



Department of Commerce

# Washington State Electric Utility Resource Planning

*2018 Report*

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Report to the Legislature  
Brian Bonlender, Director

## Acknowledgements

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## Introduction

### Background

Washington consumers and businesses depend on electricity service from one or more of over 60 electric utilities operating in this state. These utilities vary greatly in size, geographic scope, history and governance, but each is responsible for ensuring an adequate supply of an essential resource.

Washington law requires each utility plan for the future by examining the projected amounts of electricity that will be required by customers in the coming decade, and identifying the power resources that will be used to meet those demands.<sup>1</sup> Each utility must prepare a report every two years and submit it to the Department of Commerce. Commerce reviews the utility reports and submits a summary to the Legislature. This is the fifth report since the Legislature enacted the resource planning law in 2006.

Depending on their size and power sources, utilities submit either a “resource plan” (RP) or an “integrated resource plan” (IRP). The RP is a short-form report of load<sup>2</sup> resources and is primarily provided by utilities having only one or two suppliers of power resources (usually, the Bonneville Power Administration and, perhaps, market power). The IRP is more complex plan and must incorporate a number of specific requirements identified in statute. IRPs are generally required for utilities with 25,000 or more customers.

### Purpose of this Report

Utilities develop resource plans to assess their specific future load and resource situations. This report aggregates the individual reports to provide an assessment at the statewide level of whether utilities are planning for adequate supplies, and what resources are expected to meet any growth in electric power demand, per 19.280.060 RCW.

This report summarizes the electricity loads and resources reported by Washington utilities in their 2018 reports to Commerce. It compares them to estimated summaries of previous years. Resources proposed to meet load are categorized by generating fuel type and source type (such as contract or market). An imbalance of loads and resources may indicate either a resource surplus or deficit, and this will be identified.

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<sup>1</sup> Chapter 19.280 Revised Code of Washington, Electric Utility Resource Plans.

<http://app.leg.wa.gov/RCW/default.aspx?cite=19.280>

<sup>2</sup> As used in the statute and this report, “load” means the amount of electric energy demanded by a utility’s customers during a defined period.

The information collected for this report is limited to the identification of loads and resources and their associated aggregate quantities. It does not attempt to evaluate specific goals or outcomes for resource acquisition strategies used by utilities.

This report provides information on utilities' energy efficiency and renewable energy resources. It does not analyze issues related to the energy efficiency and renewable energy requirement of, or compliance with, the Energy Independence Act (RCW 19.285).

## Utility Reporting

The utility resource planning statutes in Chapter 19.280 RCW<sup>3</sup> require that each utility prepare a resource plan (RP) and submit it to Commerce by Sept. 1 of each even-numbered year. Commerce received reports from 62 utilities. The individual reports are presented in Appendix B.

Electric utilities in Washington vary significantly in size and the scope of operations. This is reflected in the way utilities approach resource planning and forecasting. Larger utilities typically use multiple sources of electricity supply to meet their customers' requirements and engage in sophisticated assessments of risks and benefits in evaluating alternative sources of new energy. Many smaller utilities rely on a single supplier to supply all of the power required by their customers. For smaller utilities, the upstream provider – often the Bonneville Power Administration but sometimes another electric utility – undertakes the complex planning and forecasting exercise that leads to a resource plan.

The resource planning statute reflects this difference in approaches. It requires that larger utilities prepare and submit IRPs, which are the product of a thorough assessment of future needs and alternatives for meeting those needs through both demand-side and supply-side resources. Smaller utilities are allowed to prepare and submit a simplified assessment of loads and resources.

### **Interpretation of base-year, five-year, and 10-year data**

The resource plan summary submitted to Commerce includes load and resource information for three points in a 10-year planning cycle. These points are the base-year, a five-year plan and a 10-year plan. In 2018, most utilities used 2017 as the base-year, and the five-year and 10-year points are 2022 and 2027, respectively. However, utilities vary in their planning cycles, and some utilities use an earlier or later set of years in their reporting: the base year ranges from 2015 to 2019. For purposes of the statewide summary, Commerce aggregates all base-year data into a single value (2017) and does likewise for the five-year (2022) data and 10-year data (2027).

### **Interpretation of conservation and load data**

An important principle of integrated resource planning is that all resources should be evaluated on a consistent basis. This includes both different generating resources – such as wind and natural gas – and demand-side resources in the form of energy conservation. With conservation analyzed as resource and compared to supply-side options, utilities are able to determine whether customers are better served by improving the efficiency of their energy consumption or increasing the amount of energy delivered to them.

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<sup>3</sup> <http://apps.leg.wa.gov/rcw/default.aspx?cite=19.280>

A consequence of this approach is that energy conservation is sometimes portrayed as a reduction in the utility's load and sometimes portrayed as a resource available to meet load. This can lead to confusion in interpreting utility plans.

Here is how this potential confusion is resolved in the reports submitted to Commerce and summarized in this document:

Utilities report a base-year load amount that reflects whatever conservation has occurred in the past. For the five-year and 10-year values, utilities are directed to report the load that they would expect to serve in the absence of any additional conservation savings. The report separately lists the conservation resources that the utility expects to acquire during the five-year and 10-year periods.

For example, Clark Public Utilities reports that its load in 2017 was 528.5 average megawatts (aMW).<sup>4</sup> This figure represents the actual load of its customers in the base-year. It reflects many years of conservation programs at Clark Public Utilities and would be significantly higher without those historical conservation achievements. For the five-year interval, Clark forecasts a load of 572 aMW and conservation savings of 34.2 aMW. The first number represents the load that Clark would expect if it achieved no conservation savings after the base-year. Without conservation, its load would increase by 43.6 aMW, but with conservation the forecast load increase is only 9.3 aMW for an adjusted total load of 537.8 aMW at the end of the five-year interval.

In summary, the amounts reported as load for the five-year and 10-year intervals are based on an assumption of no new conservation. The actual loads at these future time points are likely to be lower by the amount of energy conservation identified by each utility.

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<sup>4</sup> aMW, or average megawatt, is an amount of electric energy equal to one megawatt-hour per hour for an entire year, or 8,760 megawatt-hours.

## Results

The 2018 resource plans submitted to Commerce are summarized in Table 1 through Table 5 and Figures 1 and 3 of this report.

Table 1 presents utility report information in units of average-Megawatts (aMW) on statewide annual utility load and resources, including imports and exports, for the base year (2017), and the five and 10-year forecasts. The right two columns in the table illustrate the difference between the base year and the five and 10-year forecasts.

A few points of interest in the table should be noted. First the large export value in the base-year is a deviation from 2016 utilities report, being well over twice the size of the export value in the previous Commerce utility report. Most of the increase in export power is due to one utility, Grant PUD. Another difference is the lower forecast resource contribution by coal-fired electricity generation in the 2018 Commerce utility report.<sup>5</sup> The diminished contribution of coal-fired electricity generation, as well as reduced natural gas-fired generation, results in a statewide resource deficit in the 10-year forecast (2027). Finally, the 2018 Resource Plan report shows that short-term contracts make a larger contribution to total resources in the base year than in the 2016 report. Some of the increase likely represents short-term contracts with the Centralia (Trans Alta) coal-fired power plant. Short-term and long-term contracts are lower in the five and 10-year forecast. This may be due to contract expiration rather than the loss of access to the contracted resource.

Washington utilities experience peak load events during the winter months. Table 2 presents utility report information for utility winter requirements and resources expressed in MW of capacity,<sup>6</sup> including imports and exports, for the base-year (2017), and the five and 10-year forecasts. Because electricity demand tends to be higher during the winter period, utilities rely more extensively on dispatchable thermal resources and short-term contracts to meet load. Demand response is also an important resource during the winter, as this reduces the need for utilities to make market purchases during periods of very high demand. Wind power and BPA resources generally provide less electricity and capacity during the winter season.

Table 3 presents a time series of Commerce Utility Resource Plans. The information in the table is aggregated annual utility loads (base-year, five-year and 10-year) for the 2008 through 2018 Commerce reports. The forecast loads do not include energy conservation/efficiency forecast by utilities. Figure 1 presents the information in Table 3 in a graphical format. Table 4 and Figure 2 present the aggregated annual utility loads (base-year, five-year and 10-year) and include energy conservation/efficiency forecast by utilities.

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<sup>5</sup> The planned closure of Colstrip units 1 & 2 had not been negotiated prior to the Puget Sound Energy Integrated Resource Plan that was used in the 2016 Commerce Utility Report

<sup>6</sup> Table 1 expressed in energy units of aMW, Table 2 in capacity units of MW.

Tables 3 and 4 and Figures 1 and 2 illustrate several key points. First, while the base-year aggregate utility load has remained in a narrow band over the period of 2008 through 2018, load growth forecasts by utilities for the five and 10-year out points have been trending down with each successive Commerce Utility Resource Plan report. In addition, by comparing Figures 1 and 2 it is evident that utility conservation/efficiency programs significantly reduce aggregate load growth. Finally, by comparing the 10-year aggregate load forecast (representing year 2017) in the 2008 Commerce Utility Resource Plan report to the base-year value in the 2018 report (2017 actual value), it is evident that the forecast load values are exceeding the actual load values. There are likely two primary reasons for this: the deep recession of 2007-09 tempered both residential and commercial growth, thereby reducing demand for electricity for several years; and Washington utilities have acquired more energy conservation/efficiency than they forecast over the previous decade.

Table 5 presents the individual utility growth forecasts and the percent of load growth anticipated to be met by conservation/efficiency. Of note in this table is that several utilities with surplus generating capacity and very inexpensive electricity (Chelan, Douglas and Grant PUDs) are forecasting very high load growth rates over the next 10 years. The growth is the result of industrial growth and server farms locating within the service territories to access the inexpensive electricity. Several utilities with more expensive electricity (Clark PUD, Tacoma Power, Seattle City Light, PacifiCorp and Puget Sound Energy) are forecasting conservation/efficiency that exceeds forecast load growth.

Figure 3 illustrates the resources that utilities forecast they will use to serve load for five and 10 years from now.<sup>7</sup> The BPA resource is a blended resource and is typically 87 percent hydropower, 10 percent nuclear, and 3 percent market purchases. Figure 3 reveals that hydropower will remain the dominant source of electric for Washington utilities.

The current round of utility resource plans indicates a continued reliance on energy conservation as the primary resource for balancing electricity supply and demand. The statewide aggregate growth in electricity demand is expected to be moderate, and most of this growth will be offset through energy conservation programs operated by utilities. Several utilities project that their conservation programs will result in more electricity savings than their projected amount of load growth. These utilities expect to experience negative growth in observed electric loads. With the majority of load growth met by conservation programs, utilities are projecting minimal need to acquire additional generating supply resources. The additional resources will primarily be used to replace retiring coal-fired generation.

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<sup>7</sup> The chart represents an average of the resources in the five-year and 10-year forecasts.

