Pacific Northwest Smart Grid Demonstration

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Driving to Grid 2020

Pacific Northwest Demonstration Project

What:

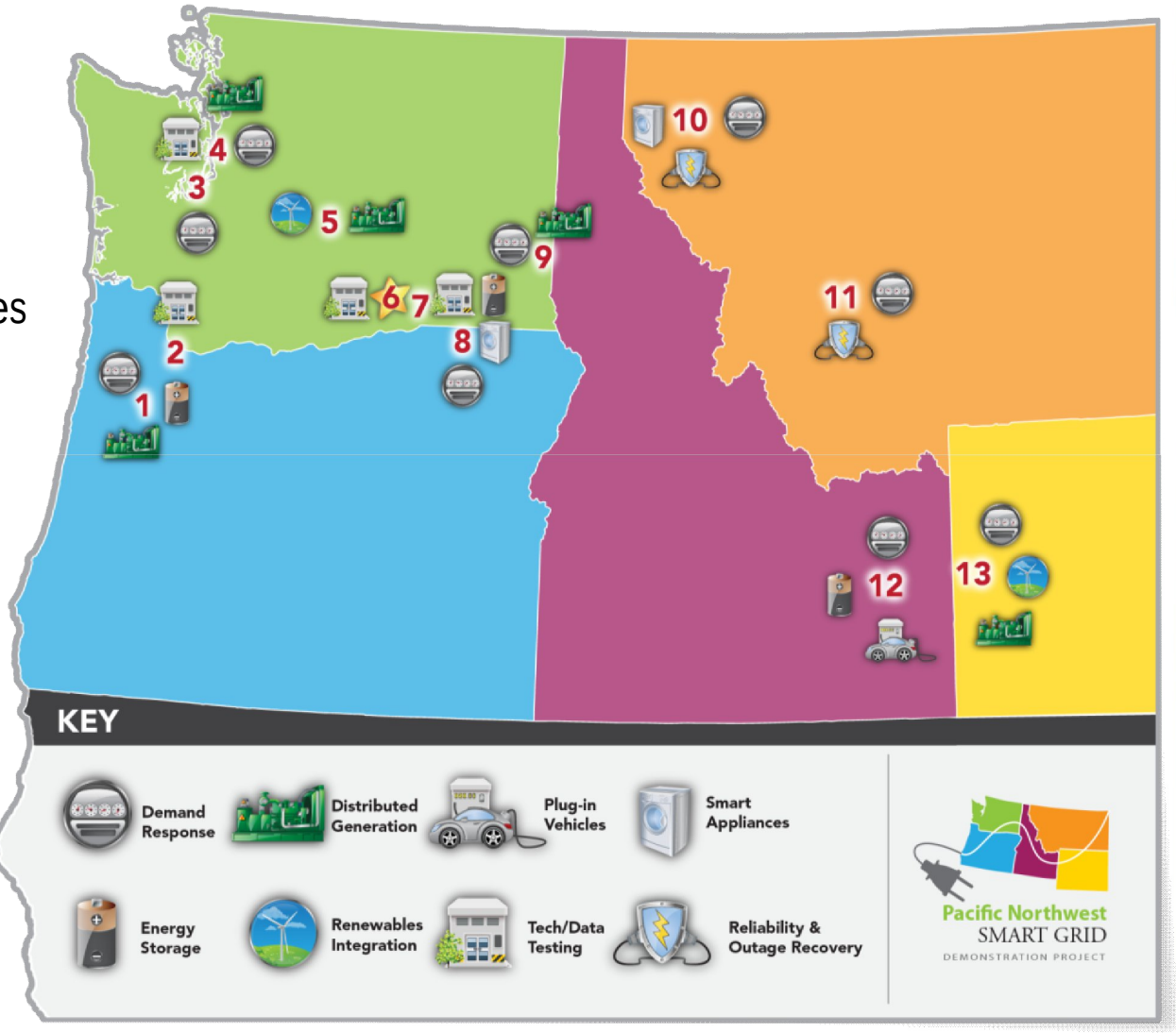
- $178M, ARRA-funded, 5-year demonstration
- $89M US DOE, $10M BPA, $79M project participants
- 60,000 metered customers in 5 states

Why:

