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Northwest Power and Conservation Council

June 4, 2019

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MEMORANDUM

TO: Council Members

FROM: Gillian Charles

SUBJECT: Remarks from Jan Lee, former Executive Director of Northwest Hydroelectric Association and introduction of new Executive Director Brenna Vaughn

BACKGROUND:

Presenter: Jan Lee, former Executive Director, Northwest Hydroelectric Association

Summary: Over the past few years, the Council has been inviting thought leaders from around the region to share their expertise and insight on the challenges and key issues facing the electric utility industry. At the June Council Meeting, the Council will hear from Jan Lee, the former Executive Director of the Northwest Hydroelectric Association (NWhA).

Ms. Lee served as the original Executive Director of the NWhA from its formation in 1983 through her retirement in February 2019. She will be speaking about her experience in the industry over the past 35 years, sharing her perspective on the current state of hydropower in the region and her thoughts on the future. Ms. Lee will also introduce the new Executive Director of the NWhA, Brenna Vaughn.

Relevance: As the energy industry and the region embrace clean energy policy and carbon reduction goals, hydropower – the cornerstone of the Pacific Northwest's power system – is sure to play a pivotal part in the new power grid of the 21st century. See the Council's recent [report](#) on the future role of hydropower in the new era of clean energy.

Background: The NWHHA provides a regional voice for the hydropower industry, representing the needs of its membership since 1981. NWHHA is dedicated to the promotion of the region's waterpower as a clean, efficient energy while protecting the fisheries and environmental quality which characterize our Northwest region. See more info at the [NWHHA website](#).

Jan Lee was Executive Director of the NWHHA from 1983 through February 2019. She was an incorporator and an original board member of the association in 1981 while working as an irrigation district manager in Bend, licensing two hydropower projects. She currently is the Executive Director of the Oregon Association of Conservation Districts under a year's contract to update the organization and hire long term management. She is a city of Sandy council member, a member of the Clackamas County and Oregon Trail School District budget committees, a long-term board member of the Clackamas Conservation District and a former member of the Oregon Legislature.

