Idaho Falls Power & the Pacific Northwest Smart Grid Demonstration Project

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Idaho Falls Power

Idaho Falls Power

Largest municipality in the state of Idaho

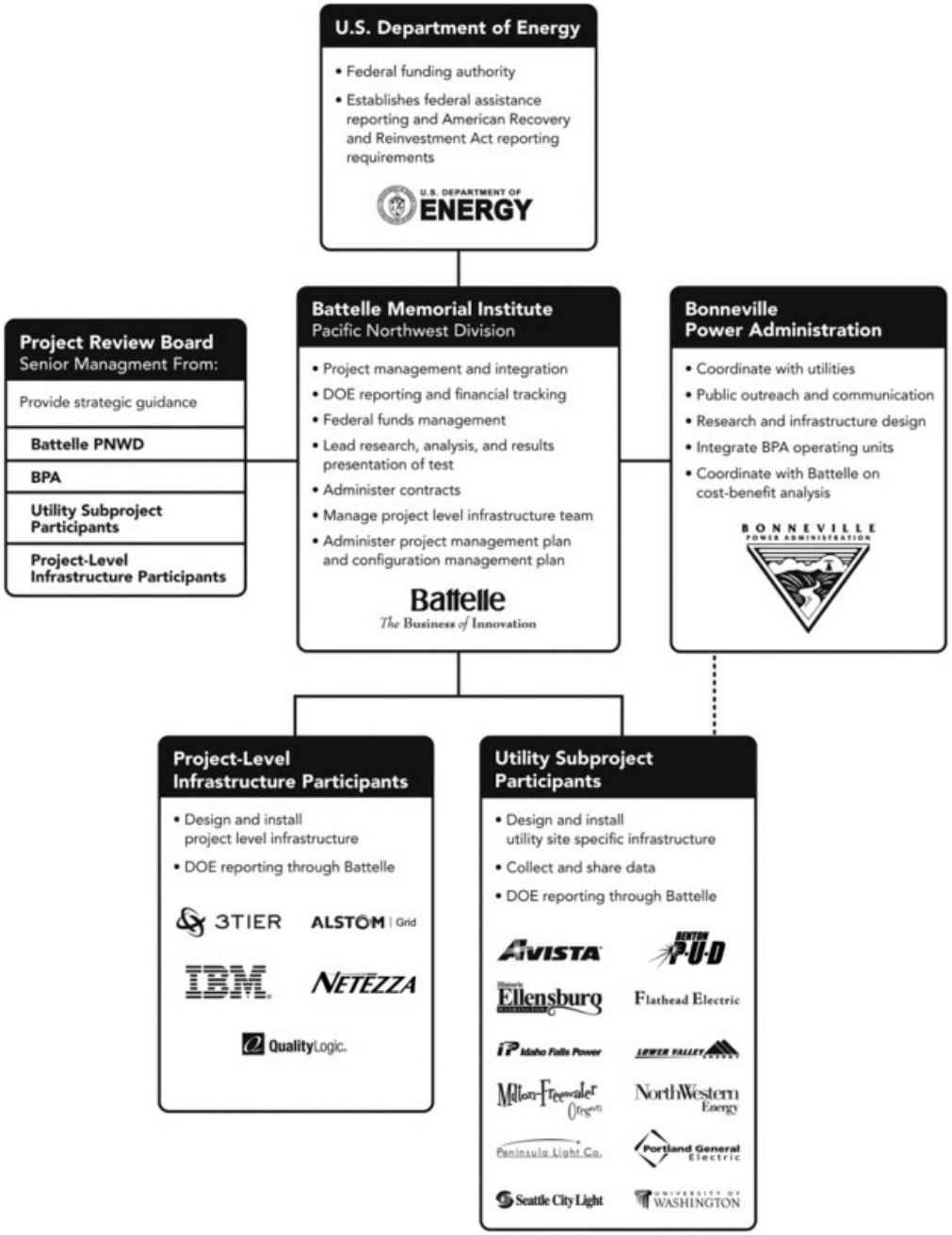
- 27,000 electric metered customers
- 17 square mile service territory
- 12 power distribution substations
- 5 Hydro electric generating facilities

Acknowledgment & Disclaimer

- Acknowledgment:

This material is based upon work supported by the Department of Energy under Award Number DE-OE0000190.

