

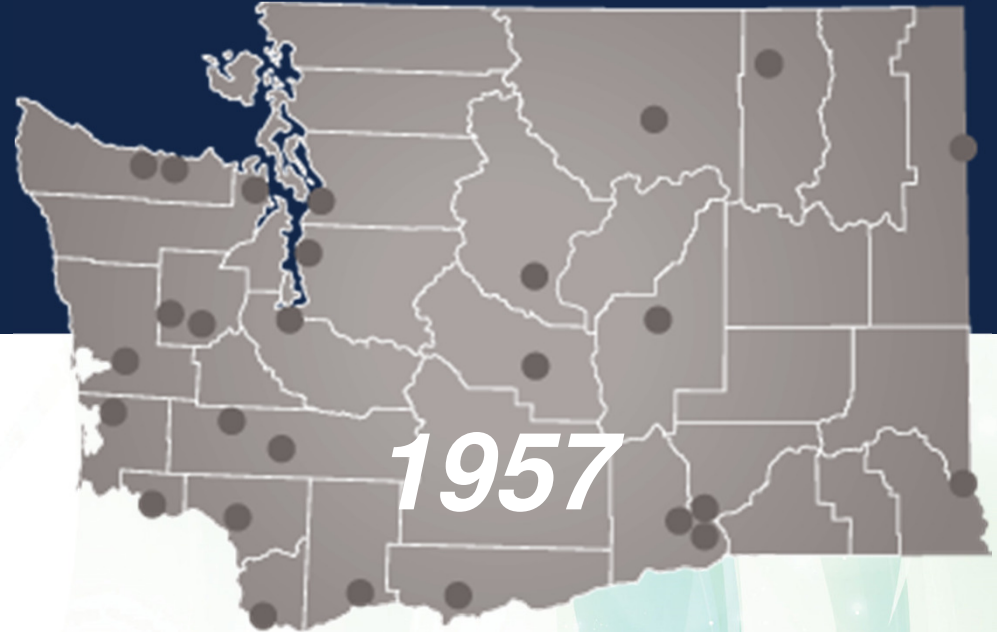
Aggregated Demand Response Pilot

Demand Side Management Resource Support

Northwest Power and Conservation Council
September 9, 2015 – Portland OR

Jim Gaston/John Steigers
Energy Northwest

Energy Northwest



A not-for-profit
Municipal Corporation

Asotin County PUD

Clark Public Utilities

Kittitas County PUD

Pend Oreille County PUD

Benton County PUD

Cowlitz County PUD

Klickitat County PUD

Seattle City Light

Chelan County PUD

Ferry County PUD

Lewis County PUD

Skamania County PUD

City of Port Angeles

Franklin County PUD

Mason County PUD 1

Snohomish County PUD

City of Richland

Grant County PUD

Mason County PUD 3

Tacoma Public Utilities

City of Centralia

Grays Harbor County PUD

Okanogan County PUD

Wahkiakum County PUD

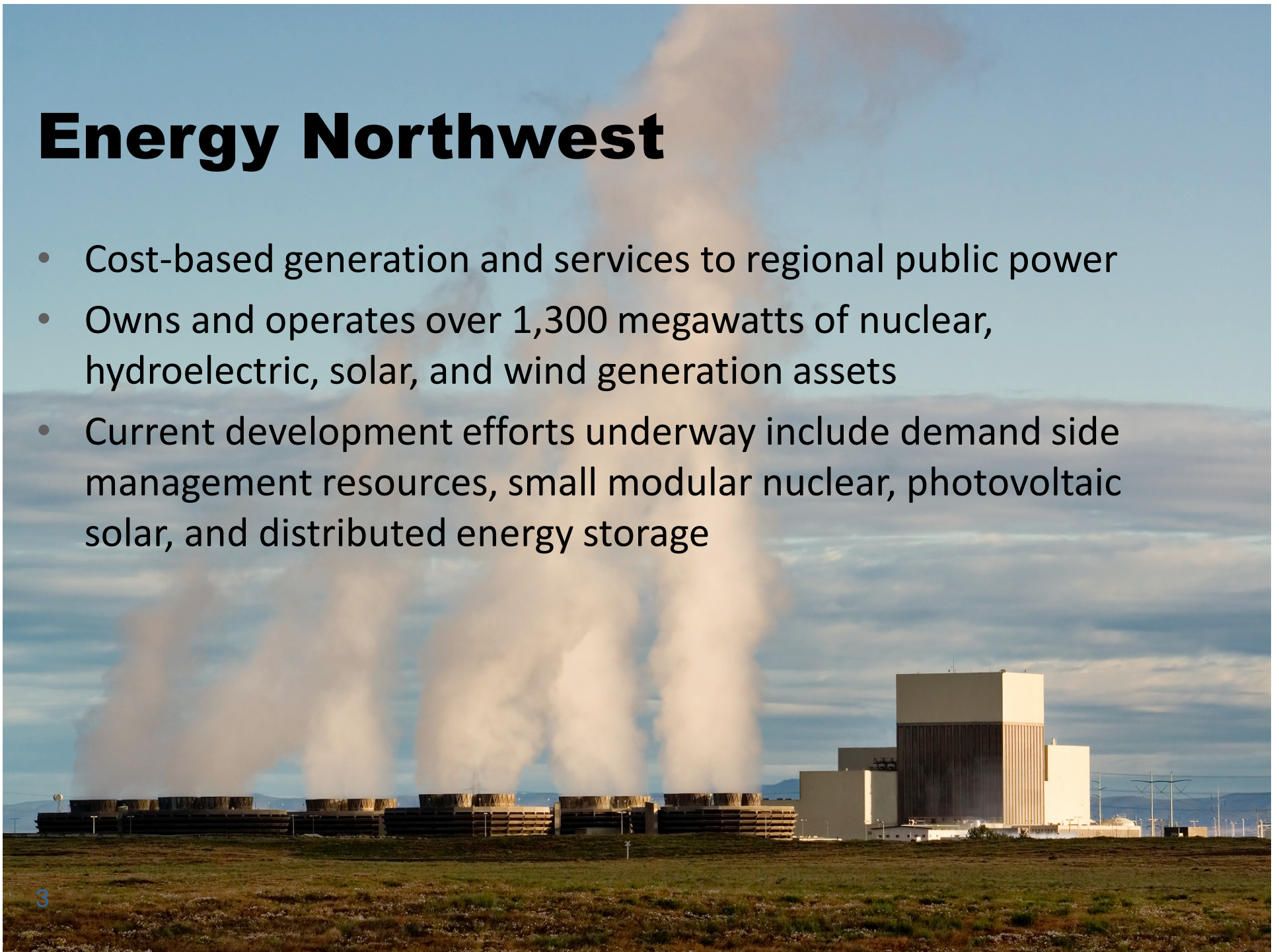
Clallam County PUD 1

Jefferson County PUD

Pacific County PUD

Energy Northwest

- Cost-based generation and services to regional public power
- Owns and operates over 1,300 megawatts of nuclear, hydroelectric, solar, and wind generation assets
- Current development efforts underway include demand side management resources, small modular nuclear, photovoltaic solar, and distributed energy storage



What is the Pilot?

- BPA, as balancing authority, is obliged to balance its system
 - 4,300(+) MW intermittent wind generation
 - Increasingly less capacity and flexibility of its hydroelectric resources
- EN's Pilot provides BPA 35 MW of Fast INC balancing reserves
 - "Fast" < 10-minute Response From Notification
 - "INC" Load Reduction (same net effect as a generation increase)
- BPA pays EN capacity reservation: performance based
 - EN pays incentives to participants
 - No event or energy based compensation for Pilot; capacity fee only
 - Limits on calls and duration
- Timeline – Initial period ends Jan 2016; options through Jan 2017

Demand Response Aggregated Control System (DRACS)