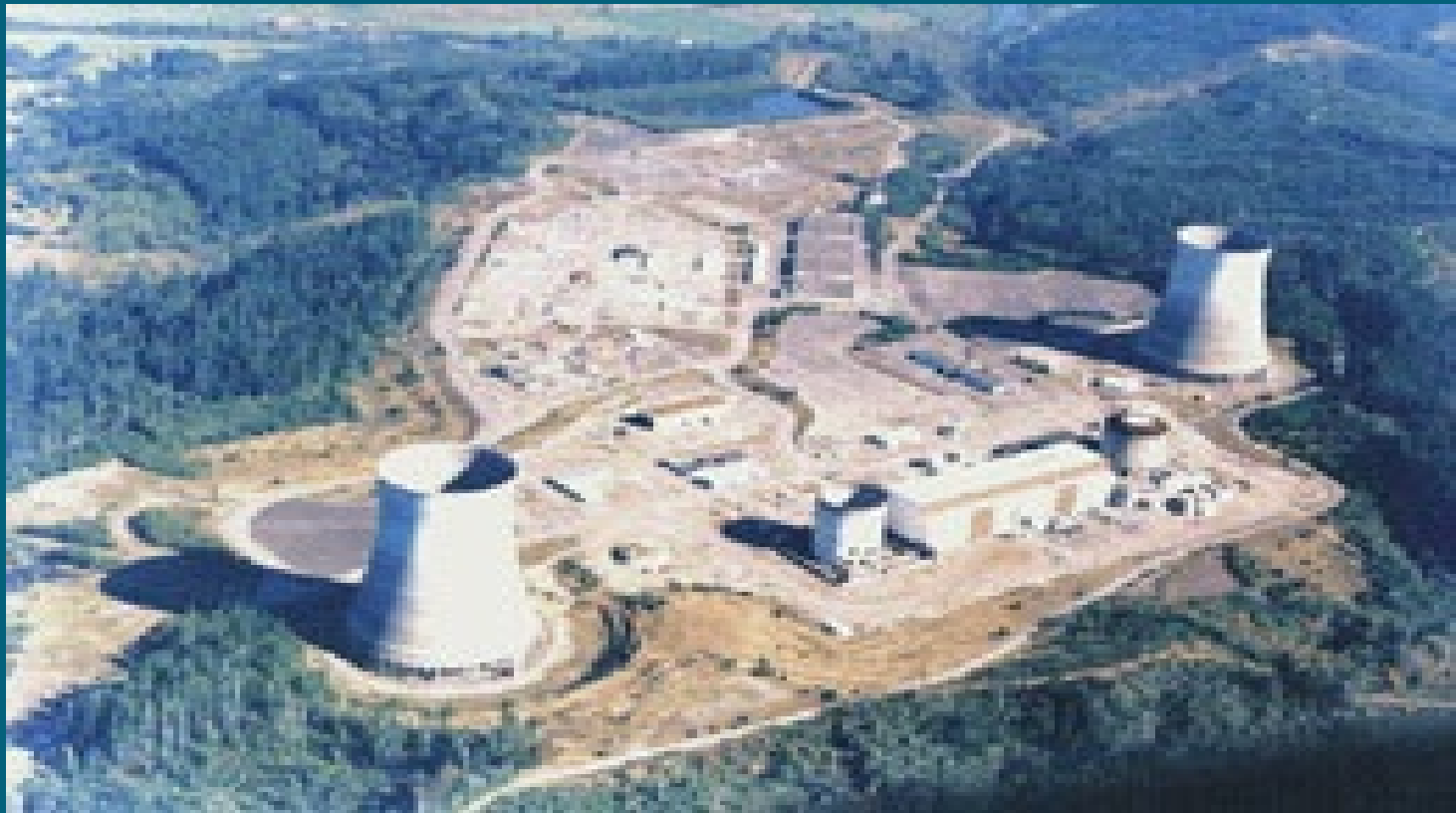
Brenna Vaughn is the Executive Director of the NWHHA. She has served in the hydropower industry for nearly 10 years and previously focused on the research and development side of hydropower as the Managing Director of the Hydropower Foundation. She has a keen focus on hydropower's role in the growing interdependence of renewable energy while protecting our environment. Brenna has held several leadership positions in various nonprofits and is often found digging in the garden, playing with her three small children and exploring the world.