- Disclaimer:



Project Stakeholders

- Battelle Memorial Institute, Pacific Northwest Division
- Bonneville Power Administration
- 11 utilities (and UW) and their vendors
- 5 technology infrastructure partners

Pacific Northwest
SMART GRID
DEMONSTRATION PROJECT

Pacific Northwest Demonstration Project Synopsis

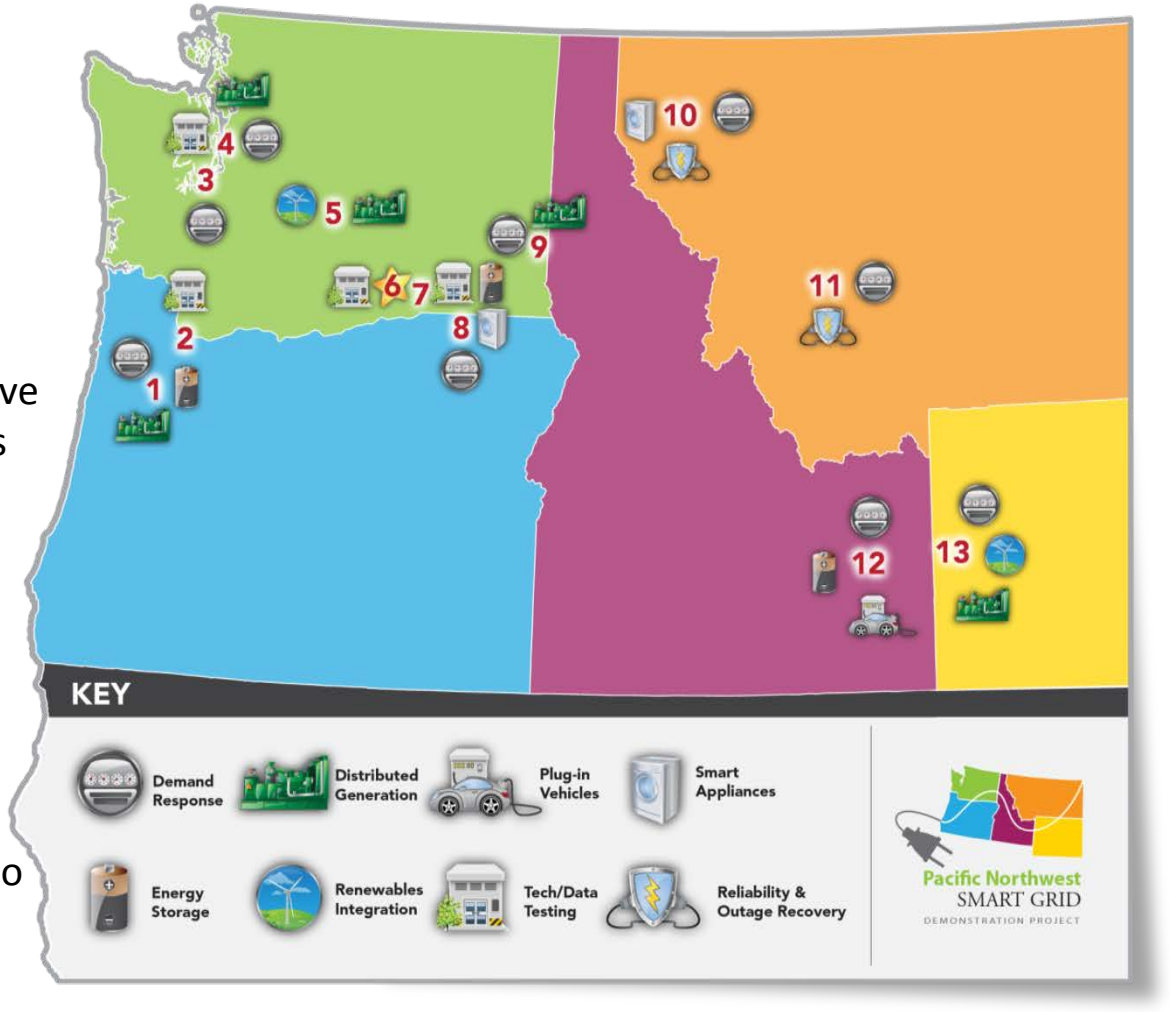
What:

- $178M, ARRA-funded, 5-year demonstration
- 70,000 metered customers in 5 states

Why:

- Develop communications and control infrastructure using incentive signals to engage responsive assets
- Quantify costs and benefits
- Contribute to standards development
- Facilitate integration of wind and other renewables

Only project of its kind integrating resources across multiple utilities to achieve regional benefits.



