Northwest Power and Conservation Council Symposium:

Pacific Northwest Power Markets

July 8, 2013 Seattle, WA

Strategic Direction

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

Strategic Plan

"We will be a recognized leader and innovator in energy efficiency and renewables. We believe that interest in conservation and renewables is not a passing fad but represents societal values, political and economic realities, as well as regulatory and legal requirements"

"We will meet growth first through conservation and then a diverse mix of renewable resource technologies"

Building a Renewables Portfolio

- Multiple Initiatives
  - Conventional Resources
    - Bias for ownership
    - Wind
    - Geothermal
    - Hydro
  - Customer Distributed
    - Solar
    - Small wind
    - Small renewables program
  - Research & Development
    - Tidal energy exploration
    - Energy storage demonstration
  - Tying it all together
    - Smart Grid

SNOHOMISH PUD
your northwest renewables utility

Wind Energy

- Wind is only new utility-scale renewable that is commercially available immediately
- Snohomish's power supply portfolio went from 0 to ~8 percent wind in less than two years
- Chose PPA's vs. utility ownership
- More wind resources available in Columbia Gorge
  - Operational challenges limit amount we can take
    - Committed Intra-hour scheduling pilot and other potential tools

Geothermal Energy

- Significant potential for baseload renewable energy
- No development and historically limited exploration in Washington state
- High upfront costs and risks
- Drilled 5 temperature gradient wells in/near Snohomish County in 2010
- Drilled Washington's deepest geothermal exploration well in 2011
- Many prospective areas off limits due to wilderness areas and other designations

