

Meeting Report

2011 Integrated Resource Plan

Third Public Input Meeting, August 4, 2010

Meeting Date: Wednesday, August 4, 2010,

Meeting Time: 9:00 am – 3:00 pm (Pacific) / 10:00 am – 4:00pm (Mountain)

Location: Portland, Oregon; Salt Lake City, Utah; and telephone conference

Organizations Attending

- Alpern Myers Stuart LLC (Interwest Energy Alliance)
- Bella Energy Inc.
- EnCana
- General Electric (GE)
- Idaho Public Service Commission (ID-PSC)
- Invenergy LLC
- Northwest Energy Coalition (NVEC)
- Northwest Pipeline GP (NWPGP)
- Northwest Power and Conservation Council (NWPCC)
- Oregon Public Utility Commission (OPUC)
- PacifiCorp
- Renewable Northwest Project (RNP)
- Salt Lake Community Action Program (SLCAP)
- Utah Association of Energy Users (UAE)
- Utah Clean Energy (UCE)
- Utah Department of Air Quality (UT-DAQ)
- Utah Division of Public Utilities (DPU)
- Utah Office Of Consumer Services (OCS)
- Utah Public Service Commission (UT-PSC)
- Utah State Energy Program (USEP)
- Wasatch Clean Air Coalition
- Washington Customer (WA Customer)
- Washington Utilities and Transportation Commission (WUTC)
- West Wind Wires (WWW)
- Western Grid Group (WGG)
- Wyoming Public Service Commission (WY-PSC)

The list of individual meeting attendees is provided as Appendix A.

Meeting Overview

The integrated resource planning topics covered at this meeting included demand-side management (DSM) resources, distributed generation resources, supply-side resources, capacity planning reserve margin analysis, and proposed portfolio development cases. An update on the wind integration study schedule was also provided; specifically, that the study filing date was moved from August 2 to September 1, 2010.

Jeff Bumgarner, PacifiCorp's director of demand-side management programs, summarized the status of the DSM and distributed resource potentials study update being performed by The Cadmus Group. Cadmus Group staff in attendance fielded questions and comments on a memo circulated before the meeting that outlines distributed solar photovoltaic resource cost and performance characteristics to be used for the study.

Jim Lacey, from PacifiCorp's Construction & Development Department, provided an overview of supply-side resources and associated cost trends, and the geothermal commercial potential study performed for PacifiCorp by the consultant team of Black & Veatch and Geothermix. Jim Lacey also led a discussion on approaches for evaluating energy storage benefits for intermittent renewable resources, focusing on technology verification, location analysis, and value added from capacity contribution and ancillary services perspectives.

Pete Warnken, manager of integrated resource planning, outlined the plan for analyzing capacity planning reserve margins and selecting an appropriate reserve margin level for portfolio modeling. The plan consists of a Loss of Load Probability (LOLP) study using the Company's Planning and Risk (PaR) production cost model, development of a comparative reserve margin based on the Western Electric Coordination Council (WECC) Reserve Margin Building Block Guidelines, and portfolio economic evaluation based on different reserve margin levels. The meeting concluded with an introduction of 50 proposed portfolio scenario cases generally structured as a combination of alternative load forecasts, price forecasts (carbon dioxide and natural gas/electricity), renewable incentive policies, and demand-side management penetration potential assumptions. PacifiCorp requested that comments and recommendations on the scenario cases be provided by the next general public input meeting, to be scheduled for mid-September, 2010.

Discussion Highlights

Demand-side Management and Distributed Generation Resources

- Participants discussed the rationale and implications of Utah moving from a Total Resource Cost to a Utility Cost basis for evaluating DSM program cost-effectiveness. This decision impacts the construction of the Utah-specific supply curves fed to the capacity expansion optimization model, System Optimizer.
- PacifiCorp described in detail how the DSM supply curves are represented and constructed for the System Optimizer model. They are modeled as discrete resources by location, annual availability, cost level, and avoided energy/capacity profiles, which translates into 1,580 individual resource options. One participant recommended that PacifiCorp investigate converting the energy efficiency resources into linear supply curves. PacifiCorp responded that System Optimizer is a proprietary software product, but that simplifying energy efficiency characterization has merit and should be brought up with the model vendor, Ventyx, as a possible future product enhancement.
- Heidi Ochsner of The Cadmus Group conducted a walk-through of the distributed photovoltaic inputs and data sources memo provided to participants for review prior to the meeting. Participants discussed the assumptions underlying project administrative cost estimates, project economic impact of changing solar panel orientation (Azimuth coordinates), suitability of using PacifiCorp's Utah Solar PV Incentive Pilot data for installation cost estimation, reasonableness of installation cost estimates, and assumed future cost trends given recent improvements in module efficiency and manufacturing.
- Utah State Energy Program staff offered to provide PacifiCorp with installation cost and system size data from the Rebate program.

