Northwest **Power** and **Conservation** Council

September 7, 2016

MEMORANDUM

TO: **Power Committee**

FROM: **Gillian Charles, Energy Analyst**

SUBJECT: **Generation Resources Development Update**

BACKGROUND:

Presenter: Gillian Charles

Summary: Staff will present an update on recent generating resource developments in the region, including a look at the existing system's resource mix, new projects that have come online in the past few years, and a look at the mix of projects in the development pipeline. In addition, staff will discuss the drivers for new development (such as renewable portfolio standards) and what utility integrated resource plans have identified as resource needs over the next five years.

Finally, staff will provide a brief overview of the Council's existing and proposed generating project database (commonly referred to as just "the project database"), which serves as a key source of data for many of the power division's analyses.

Relevance: The data in the project database serves as an important input to several of the Council's models, including the Regional Portfolio Model, GENESYS, and AURORA, and informs analyses such as renewable portfolio standards compliance, resource technology and development trends, and environmental regulation compliance. The project database is one of

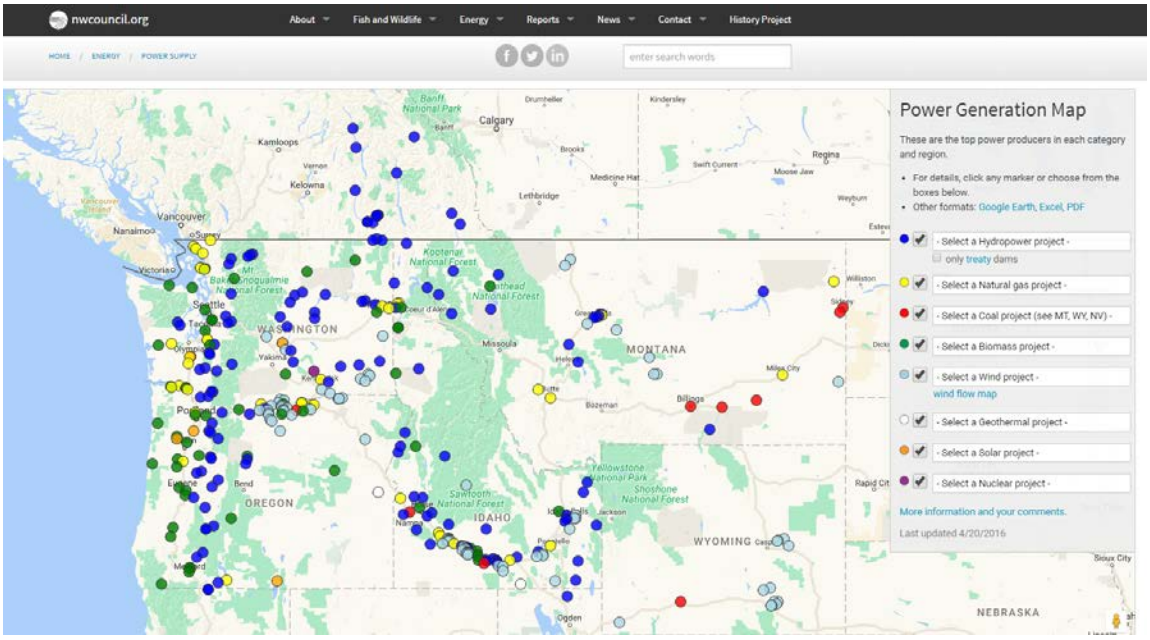
many building blocks that informs the analysis for the Council's power plans.

Workplan: Prepare for Eighth Plan/Generation Resources/Update generating resource datasets and tools (C.4.1)

Background: The Council's project database tracks existing and proposed generating projects in the Pacific Northwest. The data in the existing projects portion of the database serves as an important input to several of the Council's models and analyses, including the Regional Portfolio Model, GENESYS, and AURORA. Project data includes details on the project's nameplate capacity, resource technology, online date (and retirement date, if applicable), location, ownership, load, historical annual energy production, as well as planning assumptions such as the portion of the electricity output that goes to the region.

The new projects portion of the database captures and tracks projects in the region that are in various stages of planning and development. Included are projects that have been announced by a developer or utility, secured a power purchase agreement, established or initiated the process of obtaining a preliminary permit or site license, and projects that have broken ground and are under construction.

More Info: See the Power Supply page on the Council's website for the projects database (the latest version will be posted later this week) and infographics, including the power generation map (picture below) – an interactive map of all the existing projects in the region.