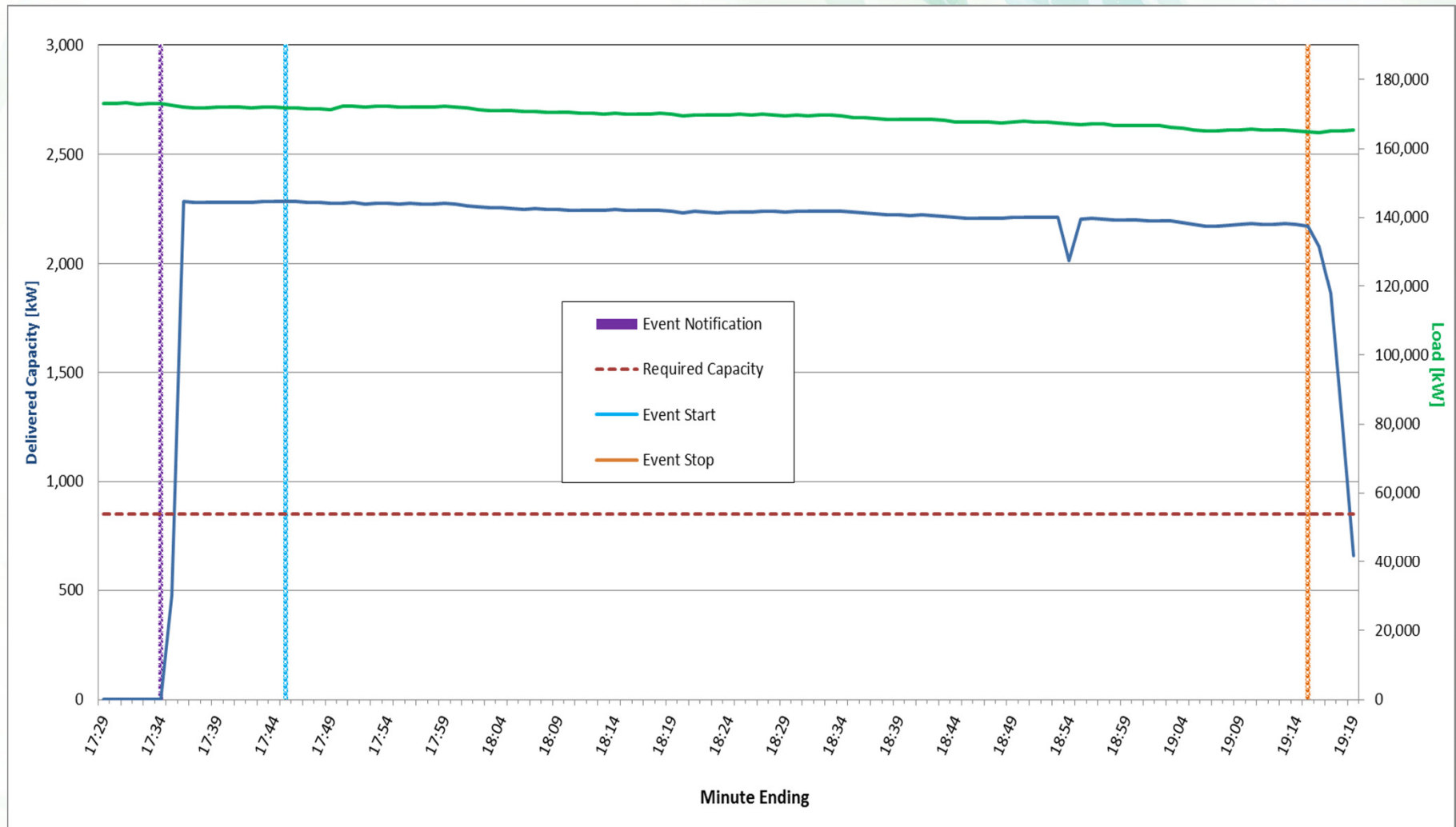
- Robust SCADA architecture, data management, & coding
- Hosted in Pacific Northwest National Laboratory's Energy Infrastructure Operations Center (EIOC)
- Cloud-based secure communications; FISMA-compliant
- Functionality
 - Communicates with BPA Demand Response Operations Management System (DROMS) via Open ADR v.2.0 communication protocols
 - Monitors 24/7 all asset loads, status, comms pathways; alarms/alerts
 - Receives event notifications; calls for all assets' response; monitors and reports load change to BPA, all utilities, and all assets in real time
 - Generates all settlement records and documentation for BPA
 - Provides participating utilities and assets with 24/7 load reporting

City of Richland WA Demand Voltage Reduction (DVR)

- (10) 115/13.8kV substations; (15) load tap changing transformers
- (71) distribution feeder voltage and load metering points
- Direct DRACS to SCADA connection
- Fixed voltage increments (2.5%)
- Capacity – 850 kW
- Actual Performance – 980 to 2,400(+) kW



City of Richland – Demand Voltage Reduction Event 1507- 087 - Jul 7, 2015 - 5:34pm



North Pacific Paper Corporation (NORPAC)