NORTHWEST HYDROELECTRIC ASSOCIATION

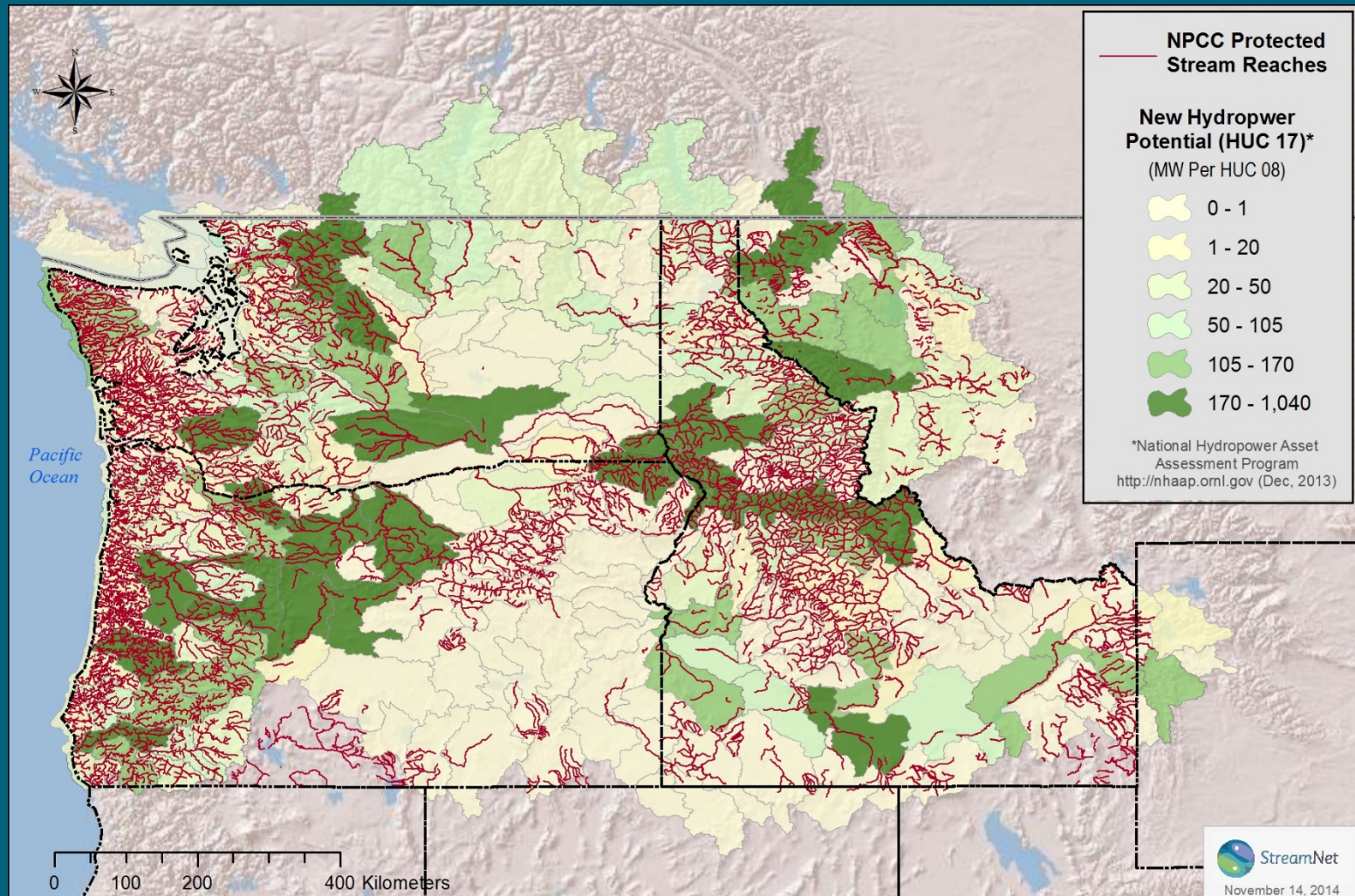
- Jan Lee
Executive Director 1983-2018
- Brenna Vaughn
Executive Director 2018-Present