Generation Resources Development Update

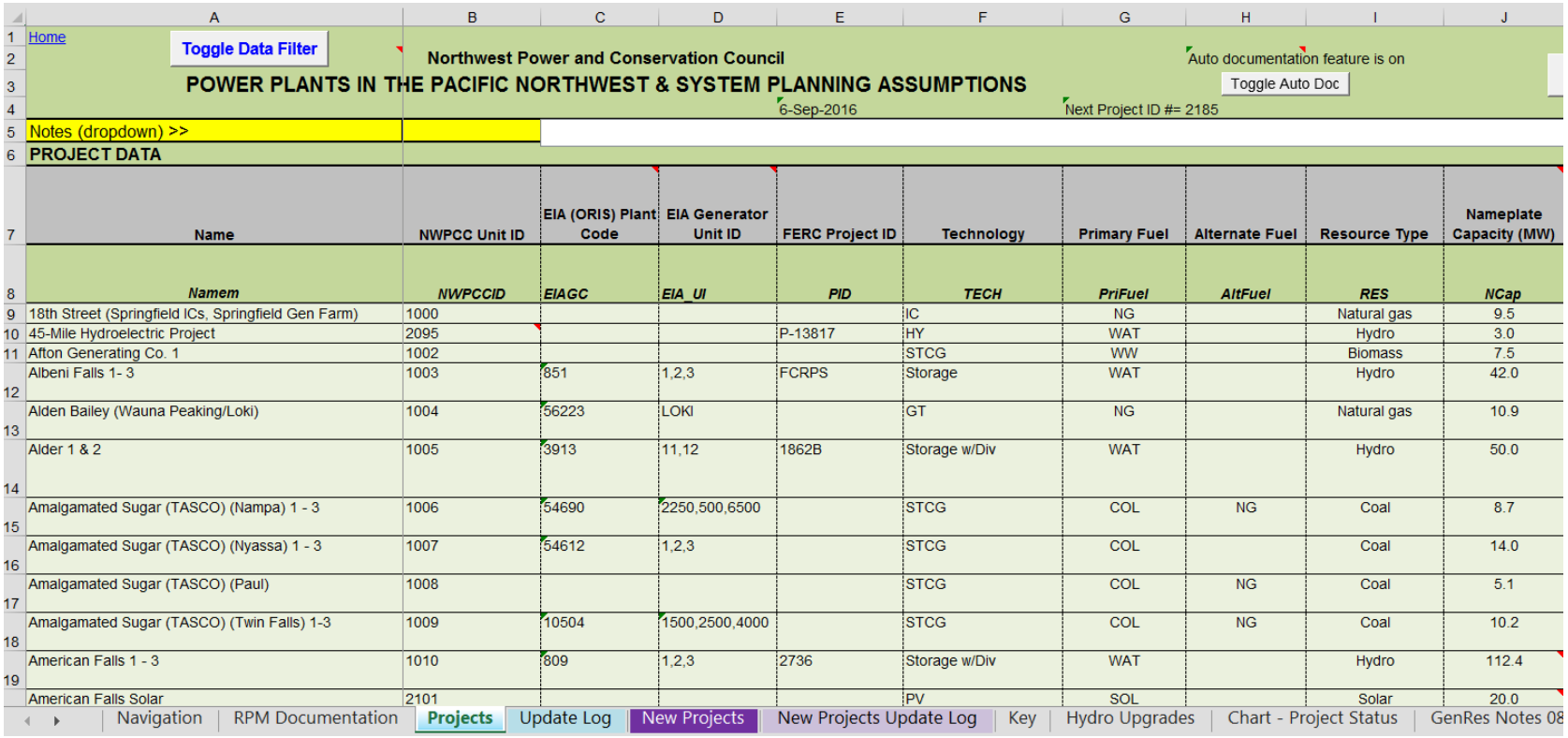
Gillian Charles

Power Committee

September 13, 2016

Overview

- The Council's project database
  - What is it? Why is it important?
- A look at the region's existing power system
  - Recent projects that have come online over the past few years
- A look at the proposed projects in the development pipeline
  - What is driving development?
- Next steps



Home

Toggle Data Filter

Northwest Power and Conservation Council

POWER PLANTS IN THE PACIFIC NORTHWEST & SYSTEM PLANNING ASSUMPTIONS

6-Sep-2016

Auto documentation feature is on

Toggle Auto Doc

Next Project ID #= 2185

Notes (dropdown) >>

PROJECT DATA

Name	NWPCC Unit ID	EIA (ORIS) Plant Code	EIA Generator Unit ID	FERC Project ID	Technology	Primary Fuel	Alternate Fuel	Resource Type	Nameplate Capacity (MW)
Namem	*NWPCCID*	*EIAGC*	*EIA_UI*	*PID*	*TECH*	*PriFuel*	*AltFuel*	*RES*	*NCap*
18th Street (Springfield ICs, Springfield Gen Farm)	1000				IC	NG		Natural gas	9.5
45-Mile Hydroelectric Project	2095			P-13817	HY	WAT		Hydro	3.0
Afton Generating Co. 1	1002				STCG	WW		Biomass	7.5
Albeni Falls 1- 3	1003	851	1,2,3	FCRPS	Storage	WAT		Hydro	42.0
Alden Bailey (Wauna Peaking/Loki)	1004	56223	LOKI		GT	NG		Natural gas	10.9
Alder 1 & 2	1005	3913	11,12	1862B	Storage w/Div	WAT		Hydro	50.0
Amalgamated Sugar (TASCO) (Nampa) 1 - 3	1006	54690	2250,500,6500		STCG	COL	NG	Coal	8.7
Amalgamated Sugar (TASCO) (Nyassa) 1 - 3	1007	54612	1,2,3		STCG	COL		Coal	14.0
Amalgamated Sugar (TASCO) (Paul)	1008				STCG	COL	NG	Coal	5.1
Amalgamated Sugar (TASCO) (Twin Falls) 1-3	1009	10504	1500,2500,4000		STCG	COL	NG	Coal	10.2
American Falls 1 - 3	1010	809	1,2,3	2736	Storage w/Div	WAT		Hydro	112.4
American Falls Solar	2101				PV	SOL		Solar	20.0

Navigation | RPM Documentation | Projects | Update Log | New Projects | New Projects Update Log | Key | Hydro Upgrades | Chart - Project Status | GenRes Notes 08

What is it? Why is it important?

THE PROJECT DATABASE

Project Database: The Basics

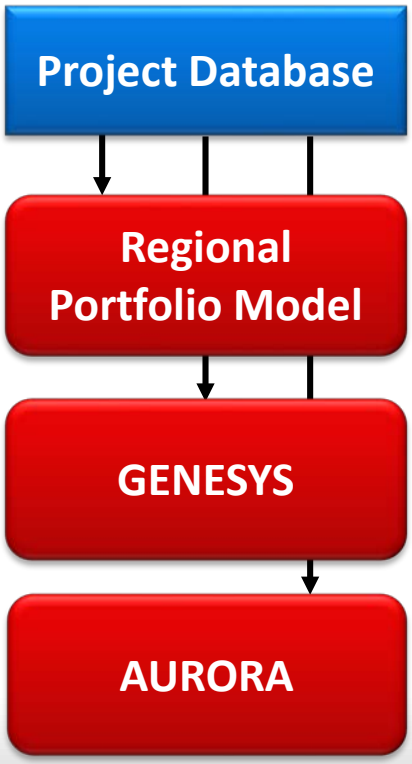
- Developed to track existing and new projects in the Pacific Northwest
- Evolved to provide inputs to various models and analyses
- Public data source – regularly posted to the Council's website, populates generation map
- Data comes from many sources:
  - EIA, FERC, news articles, press releases, integrated resource plans, RFPs, SNL, Clearing Up, Renewable Northwest
- **Important!** The project database is a living workbook and is a **work in progress**