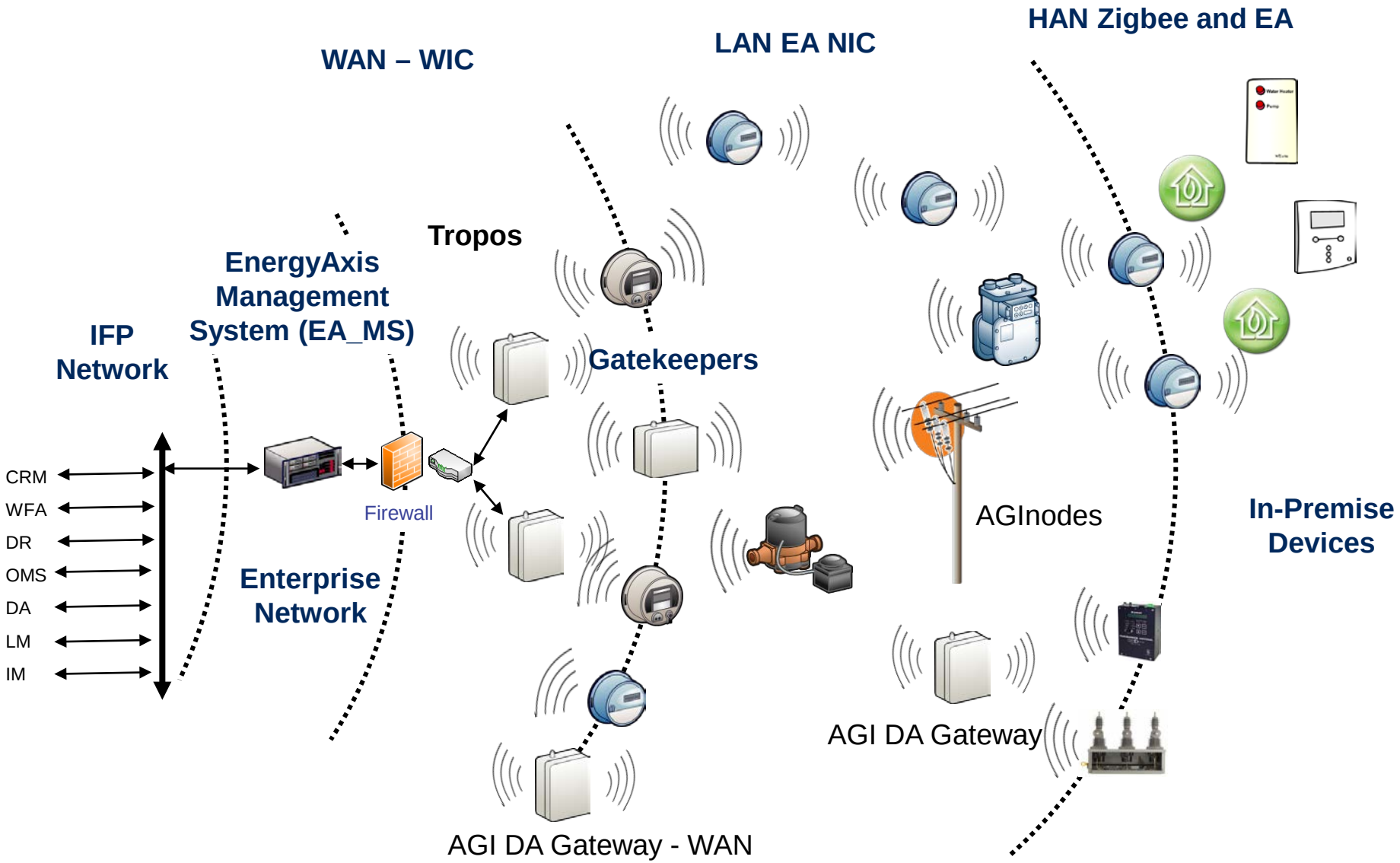
Idaho Falls Power: The past 10 years

- Develop and implement a Geographic Information System (GIS) including development of a electrical geometric network
- Upgrade the Utility SCADA System
- Build a city wide fiber optic network for city and utility purposes
- Implement an Outage Management system including an Interactive Voice Response system (and integrate with the GIS system)
- Upgrade the city's electric metering system