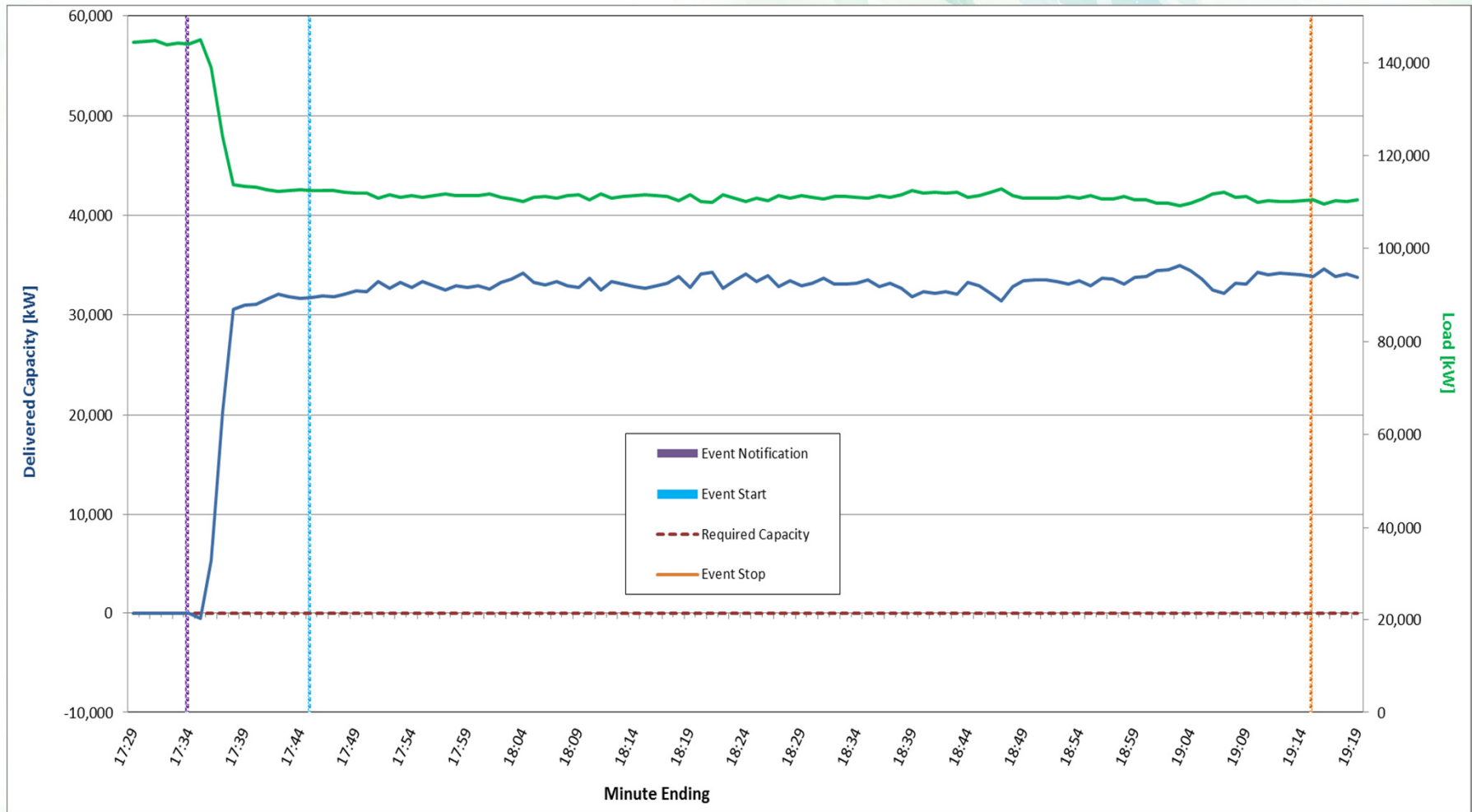
- Cowlitz County PUD
- (3) newsprint machines
- (9) refiner lines
- (4) 5,000hp(+) motors per line

- Direct DRACS to facility DCS
- Real-time meter data out
- Event control signals in
- Shuts down (2) refiner lines
- (8) motors ->20(+) megawatts