Supply-side Resources

- A participant asked PacifiCorp what data sources were used for developing the supply-side resource characteristics. Jim Lacey responded that there were a mix of sources, including both internal and external studies, as well as experience with recent plant projects. The costs reflect PacifiCorp's cost to build resources in its service territory.
- PacifiCorp explained that resource capital costs represent the cost going into rate base immediately after construction. For example, they include Allowance For Funds Used During Construction (AFUDC) and owner costs.
- Participants discussed how PacifiCorp is handling new or potential pollutant control regulations in its assessment of coal plant retirements.
- One participant recommended that PacifiCorp conduct a general assessment of the ramping requirement for intermittent resources and sufficiency of resources to cover it now and in the future.
- Participants requested that the full Supply-side Resource table be distributed for review. PacifiCorp agreed to provide the table. Please refer to Appendix B for the draft Supply-side Resource table.
- For utility-scale solar projects, PacifiCorp emphasized that the focus for resource characterization is on conventional technologies, since that is what developers are generally offering in the market.
- Idaho commission staff outlined their experience with reviewing geothermal Requests for Proposals (RFPs). They pointed out that bids had many contingencies and conditions, and noted that Idaho Power concluded that an RFP is not an appropriate procurement mechanism for geothermal projects.
- Participants discussed the proximity of geothermal sites to main transmission lines as a criterion for screening resources in the geothermal potential study, and additional site development costs necessary for utilities to make a project commitment.
- PacifiCorp agreed to provide Washington commission staff with a brief explanation regarding Washington geothermal sites in the potential study.
- Participants discussed the relative merits of utility-scale energy storage versus distributed energy storage. Some participants stated that distributed energy storage should be a higher priority for analysis and acquisition.

Planning Reserve Margin Analysis

- Participants discussed the appropriate year to simulate for the Loss of Load Probability study. PacifiCorp will consider an alternate year. (2013 was originally proposed for the study.)
- Participants discussed transmission assumptions for the LOLP study, including market purchase availability and whether including non-firm transmission capability is important.
- PacifiCorp emphasized that the LOLP study will not address the value of "energy not served" (ENS), but rather the resource cost of avoiding it.
- One participant suggested that PacifiCorp look at conservation as an appropriate incremental reliability resource for the LOLP study because its forced outage rate is zero. PacifiCorp responded that mixing resource types complicates the LOLP study, but agrees that looking at the reliability impact of different resource mixes is useful.

- The Northwest Power and Conservation Council recommended a publicly available report written by the Pacific Northwest Utilities Conference Committee (PNUCC) on reliability and reserves. PacifiCorp noted that it has read the paper and will make it available to IRP participants.

Portfolio Development Cases

- Participants debated the suitability of allowing System Optimizer to optimize coal plant retirements for all cases as opposed to a limited set as proposed by PacifiCorp. In addition to IRP schedule impacts because of model run-time, PacifiCorp explained that coal plant retirement evaluation is in a formative stage, and needs to be handled as limited scenario analysis given regulatory uncertainty, the need for additional detailed impact analysis, and other factors.
- Participants discussed how the Energy Gateway transmission projects are represented in portfolio development. Utah participants noted that the Utah commission, in their 2008 IRP acknowledgment order, requires that only resources in the final procurement or permitting stages could be included in portfolios, unless the portfolio is used for sensitivity analysis.

Responses to Parking Lot Questions IRP Public Meeting – August 4, 2010

1. Geothermal Study: Why are there no Washington Geothermal sites?

Response:

The Contractor did include three potential sites in Washington (See Appendix A of the [PacifiCorp Geothermal Resource Study](#).) These sites are currently in the exploration phase of development and were not a focus of this study due to commercial viability.

Action Item Follow-up

Supply-side Resources

1. Please provide a complete supply-side table with all resources and cost/performance attributes.

Response:

Refer to Appendix B for the Draft Supply-side table.