Northwest Hydroelectric Association
503-502-7262
www.nwhydro.org

WPPSS AND THE HYDRO GOLD RUSH

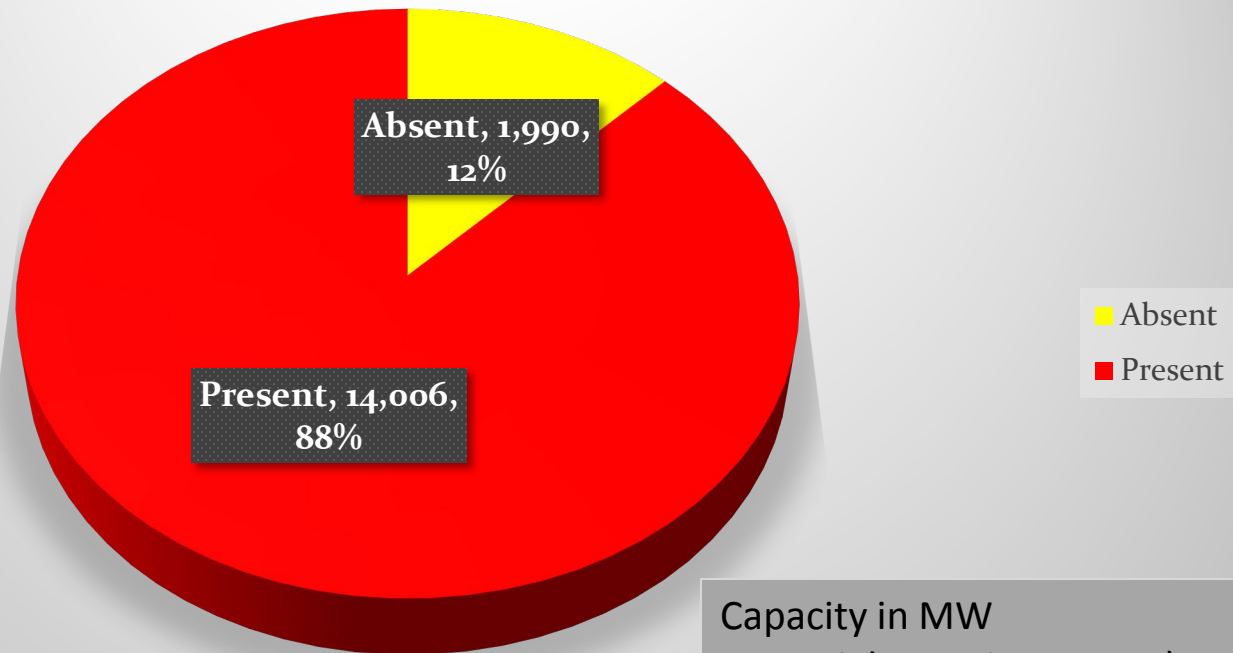


Protected Areas stream reaches overlaid on map layer of new hydropower potential (MW) existing in Pacific Northwest (Hydrologic Region 17) at the HUC08 level (4th level HUC) based on study conducted by the National Hydropower Asset Assessment Program (Kao, S. et. al, 2014), US DOE.



Potential Capacity Associated with NPCC Protected Areas in Region 17

NPCC PROTECTED AREAS



Capacity in MW
Potential capacity >1 MW)

Conduit Projects



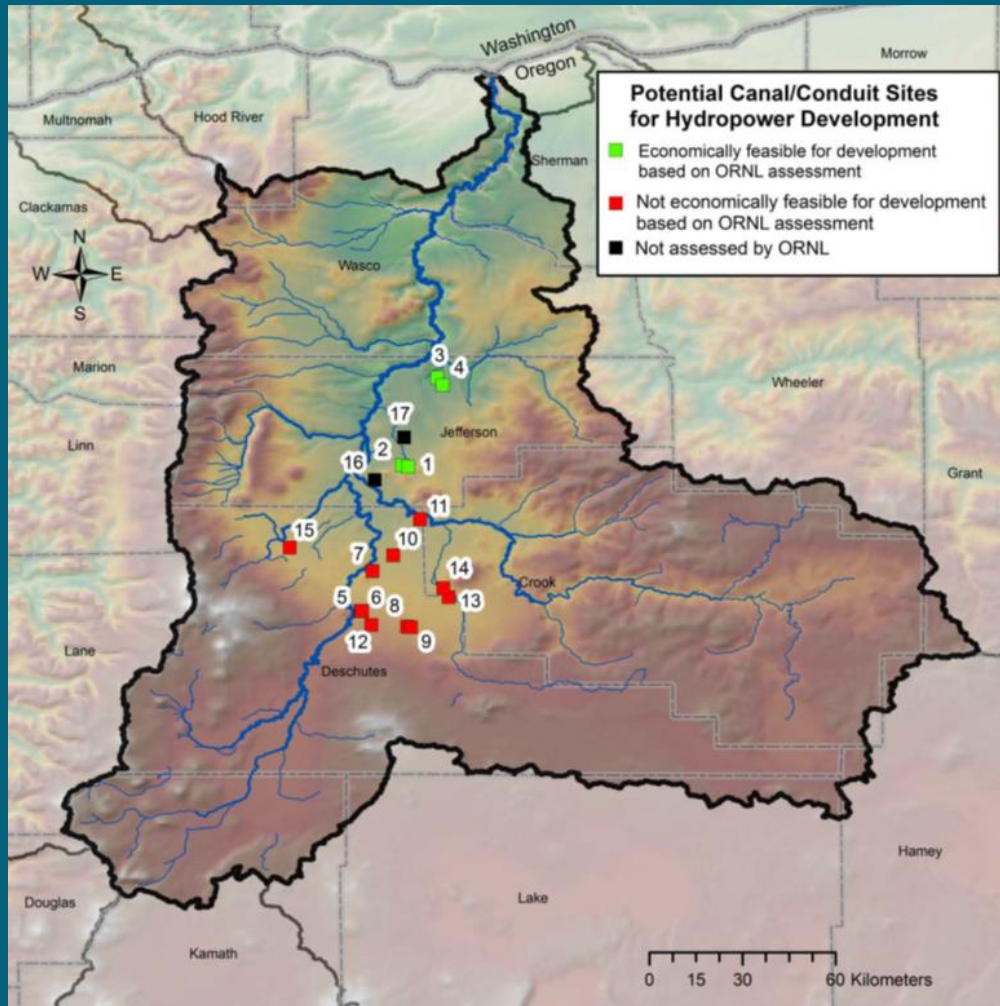
Photos of Swalley Irrigation District
Bend, OR