**Table 1: Washington State Projected Requirements and Resources,  
Annual Energy, aMW**

	<b>Base year</b>	<b>Five Year Forecast</b>	<b>Ten Year Forecast</b>	<b>Five Year Forecast: versus base year</b>	<b>Ten Year Forecast: versus base year</b>
<b>Requirements</b>					
Loads	10,237	10,821	11,361	584	1,124
Exports	1,096	309	261	(787)	(835)
Conservation		470	774	470	774
<b>Total Net Requirements</b>	<b>11,333</b>	<b>10,660</b>	<b>10,849</b>	<b>(673)</b>	<b>(484)</b>
<b>Resources</b>					
Hydro	3,363	3,229	3,203	(134)	(160)
Natural gas	1,999	2,016	1,849	17	(150)
Cogeneration	14	15	15	1	1
Coal	952	664	696	(288)	(256)
Wind	502	534	465	32	(37)
Other Renewables	69	110	107	41	38
Net Long-term Contracts	419	482	32	63	(387)
Net Short-term Contracts	651	295	320	(356)	(330)
Market Purchase	26	48	71	22	45
Demand Response	-	0.1	0.1	0.1	0.1
Other Resources	(6)	(6)	(6)	0	0
BPA Resources	4,163	3,860	3,869	(303)	(294)
Imports	94	56	5	(38)	(89)
<b>Total Resources</b>	<b>12,246</b>	<b>11,304</b>	<b>10,628</b>	<b>(942)</b>	<b>(1,618)</b>
Load Resource Surplus	913.0	645.0	(221.0)	(268.0)	(1,134.0)

**Table 2: Washington State Projected Requirements and Resources,  
Winter Capacity, MW**

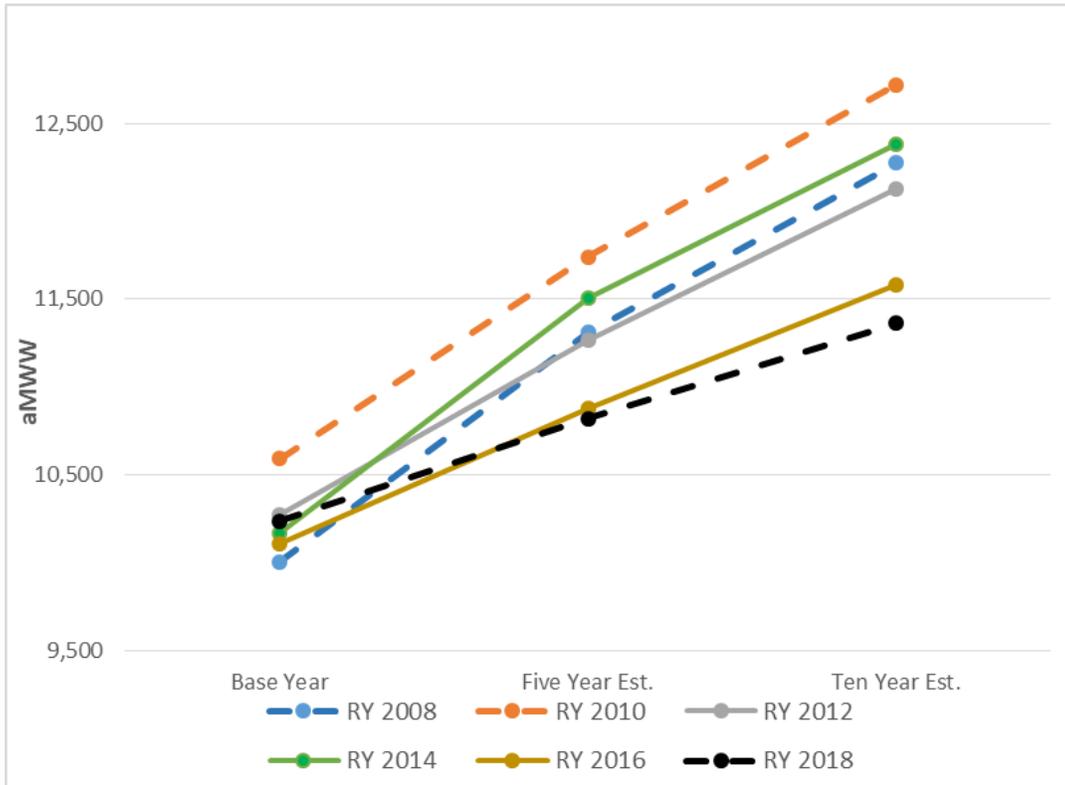
	Base year	Five Year Forecast	Ten Year Forecast	Five Year Forecast: versus base year	Ten Year Forecast: versus base year
<b>Requirements</b>					
Loads	13,444	13,697	13,236	253	(208)
Exports	1,463	35	12	(1,428)	(1,451)
Demand Response	-	79	107	79	107
Conservation		592	855	592	855
<b>Total Net Requirements</b>	<b>14,907</b>	<b>13,061</b>	<b>12,286</b>	<b>(1,846)</b>	<b>(2,621)</b>
<b>Resources</b>					
Hydro	4,429	4,867	4,989	438	560
Natural gas	3,264	3,271	2,777	7	(487)
Cogeneration	24	24	24	0	0
Coal	1,382	941	875	(441)	(507)
Wind	285	290	235	5	(50)
Other Renewables	95	93	126	(2)	31
Net Long-term Contracts	466	447	35	(19)	(431)
Net Short-term Contracts	3,126	2,143	2,261	(983)	(865)
Market Purchase	-	-	-	-	-
Other Resources	14	14	14	0	0
BPA Resources	2,943	2,502	1,995	(441)	(948)
Imports	462	379	414	(83)	(48)
<b>Total Resources</b>	<b>16,489</b>	<b>15,049</b>	<b>13,852</b>	<b>(1,440)</b>	<b>(2,637)</b>
Load Resource Surplus	1,582	1,988	1,566	406.0	(16.0)

*Note: Winter capacity (MW) results reflect only utilities submitting integrated resource plans. Utilities submitting integrated resource plans represent about 85 percent of state load (aMW). Smaller utilities submit resource plans and do not report seasonal capacity requirements or resources.*

**Table 3: Utility Report Time Series Base-year and Forecast Loads  
Without Conservation/Efficiency**

<b>Utility Report Year</b>	<b>Base Year</b>	<b>Base Year aMW</b>	<b>Five Year</b>	<b>Five Year Est. aMW</b>	<b>Ten year</b>	<b>Ten Year Est. aMW</b>
2008	2007	10,005	2012	11,309	2017	12,276
2010	2009	10,593	2014	11,742	2019	12,723
2012	2011	10,270	2016	11,269	2021	12,131
2014	2013	10,170	2018	11,506	2023	12,385
2016	2015	10,105	2020	10,881	2025	11,582
2018	2017	10,237	2022	10,821	2027	11,361

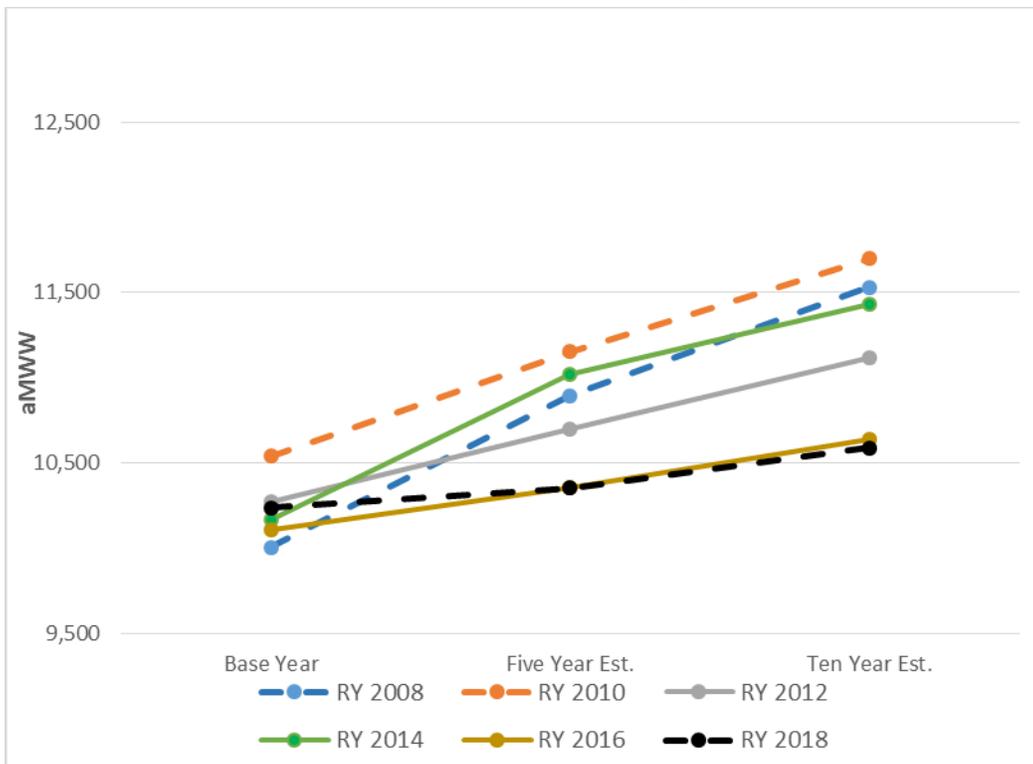
**Figure 1: Utility Report Time Series Base-year and Forecast Loads**



**Table 4: Utility Report Time Series Base-year and Forecast Loads  
With Conservation/Efficiency**

<b>Utility Report Year</b>	<b>Base Year</b>	<b>Base Year aMW</b>	<b>Five Year Year</b>	<b>Five Year Est. aMW</b>	<b>Ten year</b>	<b>Ten Year Est. aMW</b>
2008	2007	10,005	2012	10,896	2017	11,532
2010	2009	10,538	2014	11,153	2019	11,701
2012	2011	10,270	2016	10,699	2021	11,115
2014	2013	10,170	2018	11,021	2023	11,428
2016	2015	10,105	2020	10,352	2025	10,635
2018	2017	10,237	2022	10,351	2027	10,587

**Figure 2: Utility Report Time Series Base-year and Forecast Loads  
With Conservation/Efficiency**



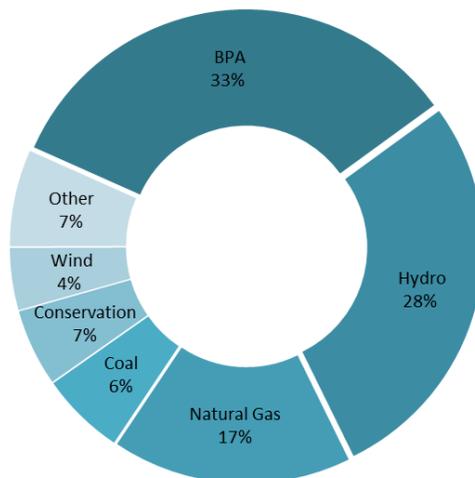
**Table 5: Individual Utility Load Forecasts with and without Conservation**