- Quantify costs and benefits
- Develop communications protocol
- Develop standards
- Facilitate integration of wind and other renewables

Who:

Led by Battelle and partners including BPA, 11 utilities, 2 universities, and 5 vendors



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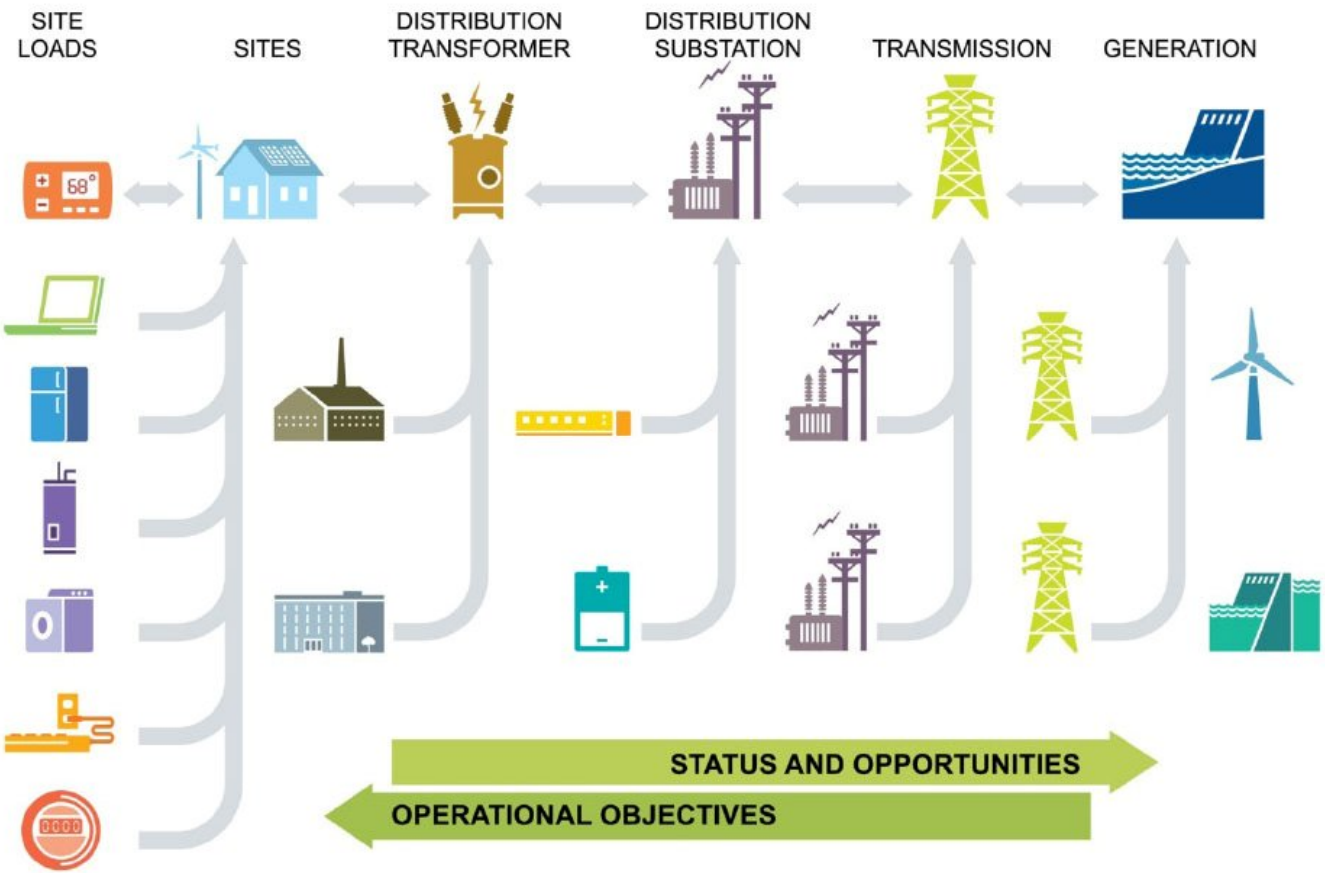
Project Basics

Transactive Control Operational objectives

- Manage peak demand
- Facilitate renewable resources
- Address constrained resources
- Improve system reliability and efficiency
- Select economical resources (optimize the system)