Planning Reserve Margin Analysis

1. Please provide the report written by the Pacific Northwest Utilities Conference Committee (PNUCC) on reliability and reserves.

Response:

Please refer to PNUCC's website (<http://www.pnucc.org>) for the report titled "Reserves in Capacity Planning, A Northwest Approach" (June 2010).

Document Link:

<http://www.pnucc.org/documents/ReservesinCapacityPlanningFinal.pdf>

Appendix A: Meeting Attendance List, Individuals

Organization	Name
Alpern Myers Stuart LLC (Interwest Energy Alliance)	Lisa Tormoen Hickey
Bella Energy Inc.	Ron Barness
Encana	Rod Crockford Roger Belland
General Electric	Dave Johnson
Idaho Public Service Commission (ID-PSC)	Rick Sterling
Invenergy LLC	Brett Oakleaf
Northwest Energy Coalition (NVEC)	Steve Weiss
Northwest Pipeline GP (NWPGP)	Teresa Hagins
Northwest Power and Conservation Council (NWPCC)	Michael Schilmoeller
Oregon Public Utility Commission (OPUC)	George Compton Erik Colville
PacifiCorp	Stefan Bird Jeff Bumgarner Greg Duvall Susan Farmer Brian Fritz Irene Heng Don Jones, Jr. Jim Lacey Michael Liljenwall Brian Osborn Mark Tallman Pete Warnken
Renewable Northwest Project (RNP)	Ken Dragoon Megan Decker
Salt Lake Community Action Program (SLCAP)	Betsy Wolf
Utah Association of Energy Users (UAE)	Kelley Francone
Utah Clean Energy (UCE)	Sara Baldwin Sophie Hayes Sarah Wright
Utah Department of Air Quality (UT-DAQ)	Glade Sowards
Utah Division of Public Utilities (DPU)	Abdinasir Abdulle Phil Powlick

Organization	Name
	Sam Liu Doug Wheelwright
Utah Office Of Consumer Services (OCS)	Dan Gimble Cheryl Murray
Utah Public Service Commission (UT-PSC)	John Harvey Carol Revelt
Utah Public Service Commission (UT-PSC)- <i>Continued</i>	Becky Wilson
Utah State Energy Program (USEP)	Jason Berry
Wasatch Clean Air Coalition	Kathy Van Damm
Washington Customer (WA Customer)	John Klingele
Washington Utilities and Transportation Commission (WUTC)	David Nightingale
West Wind Wires (WWW)	Roger Hamilton
Western Grid Group (WGG)	Jim Bryne
Wyoming Public Service Commission (WY-PSC)	Don Biederman