Cowlitz County PUD/NORPAC

Event 1507-087 - Jul 7, 2015 - 5:34pm



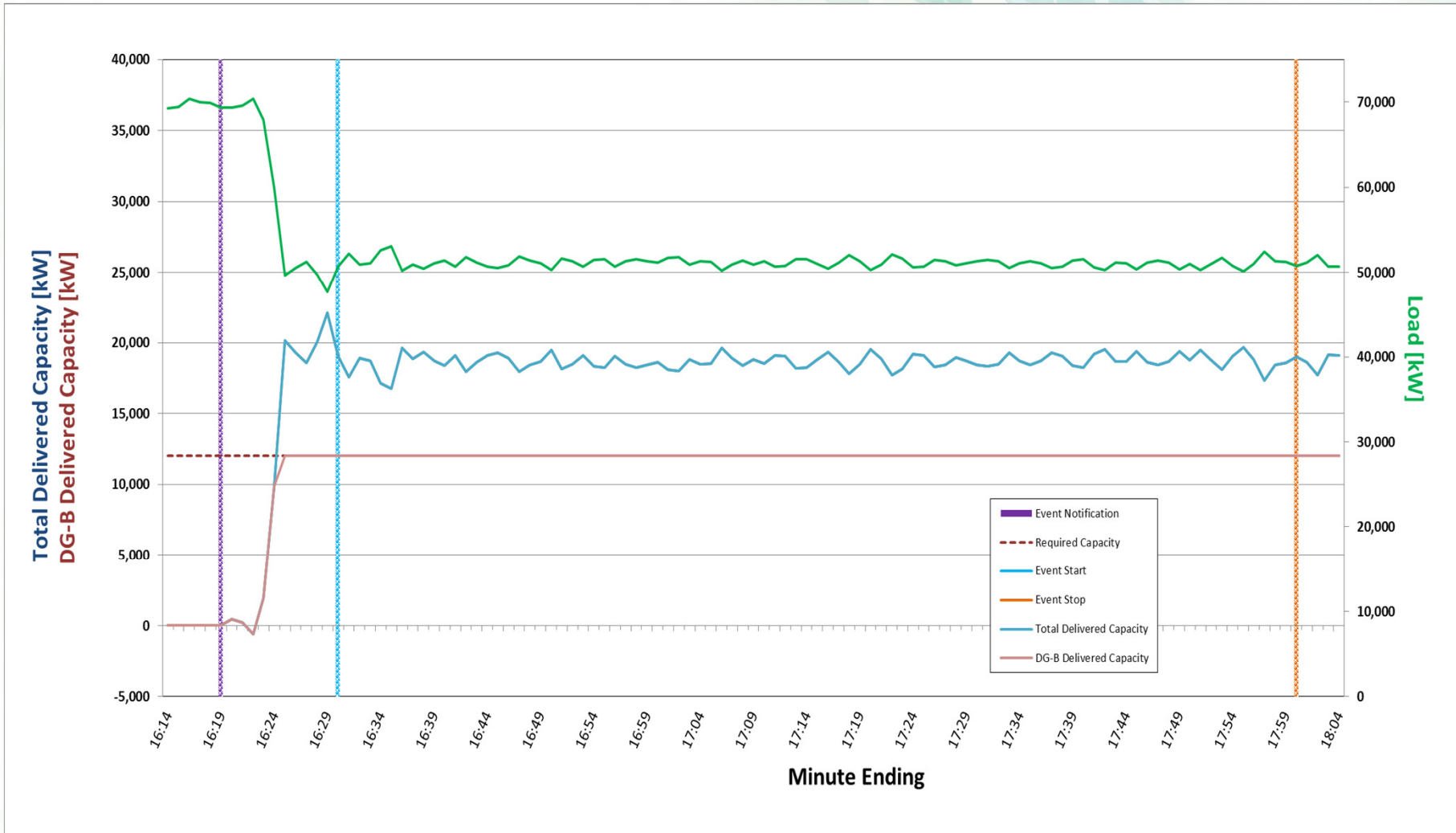
Ponderay Newsprint Company (PNC)

- Pend Oreille County Public Utility District
- (1) newsprint machine; (2) thermal-mechanical refiner lines
- (3) 25,000hp drive motors per refiner line
- Direct DRACS to DCS connections
- (1) refiner line taken off line for DR Events
- (3) motors ->16 MW(+)