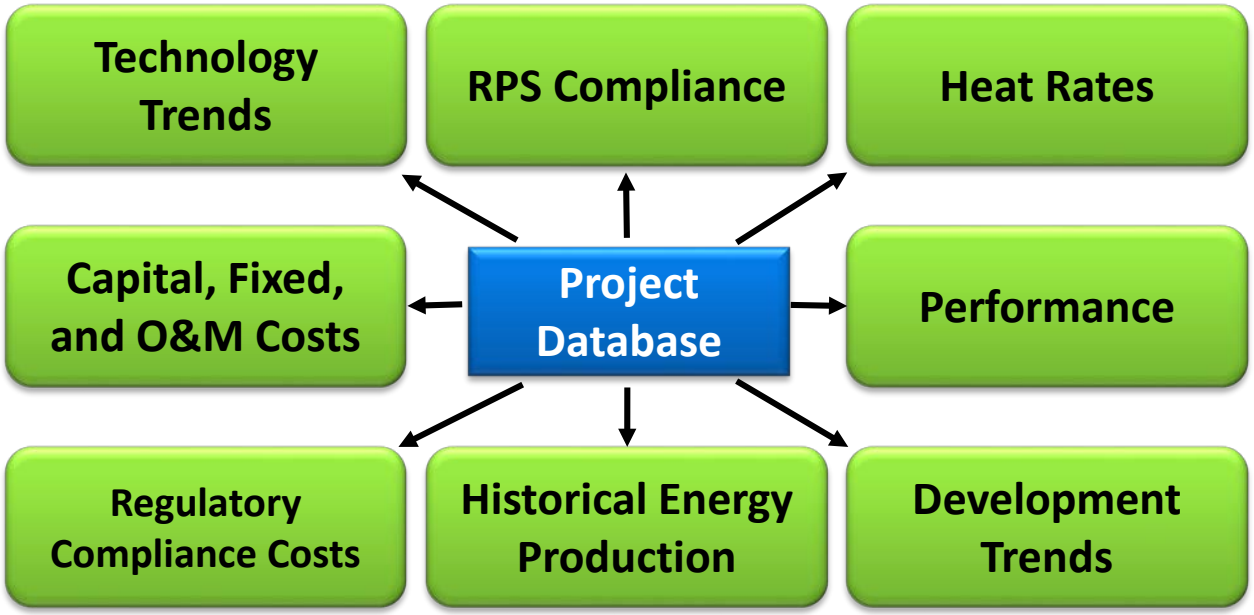
Project Database: The Guts

- Hundreds of existing, retired and under-development **utility-scale projects**
  - Data includes project specs, location, power purchase agreements, annual generation (Mwa)
  - For new projects – tracks phases of development
- Charts, pivot tables, filters

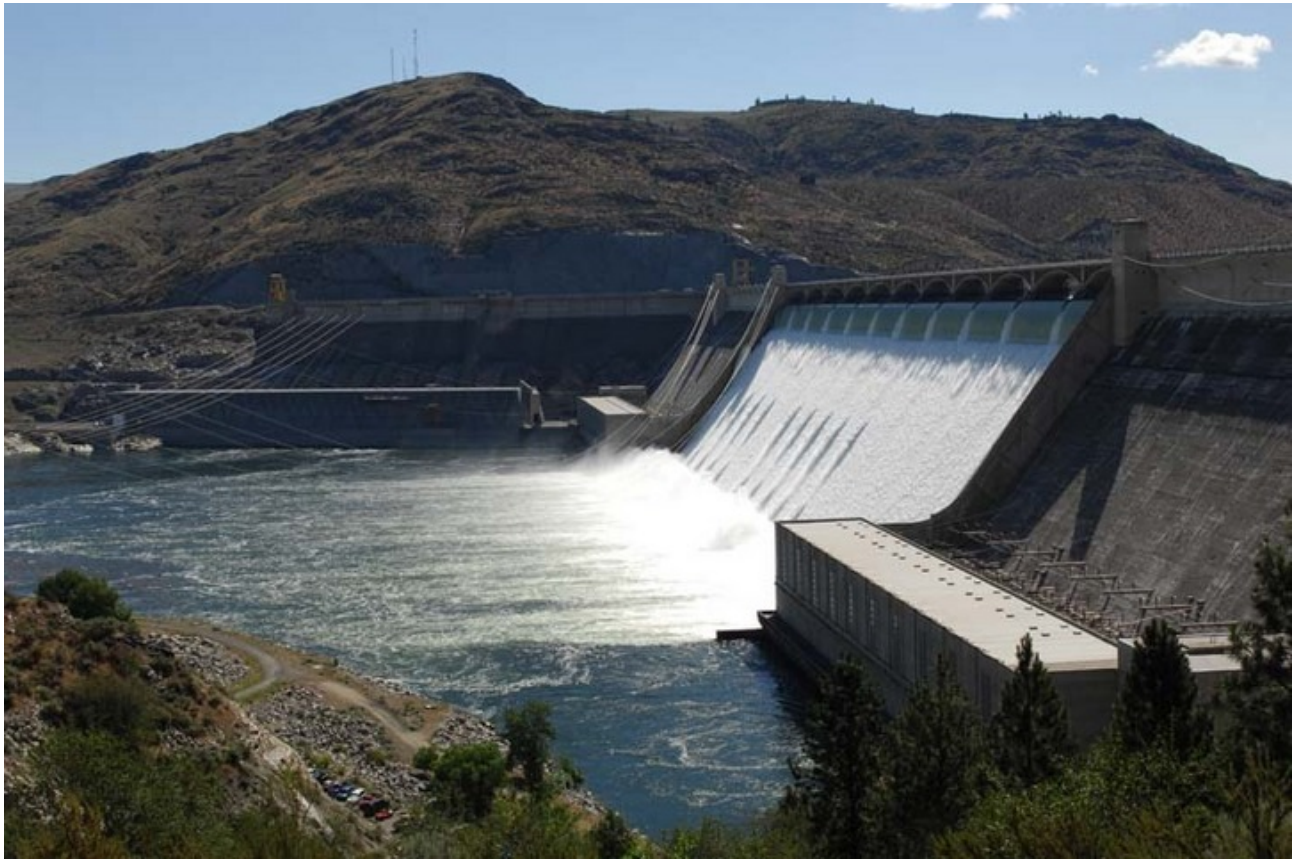
Why is it important?

- The Project Database informs many of the Council's models and analyses





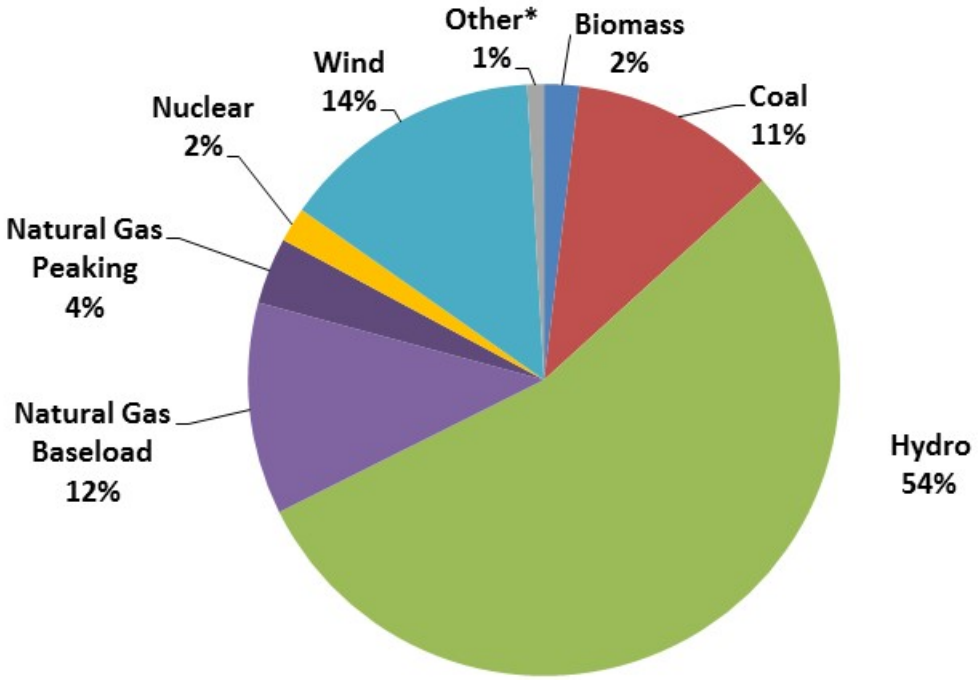
… and much more!



