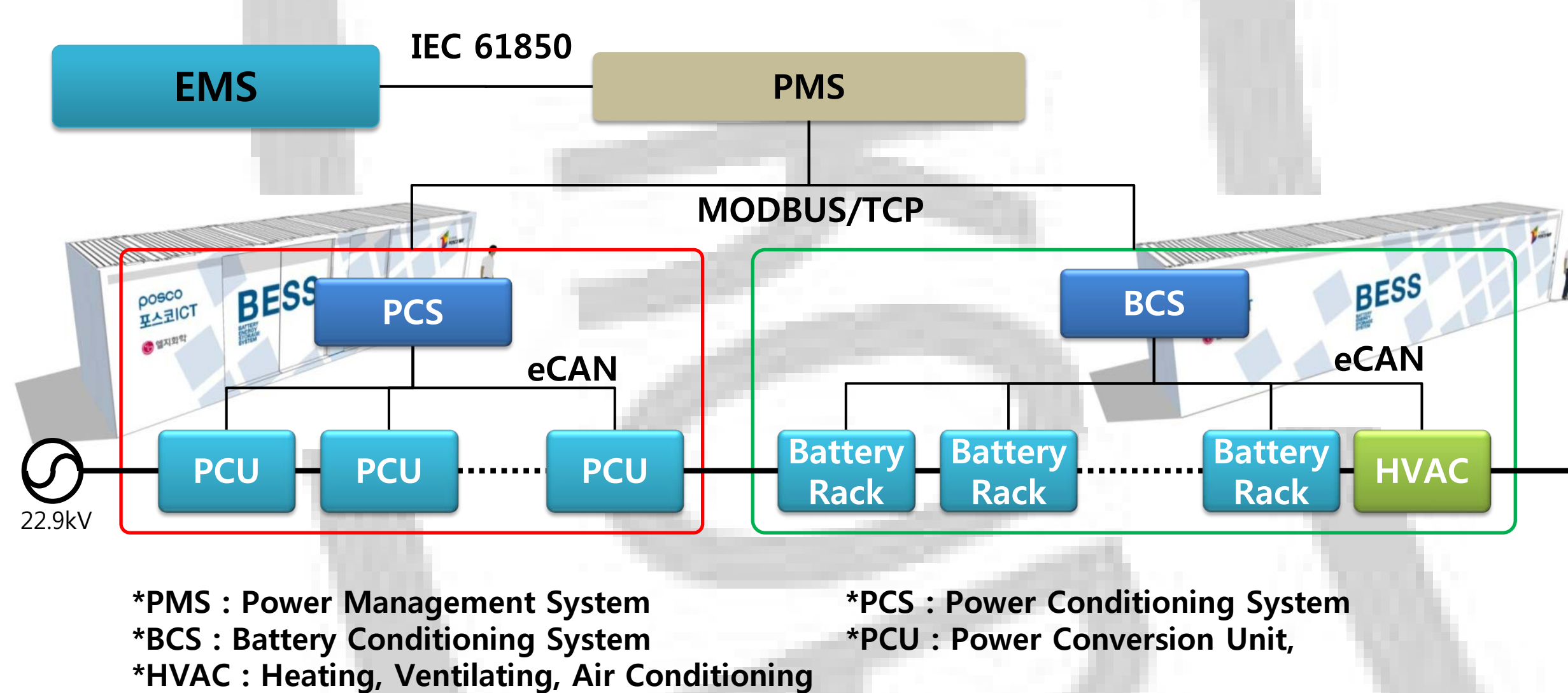## Schematic of the Test Site

Features

- Microgrid Test-bed in Real Grid Environment
- Various Types of Energy Storage System
- 5 buildings in KIER Research Center as a Real Active Load
