Russ Schneider

Flathead Smart Grid Demonstration Project Manager

BONNEVILLE POWER ADMINISTRATION

Efficiency MATTERS

May 10-11, 2011
Doubletree Hotel – Portland

Your Co-op Flathead Electric
Community...Integrity...Reliability

Peak Time

Your Co-op Flathead Electric
Community...Integrity...Reliability

Flathead's BPA/Battelle PNW Smart Grid Demonstration participation Objectives

1. Augment Existing Capital Budget with Federal Funding.
2. Complete TWACS AMI Roll-out in Northwest Montana.
3. Compare the residential Critical Peak Demand Reduction cost-effectiveness of three levels of smart grid (Volunteer Options #1-3).
4. Determine Flathead Co-op member preferences.
5. Demonstrate coordination of modern grid assets from BPA's Transmission System all the way to the Residential Member - using innovative communication and control systems

Battelle
The Business of Innovation

BONNEVILLE POWER ADMINISTRATION

Spirae

Flathead Electric
Your Co-op
Community...Integrity...Reliability

Aclara TWACS Powerline Carrier AMI

- Libby and Marion, MT areas will receive Aclara – Two Way Automated Communication meters (TWACS) and
  - Hourly interval data with real-time outage management information .
- Flathead will be NISC Meter Data Management site for integration witn Billing / CIS.
  - Members benefit from increased service quality, outage management, billing efficiency and availability of hourly data in E-Bill / bill-pay portal.

ACLARA

iVUE | NISC
The vision to see. The power to do.

Flathead Electric
Your Co-op
Community...Integrity...Reliability

Volunteer Options #1= In Home Display & #2 = Water Heater Demand Response

1. **150 Volunteers** – with an In-Home Display (IHD). The IHD will be configured to respond to over-power line communications broadcast from the integrated AMI system.

2. **150 Volunteers** install water heater Demand Response Units (DRU) to control loads. The DRU would allow members to have their hot water heater operated by the co-op in response to peak demands.

ACLARA

Flathead Electric
Your Co-op
Community...Integrity...Reliability

Volunteer Option #3 Residential AMI Meters + Smart Appliances

3. **150 Volunteers** – Implement Smart Appliances for advanced control
   - Wireless Home Energy Network communication module that can communicate with any Zigbee 1.0 compatible device.
   - For a one-time out of pocket cost of $800 the member will receive: one dishwasher, clothes washer, clothes dryer, Home Energy Gateway System, Communications Modules, one for each appliance, and one Water Heater switch.
   - FEC will be responsible for install of the communication equipment and delivery and set-up of the appliance.