Pend Oreille County PUD/PNC

Event 1508-102 - Aug 22, 2015 – 4:19 pm



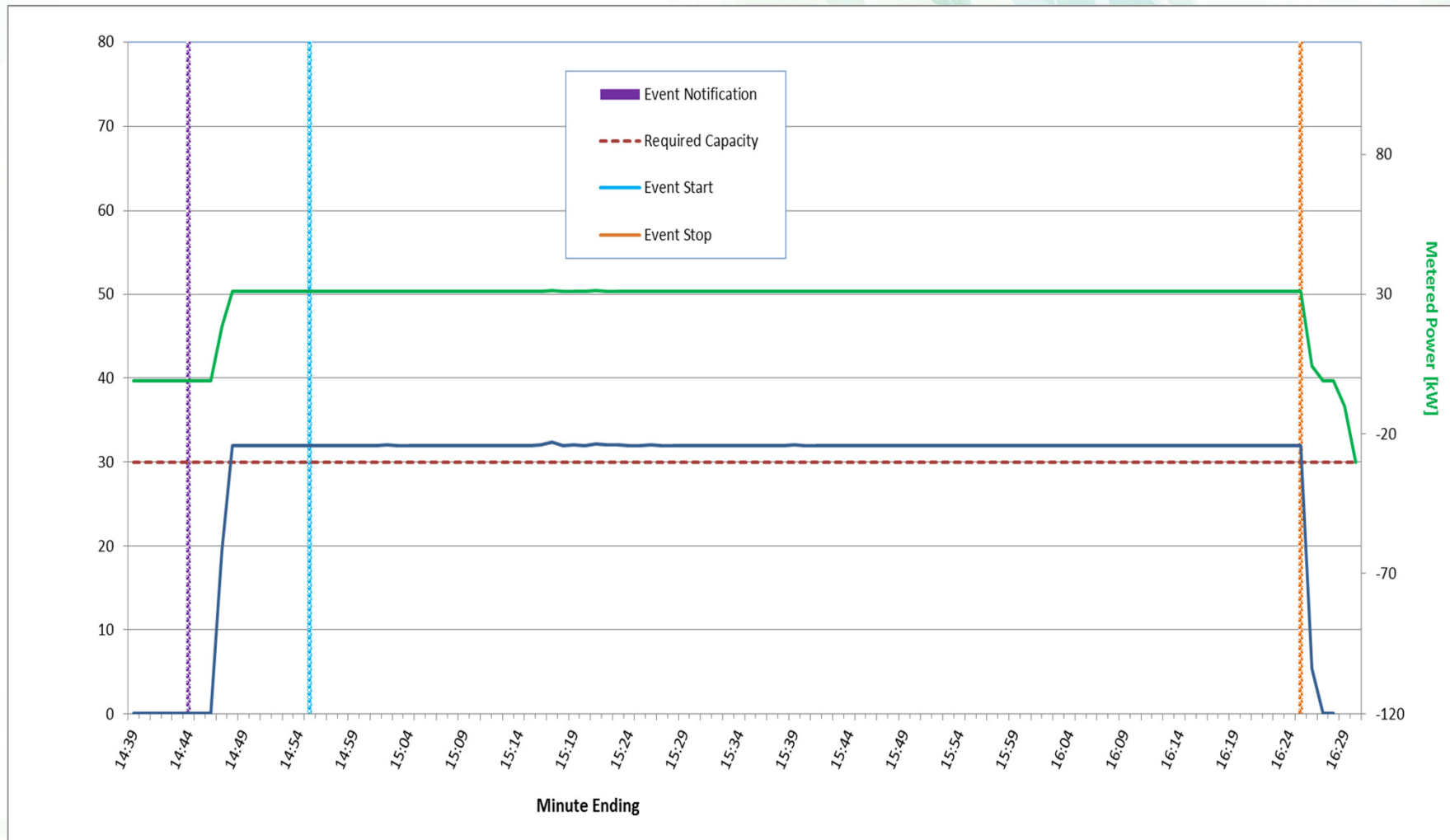
Powin Energy Battery Energy Storage System

- Portable, self-contained, 968 lithium ion batteries
- Onboard communications, server/BMS, power electronics
- 120kW in/out
- 500kWh storage
- Connections at 480vAC 3-phase
- Very fast response
- Currently deployed in Tualatin OR