Appendix B: Draft Supply Side Table

Supply Side Resources DRAFT (IRP PIM August 4, 2010)	Location / Timing		Plant Details			Outage Information		Costs				Emissions				
	Description	Installation Location	Earliest In-Service Date	Average Capacity MW	Design Plant Life in Years	Annual Average Heat Rate HHV (BTU/kWh)	Maint. Outage Rate	Equivalent Forced Outage Rate (EFOR)	Low Estimate Capital Cost (\$/kW)	High Estimate Capital Cost (\$/kW)	Var. O&M (\$/MWh)	Fixed O&M (\$/kW-yr)	SO2 (lbs/MMBtu)	NOx (lbs/MMBtu)	Hg (lbs/trillion Btu)	CO2 (lbs/mmBtu)
EAST SIDE RESOURCE OPTIONS																
Coal																
Utah PC without Carbon Capture & Sequestration	Utah	2020	600	40	9,106	4.6%	4.0%	\$2,923	\$3,692	\$0.96	\$38.80	0.100	0.070	0.40	205	
Utah PC with Carbon Capture & Sequestration	Utah	2025	526	40	13,087	5.0%	5.0%	\$5,285	\$6,676	\$6.71	\$66.07	0.050	0.020	0.20	20.5	
Utah IGCC with Carbon Capture & Sequestration	Utah	2025	466	40	10,823	7.0%	8.0%	\$5,117	\$6,463	\$11.28	\$53.24	0.050	0.011	0.04	20.5	
Wyoming PC without Carbon Capture & Sequestration	Wyoming	2020	790	40	9,214	4.6%	4.0%	\$3,310	\$4,181	\$1.27	\$36.00	0.100	0.070	0.60	205	
Wyoming PC with Carbon Capture & Sequestration	Wyoming	2025	692	40	13,242	5.0%	5.0%	\$5,985	\$7,559	\$7.26	\$61.37	0.050	0.020	0.30	20.5	
Wyoming IGCC with Carbon Capture & Sequestration	Wyoming	2025	456	40	11,047	7.0%	8.0%	\$5,794	\$7,318	\$13.52	\$58.00	0.050	0.011	0.06	20.5	
Existing PC with Carbon Capture & Sequestration (500 MW)	Utah/Wyo	2025	(139)	20	14,372	5.0%	5.0%	\$1,314	\$1,660	\$6.71	\$66.07	0.050	0.011	0.30	20.5	
Natural Gas (4500 feet)																
Utility Cogeneration	Utah	2014	10	20	4,974	10.0%	8.0%	\$4,449	\$5,619	\$23.29	\$1.86	0.0000	0.000	0.255	118	
Fuel Cell - Large	Utah	2013	5	30	7,262	2.0%	3.0%	\$1,668	\$2,106	\$0.03	\$8.40	0.0006	0.000	0.255	118	
SCCT Aero	Utah	2014	118	30	9,773	3.8%	2.6%	\$1,047	\$1,322	\$5.63	\$9.95	0.0006	0.011	0.255	118	
Intercooled Aero SCCT	Utah	2014	279	30	9,379	3.8%	2.9%	\$1,229	\$1,553	\$3.93	\$7.01	0.0006	0.011	0.255	118	
Internal Combustion Engines	Utah	2014	301	30	8,806	5.0%	1.0%	\$1,204	\$1,521	\$5.50	\$6.49	0.0006	0.017	0.255	118	
SCCT Frame (2 Frame "F")	Utah	2014	362	35	10,446	3.8%	2.7%	\$1,037	\$1,310	\$7.16	\$5.41	0.0006	0.050	0.255	118	