Aggregation of power and signals occurs through a hierarchy of interfaces

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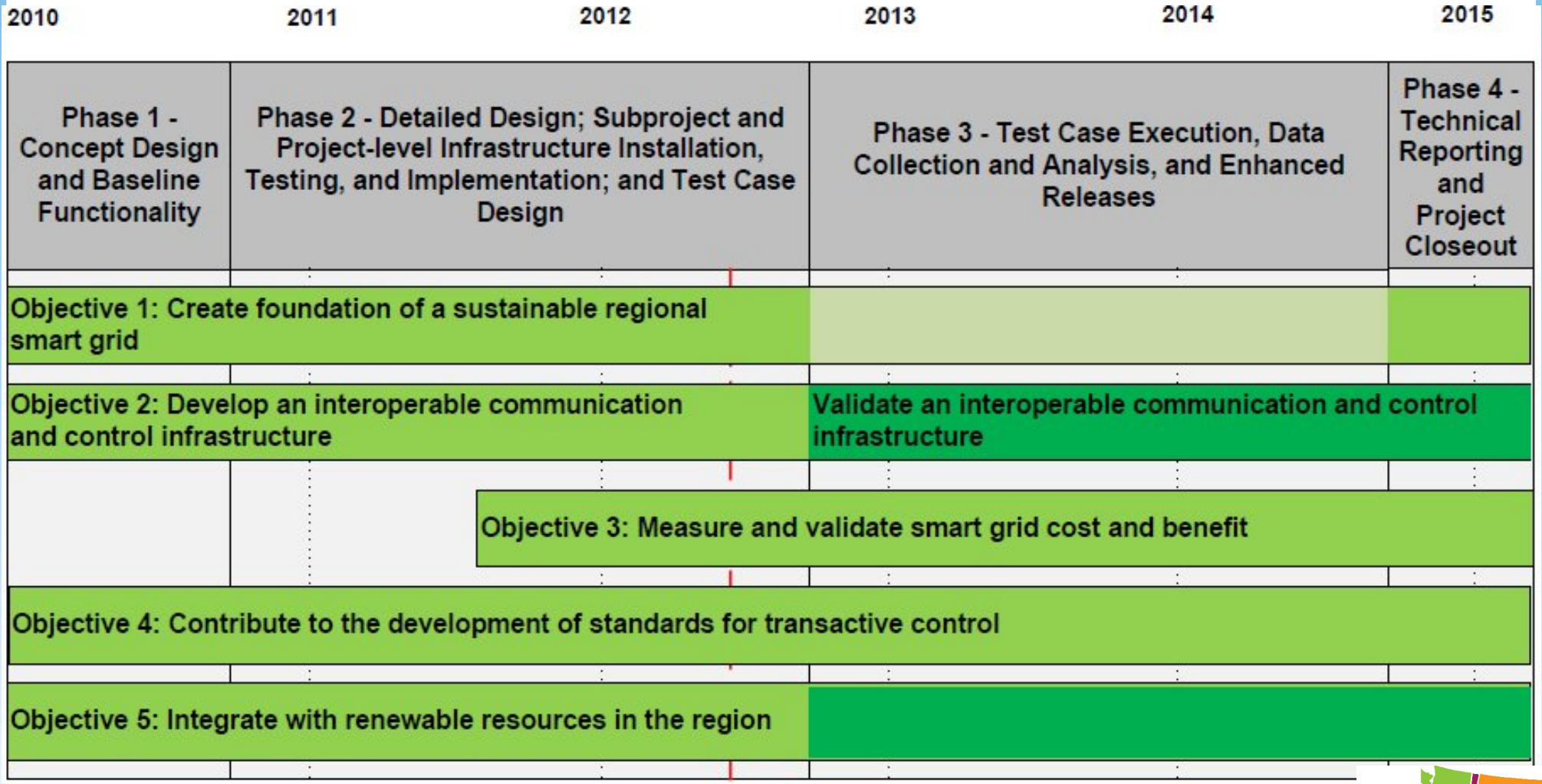
Progress Towards Project Objectives



Underlying frameworks, architectures and key standards

- Distributed architecture with intelligence in each “transactive control node”
- Key information encoded in the Transactive Incentive Signal and Transactive Feedback Signal – no current standards apply, will be discussed as a possible new standard
- Distributed system implemented using IBM’s Internet Scale Control System (iCS) an implementation of ISO/IEC 18012

