University of Washington’s Smart Grid Deployment

Matt O’Donnell
Dean, College of Engineering

John Chapman
Executive Director, Facilities Services

Academic & Administrative Partnership

- UW College of Engineering
- UW Facilities Services

Utility Participants

- University of Washington
- Avista (WSU)
- Benton County PUD
- City of Ellensburg
- Flathead Electric
- Idaho Falls Power
- Lower Valley Energy
- Milton-Freewater
- Northwestern Energy
- Peninsula Light
- Portland General

Battelle Memorial Institute (at PNNL), Bonneville Power Administration
Smart Grid Project: Research Potential
• Parallel data capture
• Simulated demand response switching
• Efficiency testbed at microscale – dorms
• Testbed for faculty/student research projects

UW Seattle Campus – Quick Facts
• Over 40,000 Students
• Over 29,000 Faculty and Staff
• Over 16 million GSF
• One Square Mile

UNIVERSITY OF WASHINGTON SMART GRID PROJECT
UW - A Laboratory for Smart Grid technologies
• Seattle City Light’s largest customer
• Diverse set of facilities: research, classroom, residential, medical, stadium
• Customer-owned electrical distribution system
• Students/researchers can use campus as a test-bed for research.
Facilities Energy Management System (FEMS)

- Enterprise Platform Interface and Information System
- Metering Data Warehouse
- Energy Dashboards / Energy Trend Analysis
- Activity Based Budgeting Initiative
- Identify Opportunities for Energy Savings

Transactive Control
Power Generation

- Two – 2000 kW Standby Generators
- 5000 kW Turbine Generator
- Incentive Demand Response Testing
- Renewable Energy Integration / Rate Design
Building HVAC Controls (DDC)

- HVAC Controls – Transactive Control
- Low-Occupancy Set-back
- Cyber Security Issues
- Energy Savings Potential

Solar PV Generation

Solar PV Monitoring

Student Housing Energy Conservation

- Floor by Floor measurement and display of energy use in new dorm
- Room by Room measurement, display and control in 240 rooms
- Behavioral response
Laboratory, Classroom, and Office Buildings

- Electrical Sub-metering within buildings (Computer Science/Electrical Engineering and new Business School)
- Floor-by-floor sub-meter
- Two individual laboratories to be sub-metered at branch circuit level
- Behavioral response

UNIVERSITY OF WASHINGTON SMART GRID PROJECT

Anticipated Campus Benefits
- Up to 5% reduction in electricity use based on building system optimization and awareness campaign.
- Potential to improve how energy costs are allocated to actual end users.
- Platform to test cyber-security issues.
- Provide information to students, faculty and facility operators on energy use in classrooms, dorms, etc.
- Jump start hands-on learning with actual real-world smart grid application and real user data.
- Provide smart grid infrastructure for follow-on research.

PROJECT BENEFITS BEYOND CAMPUS

Local and Regional Benefits
- Test utility-level demand-response strategies, inform electricity rate design.
- Renewable generation integration.
- Findings transferrable to other institutions and businesses.
- One step forward towards developing and deploying a local, regional and national smart grid system.
- Regional reliability improvements

What will the future bring?

Environment and Communications 50 years ago
Paradigm Shift

Environment and Communications today

Questions?
Matt O'Donnell
donnell@uw.edu
John Chapman
jchapman@uw.edu