Information we can glean from the existing projects in the region

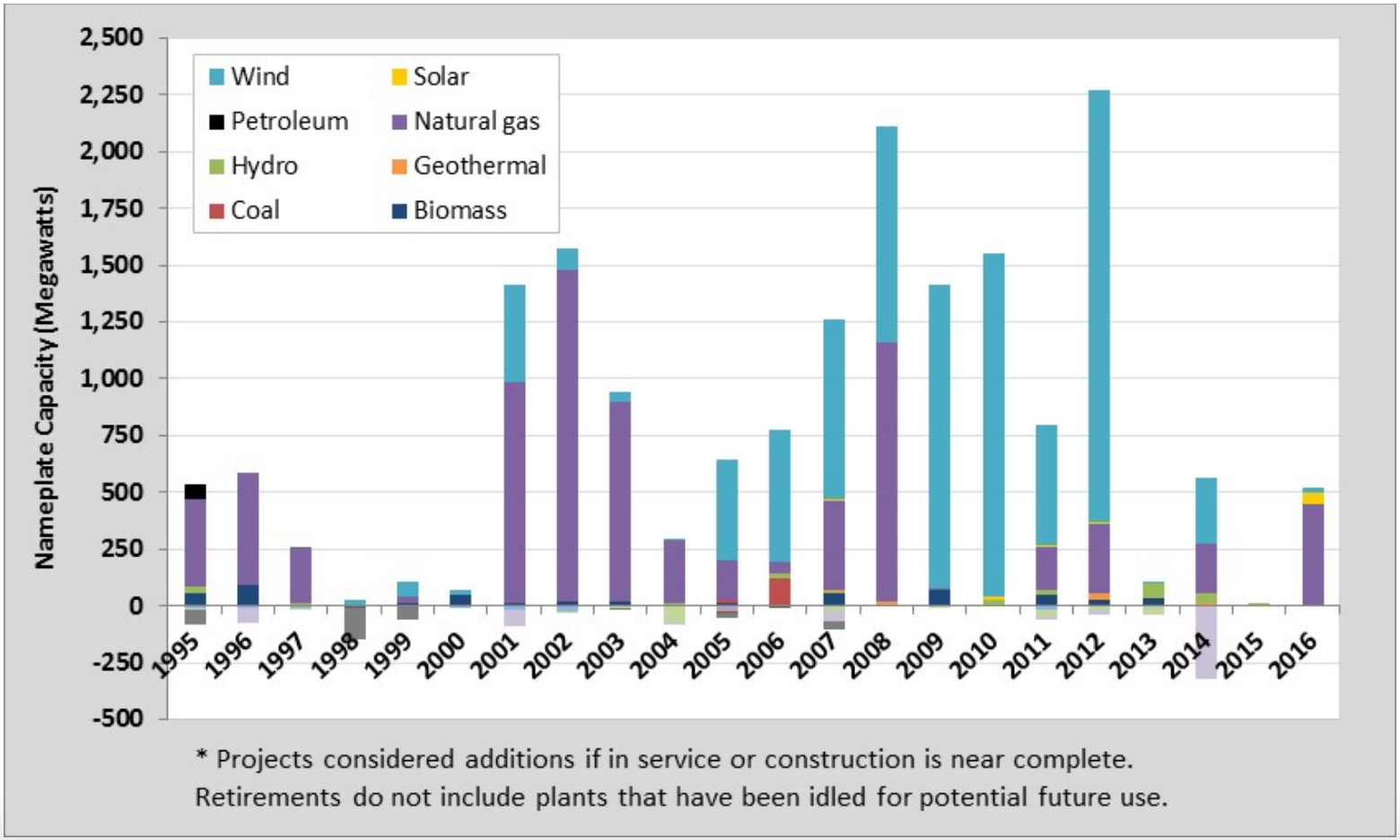
EXISTING SYSTEM

Composition of Existing Regional Power System

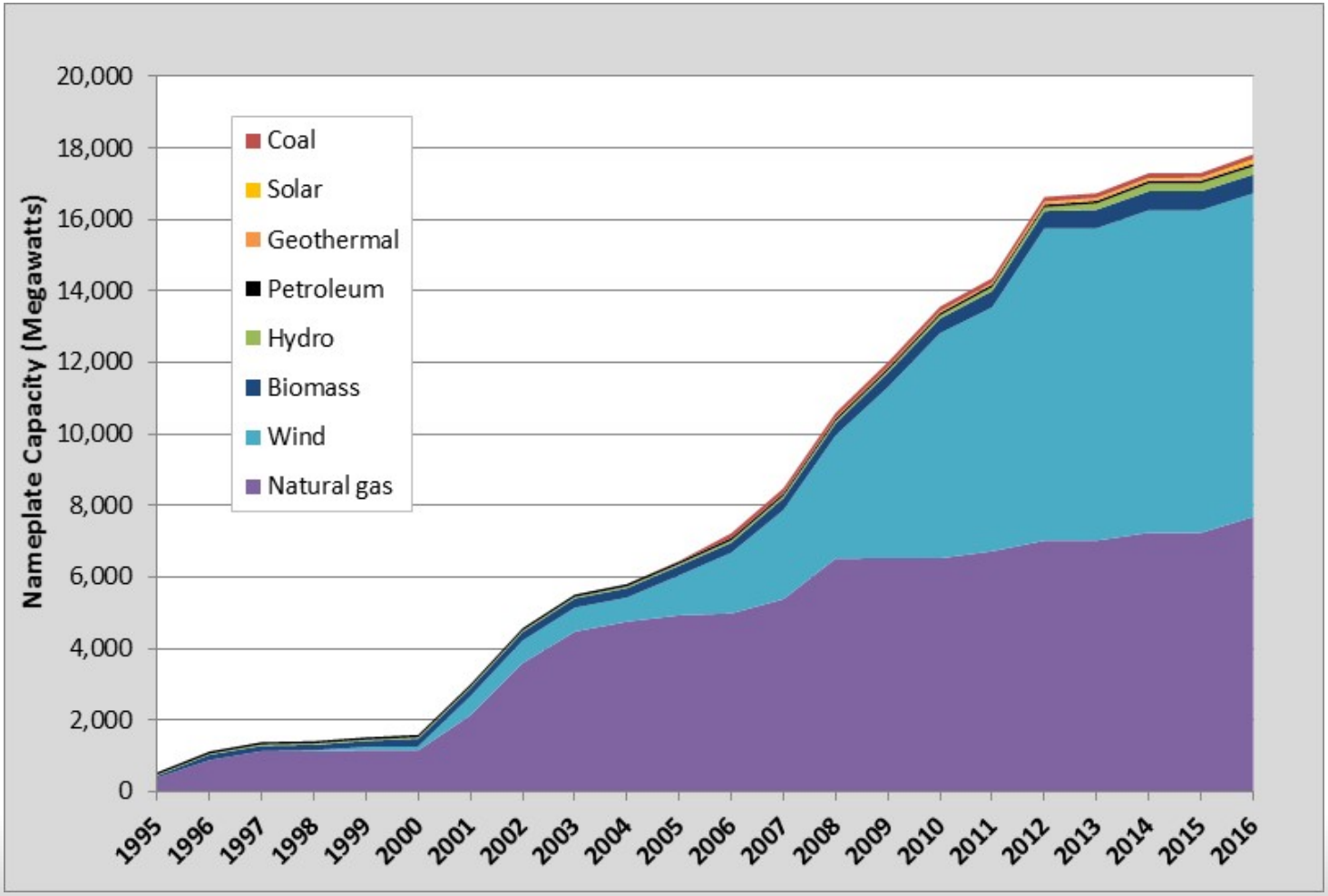