imagination at work

Flathead Electric Your Co-op
Community...Integrity...Reliability

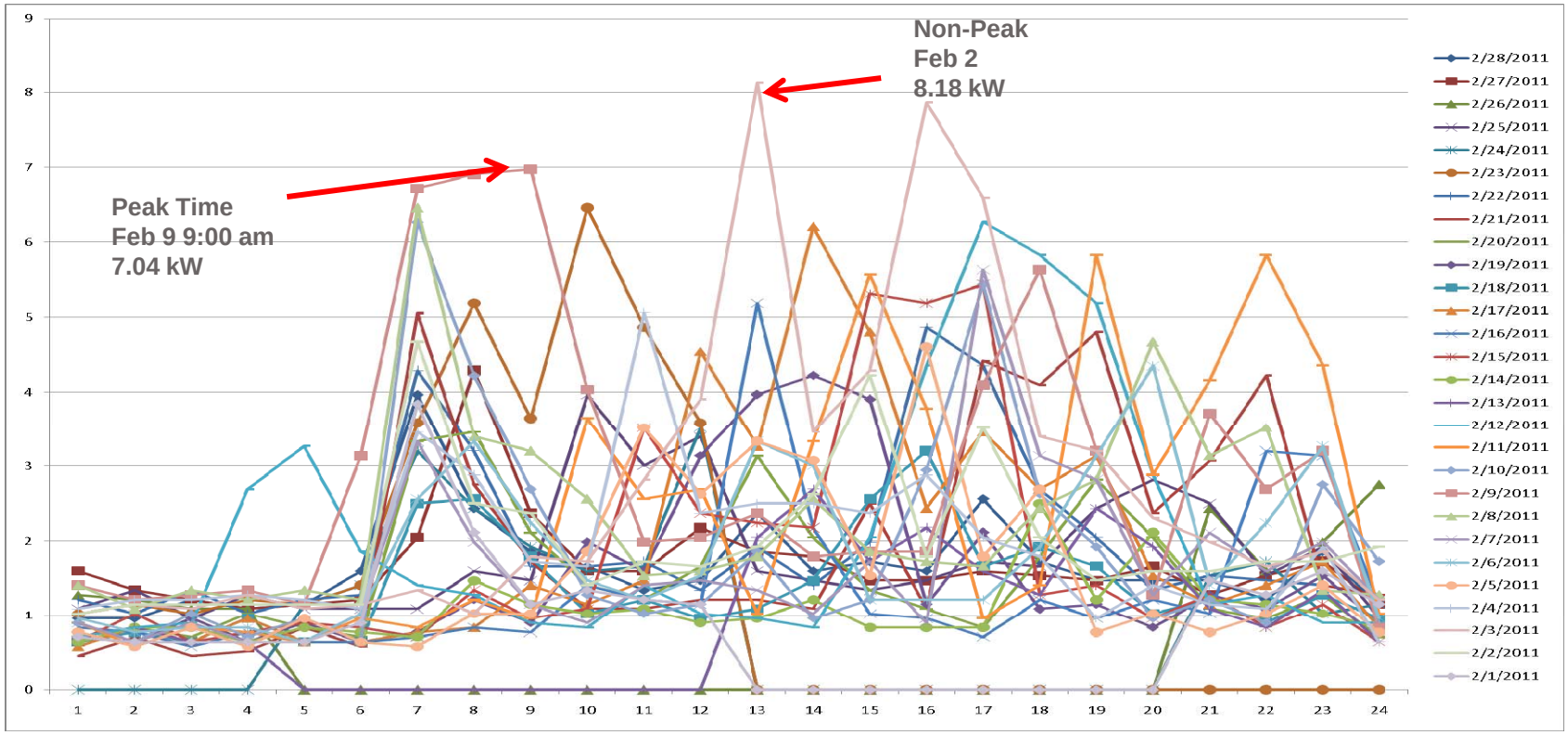
Peak Time

Critical Peak Rebate and Participation Incentives

- Volunteer Option #1- receive a $5 monthly participation credit for each month of participation, qualifying annual rebate credit and a free IHD
- Volunteer Option #2- receive an $8 monthly participation credit for each month of participation as well as a free DRU
- Volunteer Option #3- One time out of pocket payment of $800 by member for Smart Appliance Dishwasher, Washer and Dryer, and DRU for Hot Water heater and IHD, wireless Home Area Network package and qualifying annual rebate credit.
- Peak Time Annual Rebate for Options #1 & #3 - If the participating member's highest hourly usage is lower during the Peak Time period than their highest hourly usage during the rest of the month then they will receive a $4 rebate for each kilowatt difference (just under 50% BPA Demand Charge), accumulated every month and paid annually as a bill rebate.

Your Co-op Flathead Electric
Community...Integrity...Reliability

Peak Time Rebate Example



Potential rebate $4.56

PeakTime

Flathead Electric
Your Co-op
Community...Integrity...Reliability

Peak Time

Progress & Challenges

- Volunteer Recruitment/PR – Going well, have signed agreements with over 50% of total, shooting for 100% sign-up by August 2012.
  - Full time Demand Response Coordinator in Libby community doing well.
  - Outreach in radio, newspaper, bill stuffer, etc. – hardly any negative feedback.
  - Peak Time branding by communication group working well.

- Equipment Installation – Have DRUs in the field, installation ongoing, IHDs are ready go once a couple outstanding integration issues are resolved. Appliances arrangements set and ordering and installation progressing, Libby being a rural area without some national chains and contractors made smart appliance delivery and setup more difficult. Some functionality out of the box, other more advanced parts of the project will depend on back-office integration.

- Back-office integration – Lots of things in motion.
  - Spirae serves as our integration consultant/software developer to receive and manage regional incentive signal from BPA/Battelle.
  - Aclara AMI system has Load Management Software for DRUs and IHDs which have to receive signal from Spirae system.
  - GE Nucleus software has to receive Peak Time signal from Spirae software.
  - NISC Meter Data Management for customer presentment in Ebill.

Flathead Electric
Your Co-op
Community...Integrity...Reliability

Peak Time

Cost Benefit

- Will be working with Battelle on a very detailed cost benefit for each test case.
  - Base AMI system benefits
  - IHD Peak Shaving
  - DRU Peak Shaving
  - Smart Appliance Peak Shaving

Battelle
The Business of Innovation

- Will compare installed costs/build metrics and demand reduction during Peak Time events.
- Will allow wider deployment of cost-effective aspects of the project and properly sized future rebates.

Flathead Electric
Your Co-op
Community...Integrity...Reliability

Questions?

Peak Time

Pacific Northwest Smart Grid Demonstration Project

Idaho Falls Power

Energy Efficiency Utility Summit
May 10, 2011

Idaho Falls Power diversion dam on the Snake River
Idaho Falls, Idaho

Discussion Topics

Project description/personal role

Objectives

Unique aspects

Where are we at?

Cost / benefit analysis

Would we do anything differently?