Utility	Load Growth with No Conservation		Percent of Load Growth Met by Conservation	
	Five Yr Change %	Ten Year Change %	Five Year Forecast	Ten Year Forecast
Alder Mutual Light Company	-8.3%	-8.3%	0%	0%
Asotin County PUD No. 1	1.9%	5.2%	0%	0%
Avista	3.5%	5.2%	78%	109%
Benton County PUD No. 1	4.3%	8.8%	70%	76%
Benton Rural Electric Assn	7.1%	15.2%	0%	0%
Big Bend Electric Cooperative	5.9%	9.4%	8%	5%
Blaine, City of	-0.3%	-0.3%	NA	NA
Centralia, City of	22.8%	23.3%	0%	0%
Chelan County PUD No.1	20.7%	45.5%	16%	14%
Cheney, City of	4.6%	11.3%	0%	0%
Chewelah, City of	0.0%	1.2%	0%	0%
Clallam County PUD No. 1	14.3%	22.1%	36%	47%
Clark Public Utilities	8.2%	15.1%	79%	73%
Columbia REA	10.1%	23.5%	0%	0%
Consolidated Irrigation District No. 19	-14.8%	-11.1%	0%	0%
Coulee Dam, Town of	-5.8%	-2.4%	0%	0%
Cowlitz County PUD No. 1	-18.2%	-18.8%	NA	NA
Douglas County PUD No, 1	113.4%	137.5%	1%	1%
Eatonville, Town of	2.4%	4.2%	0%	0%
Ellensburg, City of	-2.2%	-1.5%	NA	NA
Elmhurst Mutual Power and Light Company	-1.2%	2.7%	NA	5%
Ferry County PUD	-12.5%	-11.5%	NA	NA
Franklin County PUD No. 1	2.9%	8.4%	109%	75%
Grant County PUD No. 2	28.9%	45.6%	1%	1%
Grays Harbor County PUD No. 1	8.6%	8.6%	0%	0%
Inland Power and Light	5.4%	9.2%	19%	10%
Jefferson County PUD No. 1	-0.9%	0.6%	NA	28%
Kittitas County PUD No. 1	3.1%	5.6%	5%	4%
Klickitat County PUD No. 1	4.0%	7.4%	9%	6%
Lakeview Power and Light	2.9%	5.5%	16%	8%
Lewis County PUD No. 1	-2.6%	-1.8%	NA	NA
Mason County PUD No. 1	2.0%	2.9%	21%	15%
Mason County PUD No. 3	4.1%	7.6%	11%	7%
McCleary, City of	-4.9%	-4.4%	NA	NA
Milton, City of	-0.9%	-0.1%	NA	NA
Modern Electric	2.7%	4.9%	NA	NA
Nespelem Valley Electric Cooperative	12.8%	14.4%	0%	0%

**Table 5 (continued)**

Ohop Mutual Light Company	-5.3%	-4.4%	NA	NA
Okanogan County Electric Cooperative	-3.4%	-1.8%	NA	NA
Okanogan County PUD No. 1	3.0%	9.3%	0%	0%
Orcas Power and Light Cooperative	2.9%	5.9%	21%	10%
Pacific County PUD No. 2	6.2%	7.4%	34%	45%
Pacific Power and Light (PacifiCorp)	1.9%	4.9%	309%	190%
Parkland Light and Water Company	0.0%	1.2%	NA	50%
Pend Oreille PUD	-67.3%	-66.8%	NA	NA
Peninsula Light	0.9%	2.2%	81%	68%
Port Angeles, City of	50.7%	70.6%	2%	1%
Puget Sound Energy	6.8%	13.2%	131%	100%
Richland, City of	4.8%	9.9%	0%	0%
Ruston, Town of	2.3%	0.6%	0%	0%
Seattle City Light	1.6%	3.4%	299%	247%
Seattle, Port of	33.8%	52.2%	0%	0%
Skamania County PUD No. 1	-6.1%	-5.2%	NA	NA
Snohomish County PUD No. 1	2.3%	8.1%	250%	148%
Steilacoom, Town of	2.3%	4.9%	9%	4%
Sumas, City of	-2.1%	-0.8%	NA	NA
Tacoma Power	6.0%	5.6%	48%	103%
Tanner Electric	6.6%	12.9%	11%	5%
Vera Water and Power	5.8%	8.4%	0%	0%
Wahkiakum County PUD No. 1	-5.6%	-5.6%	NA	NA
Whatcom County PUD No. 1	11.9%	10.7%	11%	0%
Yakama Power	14.3%	15.5%	0%	0%
<b>State level forecast --&gt;</b>	<b>5.7%</b>	<b>11.0%</b>	<b>80%</b>	<b>69%</b>

**Figure 3: Forecast Available Resources**



## Comparison to Regional Plans

### **PNUCC 2018 Northwest Regional Forecast**

The Pacific Northwest Utilities Conference Committee (PNUCC) is an electric utility association that compiles information on expected loads and resources of electric utilities in the Pacific Northwest. It includes the loads and resources of Washington utilities along with those of utilities in Oregon, Idaho and Montana.<sup>8</sup>

The *2018 Northwest Regional Forecast* (through 2028) concluded that regional utilities are expecting only modest growth in retail loads and expect to acquire substantial amounts of energy efficiency through utility programs, market transformation programs and governmental codes and standards. The report notes that forecast growth in winter peak demand is flattening, while the summer peak demand growth is remaining steady. It was also noted that load growth varies greatly by utility.

PNUCC highlights winter-peaking requirements as a concern. The region's projected peak demand, including a planning margin that increases over time, is projected to exceed utilities' firm resources in every year of the planning period. The supply of winter peaking resources does not include out-of-region imports, the capacity of independent power projects within the Northwest or hydroelectric system capacity in excess of critical water conditions.

The compiled results from PNUCC indicate that on an annual energy basis the Northwest utilities collectively expect to have surplus energy resources through the 2021-2022 operating year. The regional forecast shows an energy deficit starting in 2022 (522 aMW) and continuing to grow through the end of the 10-year planning period (1595 aMW). Much of the deficit is the result of the planned retirement of five coal-fired generating units representing nearly 3,000 MW of capacity: Boardman, Colstrip Units 1 and 2 in July 2022, and Centralia Unit 1 in 2020 and Centralia Unit 2 in 2025.

According to the PNUCC report, Northwest utilities made no capacity additions in 2017 and are only committed to additions of about 200 MW by 2020--primarily wind, solar and unspecified projects. PNUCC identifies a larger amount of planned resources in the region, but because they have less certainty from a financial or regulatory standpoint, they are not included in the forecast. Planned resources through 2025 include almost 900 MW of wind and solar capacity, and 1,000 MW of dispatchable resources (for peak demand), including 114 MW of battery storage.

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<sup>8</sup> *Northwest Regional Forecast of Power Loads and Resources*, April 2018. [www.pnucc.org/system-planning/northwest-regional-forecast](http://www.pnucc.org/system-planning/northwest-regional-forecast). The PNUCC report provides considerably more detail on individual generating units than utilities submit through the state resource plan reporting requirements.

## Pacific Northwest Power Supply Adequacy Assessment for 2021

The region's power planning body, the Northwest Power and Conservation Council (Power Council), evaluated the adequacy of the electric power supply in 2018 and concluded that resources are expected to be adequate through 2020. Resources are considered adequate when the loss-of-load probability (LOLP) is less than 5 percent.<sup>9</sup> However, with the planned retirements of five Northwest coal units by July 2022, the system will reach a LOLP of 7 percent in 2023 and will no longer meet the Power Council's adequacy standard. An additional 600 to 700 MW of capacity will have to be acquired to maintain the LOLP 5 percent standard through the remainder of the 10-year forecast period.<sup>10</sup>

Like the PNUCC report, the Power Council notes that the Pacific Northwest is a winter peaking region, and that a resource shortfall exists and is likely to occur during December, January and February. They also noted that many utilities are developing notable summer demand peaks and that the region will begin to see a higher likelihood of summer shortfalls within the next 10 years.

The Power Council found these results to be "not surprising" and noted that utilities have identified 540 MW of wind capacity and about 800 MW of unspecified capacity. These are planned resources and are not included in their analysis. The council also noted that there are approximately 400 MW of demand response that will likely be available by 2021, and this resource is also not included in the analysis. The analysis also assumed a slightly conservative amount of imported market power being available from the Southwest region during the winter. Higher imports would diminish the region's LOLP.

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<sup>9</sup> A LOLP above 5 percent should not be interpreted to mean that actual curtailments will occur. Rather, it means that the likelihood of utilities having to take extraordinary and costly measures to provide continuous service exceeds the tolerance for such events. The analyses to determine LOLP are somewhat conservative.

<sup>10</sup> *Pacific Northwest Power Supply Adequacy Assessment for 2023*, September 27, 2018, Document 2018-10. <https://www.nwcouncil.org/reports/pacific-northwest-power-supply-adequacy-assessment-2023>

## Overgeneration Concerns

In 2013, the Legislature amended the resource planning statute to address concerns about the potential for “overgeneration” events. The legislation required that utilities consider this potential in their planning “if applicable to the utility's resource portfolio,” and required that Commerce include in this report an assessment of utility approaches to overgeneration.

The statute defines an overgeneration event as:

*“an event within an operating period of a balancing authority when the electricity supply, including generation from intermittent renewable resources, exceeds the demand for electricity for that utility's energy delivery obligations and when there is a negatively priced regional market.”*

Overgeneration might occur when high river flows and high wind volumes coincide. The capacity of the hydroelectric system to store extra river flow is limited, and even the option of spilling water over the dams is restricted by fish mortality concerns. In these rare and short-lived circumstances, the regional power system may have more electric generation from hydroelectric and wind resources than what is required to meet regional loads and export opportunities.

Since 2013, the Bonneville Power Administration has adopted an Oversupply Management Protocol, providing tools for the operators of the hydroelectric system and transmission grid to manage oversupply situations.<sup>11</sup> The implementation of this protocol has generally shifted the overgeneration issue from a planning concern to an operational concern.

In many cases, utilities did not find it necessary in their 2017-2018 integrated resource plans to address overgeneration as an issue separate from the more general assessment of generating resource alternatives. The overgeneration prospect is one that contributes to an increasing interest among utilities in energy storage technologies, such as pumped storage and battery storage systems.

Here are excerpts illustrating utilities’ analyses of the overgeneration issue:

**Clark Public Utilities (2016 IRP, p. 33):**

Pumped storage provides probably the best combination of size and response to integrate renewables on a wholesale power scale at a reasonable cost. However, the 10-year planning horizon now contemplated in this IRP removes pumped storage from consideration. Any new pumped storage development in close proximity to Clark Public Utilities to make it cost effective from a transmission viewpoint is at least 10 years away from operation, if not more.