Kinetic Projects



**Photos of Kinetic Projects, courtesy of
Instream Energy and Hydrovolts**

Canal and Conduit Sites, Central OR



Map of Potential Canal and Conduit Sites in the Deschutes and Crooked River Basins, Central Oregon

Summary of Findings

2014 Analysis by NWEA

Pacific NW Potential for 2015-2035

- 3,200 MW Capacity
- 23,000,000 MWhs

Potential Hydropower 2015-2035

Non-Powered Dams								Capacity
	FERC No.	Study #	Date Opr.	Developer	State	Project Information	River	MW
Identified in Survey and FERC Applications								
Tongue River Dam	P-14602		N/A	State of Montana, DNR	MT	Add capacity	Ruby	2.200
Gibson Dam	P-12478		2016	Tollhouse Energy/Greenfield I.D.	MT	New project at existing dam	Sun	15.000
Mason Dam	P-12686		N/A	Baker County	OR	New project at existing dam	Powder	3.400
Pinto Dam	P-14380		2019	GCHPA*	WA	New project at existing dam	Columbia	2.929
Warmsprings Dam Hydro	P-13570		N/A	Warmsprings Irrigation District	OR	New project at existing dam	Malheur	2.700
Studies A-1, A-2, A-3 & FERC Applications								
McKay Dam	P-14205	A-3	N/A	McKay Dam Hydropower	OR	New project at existing dam	Umatilla	3.000
Howard A. Hanson Dam	P-14594	A-1, 2	N/A	Howard A. Hanson Power, LLC	WA	New project at existing dam	Green	5.000
Scooteney Wasteway	P-14352	A-3	2019	GCHPA	WA	New project at existing dam	Columbia	1.100
Easton Diversion Dam	P-13850	A-3	N/A	Qualified Hydro 15 LLC	WA	New project at existing dam	Yakima	1.200
Blue River Dam	P-14381	A-1	N/A	Qualified Hydro 15 LLC	OR	New project at existing dam	Blue	20.630
NON-POWERED DAMS POTENTIAL							10 Projects:	57.159
Conduit Exemptions & Hydrokinetic Projects								
Studies B-1 and B-2		B-2	N/A	Various irrigation districts	OR	4 Conduit projects	Deschutes	5.317
Study B-3		B-3	N/A	Various irrigation districts	OR	2 Conduit projects	Deschutes	1.579
Stiudy B-5		B-5	N/A	Various canal sites	NW	111 Conduit projects	NW Rivers	34.000
Survey Responses		SR	N/A	Various canal/pipeline sites	NW	15 Conduit projects	NW Rivers	14.627
Hydrokinetic Demo Project		SR	2015	Hydrokinetic unit in canal	WA	1 Hydrokinetic conduit project	Yakima	0.01
FERC apps. Issued		FERC	N/A	Approved projects/canals	NW	7 Conduit projects	NW Rivers	2.099
FERC approved NOIs		FERC	N/A	Approved projects/canals	NW	3 Conduit projects	NW Rivers	6.065
CONDUIT EXEMPTIONS AND HYDROKINETIC PROJECTS							143 Projects:	63.697
Pumped Storage Projects								
John Day Pool		C-2	N/A	Klickitat PUD	WA	Pumped storage	Columbia	1,000.000
Swan Lake		C-2	N/A	EDF Renewable Energy	OR	Pumped storage	Klamath	600.000
Banks Lake		SR	2019	*Grand Coulee Hydroelectric Power Agency (GCHPA)	WA	Pumped storage	Columbia	1,040.000
PUMPED STORAGE PROJECTS								2,640.000