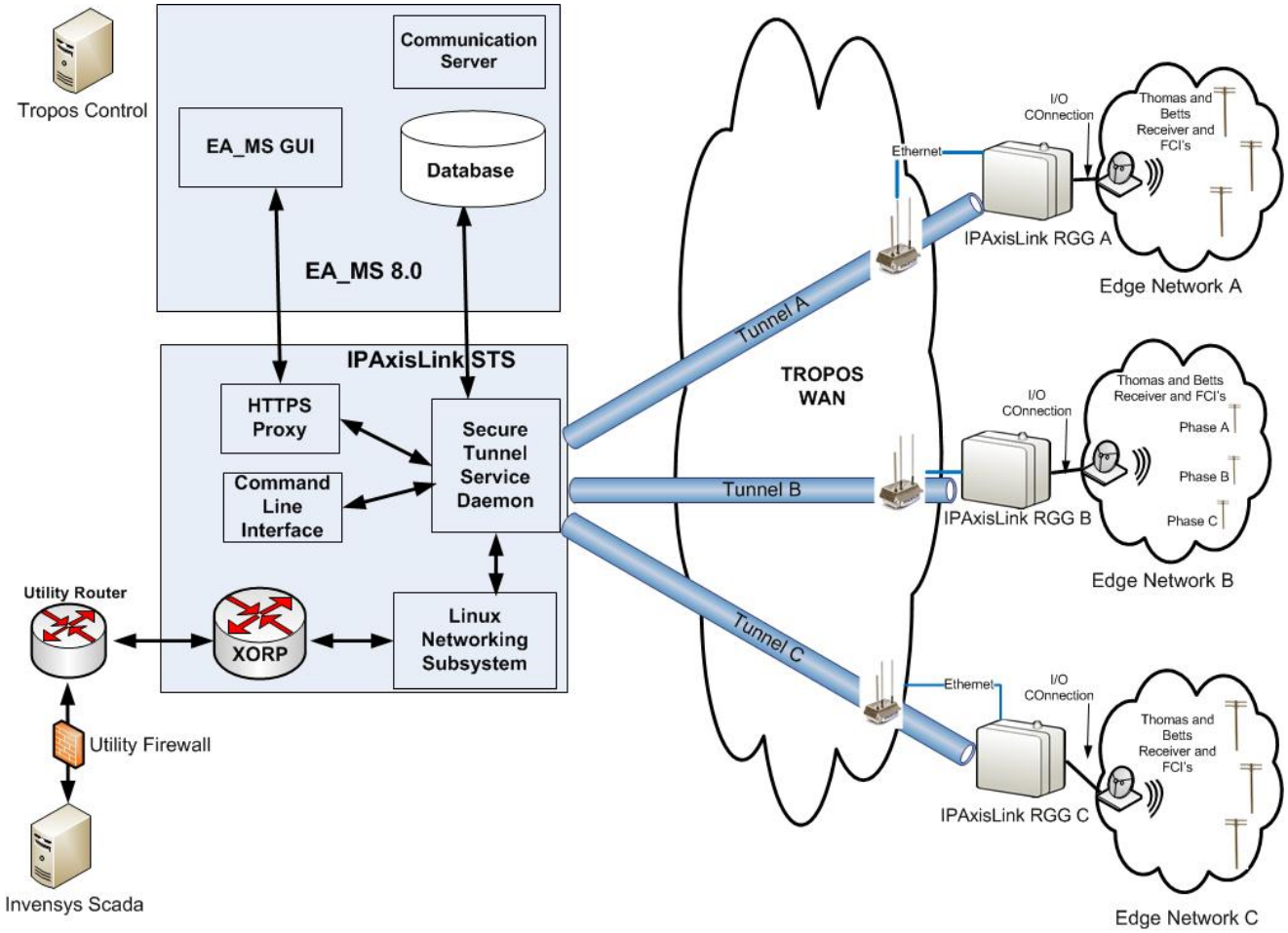
Idaho Falls Power Smart Grid Projects

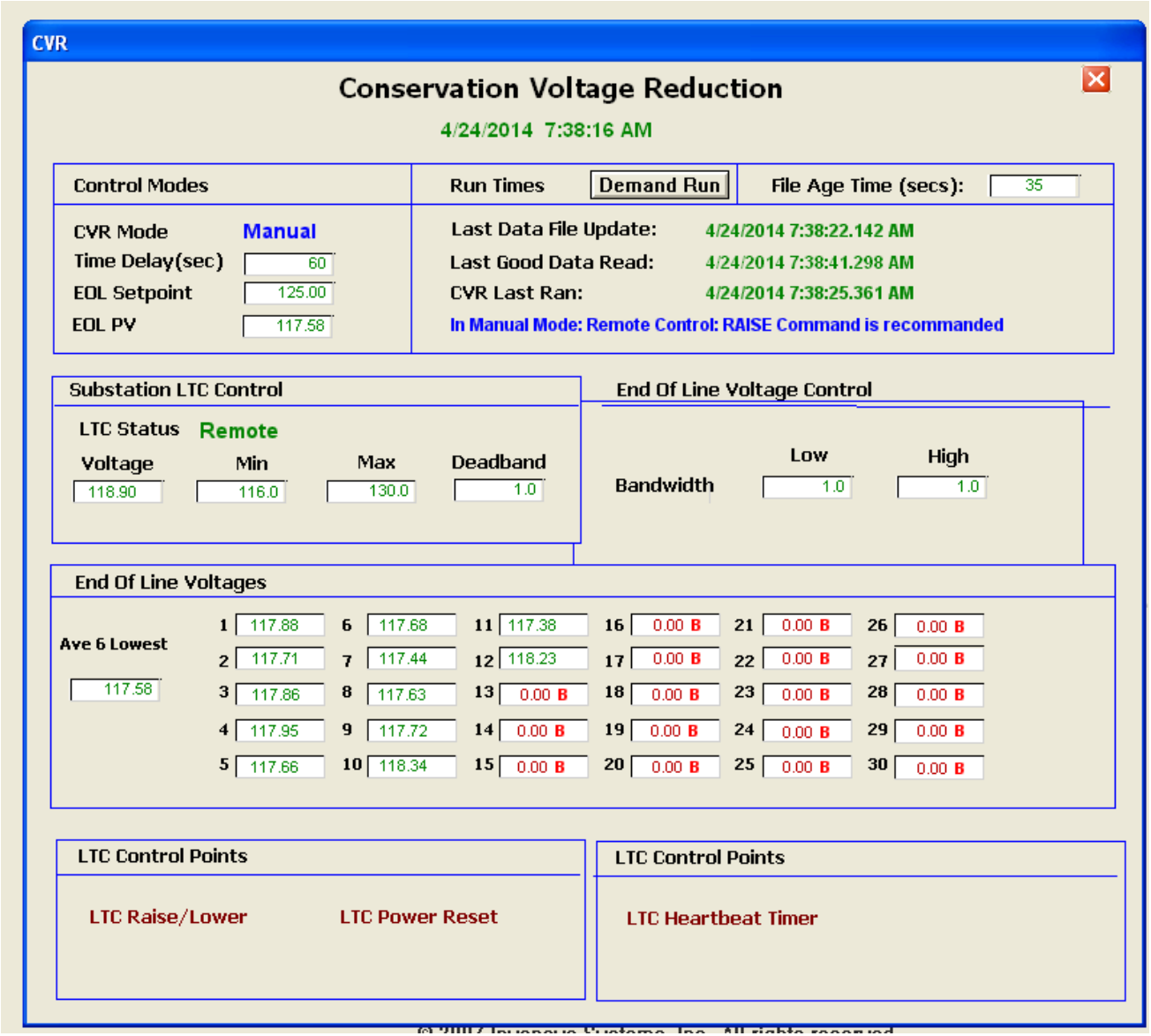
- Conservation Voltage Reduction (CVR)
- Automated Power Factor Control
- Fault Detection, Isolation and Restoration
- Personal Energy Management (PEM) – In home displays, water heaters, thermostats & Web portal
- Plug In Hybrid Electric Vehicles (PHEV's), battery storage and distributed generation
- AMI system implementation
- AMI, SCADA & Outage management system integration
- Cyber Security
- Outreach and Education