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<sup>11</sup> [www.bpa.gov/projects/initiatives/oversupply/Pages/default.aspx](http://www.bpa.gov/projects/initiatives/oversupply/Pages/default.aspx)

**Grant Public Utilities** (2018 IRP, p. 66 and 88):

The primary impact of California’s increasing renewable goals is a reduction in the size of the potential export market for the Northwest— particularly during hydro runoff. This will increase the likelihood of oversupply and renewable curtailment.

Renewable generation is an important component of a low-carbon future; however a Renewables Portfolio Standard results in higher costs and higher carbon emissions than a policy that focuses directly on carbon. RPS policy has been successful at driving investment in renewables but ignores other measures, such as energy efficiency and coal displacement. RPS policy has unintended consequences, such as oversupply and negative wholesale electricity prices that create challenges for reinvestment in existing zero-carbon resources.

**Grays Harbor PUD** (2016 IRP, p. 47):

During spring months in the Northwest, hydroelectric resources produce significant amounts of energy from spring run-off. At the same time, windy spring conditions result in large quantities of wind energy available at the same time when demands for electricity are low. This oversupply of energy has been resolved in the past by generation curtailment, which can be highly contentious and disruptive. Pumped storage may become the energy storage solution of choice as more wind is added to the balancing area and curtailments increase. During periods of high wind and high water, water is pumped to a storage reservoir using wind energy to power the pumps. The water is then released through the hydroelectric facility once demand increases or there is less generation from wind resources. The cost-effectiveness of pumped storage is determined by the price differential between heavy load hours (high demand) and low load hours (low demand). The efficiency of the pumps and hydroelectric generators are also an important factor. As facilities become more efficient and require less energy, the cost-effectiveness increases. Generally, however, pumped storage is a net consumer of energy in that it takes more energy to pump the water uphill than is recouped in the generation process when the water is released through the generator.

**Snohomish PUD** (2017 IRP, pp. 5-26):

The district resides in the Bonneville Power Administration’s (BPA’s) footprint or balancing authority area (BAA). BPA is responsible for moment-to-moment balancing of loads and resources within its footprint, including the district. BPA mitigates overgeneration conditions or oversupply events through its Oversupply Management Protocol. An oversupply event is an event that historically occurs in the late spring, and is marked by moderate temperatures that reduce demand at the same time regional snows melt and spring rains begin, resulting in high hydroelectric energy production that combines with high energy production from regional wind projects. The district’s portfolio is subject to BPA’s Oversupply Management Protocol and pays the oversupply rate assessed by BPA.

The district’s efforts to mitigate oversupply for its own portfolio and electric system are also being assessed via use cases being conducted as part of the MESA energy storage initiative.

**Avista (2017 IRP, pp. 9-9, 9-10):**

Increasing solar and wind generation on the electric grid makes energy storage technologies attractive from an operational perspective. Storage could be an ideal way to smooth out renewable generation variability, oversupply, and assist in load following and regulation needs. The technology could help meet peak demand, provide voltage support, relieve transmission congestion, take power during over-supply events, and supply other non-energy needs for the system. The IRP considered several storage technologies, including pumped hydroelectric, lead-acid batteries, lithium-ion batteries, vanadium flow batteries, flywheels, compressed air, liquefied air, and gravity systems.

Avista installed a vanadium flow battery in Pullman, Wash. to learn more about storage technology. The Turner Energy Storage Project provides insight about the technology's reliability, potential benefit to the transmission and/or distribution systems, and potential power supply benefits including oversupply events. The battery has 1.2 megawatts of power capability and 3.5 megawatt-hours of energy storage. A Washington research and development grant partially funded this project.

**Chelan PUD (2018 draft IRP, p. 13):**

Oversupply in the region continues to have a financial impact to utilities. In spite of the Northwest seeing a rapid end to the wind fleet buildout as many financial incentives are ending, regional policies, California markets and solar energy continue to create oversupply conditions throughout the Western Interconnect.

For comparison, the spring runoff period (April-July) of 2016 had two day-ahead days with negative local prices, and 2017 had 35 days. In the hourly balancing or real-time market, 2016 had 23 hours with negative local prices, and 2017 had 368 hours. Snowpack and timing of spring runoff can impact the number of days and hours with oversupply and negative prices.

As wind's intermittent nature can push a region into oversupply, behind-the-meter or unmetered solar (residential) and metered (utility-sized) solar continues to increase due to an exponential drop in solar panel cost and similar growth in solar panel output. Full solar output can just as easily push a region into oversupply as wind alone once did.

In the Northwest, the BPA has developed new business practices that push the burden of oversupply back to the market and away from themselves. These new practices include not selling at negative prices until spilled water reaches dissolved gas limits, holding renewable generators to a fixed schedule, not accepting unplanned surplus and canceling transmission loss returns. The cancelling of transmission loss returns can add hundreds of megawatts to an already oversupplied period and drive prices even more negative.

## Appendix A: Utility Cover Sheets

Washington Electric Utility Loads and Resources Estimates reported to the Department of Commerce in 2018.

Alder Mutual Light Co.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	0.60	0.55	0.55
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	0.60	0.55	0.55
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	0.60	0.55	0.55
<b>Load Resource Balance</b>	0.00	0.00	0.00

Asotin County Public Utility District

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Tim Simpson

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2018	2023	2028
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	6.18	6.30	6.50
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	6.18	6.30	6.50
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	6.18	6.30	6.50
<b>Load Resource Balance</b>	0.00	0.00	0.00

Avista

<<< Utility Name

Date of Board/Commission Approval

March-18

Washington State Utility  
Integrated Resource Plan Year 2018

Prepared by: John Lyons

0.6535 Washington Production/Transmission Ratio

Notes:

Loads are 1 in 2 expected values and do not include any consideration of planning margin. Using the 90th percentile for hydro energy, rather than the critical water year. Load for the 2017 Base Year is actual load instead of weather adjusted load. The main cover sheet shows the Avista system, and WA share only cover sheet shows 65.35% to show the Washington only portion of the system. The other category includes the Pullman Energy Storage Project.

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2022			2027		
Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	1,098.53	1,042.99	699.51	1,132.25	1,074.03	724.34	1,154.28	1,096.70	735.71
<b>Exports</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Resources:</b>									
Future Conservation/Efficiency				38.16	22.14	19.48	75.90	46.13	39.58
Demand Response				0.00	0.00	0.00	0.00	0.00	0.00
Cogeneration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro	706.05	704.03	347.01	710.95	687.62	341.13	726.69	704.26	346.36
Wind	0.00	0.00	26.14	0.00	0.00	26.14	0.00	0.00	26.14
Other Renewables	30.71	30.71	26.79	30.71	30.71	26.79	30.71	30.71	26.79
Thermal - Natural Gas	571.58	467.04	423.47	571.58	467.04	423.47	387.29	316.03	291.46
Thermal - Coal	222.00	222.00	124.17	145.08	145.08	124.17	145.08	145.08	124.17
Net Long Term Contracts	0.00	0.00	-35.17	14.10	14.63	15.68	14.10	14.63	15.68
Net Short Term Contracts	0.00	0.00	-56.54	0.00	0.00	0.00	0.00	0.00	0.00
BPA	53.59	0.00	27.45	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.65	0.65	0.00	0.65	0.65	0.00	0.65	0.65	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Distributed Generation	0.00	0.26	0.04	0.00	0.26	0.04	0.00	0.26	0.04
Undecided	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Resources</b>	1,584.58	1,424.70	883.35	1,511.23	1,368.13	976.89	1,380.43	1,257.76	870.22
<b>Load Resource Balance</b>	486.04	381.71	183.84	378.98	294.10	252.55	226.15	161.06	134.51

PUD1 of Benton County

<<< Utility Name

Date of Board/Commission Approval

August-18

Washington State Utility

**Integrated Resource Plan Year 2018**

Prepared by:

James Dykes

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2022			2027		
	Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads (Note 1)</b>	370.00	425.00	210.26	317.89	438.66	219.31	324.55	441.43	228.68
<b>Exports</b>									
<b>Resources:</b>									
Future Conservation/Efficiency (Note 5)				6.29	6.29	6.29	14.08	14.08	14.08
Demand Response									
Cogeneration									
Hydro	1.00	2.00	1.59	1.00	3.00	1.31	1.00	3.00	1.31
Wind	0.00	0.00	2.38	0.00	0.00	2.70	0.00	0.00	2.70
Other Renewables									
Thermal - Natural Gas (Note 2)	40.00	50.00	20.58	50.00	50.00	20.83	0.00	0.00	0.00
Thermal - Coal									
Net Long Term Contracts									
Net Short Term Contracts (Note 3)	79.00	57.00	-46.88	10.60	63.37	-9.85	59.47	108.35	12.56
BPA (Note 4)	250.00	316.00	234.35	197.00	245.00	198.03	197.00	245.00	198.03
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	370.00	425.00	212.03	264.89	367.66	219.31	271.55	370.43	228.68
<b>Load Resource Balance</b>	0.00	0.00	1.77	-53.00	-71.00	0.00	-53.00	-71.00	0.00

**Notes:**

- 1 - Based on values used in District's 2018-2027 Load Forecast which is a major driver in the IRP modeling process. 3 aMW added to account for average wholesale scheduled returned losses to BPA, Conservation Potential Assessment value to account for gross loads before impact of conservation.
- 2 - Frederickson NG contract expires in 2022.
- 3 - Winter, Summer capacity deficits and energy needs secured from the market via Risk Management Committee approved hedges and short term market purchases.
- 4 - Assumes BPA Rate Period High Water Allocation (Critical Water); Future Winter and Summer Peak resource allocations do not account for shaping capability of the Slice Product.
- 5 - Cumulative Conservation Potential Assessment estimated value

Benton Rural Electric Association

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Steve Catlow

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	65.71	70.40	75.70
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	60.49	58.70	58.70
<i>BPA Tier 2</i>		11.70	17.00
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>	5.22		
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	65.71	70.40	75.70
<b>Load Resource Balance</b>	0.00	0.00	0.00

Big Bend Electric Cooperative, Inc.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Christina Wyatt

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	62.85	66.53	68.76
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.31	0.32
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	62.85	60.88	60.88
<i>BPA Tier 2</i>		0.34	0.56
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>		5.00	7.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	62.85	66.53	68.76
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

(mm/yy)

**Notes:**

See attached document: 2018 Washington State Electric Resource Plan for Big Bend Electric Cooperative  
 Approved by Big Bend Electric Cooperative's Board of Trustees on 8/30/2018

City of Blaine

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	9.50	9.47	9.47
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.11	0.11
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>		9.36	9.36
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	0.00	9.47	9.47
<b>Load Resource Balance</b>	-9.50	0.00	0.00

Centralia, City of

<< Utility Name

Washington State Utility Resource Plan Year 2018

Prepared by: David L. Johnson, P.E.