Potential Hydropower 2015-2035

General Assessments								Capacity	
	FERC No.	Study #	Date Opr.	Developer	State	Project Information	River	MW	
Identified in Survey and FERC Applications									
Various canal or small reservoir		E-3	N/A	Various irrigation districts	OR	30 Conduit exemptions	Oregon Rivers	<div></div> 20.630	
Oak Springs		SR	N/A	Oregon Dept. Fish/Wildlife	OR	Exemption at existing diversion	Deschutes	0.085	
Unidentified Location		SR	N/A	Portland General Electric	OR	New traditional project	Clackamas	<div></div> 2.800	
Identified in FERC Applications only									
Go with the Flow	P-14538	FERC	N/A	Go with the Flow Hydropower	OR	Traditional hydro exemption	Umatilla	<div></div> 1.200	
Weiser-Galloway	P14608	FERC	N/A	Idaho Water Resources Board	ID	Traditional hydro project	Weiser	<div></div> 60.000	
Two Girls Creek	P-14626	FERC	N/A	Green Volt Hydro Inc.	OR	Traditional hydro	Two Girls Creek	<div></div> 5.000	
GENERAL ASSESSMENTS							35 Projects:	89.7	
Upgrades									
These projects were identified in the survey:									
Blind report as requested		SR	2020	Unidentified utility	WA	Add equipment	NW	<div></div> 7.000	
Box Canyon Dam	P-2042	SR	2017	Pend Oreille PUD	WA	Add equipment	Pend Oreille	<div></div> 30.000	
North Wasco PUD Plant	P-7076	OR	2018	North Wasco PUD	OR	Add capacity at Dalles Dam	Columbia	<div></div> 5.000	
Shoshone Falls	P-2778	ID	2022	Idaho Power Company	ID	Add capacity	Snake	<div></div> 52.000	
Blind report as requested		SR	2015	Unidentified utility	WA	Add energy	NW	0.000	
Grand Coulee Dam		SR	2018+	Bureau of Reclamation	WA	Add units 19-21	Columbia	<div></div> 200.000	
Boundary Dam		SR	2015-2035	Seattle City Light	WA	Add equipment	Pend Oreille	<div></div> 40.000	
Packwood Lake Hydro		SR	2015	Energy Northwest	WA	Add energy	Cowlitz	0.000	
Black Canyon Dam		SR	2018	Bureau of Reclamation	ID	Add third unit	Payette	<div></div> 12.000	
Hungry Horse Dam		SR	2019+	Bureau of Reclamation	MT	Replace turbines/efficiency	Flathead	0.000	
Lower Baker		SR	N/A	Puget Sound Energy	WA	New powerhouse		<div></div> 30.000	
Little Falls		SR	2015-2018	Avista Corporation	WA	4 new units	Spokane	<div></div> 4.000	
Nine Mile		SR	2015	Avista Corporation	WA	Upgrade	Spokane	<div></div> 8.000	
Palisades Dam		SR	2016	Bureau of Reclamation	ID	Replace turbines +7.5 efficiency	Snake	0.000	
							14 Projects:	388.000	
TOTAL OF ALL PROJECTS OF EACH TECHNOLOGY:								3,238.56	

Future of Hydropower

- Non-powered dams
- Incremental Upgrades and Improvements
- Pumped storage/energy storage
- Conduit
- Tidal/Marine/Hydrokinetic

Non-Powered Dams

- 2014 Report Identified 10 sites for development of hydropower at the non-powered dams
- As of today, one has an active license now and three are in the permitting process
- In 2019 DOE Fiscal Year funding, there is a study proposed to look at US Army Corps Dam that could identify additional development
- USBR is currently piloting several projects to contract out development of hydropower projects at their dams

Incremental Development/Upgrades

DOE Published 2018 market report and trends last month

When looking at the Northwest, DOE indicated 5 capacity upgrades in the region totaling 636 MW of generation.

Since the 2014 report it is assumed that the 14 projects identified in the report that indicated capacity upgrades have either completed or are in progress of increasing capacity.