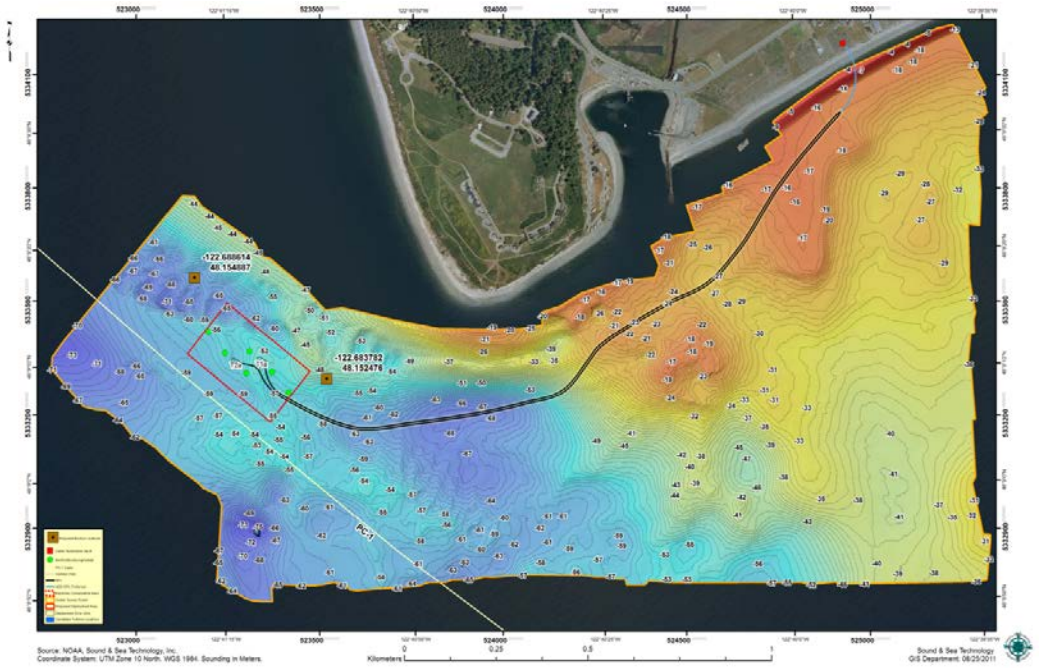
Hydro Energy

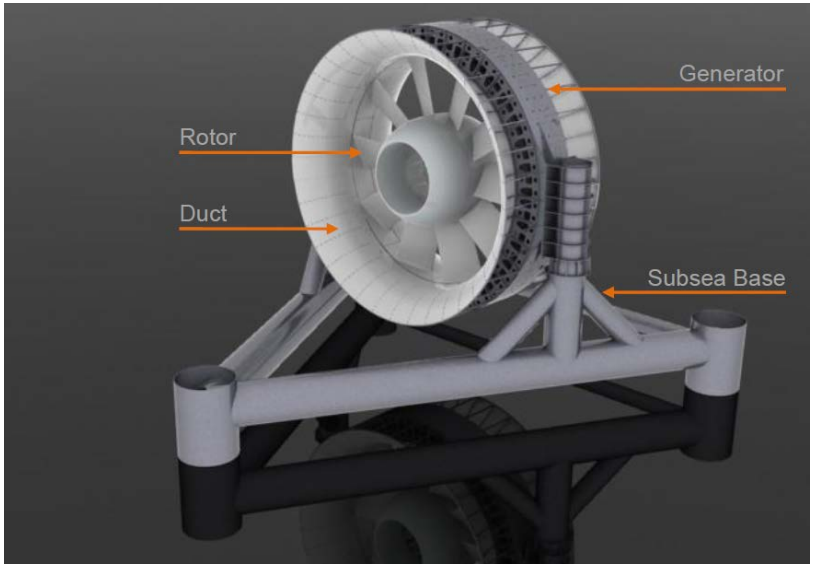
- Focus on low impact, run of river, small hydro
- Utility ownership
- Meaningful, economic potential; however does not meet state RPS requirements
- Some social & environmental resistance
- Projects
  - Woods Creek
  - Youngs Creek
  - Others under study

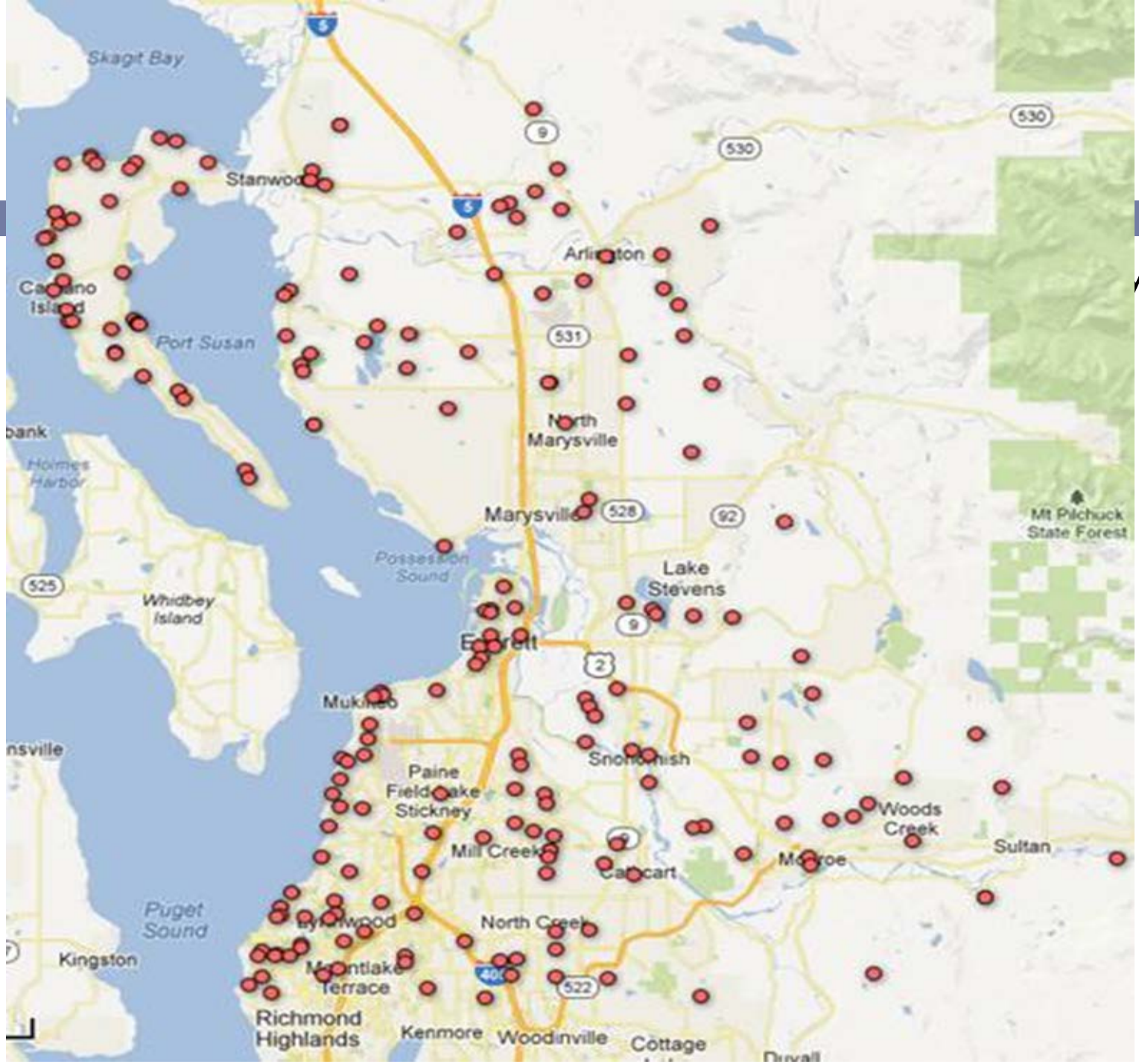
Hydro Project of the Year Winner: Youngs Creek