Located in Power Act Region or contracted to PNW loads; WECC; In-service, under construction, standby or idle
Includes PacifiCorp WY wind plants
*Other - Geothermal, Petroleum, Solar

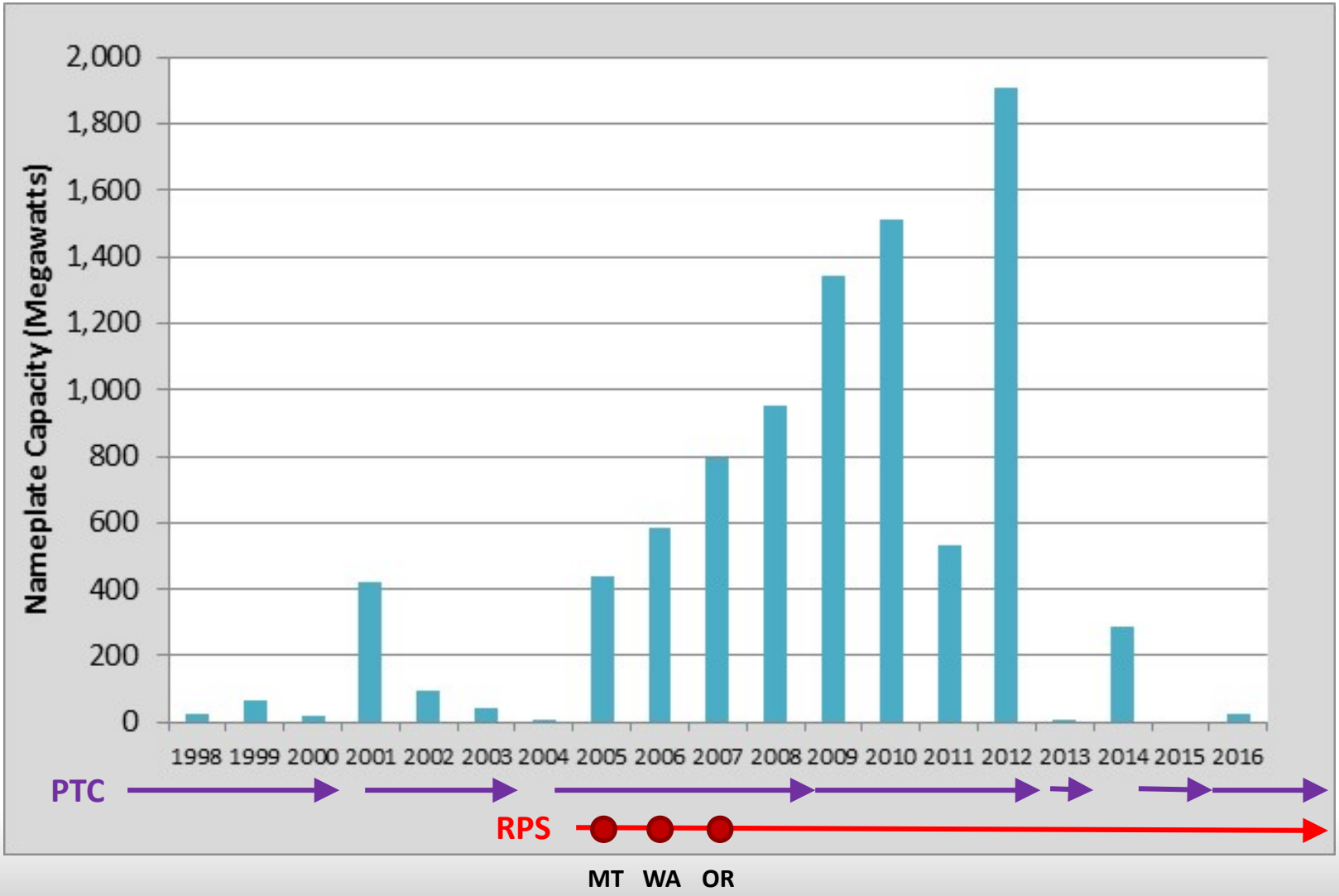
PNW Additions and Retirements over the Past Two Decades (MW)