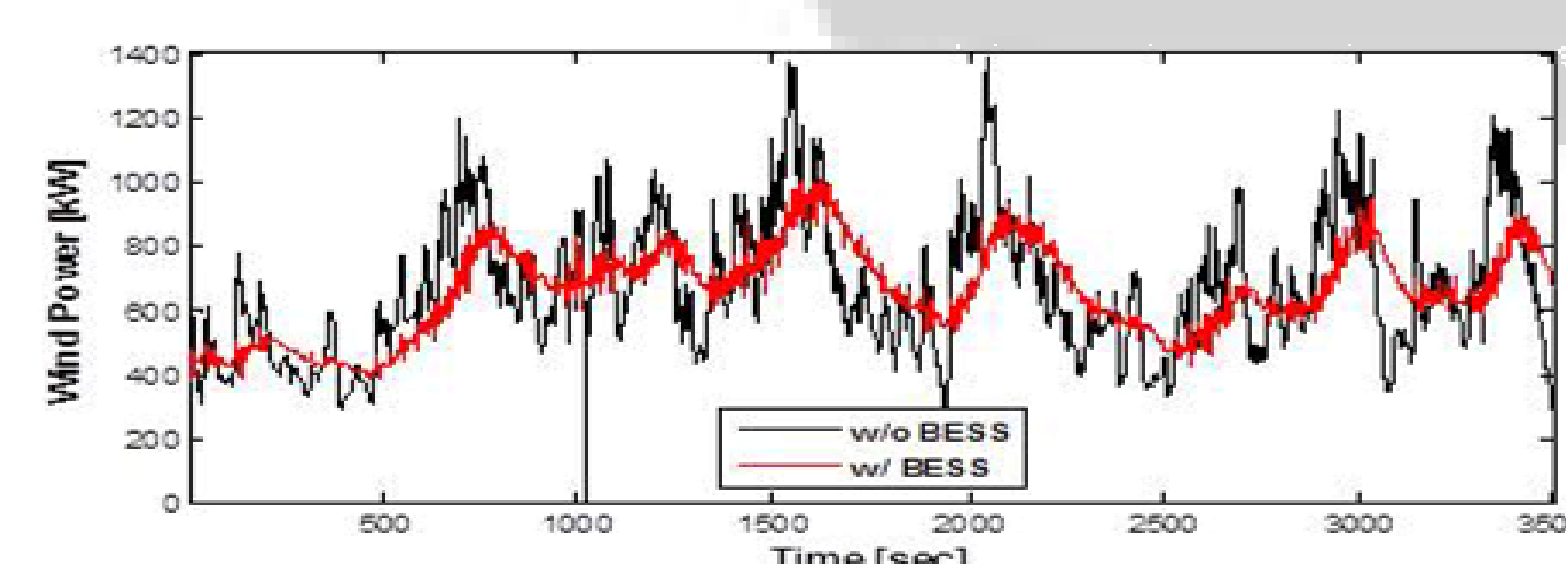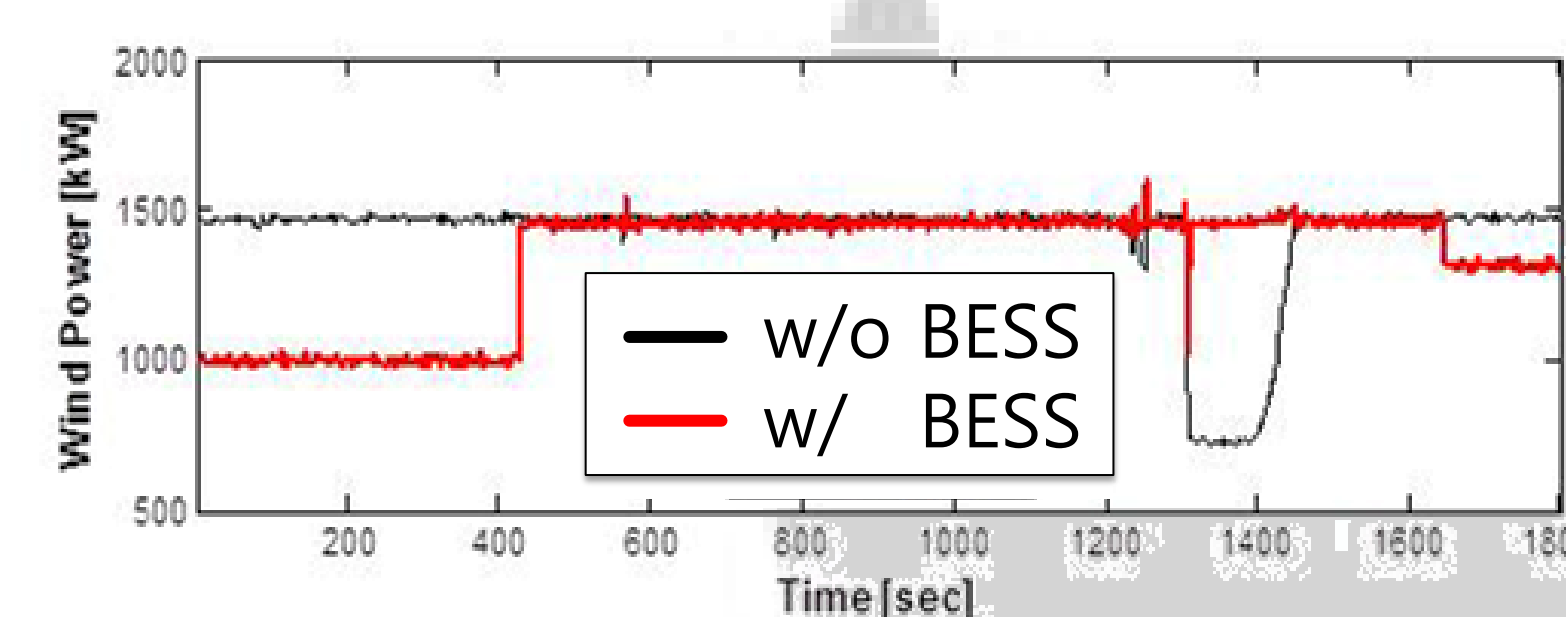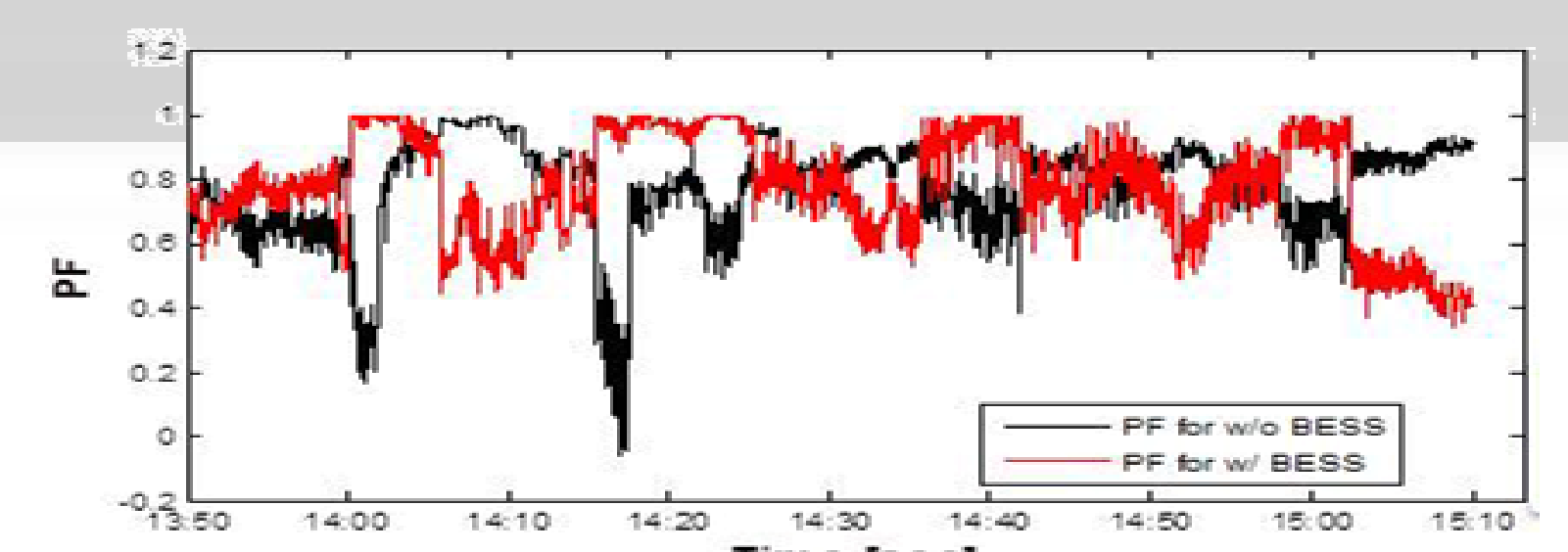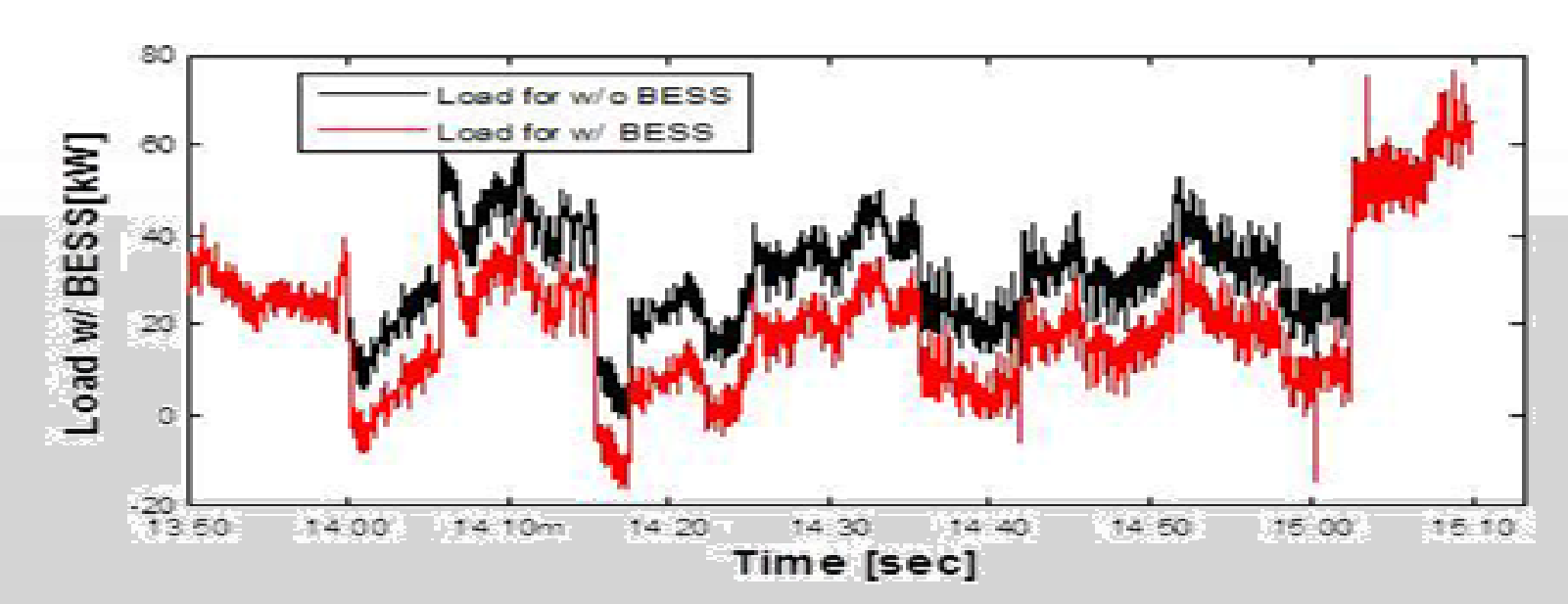

Energy Storage System

*PMS : Power Management System   *PCS : Power Conditioning System
*BCS : Battery Conditioning System   *PCU : Power Conversion Unit,
*HVAC : Heating, Ventilating, Air Conditioning

Specification

Round Trip Efficiency		> 90%(@ 1C-rate)
BCS	Capacity	500kWh
	Voltage	650~800V
	Type	Li-Po
PCS	Rating	2MVA
	Voltage	3Ph, 22.9kV
	Frequency	60Hz
	Efficiency	>97%

Selective Results

WTG Power Stabilization

Microgrid

Validation of

✓ ESS Operation Scheme for Wind Power Smoothing.
✓ ESS Operation Scheme for Microgrid Load Leveling.
✓ ESS Operation Scheme for PF Correction.