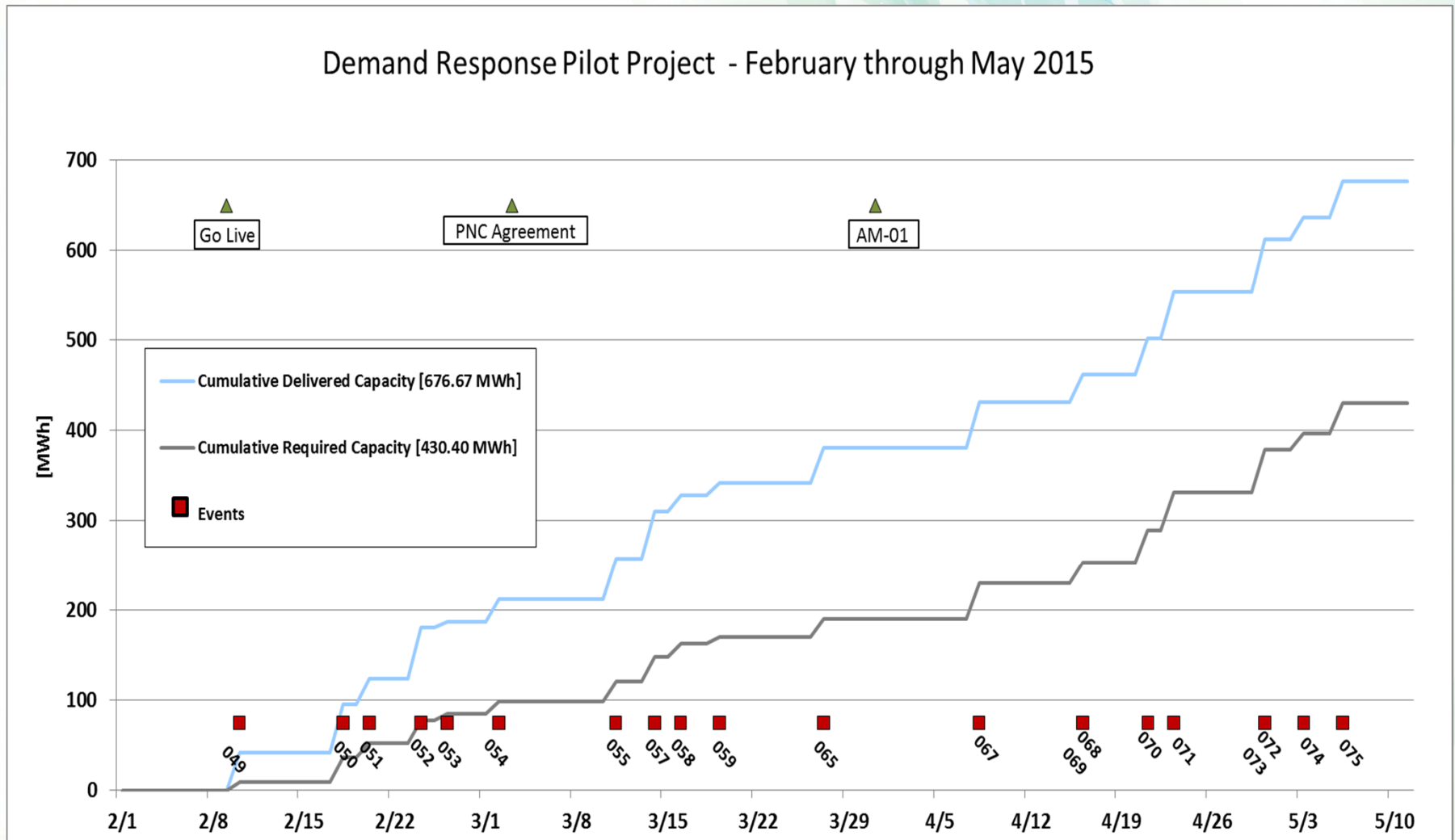


Powin – Battery Energy Storage System

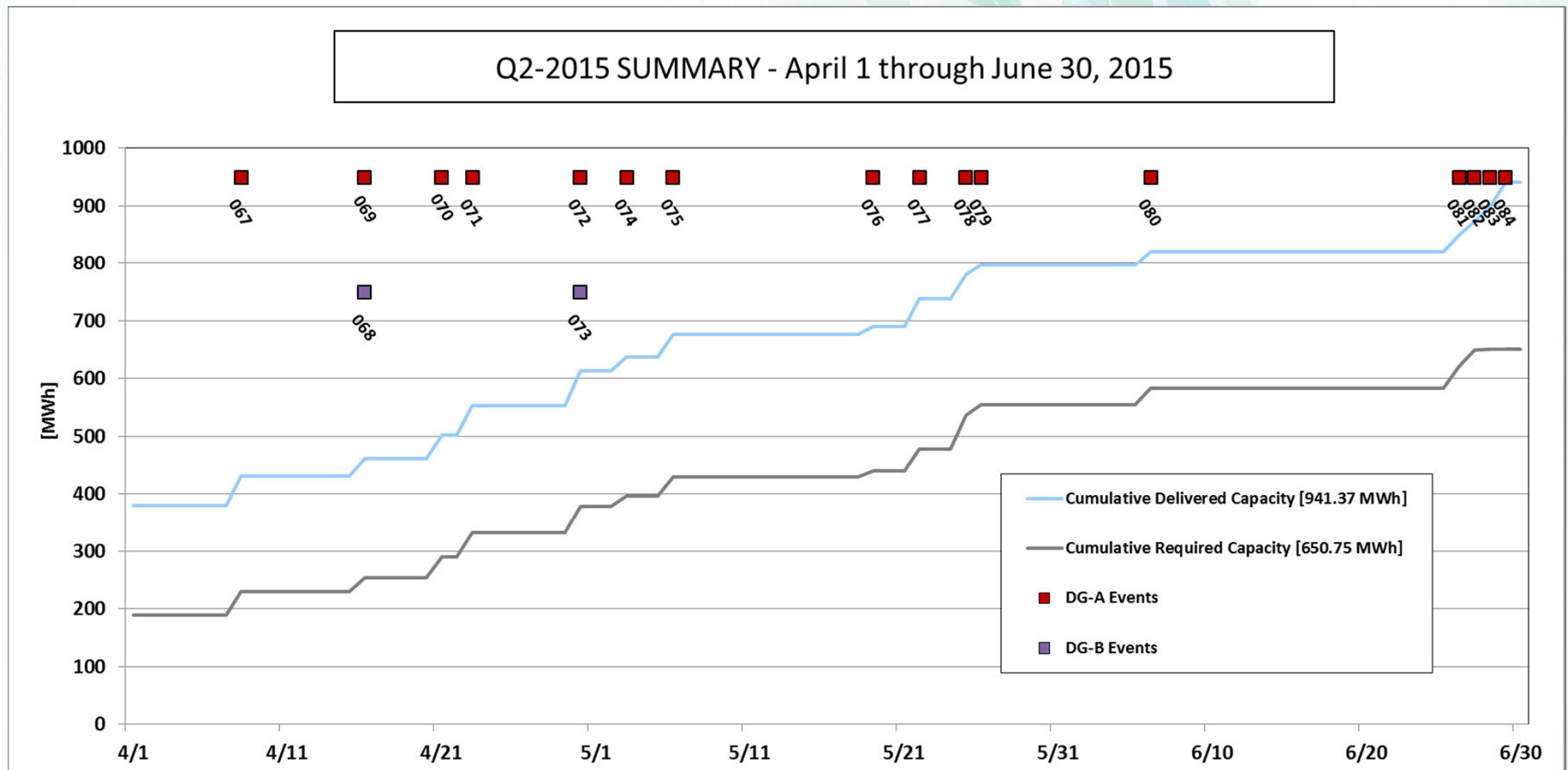
Event 1507- 091 - Jul 15, 2015 - 2:44pm



DR Pilot - Summary



DR Pilot - Summary



Pilot Results To-Date

September 7, 2015, to-date:

- Performance: 52 called events - 94% success
 - Industrial contributors; very good performance, getting better
 - Availability 98%(+)
- Pilot events are being aligned with real-world BPA operations
 - Effective August 1st
 - Phased-in alignment

Actively recruiting additional participant utilities and load contributors

Lessons Learned To-Date

DR Team's utility-focused engagement policy/model very well-received

Settlement docs should be accomplished immediately post-event

- Early identification of emergent issues

Definition of DRACS functionality and reporting requirements

- Make programing changes? => full spectrum on-line testing

Communicate early and often with customer (BPA), utility participants, and assets

Cost-based participant-governed structure

- Concept seems very well-received both by utilities and assets
- Transparency in structure and economics is highly valued

Questions? Interests?

Contacts

John Steigers Project Manager/Generation Project Development
(509) 377-4547 jasteigers@energy-northwest.com

Leo Quiachon Manager O&M Professional Services
(509) 377-8610 liquiachon@energy-northwest.com

Jim Gaston General Manager Energy Services & Development
(509) 377-8347 jwgaston@energy-northwest.com