Pumped Storage Hydropower



Rocky Mountain Pumped Storage Project

Pumped Storage Hydropower

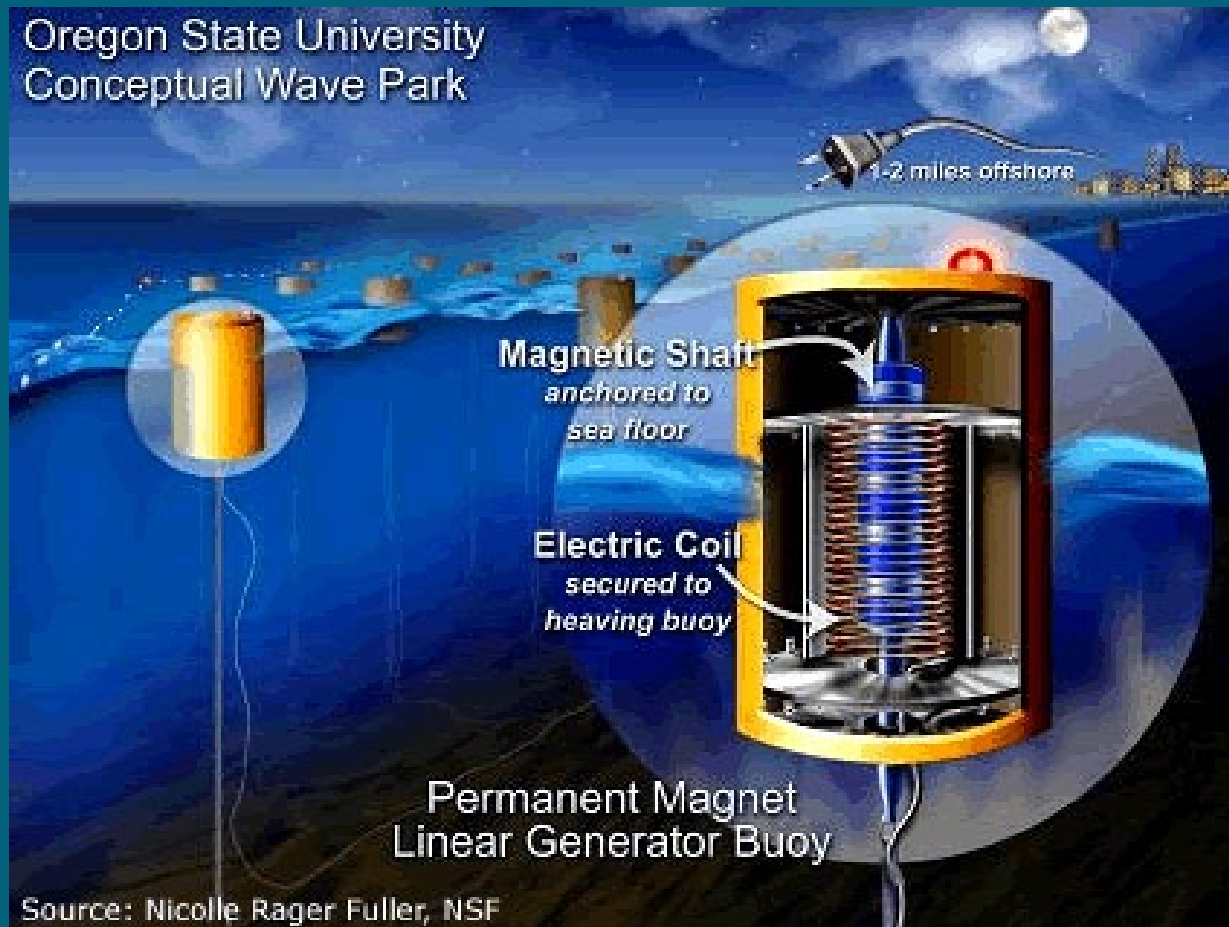
- 2014 report identified only three sites for development of pumped storage hydropower
 - In a recent FERC query, there are now seven active FERC permits in the region.
- ORNL is exploring modular pumped storage to augment the market between large pumped storage hydro and small battery storage.

Conduit

- DOE 2018 Market Report identified 71 conduit projects in development in the Northwest with a capacity of 21 MW

Tidal & Wave Energy

Oregon State University
Conceptual Wave Park



Source: Nicolle Rager Fuller, NSF

CONTACT INFORMATION

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