EnergyAxis Component View



Distribution Automation Network




CVR
Conservation Voltage Reduction
4/24/2014 7:38:16 AM
Control Modes
Run Times
Demand Run
File Age Time (secs):
35
CVR Mode
Manual
Time Delay(sec)
60
EOL Setpoint
125.00
EOL PV
117.58
Last Data File Update:
4/24/2014 7:38:22.142 AM
Last Good Data Read:
4/24/2014 7:38:41.298 AM
CVR Last Ran:
4/24/2014 7:38:25.361 AM
In Manual Mode: Remote Control: RAISE Command is recommanded
Substation LTC Control
LTC Status
Remote
Voltage
Min
Max
Deadband
118.90
116.0
130.0
1.0
End Of Line Voltage Control
Low
High
Bandwidth
1.0
1.0
End Of Line Voltages
Ave 6 Lowest
117.58
1 117.88
2 117.71
3 117.86
4 117.95
5 117.66
6 117.68
7 117.44
8 117.63
9 117.72
10 118.34
11 117.38
12 118.23
13 0.00 B
14 0.00 B
15 0.00 B
16 0.00 B
17 0.00 B
18 0.00 B
19 0.00 B
20 0.00 B
21 0.00 B
22 0.00 B
23 0.00 B
24 0.00 B
25 0.00 B
26 0.00 B
27 0.00 B
28 0.00 B
29 0.00 B
30 0.00 B
LTC Control Points
LTC Raise/Lower
LTC Power Reset
LTC Control Points
LTC Heartbeat Timer

In-home Display “Test Drive”

- Helps you incorporate energy management into your daily routine
- Enables you to see how much power you are consuming in real-time, instead of waiting for the monthly bill
- Set it to alert you if you reach a consumption threshold
- IFP may send energy-related messages to the display
- *“Test Drive” open to 1000 volunteers*

Thermostat “Test Drive”

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- Customizable to respond to factors such as temperature and electricity costs
- Embedded communications enable IFP to adjust temperature for short periods when demand is high; you can override if desired
- Displays current cost of power, state of control and total energy consumption
- IFP may send energy-related messages to the display
- *“Test Drive” open to 250 customers in selected neighborhoods*

Load Control “Test Drive”

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- Helps IFP balance electricity supply and demand by removing non-essential loads during times of critical peak demand
- Control devices allow IFP to shut off power to water heaters for short periods of time; you can override if desired
- Device lets you see when water heater is, or has been, subject to load control event
- *“Test Drive” open to 250 customers in selected neighborhoods*