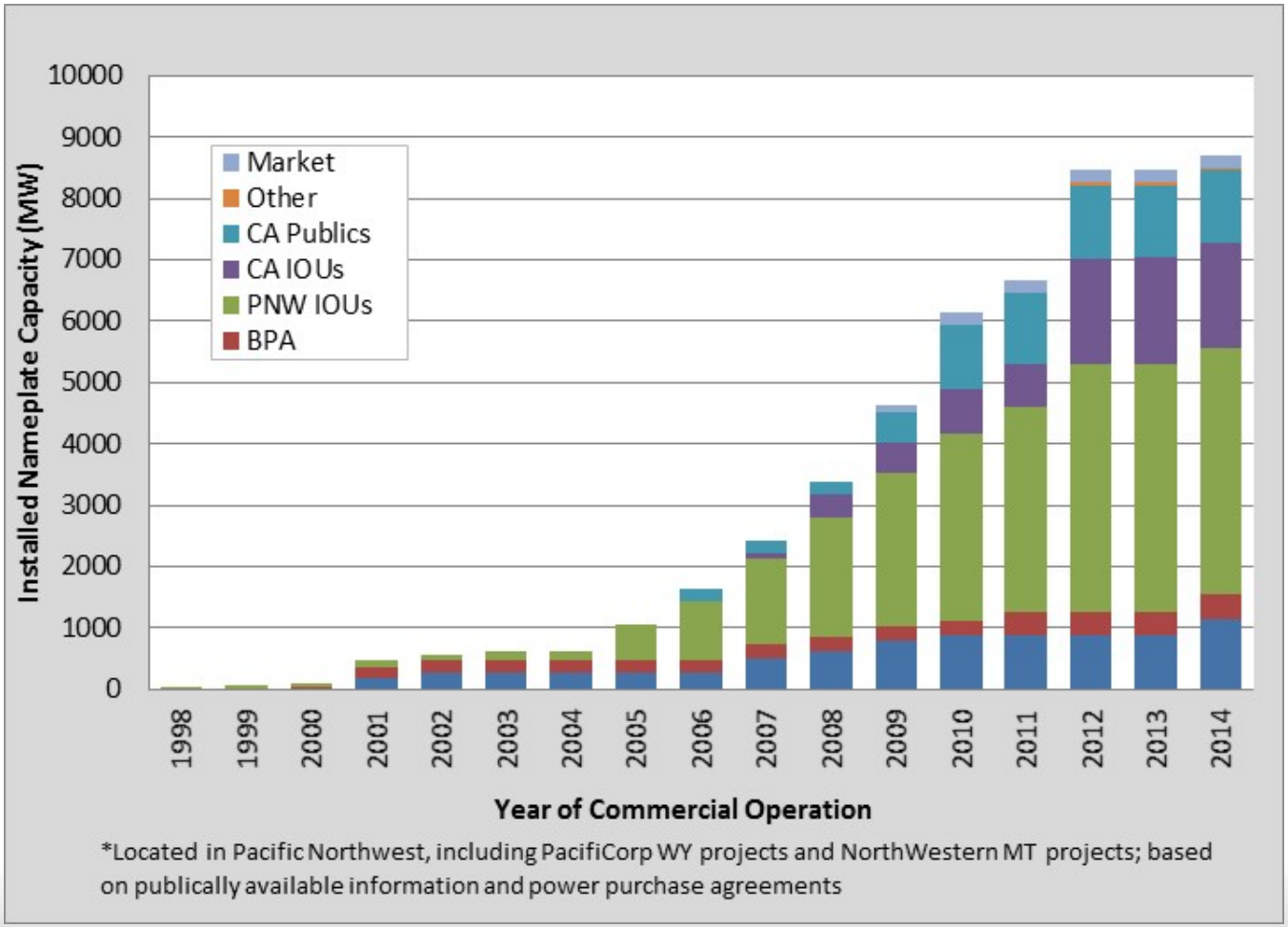
Cumulative Capacity Additions over the Past Two Decades (MW)



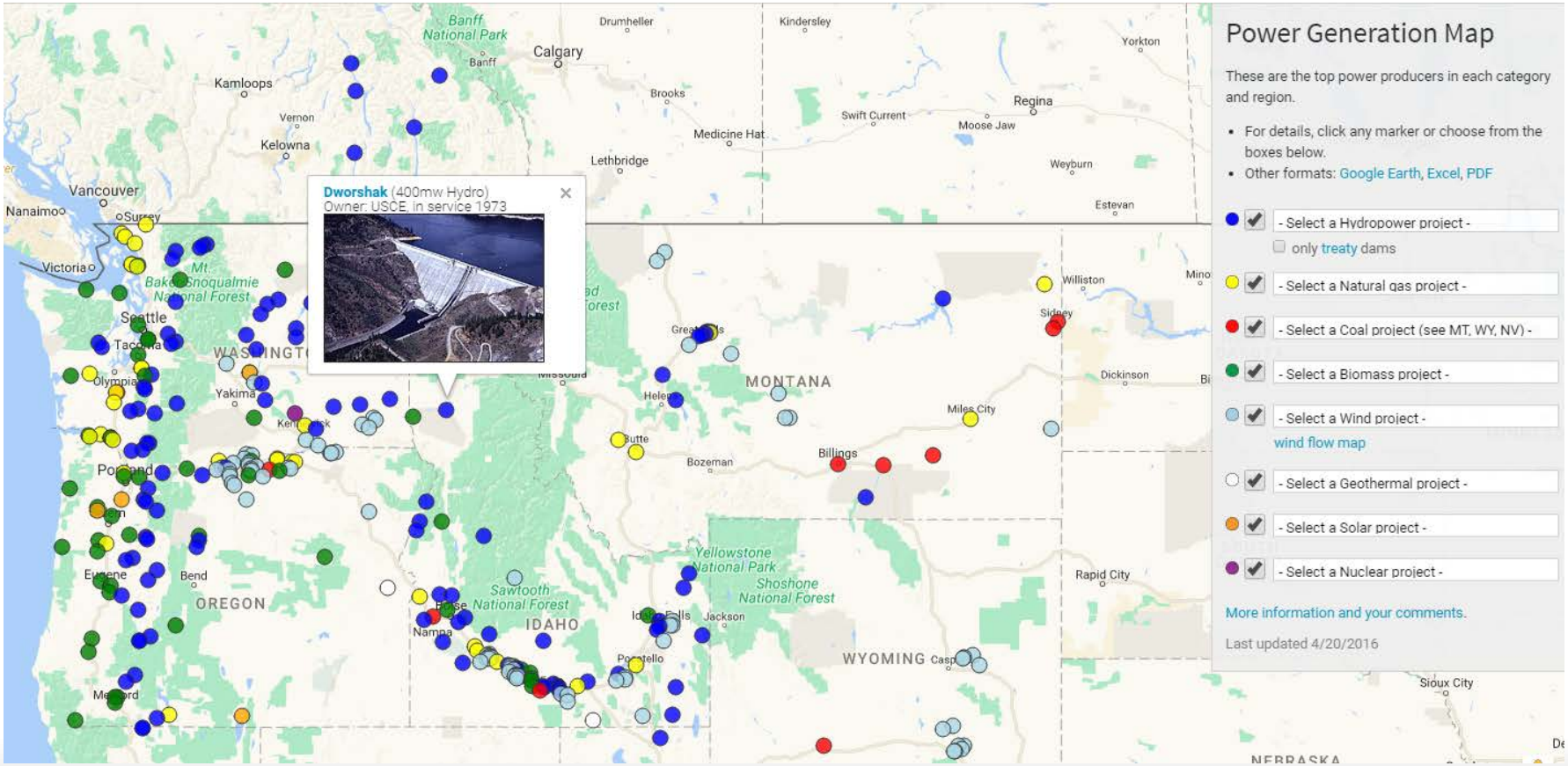
Annual Wind Development (MW)



Cumulative Wind Development by Load: Where is the Wind Going?