R&D: Tidal Energy

- No commercial tidal energy array operating anywhere in the world
- Potential for predictable, renewable energy close to load
- Final License Application submitted for Admiralty Inlet Pilot Plant






Skagit Bay
Port Susan
Whidbey Island
Possession Sound
Puget Sound
Holmes Harbor
Stanwood
Arlington
North Marysville
Marysville
Lake Stevens
Mt Pilchuck State Forest
Everett
Mukilteo
Snohomish
Paine Field
Lake Stickney
Mill Creek
Cathcart
Woods Creek
Monroe
Sultan
North Creek
Mountlake Terrace
Kingston
Richmond Highlands
Kenmore
Woodinville
Cottage
Duvall
530
531
528
525
522
92
9
2
5
405

Customer/Distributed Wind

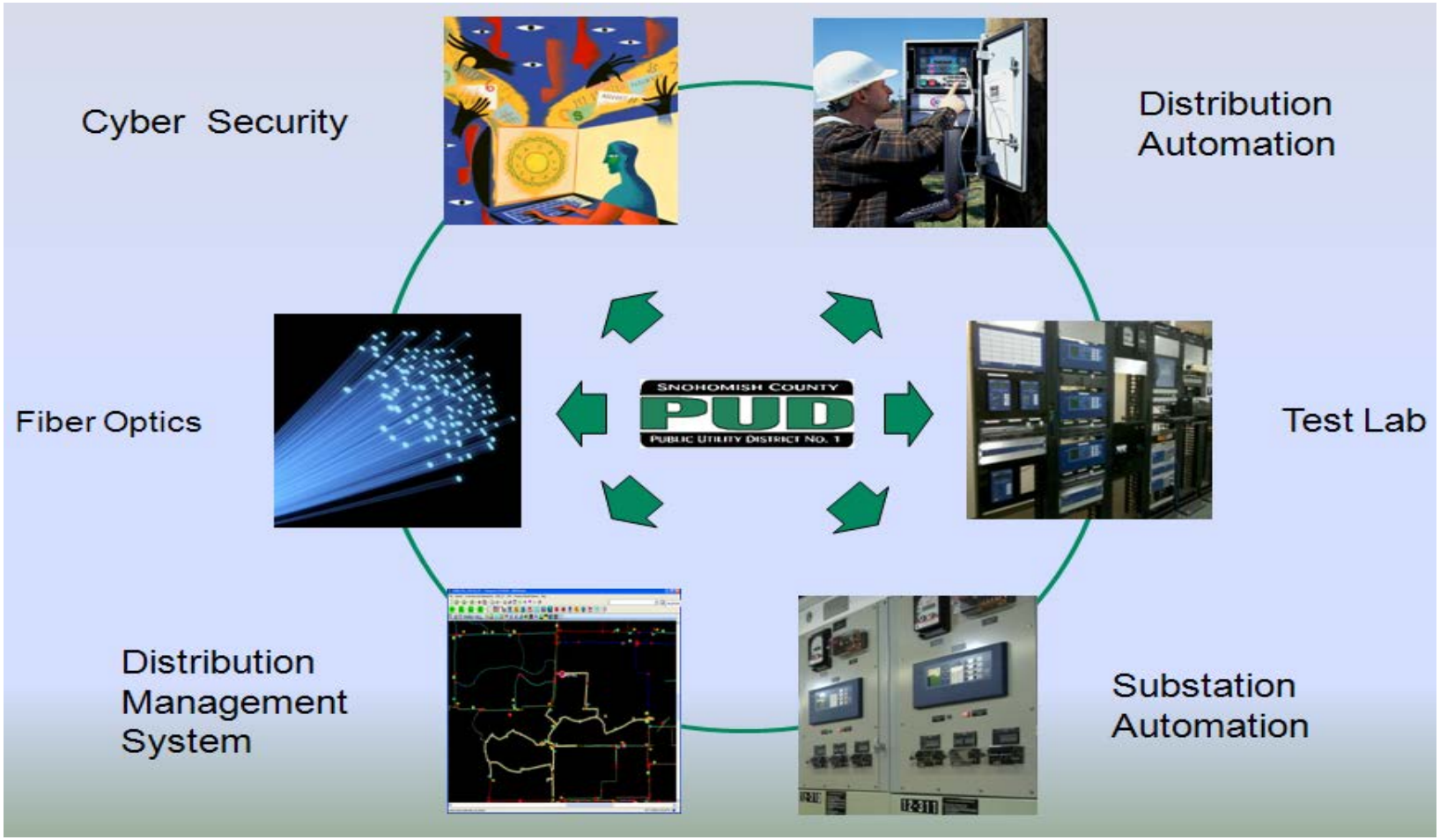
- Provide real world data for customers interested in pursuing small wind installations at their homes or businesses
- Installed two wind turbines at Snohomish PUD operations center