	<b>Base Year</b>	<b>5 Yr. Est.</b>	<b>10 Yr Est.</b>
<b>Estimate Year</b>	2017	2023	2028
<b>Period</b>	<b>Annual</b>	<b>Annual</b>	<b>Annual</b>
<b>Units</b>	<b>(MWa)</b>	<b>(MWa)</b>	<b>(MWa)</b>
<b>Loads</b>	31.81	38.82	38.98
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	23.98	24.25	24.25
<i>BPA Tier Load Shaping</i>	0.72	0.46	0.62
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	7.11	7.11	7.11
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>		7.00	7.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	31.81	38.82	38.98
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-18 (mm/yy)

**Notes:**

Line 22 - The City is in the process (2018) of adding a new Extra-Large Load. At this point in time it is our best estimate that this load will be in the 6MW range. The City will have more concrete data regarding this load in the 2020 Resource Plan and may increase or decrease this estimate at that time. There is 1MW included in Line 22 that is attributed to the City's normal growth.

PUD No. 1 of Chelan County	<i>Date of Board/Commission</i>	July-18
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Washington State Utility	<b>Integrated Resource Plan Year</b>	<b>2018</b>
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Prepared by: Becky Keating

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2023			2028		
	Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	436.00	241.00	198.00	493.00	295.00	239.00	544.00	342.00	288.00
<b>Exports</b>									
<b>Resources:</b>	/ / / / / / / / / /								
Future Conservation/Efficiency				14.88	8.46	6.76	28.40	16.14	12.89
Demand Response									
Cogeneration									
Hydro	419.00	220.00	189.00	683.00	345.00	301.00	847.00	423.00	370.00
Wind	0.35	0.25	2.13	1.67	0.45	2.25	1.67	0.45	2.25
Other Renewables									
Thermal - Natural Gas									
Thermal - Coal									
Net Long Term Contracts									
Net Short Term Contracts									
BPA									
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	419.35	220.25	191.13	699.55	353.91	310.01	877.07	439.59	385.14
<b>Load Resource Balance</b>	-16.65	-20.75	-6.87	206.55	58.91	71.01	333.07	97.59	97.14

**Notes:**

Appendix B in Chelan PUD's IRP includes this cover sheet with supplemental information on loads and resources.

City of Cheney

<< Utility Name

Washington State Utility Resource Plan Year 2018

Prepared by: Stephen Boorman

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2018	2023	2028
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	17.01	17.79	18.93
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	14.87	14.87	14.87
<i>BPA Tier 2</i>	0.14	1.92	2.06
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>	2.00	1.00	2.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	17.01	17.79	18.93
<b>Load Resource Balance</b>	0.00	0.00	0.00

City of Chewelah

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	2.56	2.56	2.59
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	2.56	2.56	2.59
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	2.56	2.56	2.59
<b>Load Resource Balance</b>	0.00	0.00	0.00

PUD #1 of Clallam County

<< Utility Name

Date of Board/Commission Approval

September-18

Washington State Utility Resource Plan Year

2018

Prepared by:

Sean Worthington

**Notes:**

Data is reported using the Federal fiscal year (October through September). The base year is 2016 weather normalized load. The 2023 and 2028 load forecasts are based on 2017 weather normalized actual load applied to BPA's AAGR of 0.4% including mandated conservation from the Energy Independence Act.

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2016	2023	2028
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	72.42	82.75	88.39
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		3.73	7.46
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	69.39	74.81	74.81
<i>BPA Tier 2</i>	2.36	3.54	5.45
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	0.67	0.67	0.67
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	72.42	82.75	88.39
<b>Load Resource Balance</b>	0.00	0.00	0.00

Clark Public Utilities <<< Utility Name

Washington State Utility  
**Integrated Resource Plan Year 2018**

Prepared by: Tom Haymaker

**Notes:**  
 Line 26: Distibuted Generation such as rooftop solar and community solar are included as negative loads. Their impacts to load are diminumus for planning purposes.

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate			
	2019			2024			2029			
	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual	
Period	Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	949.00	733.00	528.45	1,034.00	768.00	572.00	1,110.00	801.00	608.00	
<b>Exports</b>										
<b>Resources:</b>										
Future Conservation/Efficiency				64.43	18.70	34.24	122.00	38.50	58.19	
Demand Response										
Cogeneration										
Hydro	1.00	1.00	1.79	1.00	1.00	1.79	1.00	1.00	1.79	
Wind	0.00	0.00	15.91	0.00	0.00	15.91	0.00	0.00	15.91	
Other Renewables										
Thermal - Natural Gas	257.00	243.00	206.94	257.00	243.00	206.94	257.00	243.00	206.94	
Thermal - Coal										
Net Long Term Contracts										
Net Short Term Contracts	300.00									
BPA	508.00	407.00	319.72	508.00	407.00	319.72	508.00	407.00	319.72	
Other										
Imports										
Distributed Generation										
Undecided										
<b>Total Resources</b>	1,066.00	651.00	544.36	830.43	669.70	578.60	888.00	689.50	602.55	
<b>Load Resource Balance</b>	117.00	-82.00	15.91	-203.57	-98.30	6.60	-222.00	-111.50	-5.45	

Date of Board/Commission Approval 08/18 (mm/yy)

Columbia REA

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Jim Cooper

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>			
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	41.82	46.04	51.65
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	37.56	37.49	37.49
<i>BPA Tier 2</i>	2.41		
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	1.35		
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>	0.50	8.55	14.16
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	41.82	46.04	51.65
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

October-17 (mm/yy)

Consolidated Irrigation District No. 19

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	0.27	0.23	0.24
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	0.27	0.23	0.24
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	0.27	0.23	0.24
<b>Load Resource Balance</b>	0.00	0.00	0.00

Town of Coulee Dam

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	2.06	1.94	2.01
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	2.06	1.94	2.01
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	2.06	1.94	2.01
<b>Load Resource Balance</b>	0.00	0.00	0.00

Cowlitz PUD

<<< Utility Name

Washington State Utility

**Integrated Resource Plan Year 2018**

Prepared by:

AW

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017	2017	2017	2022	2022	2022	2027	2027	2027
Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	759.80	621.90	532.46	636.00	494.00	435.78	634.00	490.00	432.47
<b>Exports</b>									
<b>Resources:</b>									
Future Conservation/Efficiency									
Demand Response									
Cogeneration									
Hydro	67.00	56.00	35.00	79.00	79.00	15.75	79.00	79.00	15.75
Wind	10.38	5.00	34.38	0.00	0.00	32.93	0.00	0.00	32.93
Other Renewables									
Thermal - Natural Gas									
Thermal - Coal									
Net Long Term Contracts									
Net Short Term Contracts									
BPA	778.86	693.00	613.70	631.86	574.96	418.23	631.86	574.96	418.23
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	856.24	754.00	683.08	710.86	653.96	466.92	710.86	653.96	466.92
<b>Load Resource Balance</b>	96.44	132.10	150.62	74.86	159.96	31.14	76.86	163.96	34.45

**Notes:**

Seasonal loads represent 1 hour peaks, annual loads are annual averages (MWa). Data not weather adjusted. Loads were forecasted using regression methodology with econometric factors that captured conservation effects and trends. Conservation is not separately forecasted. Hydro resources include Swift No. 2, Wanapum, and Priest Rapids. Wind resources include White Creek, Harvest, and Nine Canyon.

Date of Board/Commission Approval

August-18

PUD1 of Douglas County

<<< Utility Name

Washington State Utility

**Integrated Resource Plan Year 2018**

Prepared by:

Jeff Johnson

**Notes:**

Douglas's Customer count is 16,000, less than the 25,000 customer threshold associated with I-937.

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2022			2027		
	Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	229.00	139.00	108.23	330.00	270.00	231.00	350.00	290.00	257.00
<b>Exports</b>									
<b>Resources:</b>									
Future Conservation/Efficiency				1.00	1.00	1.00	1.00	1.00	1.00
Demand Response									
Cogeneration									
Hydro (80% of Average Water)	275.00	272.00	185.30	528.00	528.00	312.00	595.00	595.00	299.00
Wind	11.00	11.00	2.62	3.00	3.00	3.00	3.00	3.00	3.00
Other Renewables									
Thermal - Natural Gas									
Thermal - Coal									
Net Long Term Contracts	19.00	7.00	5.00	40.00	40.00	40.00			
Net Short Term Contracts									
BPA									
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	305.00	290.00	192.92	572.00	572.00	356.00	599.00	599.00	303.00
<b>Load Resource Balance</b>	76.00	151.00	84.69	242.00	302.00	125.00	249.00	309.00	46.00

Date of Board/Commission Approval

August-18

(mm/yy)

Town of Eatonville

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	3.34	3.42	3.48
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	3.34	3.42	3.48
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	3.34	3.42	3.48
<b>Load Resource Balance</b>	0.00	0.00	0.00

City of Ellensburg

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

S Rowbotham

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	17-22	17-27
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	25.00	24.45	24.62
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.10	0.10
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	24.32	23.80	23.80
<i>BPA Tier 2</i>	0.68	0.00	0.00
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>		1.00	1.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	25.00	24.90	24.90
<b>Load Resource Balance</b>	0.00	0.45	0.28

Elmhurst Mutual Power & Light Co.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	33.13	32.72	34.04
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.05	0.05
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	33.13	32.67	32.07
<i>BPA Tier 2</i>			1.92
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	33.13	32.72	34.04
<b>Load Resource Balance</b>	0.00	0.00	0.00

Public Utility District No. 1 of Ferry County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	10.60	9.27	9.38
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	10.60	9.27	9.38
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	10.60	9.27	9.38
<b>Load Resource Balance</b>	0.00	0.00	0.00

Public Utility District No 1. of Franklin County

**Washington State Utility Resource Plan Year 2018**

Prepared by: Richard Sargent

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
9 <b>Loads</b>	125.08	128.69	135.57
10 <b>Resources:</b>			
11 <i>Future Conservation/Efficiency</i>		3.94	7.88
12 <i>Demand Response</i>			
13 <i>BPA Tier 1 (include BPA PF)</i>	135.82	115.47	115.47
14 <i>BPA Tier 2</i>			
15 <b>Non BPA:</b>			
16 <i>Co-generation</i>			
17 <i>Hydro (critical water)</i>	1.23	0.70	0.70
18 <i>Wind</i>	5.28	6.00	6.00
19 <i>Other Renewables</i>			
20 <i>Thermal-Natural Gas</i>	12.35	20.00	
21 <i>Thermal-Coal</i>			
22 <i>Market Purchase (non BPA)</i>	5.39		5.00
23 <i>Other</i>			
24 <i>Distributed Generation</i>	0.60	0.80	1.00
25 <i>Undecided</i>			
26 <b>Total Resources</b>	<b>160.66</b>	<b>146.91</b>	<b>136.05</b>
27 <b>Load Resource Balance</b>	<b>35.58</b>	<b>18.22</b>	<b>0.48</b>