Interactive Project Map on Council Website



Tucannon wind farm, under construction
Photos from: RES Americas

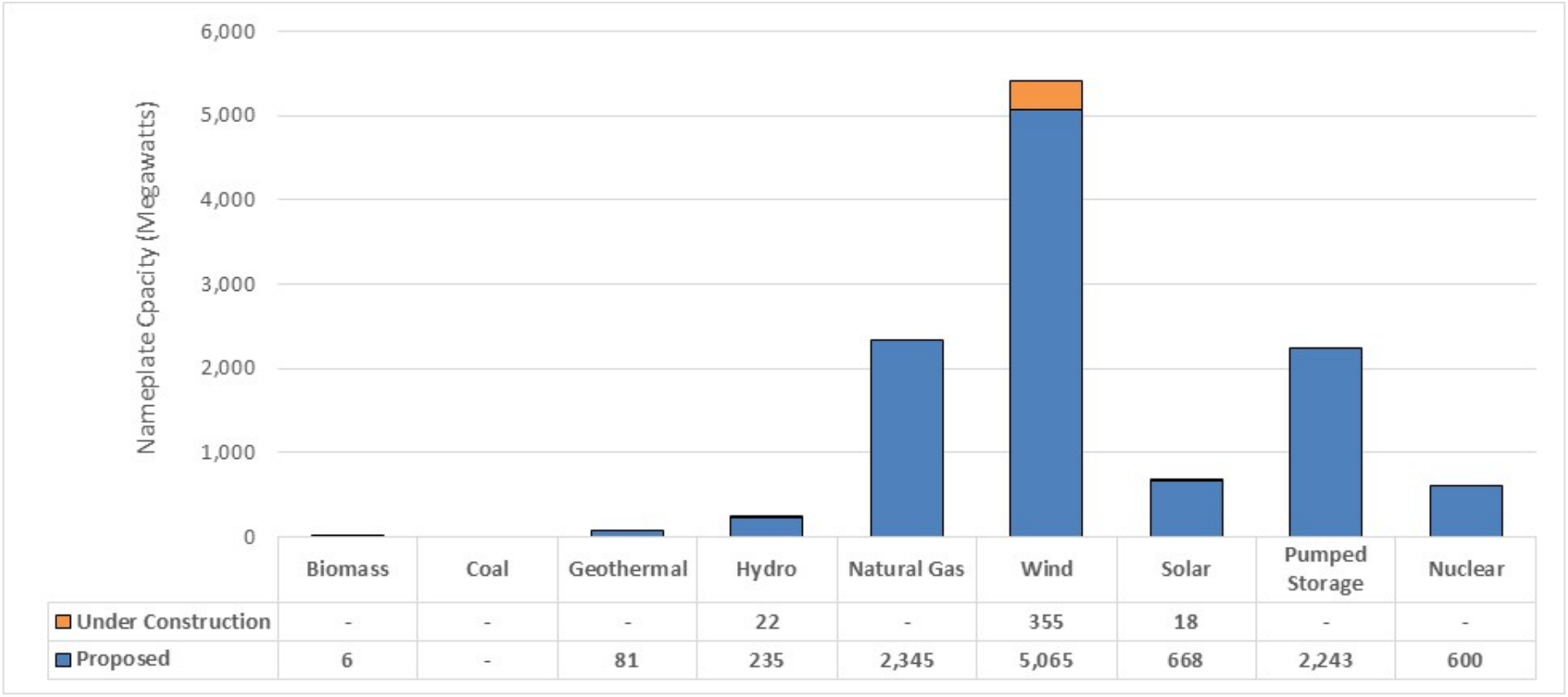
What is being developed in the region today?

PROPOSED PROJECTS

Project DB Terminology

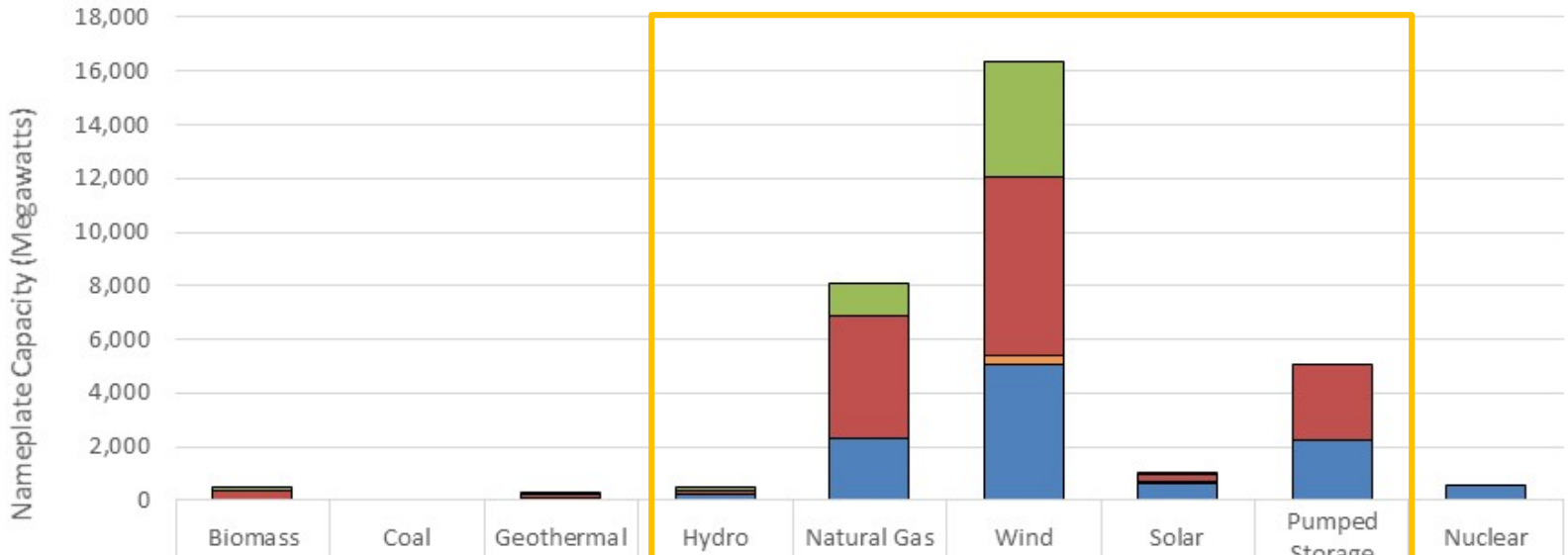
- **Proposed:** Project has been introduced via some sort of announcement or a concrete action has been initiated, e.g. NOI, press release, PPA, prelim site license
- **Planned**: Project has a high probability of being developed
- **Terminated**: Project development has been abandoned; no plans to proceed
- **Construction**: Project has broken ground
- **Operating**: Project is online and in service
- **Retired**: Project is no longer operating
- **Suspended/Deferred**: Project is no longer being actively developed, but plans to proceed in future