Small Renewables Program

- Encourage the development of small, distributed renewable generating resources
- Diversifies power supply portfolio and provides a variety of measurable benefits to ratepayers
- 100 kw – 2 MW
- Example
  - Hampton Lumber (wood waste)
- Projects under discussion
  - Food waste
  - Yard waste
  - Dairy manure

$$\begin{aligned} \textit{Contract Price} = {} & \textit{Energy Price} \\ & + \\ & \textit{Transmission \& Distribution Loss Credit} \\ & + \\ & \textit{Tradable REC Value (if applicable)} \\ & + \\ & \textit{Deferral of System Upgrades Credit (if applicable)} \\ & + \\ & \textit{Generation Capacity Cost Credit (if applicable)} \\ & + \\ & \textit{Distributed Generation Credit (if applicable)} \end{aligned}$$

Smart Grid


Cyber Security
Distribution Automation
Fiber Optics
SNOHOMISH COUNTY
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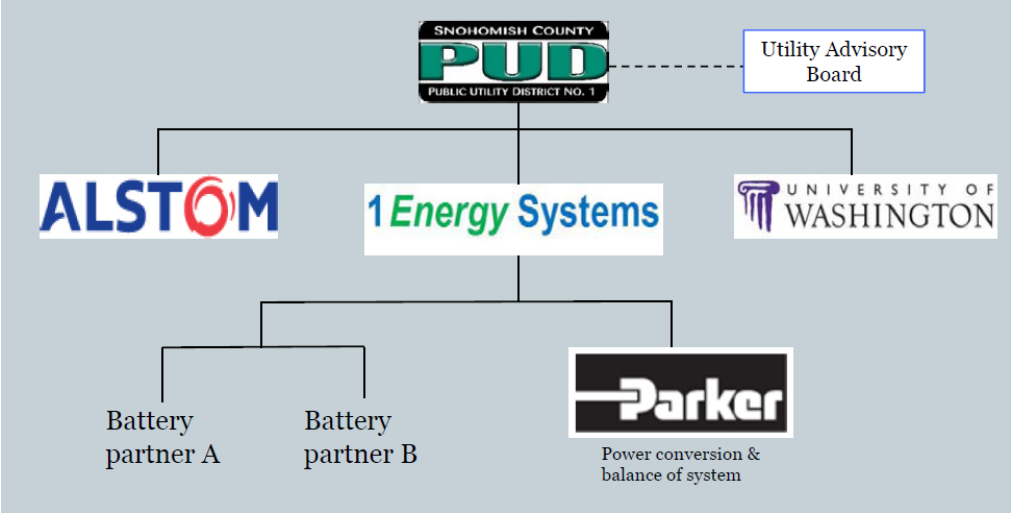
Test Lab
Distribution Management System
Substation Automation

Modular Energy Storage Architecture

- Storage is a potentially useful tool across a wide range of power / energy use cases
- Batteries may offer best *potential* to meet many utility needs
  - Modularity
  - Scalability
  - Interoperability
  - Standardization
- Current battery storage offerings are expensive and do not take full advantage of this potential
- Snohomish is developing a megawatt-scale project which aims to transform the market via standardization and architecture



Questions?

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