PHEV/ Battery Storage/Solar

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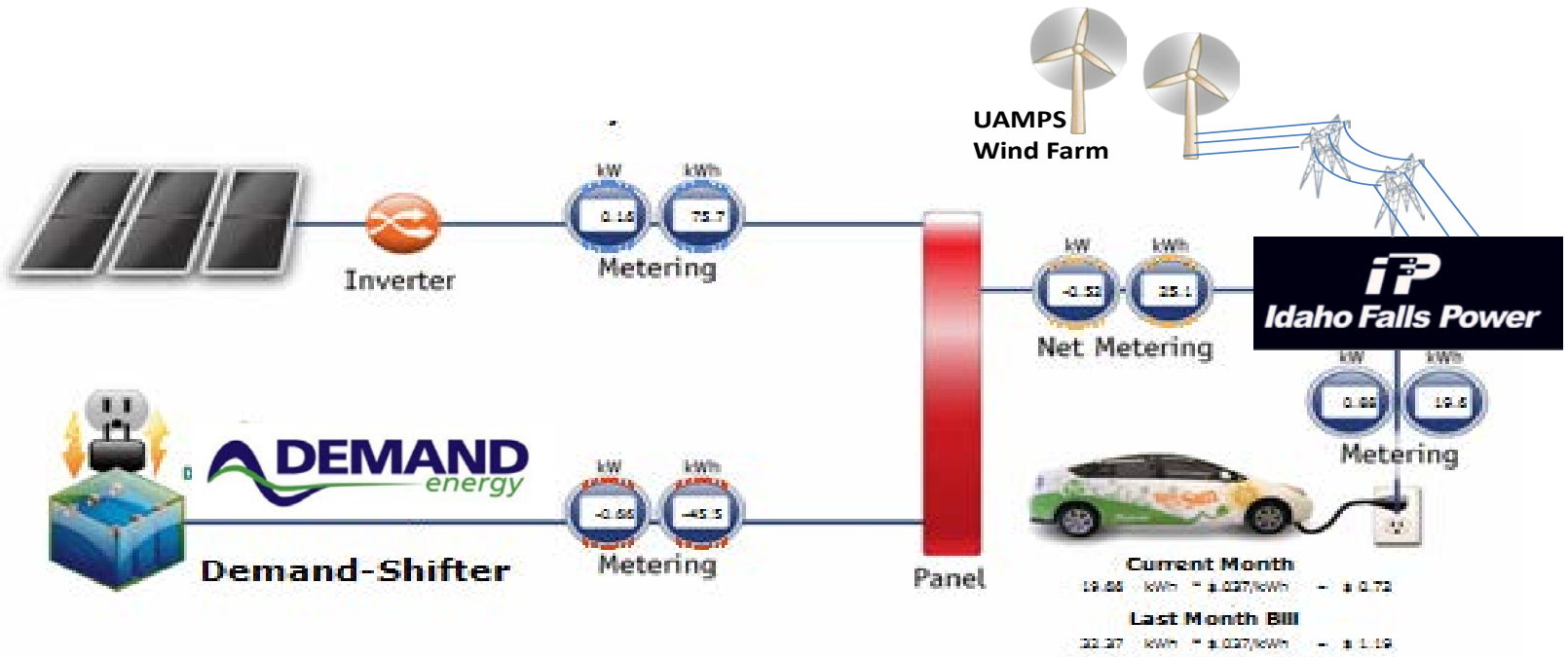

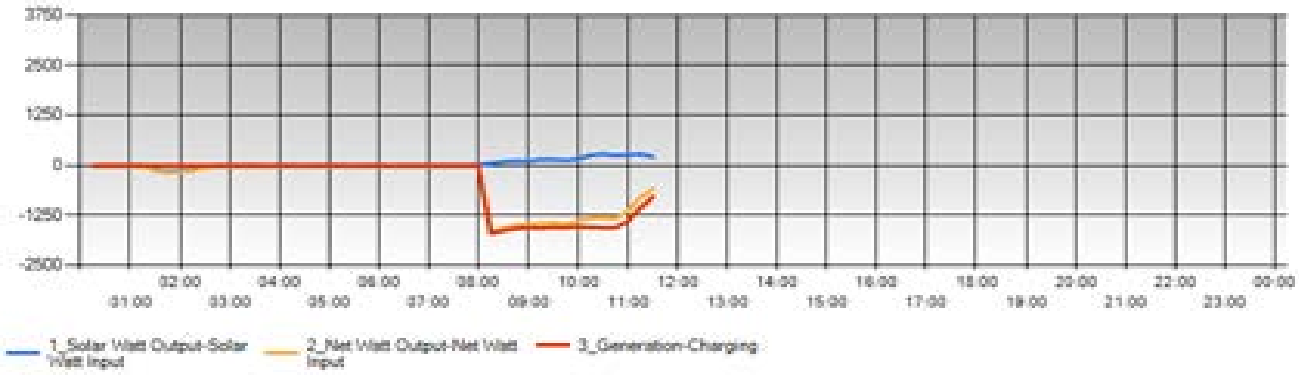

Project Successes

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- Implemented a two way communicating AMI system
  - With both a RF LAN & WAN
- Created Home area networks utilizing Zigbee protocol
- Deployed demand response programs over an AMI network
- Integrated the AMI system with SCADA for Distribution Automation purposes
- Enrolled over 1000 customer volunteers
- Significantly improved IFP system cyber security
- Improved Customer Outreach and Education processes

Project Challenges/Lessons Learned

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- Some technologies relatively new, not time tested
- Industry interoperability is early in lifecycle
  - Vendors, systems & equipment
- Underestimated the complexity of integration work
- Timely support was difficult due to the amount of projects (ARRA) that were in progress
- Uncertainty about some Vendors
- Did not anticipate the amount of Outreach and Education that ended up being required

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Questions ?

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