Date of Board/Commission Approval August-18 (mm/yy)

**Notes: Explain resource choices other than conservation / Use of renewable energy credits in planning / Distributed Generation Sources.**

*Base year load is actual and not weather normalized. Forecasted loads are weather normalized. Line 13 base year is actual Block/Slice received. Future BPA Resource is based upon Critical Water for Block/Slice; Line 20 is based upon remaining 9 month term of PPA; Line 22 based upon recent Aurora models that show Market Purchases as least cost resource. Line 24 "Distributed Generation" represents small hydro and community solar; Franklin has enough generation from contracted renewable resources to meet it's RPS requirements for the initial period and may seek purchasing renewable energy credits for any deficiencies in outlying years.*

Grant County PUD2

<<< Utility Name

Washington State Utility

**Integrated Resource Plan Year 2018**

Prepared by:

8/20/2018

Phillip Law

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	Period	2017	Annual	2022	Annual	2027	Annual		
		Winter		Summer		Winter		Summer	Winter
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	771.70	825.84	572.72	908.00	987.00	738.00	1,003.00	1,101.00	834.00
<b>Exports</b>	1,421.09	1,202.44	709.68						
<b>Resources:</b>									
Future Conservation/Efficiency						2.16			1.95
Demand Response									
Cogeneration									
Hydro	1,421.09	1,202.44	709.68	1,165.00	1,003.00	650.00	1,165.00	1,003.00	644.00
Wind			3.40			3.40			3.40
Other Renewables									
Thermal - Natural Gas						27.00	85.00	85.00	79.00
Thermal - Coal									
Net Long Term Contracts									
Net Short Term Contracts	997.70	1,125.84	751.72	303.00	430.00	302.00	307.00	413.00	302.00
BPA	10.17	4.54	5.64	9.00	8.00	5.00	9.00	8.00	5.00
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	2,428.96	2,332.82	1,470.44	1,477.00	1,441.00	989.56	1,566.00	1,509.00	1,035.35
<b>Load Resource Balance</b>	236.17	304.54	188.04	569.00	454.00	251.56	563.00	408.00	201.35

Date of Board/Commission Approval August-18 (mm/yy)

**Notes: Explain resource choices other than conservation / Use of Renewable Energy Credits in planning/ Distributed Generation Sources**

1. Base year 2017 data is actual load and actual generation. Base year 2017 peak capability is the actual generation on the observed peak load hours for 2017.
2. Hydro values include Grant PUD rights in Wanapum, Priest Rapids, P.E.C., Quincy Chute, and Wapato. Wanapum and Priest Rapids generation is based on expected water. Grant PUD uses a 15% planning margin to cover various events such as a low water year, unplanned generation outages, extreme weather, unanticipated load growth, etc..
3. Conservation is based on an economic potential study performed in November 2017.
4. Physical loads and resources are covered through a resource and load exchange agreement with Shell Energy until 2020.

Inland Power & Light

<< Utility Name

Washington State Utility Resource Plan Year 2018

Prepared by: Brian Hess

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	107.50	113.27	117.35
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		1.10	1.00
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	107.50	105.40	105.40
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>		6.77	10.95
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	107.50	113.27	117.35
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval  (mm/yy)

**Notes:**

Base load is normalized and the 5 and 10 year estimates are those utilized in the published BPA forecast. Conservation potential assessments are showing flat or declining conservation potential. As of 2018, it is estimated that unspecified market purchases will be utilized to service the balance of load not serviced by our BPA contract. Inland Power has signed a long-term contract for REC's to satisfy its RCW 19.285 compliance obligation.

Public Utility District No. 1 of Jefferson County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	45.34	44.91	45.63
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.08	0.08
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	45.34	44.83	45.55
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	45.34	44.91	45.63
<b>Load Resource Balance</b>	0.00	0.00	0.00

Kittitas County PUD No. 1

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

EES Consulting

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	12.78	13.18	13.50
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.02	0.03
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	11.73	9.65	9.65
<i>BPA Tier 2</i>	0.00	2.45	2.78
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	0.98	0.98	0.98
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>	0.07	0.07	0.07
<i>Undecided</i>			
<b>Total Resources</b>	12.78	13.18	13.50
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-18 (mm/yy)

Notes:

Distributed Generation is primarily solar.

Public Utility District No. 1 of Klickitat County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Mike DeMott

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	47.79	49.72	51.35
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.17	0.23
<i>Demand Response</i>		0.00	0.00
<i>BPA Tier 1 (include BPA PF)</i>	36.07	36.47	36.47
<i>BPA Tier 2</i>	0.53	0.66	0.24
<b>Non BPA:</b>			
<i>Co-generation</i>	0.00	0.00	0.00
<i>Hydro (critical water)</i>	4.42	4.42	4.42
<i>Wind</i>	0.00	0.00	0.00
<i>Other Renewables</i>	0.00	0.00	0.00
<i>Thermal-Natural Gas</i>	0.00	0.00	0.00
<i>Thermal-Coal</i>	0.00	0.00	0.00
<i>Market Purchase (non BPA)</i>	7.00	8.00	10.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	48.02	49.72	51.35
<b>Load Resource Balance</b>	0.23	0.00	0.00

Lakeview Light & Power Co.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	30.97	31.86	32.66
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.14	0.14
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	30.97	31.72	32.52
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	30.97	31.86	32.66
<b>Load Resource Balance</b>	0.00	0.00	0.00

Lewis County PUD1

Washington State Utility

**Integrated Resource Plan Year 2018**

Prepared by:

Matt Samuelson

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2022			2027		
	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	261	133	114.00	219.00	135.00	111.00	222.00	136.00	112.00
<b>Exports</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Resources:</b>									
Future Conservation/Efficiency				2.75	2.20	1.52	5.50	4.40	3.04
Demand Response				0.00	0.00	0.00	0.00	0.00	0.00
Cogeneration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro	5.12	4.52	1.94	5.12	4.52	1.94	5.12	4.52	1.94
Wind	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Other Renewables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thermal - Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thermal - Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Long Term Contracts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Short Term Contracts									
BPA	197.00	175.00	133.77	197.00	175.00	129.88	197.00	175.00	130.48
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	209.37	186.77	142.96	212.12	188.97	140.59	214.87	191.17	142.71
<b>Load Resource Balance</b>	-51.63	53.77	28.96	-6.88	53.97	29.59	-7.13	55.17	30.71

Date of Board/Commission Approval

Sep-18 (mm/yy)

Mason County PUD No. 1

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

EES

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	9.28	9.47	9.55
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.04	0.04
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	8.56	8.89	8.97
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	0.72	0.54	0.54
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	9.28	9.47	9.55
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-18 (mm/yy)

Mason PUD 3

Washington State Utility Resource Plan Year **2018**

Prepared by: Michele Patterson

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	76.94	80.10	82.80
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.36	0.41
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	74.15	79.06	79.51
<i>BPA Tier 2</i>			0.47
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	1.15	0.66	0.66
<i>Wind</i>	1.62		1.73
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>	0.02	0.02	0.02
<i>Undecided</i>			
<b>Total Resources</b>	76.94	80.10	82.80
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval August-18 (mm/yy)

**Notes:**

This plan is based on the federal fiscal year to align with BPA. The base year is actual load.  
 Lines 17 & 18: The Specified Resource amounts as listed in the BPA Power Sales Agreement was used for the Hydro and Wind resources. In 2022, the wind resources are not needed to serve load; BPA will remarket it.  
 Line 24: Mason PUD 3's Distribution Generation source is solar.

McCleary, City of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	3.90	3.71	3.73
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	3.90	3.71	3.73
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	3.90	3.71	3.73
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

(mm/yy)

Milton, City of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	7.02	6.96	7.01
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.04	0.04
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	7.02	6.92	6.97
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	7.02	6.96	7.01
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

(mm/yy)

Modern Electric Water Co

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	27.41	28.15	28.75
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	27.41	26.15	26.15
<i>BPA Tier 2</i>		2.00	2.60
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	27.41	28.15	28.75
<b>Load Resource Balance</b>	0.00	0.00	0.00

Nespelem Valley Electric Cooperative Inc.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	7.79	8.79	8.91
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	6.67	5.85	5.85
<i>BPA Tier 2</i>	1.12	2.94	3.06
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	7.79	8.79	8.91
<b>Load Resource Balance</b>	0.00	0.00	0.00

Ohop Mutual Light Co.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	10.45	9.90	9.99
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.04	0.04
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	10.45	9.86	9.95
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	10.45	9.90	9.99
<b>Load Resource Balance</b>	0.00	0.00	0.00

PUD No. 1 of Okanogan County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Ron Gadeberg

**Notes:**

Loads: Used Actual 2017 Loads at POD. Used Actual 2017 Resources at POD. Forecasted Resources: BPA based on Block Slice contract (Block 19.807, Slice 25.367) Hydro Based on Critical Wells Project (8% net of output, increased critical amount by load growth for projection) BPA projections based on Block only product.

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	75.80	78.10	82.88
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	54.30	45.67	45.67
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	34.90	26.55	31.33
<i>Wind</i>	3.80	4.50	4.50
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	93.00	76.72	81.50
<b>Load Resource Balance</b>	17.20	-1.38	-1.38

Orcas Power and Light Cooperative

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Russell Guerry, P.E.

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	24.84	25.57	26.30
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.15	0.15
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	24.61	25.08	25.76
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	0.10	0.10	0.10
<i>Wind</i>			
<i>Other Renewables</i>	0.13	0.24	0.29
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	24.84	25.57	26.30
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-17 (mm/yy)

Notes:

Other Renewables will be used for solar resources.