What resources are being developed and proposed in the region? (1)



	Biomass	Coal	Geothermal	Hydro	Natural Gas	Wind	Solar	Pumped Storage	Nuclear
Under Construction	-	-	-	22	-	355	18	-	-
Proposed	6	-	81	235	2,345	5,065	668	2,243	600

How does this compare to projects that were built- and proposed projects that were terminated- since 2010? (2)



	Biomass	Coal	Geothermal	Hydro	Natural Gas	Wind	Solar	Pumped Storage	Nuclear
Operating Since 2010	122		33	160	1,206	4,251	75	-	-
Terminated Since 2010	354	-	160	94	4,523	6,658	271	2,850	-
Under Construction	-	-	-	22	-	355	18	-	-
Proposed	6	-	81	235	2,345	5,065	668	2,243	600

Moyer-Tolles Solar Station, 1.3 MW

Solar PV

Boise City Solar, 40 MW

- Operating since 2010: ~ 75 MW installed capacity
  - Boise City Solar – 40MW, online June 2016
- Under construction: ~ 20 MW (ish!)
- Proposed: ~ 670 MW
  - 48 individual projects, 80% have PPAs secured
  - Most in the 5MW/10MW/20MW project size range
  - Majority located in S. ID/S. OR.
    - ~280MW PPA w/ IPC, ~190MW PPA w/ PAC
- Terminated since 2010: ~270 MW

Wind


Tucannon Wind Farm – 267 MW

- Operating since 2010: ~ 4,250 MW
- Under construction: ~ 350 MW
- Proposed: ~ 5,050 MW
  - 30 individual projects
    - Few 10MW PURPA projects, majority >100MW
  - Project development re-emerging in Montana
  - Still a large contingent in OR/WA
  - Fewer PPAs than solar projects
- Terminated since 2010: ~ 6,650 MW

Port Westward II – 220MW

Natural Gas

Langley Gulch, 320 MW

- Operating since 2010: ~ 1,200 MW installed capacity
  - Includes ~ 660 MW PGE plants
- Under construction: 0 MW
- Proposed: ~ 2,300 MW
  - Over 800 MW in Carty site expansion
- Terminated since 2010: ~4,500 MW
  - 15 projects, mostly combined cycle tech
  - Lots of independent projects w/ no buyers

Hydropower & Pumped Storage

- Most of the proposed hydro projects are small - less than 30 MW, most avg. 10 MW
  - Exception of (up to) 60 MW Weiser-Galloway project in Idaho
- Lots of hydropower upgrades under development and not included in these MWs
- Pumped storage projects proposed in all four NW states – two are in the process of applying for final FERC license application

What is spurring new development?

- Extension of Federal tax incentives
  - PTC and ITC both renewed long-term
- Increased Oregon RPS – 50% by 2040
- PURPA
  - Lots of solar PURPA activity in Idaho and Southern Oregon
- Retirements of existing baseload resources
  - Coal plant retirements scheduled between 2020 - 2025

Renewable Portfolio Standards Compliance

- PacifiCorp just announced it will meet immediate OR RPS need with RECs
- PGE issued RFP for 175MW of renewable energy – hoping to capture 100% PTC by EOY 2016.
- WA utilities *on average* on track for compliance through 2020/2021
- NorthWestern Energy, with current planned transactions, on track for compliance through 2026
  - MT utilities also have Community Renewable Energy Project (CREP) policy to comply with

Look at latest* IRPs in terms of resource needs

Resource	Technology	Capacity (MW)	by EOY
Natural Gas	Peaker	55	2019
Natural Gas	Peaker	96	2020
Natural Gas	Peaker	18	2021
Natural Gas	Peaker	277	2021
Renewable	Wind	206	2023
Natural Gas	Peaker	18	2024
Natural Gas	Upgrades	38	2025
Natural Gas	CCCT	348	2025
Natural Gas	CCCT	286	2026
Natural Gas	Peaker	126	2026
Natural Gas	CCCT	577	2026
Natural Gas	Peaker	96	2027
Natural Gas	Peaker	92	2028
Natural Gas	Peaker	79	2028
Renewable	Wind	131	2028
Natural Gas	Peaker	79	2029
Storage	Ice-based Thermal Energy Storage	20	2030
Natural Gas	Peaker	206	2030
Natural Gas	CCCT	300	2031
Natural Gas	Upgrades	3	2033
Natural Gas	Peaker	96	2034
Natural Gas	CCCT	228	2035

*Many utility IRPs currently being updated

NEXT STEPS

The Project Database is a Work in Progress

- Staff updating database "live"
- Opportunities for improvement
  - Always looking to improve and augment data
  - Staff working on improving integrity of database and exportability to models
- Publish quarterly to the power supply page of the Council's website
  - Updated database available from staff at any time, contact Gillian Charles

BACKGROUND SLIDES

Production Tax Credit (PTC)

- Production-based income tax credit for kwh produced and sold in first 10 years of operation
- Extended in late 2015 thru Consolidated Appropriations Act
  - Begins to phase down after 2016, and expires in 2019

Investment Tax Credit (ITC)

- Front-loaded Federal tax incentive (30%) based on capital expenditures
- Extended in late 2015 thru Consolidated Appropriations Act
  - In effect through 2019, phases down until it expires in 2020.
- Wind developments can opt for ITC in lieu of PTC, however it expires at end of 2016

Renewable Portfolio Standards*

	Montana	Oregon	Washington
Standard	5% in 2008 10% in 2010 **15% in 2015**	5% in 2011 15% in 2015 20% in 2020 **50% in 2040**	3% in 2012 9% in 2016 **15% in 2020**
Date of Adoption	**2005** Montana Renewable Power Production and Rural Economic Act	**2007** Oregon Renewable Energy Act **Rev. 2016**	**2006** Ballot Initiative-937
Sourcing Limits	Located in MT; or deliverable to MT	Located in WECC	Located in PNW; or delivering electricity into WA
Technology Minimums	Community Renewable Energy Projects (CREP)	8% from small community renewables	--
Banking	2 years	Unlimited (w/ exceptions)	1 year
Multipliers	--	Solar PV x 2 (if developed by 2016)	DG x 2; Union apprenticed labor x 1.2

* This table consolidates and simplifies at a high level many of the details, nuances, and unique qualities that make up each state's RPS