

OGIMOTO LAB.

[Pursuing Energy System of the Next Generation]

Collaborative Research Center for Energy Engineering

<http://www.ogimotolab.iis.u-tokyo.ac.jp/>

Energy System Integration

Department of Electrical Engineering and Information Systems

Energy system, which is a critical infrastructure to support social and economic activities, is currently facing new challenges to achieve security, economy, and reduction of environmental burden such as carbon emission for sustainability. Energy system of the new generation should require energy system integration involving newer forms supply, i.e. photovoltaic (PV), wind power, and other renewables, as well as novel demand devices including electric vehicles and heat pump water heaters.

The upcoming energy system will require decentralized management for the integration of demand into demand-supply balancing in an energy system so as to accommodate renewable generation characterized by constantly fluctuating output and newer types of electrical loads. The decentralized energy management will assure flexibility in operation and system configuration as well as enhanced robustness against risk factors.

Energy System of the Next Generation

Establishing long term view with firm technical and socio-economic basis

Long term view covering technological innovation, socio-economic trend, and institution is crucial for studying energy issues. Our energy system integration research covers the following areas using technology assessment, simulation, optimization, scenario planning, strategic study and other techniques.

- ◆ Energy strategy
- ◆ Dynamic analysis and assessment of energy supply and demand
- ◆ Analysis of variation of renewable energy generation
- ◆ Unit commitment and scheduling

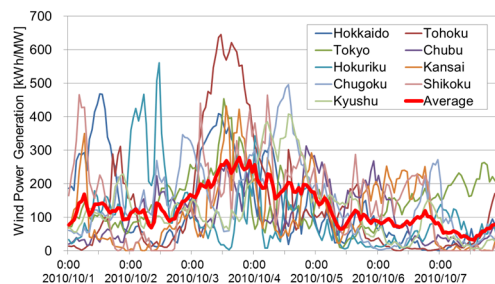
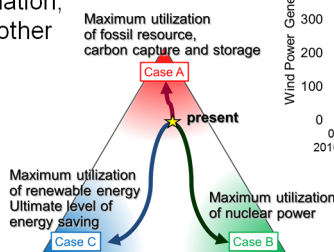


Fig. Variation of Wind Power Generation

Decentralized Energy Management System

Developing smart grid tightly integrated with overall energy system

The high penetration of fluctuating generation from PV and wind would lead to supply-demand imbalance within a whole power system. Stabilization of the overall system will require active interaction between the power system and residential energy management and batteries installed in the power system including demand side.

Our goal of the following research areas is not just energy management for demand or cost saving but contribution to overall system optimization while keeping utilities we enjoy through use of energy.

- ◆ Optimum operation scheduling for domestic appliances
- ◆ Distributed energy management, simulation and verification at COMMA House
- ◆ Asset management applied to decentralized energy system