CCCT (Wet "F" 1xl)	Utah	2015	263	40	7,302	3.8%	2.7%	\$1,253	\$1,583	\$2.94	\$13.04	0.0006	0.011	0.255	118	
CCCT Duct Firing (Wet "F" 1xl)	Utah	2015	42	40	8,869	3.8%	2.7%	\$511	\$646	\$0.39	\$0.00	0.0006	0.011	0.255	118	
CCCT (Wet "F" 2xl)	Utah	2015	525	40	6,911	3.8%	2.7%	\$1,132	\$1,430	\$2.94	\$7.93	0.0006	0.011	0.255	118	
CCCT Duct Firing (Wet "F" 2xl)	Utah	2015	84	40	9,329	3.8%	2.7%	\$571	\$721	\$0.39	\$0.00	0.0006	0.011	0.255	118	
CCCT (Dry "F" 2xl)	Utah	2015	512	40	6,963	3.8%	2.7%	\$1,134	\$1,433	\$3.35	\$9.69	0.0006	0.011	0.255	118	
CCCT Duct Firing (Dry "F" 2xl)	Utah	2015	85	40	8,934	3.8%	2.7%	\$571	\$721	\$0.11	\$0.00	0.0006	0.011	0.255	118	
CCCT (Wet "G" 1xl)	Utah	2015	333	40	6,777	3.8%	2.7%	\$1,185	\$1,497	\$4.56	\$6.75	0.0006	0.011	0.255	118	
CCCT Duct Firing (Wet "G" 1xl)	Utah	2015	72	40	9,021	3.8%	2.7%	\$502	\$634	\$0.36	\$0.00	0.0006	0.011	0.255	118	
CCCT Advanced (Wet)	Utah	2018	400	40	6,651	3.8%	2.7%	\$1,308	\$1,653	\$4.56	\$6.75	0.0006	0.011	0.255	118	
CCCT Advanced Duct Firing (Wet)	Utah	2018	75	40	9,021	3.8%	2.7%	\$642	\$811	\$0.36	\$0.00	0.0006	0.011	0.255	118	
Other - Renewables																
Wyoming Wind (35% CF)	Wyoming	2012	100	25	n/a	n/a	n/a	\$2,015	\$2,686	\$0.00	\$31.43	0.000	0.000	0.000	0	
Utah Wind (30% CF)	Utah	2012	100	25	n/a	n/a	n/a	\$2,015	\$2,686	\$0.00	\$31.43	0.000	0.000	0.000	0	
Oregon / Washington Wind (35% CF)	Ore/Wash	2012	100	25	n/a	n/a	n/a	\$2,145	\$2,860	\$0.00	\$31.43	0.000	0.000	0.000	0	
East Side Geothermal	Utah	2015	35	40	n/a	5.0%	5.0%	\$4,063	\$5,132	\$5.94	\$110.85	0.000	0.000	0.000	0	
Battery Storage	All	2015	5	30	11,000	1.9%	5.0%	\$1,924	\$2,431	\$10.00	\$1.00	0.100	0.400	3.000	205	
Pumped Storage	Nevada	2020	250	50	12,500	5.0%	5.0%	\$1,636	\$2,067	\$4.30	\$4.30	0.100	0.400	3.000	205	
Compressed Air Energy Storage (CAES)	Wyoming	2015	350	30	11,980	3.8%	2.7%	\$1,368	\$1,728	\$5.50	\$3.80	0.001	0.011	0.255	118	
Nuclear	Utah	2025	1,600	40	10,710	7.3%	7.7%	\$5,041	\$6,368	\$1.63	\$146.70	0.000	0.000	0.000	0	
Solar (PV) - 19% CF	Utah	2012	5	25	n/a	n/a	n/a	\$3,982	\$5,030	\$0.00	\$59.50	0.000	0.000	0.000	0	
Solar Concentrating (natural gas backup) - 25% solar	Utah	2014	250	30	n/a	n/a	n/a	\$3,831	\$4,839	\$0.00	\$120.99	0.000	0.000	0.000	0	
Solar Concentrating (thermal storage) - 30% solar	Utah	2014	250	30	n/a	n/a	n/a	\$4,293	\$5,423	\$0.00	\$135.56	0.000	0.000	0.000	0	