Next steps

Participant Site Locations

1. **Portland General Electric** – Salem, Oregon
2. **Bonneville Power Administration** – Portland, Oregon
3. **Peninsula Light Co.** – Fox Island, Puget Sound, Washington
4. **University of Washington/Seattle City Light** – Seattle, Washington
5. **City of Ellensburg** – Ellensburg Renewable Energy Park, Ellensburg, Washington
6. **EIOC: Electricity Infrastructure Operations Center, Battelle Memorial Institute, Pacific Northwest Division** – Richland, Washington
7. **Benton PUD** – Kennewick, Washington
8. **Milton-Freewater City Light & Power** – City of Milton-Freewater, Oregon
9. **Inland Power & Light Co.** – City of Airway Heights, Washington
10. **Avista Utilities** – Port of Whitman Business Park; Washington State University; City of Pullman (three sites), Pullman, Washington
11. **Flathead Electric Cooperative, Inc.** – Libby and Kalispell area, Northwest Montana
12. **NorthWestern Energy** – Helena and Phillipsburg area, Southwest Montana
13. **Idaho Falls Power** – Idaho Falls loop microgrid; City of Idaho Falls (two sites), Idaho
14. **Lower Valley Energy** – Lincoln, Sublette, and Teton counties, Western Wyoming

Idaho Falls Power Smart Grid Projects

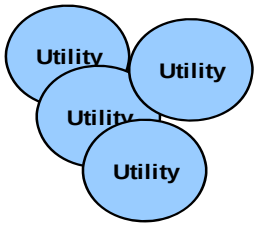
- Conservation Voltage Reduction (CVR)
- Automated Power Factor Control
- Distribution Automation
- Personal Energy Management (PEM) – residential and commercial
- Plug In Hybrid Electric Vehicles (PHEV's)
- Micro-grid/Battery System

Role

- Marketing, communication, customer outreach
- Lead on customer participation portions
  - Residential / Commercial customers
  - Demand side controls
    - Thermostats, water heaters, Commercial HVAC
    - In-home displays

Outreach and Education

Partner Utilities



Central Outreach

PNW Smart Grid Project Outreach Arm

General Public & End Users

- 12 million people in region
- 60,000 impacted customers

Educational Institutions

- Regional Colleges and Universities,
  - University of Washington/SCL collaboration (sub-project site at UW)
  - Washington State University/Avista collaboration (coursework)
  - Establishment of new university partnerships, educational outreach
- Local Schools

Over 100 Non-partner Utilities

- Smart grid information sharing with other NW utilities

Energy Organizations

- Also, NW Energy Leadership Orgs:
  - Northwest Power Planning Council
  - Northwest Power Pool
  - Northwest Utility Trade Associations

Government

- States (via governor offices):
  - Washington (Olympia)
  - Idaho (Boise)
  - Oregon (Salem)
  - Montana (Helena)
  - Wyoming (Cheyenne)

NW Congressional Delegation
Western Governors Assoc, Local Gov & PUCs

Tribes

- Affiliated Tribes of Northwest Indians
- Tribe Utilities

Goals and Objectives

Goals:

Validate new smart grid technologies and inform business cases

Provide two-way communication between distributed generation, storage, and demand assets and the existing grid infrastructure

Quantify smart grid costs and benefits
Advance interoperability standards and cyber security approaches

Objectives:

- Manage peak demand
- Facilitate integration of wind and other renewables
- Address constrained resources
- Select economical resources
- Improve system efficiency
- Improve system reliability
  - Load Management
  - Conservation Voltage Reduction
  - Distributed generation

Regional effort extensible to large portions of the United States

IFP--Find those projects that may yield significant energy savings that customers are willing to participate in for future system-wide rollout.

Unique Aspects

- PHEV Battery Charging
  - Utilize wind / solar panel resources
    - Integrated to use optimum resource
  - Discharge battery—Charge vehicle
    - When system isn’t generating
- In conjunction with DOE / INL Project

Project Timeline

	2010	2011	2012	2013	2014
Phase 1 - Design	6 months				
Phase 2 - Build Out	24 months				
Phase 3 - Data Collection			24 months		
Phase 4 - Cost Benefit Analysis & Reporting					6 months

- Notification of Award – 11/25/2009
- Cooperative Agreement Signed – 1/29/2010
- Detailed Design, 1/1/10 – 6/30/10
- Installation of infrastructure, 7/1/10-6/30/12
- All sites up and running, 7/1/12-6/30/14
- Evaluation and analysis, 7/1/14-12/30/14
- Periodic progress reports are required

Where are we at in the process

- Engineering complete for Distribution Automation
- Equipment ordered for Power Factor Control
  - Begin installation in June
- Out to bid on AMI system components
  - Begin installations in October
- PHEV
  - 10 kW battery next month, charging stations this Fall, vehicles arrive end of year
- Micro-grid battery
  - January 2012

Cost / Benefit

- Initial data using DOE template
  - Battelle requirements
  - IFP requirements
    - Customer perceptions
      - Idaho Universities assist with customer surveys
- Very detailed
- Some aspects still in development

Lessons Learned

- Timelines of Different Players
  - Different entities have different schedules
  - One size does not fit all
- Perspectives of Different Players
  - Educational tool / roadmap
  - Customer concerns

Next Steps

- Continue customer outreach
  - Finalize customer's participating
- Develop customer surveys
- Award AMI bid
- Deploy Equipment

Questions

???

Van Ashton
Energy Services Manager
Idaho Falls Power
140 S. Capital Ave
P.O. Box 50220
Idaho Falls, Idaho 83405
208-612-8443
vashton@ifpower.org
www.ifpower.org