PacifiCorp	<<< Utility Name								
Washington State Utility	Integrated Resource Plan Year			2018					
	Base Year			5 Year Estimate			10 Year Estimate		
Estimate Year		2018			2023			2028	
Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	738.40	714.57	521.99	766.70	779.72	532.06	792.24	812.84	547.62
<b>Exports</b>	28.09	61.87	24.79	23.73	21.61	15.75	12.34	11.17	12.18
<b>Resources:</b>									
Future Conservation/Efficiency				32.41	41.28	31.08	55.00	65.72	48.61
Demand Response					24.48	0.08		24.79	0.08
Cogeneration									
Hydro	87.37	78.95	42.90	71.66	56.88	31.50	72.20	57.75	30.60
Wind	28.15	25.26	55.44	46.57	42.51	67.01	45.47	41.86	64.71
Other Renewables	63.27	53.61	30.03	61.92	56.94	71.21	57.95	53.32	68.23
Thermal - Natural Gas	244.83	206.81	163.92	241.50	207.46	159.27	243.78	210.01	125.66
Thermal - Coal	501.83	450.42	219.99	436.23	401.97	205.62	369.74	338.45	237.90
Net Long Term Contracts	41.95	2.08	6.73	0.00	0.00	0.00	0.00	0.00	0.00
Net Short Term Contracts	27.42	25.49	2.32	27.29	33.62	2.66	31.73	101.37	5.87
BPA									
Other	13.21	11.85	-5.77	13.05	11.91	-5.68	13.17	12.06	-5.70
Imports	19.83	16.80	3.63	19.58	16.88	6.00	10.29	9.42	0.10
Distributed Generation	0.00	1.19	0.50	0.04	2.21	0.95	0.07	4.84	2.07
Undecided									
<b>Total Resources</b>	1,027.85	872.47	519.69	950.24	896.14	569.70	899.41	919.57	578.14
<b>Load Resource Balance</b>	261.37	96.03	-27.09	159.81	94.81	21.89	94.83	95.57	18.33

**Notes/Explanation for category choices:**

- Information is based on the 2017 Integrated Resource Plan Update filed with the Washington Utilities and Transportation Commission on May 1, 2018.
- 2017 IRP Acknowledgement Letter was issued on June 11, 2018.
- The Load Resource Balance in Capacity primarily reflects the 13% Planning Reserve Margin not included in Resources or Loads.

Public Utility District No.2 of Pacific County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Jason Dunsmoor

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	35.44	37.62	38.05
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.75	1.18
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	35.97	36.87	36.87
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>	2.90		
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	38.87	37.62	38.05
<b>Load Resource Balance</b>	3.43	0.00	0.00

Date of Board/Commission Approval

September-18 (mm/yy)

Parkland Light and Water Co.

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	13.82	13.82	13.98
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.08	0.08
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	13.82	13.74	13.90
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	13.82	13.82	13.98
<b>Load Resource Balance</b>	0.00	0.00	0.00

Pend Oreille PUD

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Director, Power and Risk Management

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	116.00	37.92	38.50
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	10.00	0.00	0.00
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>	83.17	81.60	81.60
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>	0.01	0.01	0.01
<i>Undecided</i>			
<b>Total Resources</b>	93.18	81.61	81.61
<b>Load Resource Balance</b>	-22.82	43.69	43.11

Date of Board/Commission Approval

(mm/yy)

Notes:

We have limited distributed generation at this point. Forecasted DG is not expected to grow much.

Peninsula Light

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Sharon Silver

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2016	2021	2026
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	67.38	68.00	68.85
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.50	1.00
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	67.38	67.50	67.85
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	67.38	68.00	68.85
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-18 (mm/yy)

Port Angeles, City of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	32.63	49.18	55.66
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.27	0.27
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	32.63	48.91	55.39
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	32.63	49.18	55.66
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-18 (mm/yy)

**Notes:**

Resources: BPA Tier 1 (includes BPA-PF) - The City of Port Angeles is a full resource customer of the Bonneville Power Administration (BPA). BPA will provide all power to the City through 2028.

Seattle, Port of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2025
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	16.37	21.90	24.92
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	16.37	17.11	17.11
<i>BPA Tier 2</i>		4.79	7.81
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	16.37	21.90	24.92
<b>Load Resource Balance</b>	0.00	0.00	0.00

Puget Sound Energy

<<< Utility Name

Washington State Utility **Integrated Resource Plan Year 2018**

Prepared by: Chris Schaefer

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	1/1/2018			2023			2028		
Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	5,021.00	3,224.00	2,681.00	5,359.00	3,498.00	2,864.00	5,662.00	3,801.00	3,036.00
<b>Exports</b>	14.00	320.00	66.00	11.00	311.00	63.00	0.00	300.00	48.00
<b>Resources:</b>									
Future Conservation/Efficiency				374.00	257.00	239.00	549.00	376.00	355.00
Demand Response				79.00			107.00		
Cogeneration									
Hydro	853.00	762.00	505.00	814.00	768.00	473.00	685.00	743.00	433.00
Wind	143.00	90.00	242.00	143.00	143.00	275.00	137.00	137.00	261.00
Other Renewables									
Thermal - Natural Gas	2,061.00	1,841.00	1,146.00	2,061.00	1,841.00	1,146.00	2,061.00	1,841.00	1,146.00
Thermal - Coal	658.00	658.00	608.00	360.00	360.00	334.00	360.00	360.00	334.00
Net Long Term Contracts	401.00	386.00	410.00	387.00	376.00	394.00	15.00	4.00	5.00
Net Short Term Contracts	1,722.00	1,695.00		1,752.00	1,670.00		1,863.00	1,677.00	
BPA									
Imports	308.00	8.00	50.00	308.00	8.00	50.00	308.00	8.00	50.00
Distributed Generation									
<b>Total Resources</b>	6,146.00	5,440.00	2,961.00	6,278.00	5,423.00	2,911.00	6,085.00	5,146.00	2,584.00
<b>Load Resource Balance</b>	1,111.00	1,896.00	214.00	908.00	1,614.00	-16.00	423.00	1,045.00	-500.00

**Notes:**  
PSE's Integrated Resource Plan includes the least cost combination of conservation and supply-side resources to meet requirements, per WAC 480-100-238. This information is also available in PSE's 2017 Integrated Resource Plan, page B-17, filed with the Washington Utilities and Transportation Commission, Dockets UE-160918 and UG-160919.

Richland, City of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	111.37	116.76	122.39
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	106.06	103.32	103.32
<i>BPA Tier 2</i>	5.31	4.44	9.07
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>		9.00	10.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	111.37	116.76	122.39
<b>Load Resource Balance</b>	0.01	0.00	0.00

Ruston, Town of << Utility Name

Washington State Utility Resource P 2018

Prepared by:

Tacoma Power - update 2016 rpt

	<b>Base Year</b>	<b>5 Yr. Est.</b>	<b>10 Yr Est.</b>
<b>Estimate Year</b>	2016	2021	2026
<b>Period</b>	<b>Annual</b>	<b>Annual</b>	<b>Annual</b>
<b>Units</b>	<b>(MWa)</b>	<b>(MWa)</b>	<b>(MWa)</b>
<b>Loads</b>	0.706	0.722	0.710
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>			
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>	0.706	0.722	0.710
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	0.71	0.72	0.71
<b>Load Resource Balance</b>	0.00	0.00	0.00

Seattle City Light

<<< Utility Name

Date of Board/Commission Approval

09/18

(mm/yy)

Washington State Utility **Integrated Resource Plan Year 2018**

Prepared by: A. Seelig

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2022			2027		
	Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>			1,126.10			1,144.60			1,164.16
<b>Exports</b>			75.60			0.00			0.00
<b>Resources:</b>									
Future Conservation/Efficiency						55.40			93.90
Demand Response									
Cogeneration			1.10			2.45			2.45
Hydro			795.90			709.73			682.70
Wind			37.70			11.80			0.00
Other Renewables			11.00			12.00			12.00
Thermal - Natural Gas									
Thermal - Coal									
Net Long Term Contracts									
Net Short Term Contracts									
BPA			625.90			508.10			508.20
Imports			40.40			0.00			0.00
Distributed Generation									
<b>Total Resources</b>	0.00	0.00	1,512.00	0.00	0.00	1,299.48	0.00	0.00	1,299.25
<b>Load Resource Balance</b>	0.00	0.00	310.30	0.00	0.00	154.88	0.00	0.00	135.09

**Notes: Explain resource choices other than conservation / Use of Renewable Energy Credits in planning/ Distributed Generation Sources**

10) Base year system load. 2022 and 2027 loads don't include conservation. 11 & 25) There are no seasonal exchanges in place after 2019. 16) This row represents City Light's hydro resources and long-term hydro contracts. Actual production for 2017. It also represents 1936-37 critical water condition based on 2018-19 regulation. 17) Stateline wind contract expires in 2021, but some energy is delivered in 2022 through an integration and exchange agreement. 18) Other renewables include landfill gas and waste wood biomass. Burlington Renewable biomass contract expired in 2017. 23) BPA contract converted to all Block 10/1/2017. 31) Public hearing and Housing, Health, Energy, & Workers' Rights Committee approval of Resolution 31833 on Aug 16, 2018, full council adoption Sept 4, 2018.

PUD1 of Skamania County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	16.38	15.38	15.53
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	16.38	15.38	15.53
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	16.38	15.38	15.53
<b>Load Resource Balance</b>	0.00	0.00	0.00

PUD No. 1 of Snohomish County

<<< Utility Name

Washington State Utility

**Integrated Resource Plan Year 2018**

Prepared by:

A Berg

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2017			2022			2027		
	Period	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	1,441.00	901.00	782.00	1,085.00	803.00	800.00	1,130.00	853.00	845.00
<b>Exports</b>		114.00	220.00		33.00	230.00			201.00
<b>Resources:</b>									
Future Conservation/Efficiency				58.00	46.00	45.00	126.00	97.00	93.00
Demand Response									
Cogeneration	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Hydro	117.00	50.00	52.00	78.00	29.00	69.00	83.00	28.00	72.00
Wind	33.00	90.00	55.00	37.00	77.00	67.00	13.00	33.00	27.00
Other Renewables	1.00	1.00	1.00						
Thermal - Natural Gas									
Thermal - Coal									
Net Long Term Contracts									
Net Short Term Contracts				50.00	50.00				
BPA	1,154.00	872.00	892.00	808.00	630.00	845.00	809.00	653.00	850.00
Other									
Imports	134.00			51.00			96.00	38.00	
Distributed Generation				1.00	2.00	2.00	1.00	2.00	2.00
Undecided									
<b>Total Resources</b>	1,441.00	1,015.00	1,002.00	1,085.00	836.00	1,030.00	1,130.00	853.00	1,046.00
<b>Load Resource Balance</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Date of Board/Commission Approval

May-18 (mm/yy)

**Notes for PUD No. 1 of Snohomish County**

The 2017 IRP concluded with its probabilistic approach to existing and committed resources and BPA contract assumptions that the PUD is in an annual energy surplus position in the near term, and conservation is the single largest resource to be acquired over the 2018-2037 IRP study period. In addition, the lowest cost approach to meet the increasing Energy Independence Act (I-937) annual renewables compliance targets is to acquire additional unbundled renewable energy credits to supplement the PUD's existing power supply portfolio.