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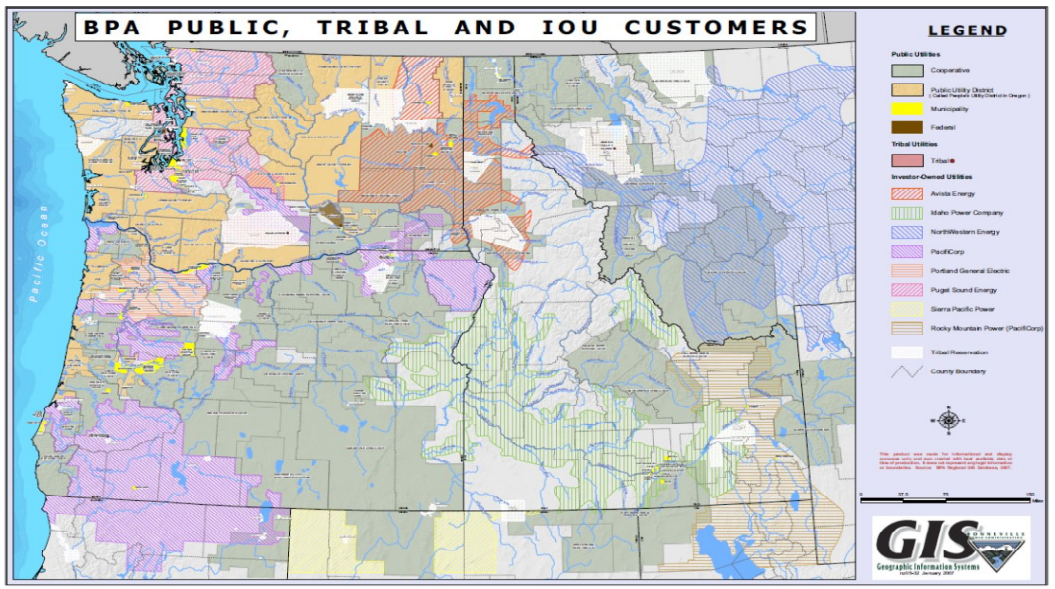
Specific elements of markets, regulation, policy, etc. that impact project

- No real-time market in the region – bi-lateral contracts across PNW
- Transmission, schedules and contracts across balancing authorities
- Aggressive renewable portfolio standards – challenge to integrate wind
  - Traditional theme of regional planning is conservation
  - Heterogeneous mix of utility organizations in the region



Key stakeholders and methods for their engagement

- General public
- Project participants
- U.S. DOE
- Regional entities
- Smart grid research and development community
- Utility industry
  - Vendors
  - Utilities
- Regulators
- Legislators

- Project website
- Participant websites and social media
- Project reports and documentation
- Technical meetings and conferences
- Technical publications
- Briefings to regulators, legislators and policy makers regionally and nationally

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Subproject Test Case Summary

	Transactive Control	Reliability	Conservation /Efficiency	Social	Totals
Avista Utilities	4	3	5	3	15
Benton PUD	1	1	1	0	3
City of Ellensburg	1	0	8	0	9
Flathead Electric	6	2	0	0	8
Idaho Falls Power	8	2	3	3	16
Lower Valley Energy	3	2	6	1	12
Milton-Freewater	3	0	0	0	3
NorthWestern Energy	4	1	3	1	9
Peninsula Light	2	1	1	0	4
Portland General Electric	4	1	1	2	8
UW/Seattle City Light	5	0	3	0	8
Totals	41	13	31	10	95

Pacific Northwest SMART GRID DEMONSTRATION PROJECT

Lessons Learned / Surprises / Challenges

- Many examples of vendors over-promising & under delivering
- Getting access to needed regional data much harder than expected
- Integration with existing bulk power system operations will be challenging
- Each utility has different challenges in relating “smart grid” to their customers – meet people where they are
- Customer questions:
  - How will this benefit me?
  - What will it cost me (time and/or money)?
- Students are pushing for adoption
- R&D with deployment to utilities is challenging!

For further information

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- "Annual Report"
- Quarterly newsletters
- Participant summaries
- Background on technology

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