WEST SIDE RESOURCE OPTIONS																
West Side Options (1500 feet)																
Natural Gas																
Utility Cogeneration	Northwest	2014	0	20	4,974	10.00%	8.00%	\$4,044	\$5,109	\$21.17	\$1.69	0.00000	0.00000	0.255	118	
SCCT Aero	Northwest	2014	130	30	9,773	3.85%	2.60%	\$952	\$1,202	\$5.12	\$9.04	0.00060	0.01102	0.255	118	
Intercooled Aero SCCT	Northwest	2014	307	30	9,379	3.85%	2.90%	\$1,117	\$1,412	\$3.57	\$6.37	0.00060	0.01102	0.255	118	
Internal Combustion Engines	Northwest	2014	331	30	8,806	5.00%	1.00%	\$1,094	\$1,383	\$5.50	\$6.49	0.00060	0.01652	0.255	118	
SCCT Frame (2 Frame "F")	Northwest	2014	405	35	10,446	3.85%	2.70%	\$943	\$1,191	\$6.51	\$4.92	0.00060	0.04950	0.255	118	
CCCT (Wet "F" 1x1)	Northwest	2015	289	40	7,302	3.85%	2.70%	\$1,139	\$1,439	\$2.67	\$11.86	0.00060	0.01100	0.255	118	
CCCT Duct Firing (Wet "F" 1x1)	Northwest	2015	46	40	8,869	3.85%	2.70%	\$465	\$587	\$0.36	\$0.00	0.00060	0.01100	0.255	118	
CCCT (Wet "F" 2x1)	Northwest	2015	578	40	6,911	3.85%	2.70%	\$1,029	\$1,300	\$2.67	\$7.21	0.00060	0.01100	0.255	118	
CCCT Duct Firing (Wet "F" 2x1)	Northwest	2015	92	40	9,329	3.85%	2.70%	\$519	\$656	\$0.36	\$0.00	0.00060	0.01100	0.255	118	
CCCT (Wet "G" 1x1)	Northwest	2015	367	40	6,777	3.85%	2.70%	\$1,077	\$1,361	\$4.14	\$6.13	0.00060	0.01100	0.255	118	
CCCT Duct Firing (Wet "G" 1x1)	Northwest	2015	80	40	9,021	3.85%	2.70%	\$456	\$576	\$0.33	\$0.00	0.00060	0.01100	0.255	118	
CCCT Advanced (Wet)	Northwest	2018	440	40	6,651	3.85%	2.70%	\$1,189	\$1,503	\$4.14	\$6.13	0.00060	0.01100	0.255	118	
CCCT Advanced Duct Firing (Wet)	Northwest	2018	83	40	9,021	3.85%	2.70%	\$584	\$737	\$0.33	\$0.00	0.00060	0.01100	0.255	118	
Other - Renewables																
Oregon / Washington Wind (35% CF)	Northwest	2012	50	25	n/a	n/a	5.00%	\$2,145	\$2,860	\$0.00	\$31.43	0.00000	0.000	0.0	0	
West Side Geothermal	Northwest	2015	35	40	n/a	5.00%	5.00%	\$4,063	\$5,132	\$5.94	\$110.85	0.00000	0.000	0.0	0	
Solar (PV) - 19% CF	Northwest	2012	5	25	n/a	n/a	n/a	\$3,982	\$5,030	0	\$9,501,118	0	0	0	0	
West Side Options at ISO Conditions (Sea Level)																
Natural Gas																
Utility Cogeneration	Northwest	2014	0	20	4,974	10.00%	8.00%	\$3,868	\$4,886	\$21.17	\$1.69	0.00000	0.00000	0.255	118	
SCCT Aero	Northwest	2014	135	30	9,773	2.00%	2.60%	\$910	\$1,150	\$4.89	\$8.65	0.00060	0.0110	0.255	118	
Intercooled Aero SCCT	Northwest	2014	321	30	9,379	3.85%	2.90%	\$1,069	\$1,350	\$3.42	\$6.10	0.00060	0.0110	0.255	118	
Internal Combustion Engines	Northwest	2014	346	30	8,806	3.85%	1.00%	\$1,047	\$1,322	\$5.50	\$6.49	0.00060	0.0165	0.255	118	
SCCT Frame (2 Frame "F")	Northwest	2014	423	35	10,446	5.00%	2.70%	\$902	\$1,139	\$6.23	\$4.70	0.00060	0.0495	0.255	118	
CCCT (Wet "F" 1x1)	Northwest	2015	302	40	7,302	3.85%	2.70%	\$1,090	\$1,377	\$2.56	\$11.34	0.00060	0.0110	0.255	118	
CCCT Duct Firing (Wet "F" 1x1)	Northwest	2015	48	40	8,869	3.85%	2.70%	\$445	\$562	\$0.34	\$0.00	0.00060	0.0110	0.255	118	
CCCT (Wet "F" 2x1)	Northwest	2015	604	40	6,911	3.85%	2.70%	\$984	\$1,243	\$2.56	\$6.89	0.00060	0.0110	0.255	118	
CCCT Duct Firing (Wet "F" 2x1)	Northwest	2015	96	40	9,329	3.85%	2.70%	\$497	\$627	\$0.34	\$0.00	0.00060	0.0110	0.255	118	
CCCT (Wet "G" 1x1)	Northwest	2015	383	40	6,777	3.85%	2.70%	\$1,030	\$1,302	\$3.96	\$5.87	0.00060	0.0110	0.255	118	
CCCT Duct Firing (Wet "G" 1x1)	Northwest	2015	83	40	9,021	3.85%	2.70%	\$436	\$551	\$0.31	\$0.00	0.00060	0.0110	0.255	118	
CCCT Advanced (Wet)	Northwest	2018	460	40	6,651	3.85%	2.70%	\$1,138	\$1,437	\$3.96	\$5.87	0.00060	0.0110	0.255	118	
CCCT Advanced Duct Firing (Wet)	Northwest	2018	86	40	9,021	3.85%	2.70%	\$558	\$705	\$0.31	\$0.00	0.00060	0.0110	0.255	119	
Other - Renewables																
Oregon / Washington Wind (35% CF)	Northwest	2012	100	25	n/a	n/a	5.00%	\$2,145	\$2,860	\$0.00	\$31.43	0.00000	0.00000	0.000	0	
Biomass	Northwest	2015	50	30	10,979	4.60%	4.00%	\$3,334	\$4,211	\$0.96	\$38.80	0.1000	0.3500	0.400	205	
Nuclear	Northwest	2025	1,600	40	10,710	7.30%	7.70%	\$5,041	\$6,368	\$1.63	\$146.70	0.0000	0.0000	0.000	0	
Hydrokinetic (Wave) - 21% CF	Northwest	2020	100	20	n/a	n/a	n/a	\$5,539	\$6,997	\$0.00	\$174.92	0.0000	0.0000	0.000	0	
Solar (PV) - 19% CF	Northwest	2012	5	25	n/a	n/a	n/a	\$3,982	\$5,030	\$0.00	\$56.91	0.00060	0.0110	0.255	118	