- 1) Base year reflects 2017 data with Winter Peak occurring in January 2017 and Summer Peak occurring in August 2017.
- 2) 5 and 10 Year reflect 2017 IRP Long Term Resource Strategy, adopted by the Snohomish PUD Board of Commissioners on May 8, 2018.
- 3) 5 and 10 Year for Winter reflects monthly average for December on peak period, Summer reflects monthly average for August on peak period.
- 4) "Loads" for the 5 and 10 Year Estimates are before new conservation and are at the total system level (i.e., retail sales + distribution line losses).
- 5) "Future Conservation/Efficiency" reflects new cumulative acquisition of Conservation as described in the 2017 Integrated Resource Plan.
- 6) Cogeneration consists of output from the Hampton Lumber Mill's Darrington, WA wood waste generator.
- 7) "Hydro" includes PUD's hydro resources: Jackson, Woods Creek, Youngs Creek, Packwood, Hancock & Calligan.
- 8) "Wind" includes PUD's long term power purchase agreements for 10% White Creek, 100% Wheat Field and 100% Hay Canyon wind projects and uses a probabilistic forecast based on historical actuals.
- 9) "Distributed Generation" for the 5 and 10 Year estimates reflects assumption for Customer-Owned Generation assumed in 2017 IRP.
- 10) "Net Short Term Contracts" for the 5 and 10 Year estimates reflect the 2017 IRP procurement of a 50 MW short term capacity product that can be called on to serve peak winter and summer demand
- 11) "BPA" for the 5 and 17 Year reflects forecast of Snohomish PUD's long-term power contract with BPA for the Block/Slice product.
- 12) "Imports" reflect short term balancing purchases from the wholesale energy market to balance the PUD's loads and resources.
- 13) "Exports" reflect short term balancing sales to the wholesale energy market to balance the PUD's loads and resources.
- 14) Rooftop solar facilities that are behind the meter (residential, commercial installations) are reflected as a reduction to Load forecast for Years 5 and 10.

Steilacoom, Town of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	4.69	4.80	4.92
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.01	0.01
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	4.69	4.79	4.91
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	4.69	4.80	4.92
<b>Load Resource Balance</b>	0.00	0.00	0.00

Sumas, City of

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	3.84	3.76	3.81
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	3.84	3.76	3.81
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	3.84	3.76	3.81
<b>Load Resource Balance</b>	0.00	0.00	0.00

Tacoma Power

<<< Utility Name

Washington State Utility  
**Integrated Resource Plan Year 2018**

Prepared by:

Ahlmahz Negash

Estimate Year	Base Year			5 Year Estimate			10 Year Estimate		
	2016			2021			2026		
	Winter	Summer	Annual	Winter	Summer	Annual	Winter	Summer	Annual
Units	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)	(MW)	(MW)	(MWa)
<b>Loads</b>	923.00		551.00	1,002.00		584.00	1,006.00		582.00
<b>Exports</b>									
<b>Resources:</b>									
Future Conservation/Efficiency						16.00			32.00
Demand Response									
Cogeneration									
Hydro	475.87		361.00	730.00		198.00	730.00		198.00
Wind									
Other Renewables									
Thermal - Natural Gas									
Thermal - Coal									
Net Long Term Contracts	4.00		32.00	5.50		32.00	5.50		11.00
Net Short Term Contracts									
BPA	512.00		434.00	525.00		375.00	525.00		350.00
Other									
Imports									
Distributed Generation									
Undecided									
<b>Total Resources</b>	991.87	0.00	827.00	1,260.50	0.00	621.00	1,260.50	0.00	591.00
<b>Load Resource Balance</b>	68.87	0.00	276.00	258.50	0.00	37.00	254.50	0.00	9.00

Date of Board/Commission Approval

Nov-17

(mm/yy)

Tanner Electric Cooperative

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	11.30	12.05	12.76
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.08	0.08
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	10.32	10.98	10.98
<i>BPA Tier 2</i>	0.97	0.99	0.71
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			1.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	11.29	12.05	12.76
<b>Load Resource Balance</b>	0.00	-0.01	0.00

Vera Water and Power

<< Utility Name

Washington State Utility Resource Plan Year 2018

Prepared by: Kevin Wells

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	27.09	28.65	29.37
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	25.09	27.65	27.37
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>	2.00	1.00	2.00
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	27.09	28.65	29.37
<b>Load Resource Balance</b>	0.00	0.00	0.00

**Notes:**

All conservation and distributed resource gains are reflected in the BPA tier one load forecast being lower than it would have been otherwise.

PUD 1 of Wahkiakum County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	5.21	4.92	4.92
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	5.21	4.92	4.92
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	5.21	4.92	4.92
<b>Load Resource Balance</b>	0.00	0.00	0.00

PUD 1 of Whatcom County

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

Whatcom PUD

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	23.81	26.65	26.35
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>		0.30	0.00
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	23.81	26.35	26.35
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	23.81	26.65	26.35
<b>Load Resource Balance</b>	0.00	0.00	0.00

Date of Board/Commission Approval

August-18 (mm/yy)

Notes:

Line 13: Whatcom PUD has a full requirements contract with BPA for resources through 2027.

Yakama Power

<< Utility Name

Washington State Utility Resource Plan Year

2018

Prepared by:

BPA

	<i>Base Year</i>	<i>5 Yr. Est.</i>	<i>10 Yr Est.</i>
<i>Estimate Year</i>	2017	2022	2027
<i>Period</i>	<i>Annual</i>	<i>Annual</i>	<i>Annual</i>
<i>Units</i>	<i>(MWa)</i>	<i>(MWa)</i>	<i>(MWa)</i>
<b>Loads</b>	16.63	19.01	19.21
<b>Resources:</b>			
<i>Future Conservation/Efficiency</i>			
<i>Demand Response</i>			
<i>BPA Tier 1 (include BPA PF)</i>	16.63	19.01	19.21
<i>BPA Tier 2</i>			
<b>Non BPA:</b>			
<i>Co-generation</i>			
<i>Hydro (critical water)</i>			
<i>Wind</i>			
<i>Other Renewables</i>			
<i>Thermal-Natural Gas</i>			
<i>Thermal-Coal</i>			
<i>Market Purchase (non BPA)</i>			
<i>Other</i>			
<i>Distributed Generation</i>			
<i>Undecided</i>			
<b>Total Resources</b>	16.63	19.01	19.21
<b>Load Resource Balance</b>	0.00	0.00	0.00

## Appendix B: 2017 WA Utility Sales, Customer Count, Revenue and Price

Utility	Ownership class	Customers (Count)	Sales (Megawatt-hours)	Revenues (Thousands Dollars)	Average Price (cents/kWh)
Avista Corp	Investor Owned	250,848	5,817,350	549,204	9.44
Benton Rural Electric Assn	Cooperative	14,260	548,599	40,465	7.38
Big Bend Electric Coop, Inc.	Cooperative	9,214	529,634	33,846	6.39
Bonneville Power Administration	Federal	10	4,528,661	58,688	1.30
City of Blaine - (WA)	Municipal	3,306	78,433	6,121	7.80
City of Centralia - (WA)	Municipal	10,184	266,120	25,294	9.50
City of Cheney - (WA)	Municipal	5,708	138,588	8,894	6.42
City of Ellensburg - (WA)	Municipal	9,625	214,459	15,982	7.45
City of Port Angeles - (WA)	Municipal	11,811	298,598	25,080	8.40
City of Richland - (WA)	Municipal	24,095	959,499	64,162	6.69
City of Seattle - (WA)	Municipal	454,496	9,408,356	875,235	9.30
City of Tacoma - (WA)	Municipal	177,150	4,745,355	342,053	7.21
Clearwater Power Company	Cooperative	986	22,536	2,009	8.91
Columbia Rural Elec Assn, Inc.	Cooperative	5,601	331,707	28,014	8.45
Elmhurst Mutual Power & Light Co	Cooperative	15,105	280,203	19,187	6.85
Inland Power & Light Company	Cooperative	39,221	928,768	70,938	7.64
Kootenai Electric Coop Inc.	Cooperative	78	2,834	242	8.53
Lakeview Light & Power	Cooperative	10,087	264,148	23,553	8.92
Modern Electric Water Company	Cooperative	10,074	228,213	14,171	6.21
Northern Lights, Inc.	Cooperative	15	117	15	12.82
Ohop Mutual Light Company, Inc	Cooperative	4,345	85,020	7,223	8.50
Okanogan County Elec Coop, Inc	Cooperative	3,601	61,521	5,792	9.41
Orcas Power & Light Coop	Cooperative	15,204	213,705	27,748	12.98
PUD 1 of Snohomish County	Political Subdivision	346,594	6,586,125	608,296	9.24
PUD No 1 of Benton County	Political Subdivision	53,111	1,785,098	125,489	7.03
PUD No 1 of Chelan County	Political Subdivision	49,940	1,725,811	52,847	3.06
PUD No 1 of Clallam County	Political Subdivision	31,796	651,407	58,126	8.92
PUD No 1 of Clark County - (WA)	Political Subdivision	203,975	4,638,251	375,254	8.09
PUD No 1 of Cowlitz County	Political Subdivision	50,365	4,825,787	264,978	5.49
PUD No 1 of Douglas County	Political Subdivision	15,875	926,104	27,344	2.95
PUD No 1 of Ferry County	Political Subdivision	3,498	89,782	7,643	8.51
PUD No 1 of Franklin County	Political Subdivision	26,589	1,051,558	80,670	7.67
PUD No 1 of Grays Harbor County	Political Subdivision	42,456	984,141	97,999	9.96
PUD No 1 of Jefferson County	Political Subdivision	19,468	383,290	35,680	9.31
PUD No 1 of Klickitat County	Political Subdivision	12,768	354,781	33,217	9.36
PUD No 1 of Lewis County	Political Subdivision	32,011	954,331	66,335	6.95
PUD No 1 of Okanogan County	Political Subdivision	21,016	631,767	46,625	7.38
PUD No 1 of Pend Oreille County	Political Subdivision	9,135	1,003,761	48,688	4.85
PUD No 1 of Skamania Co	Political Subdivision	6,054	127,356	11,172	8.77
PUD No 1 of Whatcom County	Political Subdivision	1	196,301	10,302	5.25
PUD No 2 of Grant County	Political Subdivision	50,510	4,685,406	188,473	4.02

### Appendix B (cont.)

<b>Utility</b>	<b>Ownership class</b>	<b>Customers (Count)</b>	<b>Sales (Megawatt- hours)</b>	<b>Revenues (Thousands Dollars)</b>	<b>Average Price (cents/kWh)</b>
PUD No 2 of Pacific County	Political Subdivision	17,360	314,671	25,276	8.03
PUD No 3 of Mason County	Political Subdivision	33,512	649,498	64,715	9.96
PacifiCorp	Investor Owned	130,570	4,221,298	356,529	8.45
Parkland Light & Water Company	Cooperative	4,559	118,429	8,473	7.15
Peninsula Light Company	Cooperative	32,842	606,390	57,071	9.41
Puget Sound Energy Inc	Investor Owned	1,135,020	21,316,397	2,256,627	10.59
SolarCity Corporation	Behind the Meter	99	601	76	12.61
Tanner Electric Coop	Cooperative	4,807	94,298	10,859	11.52
Town of Steilacoom	Municipal	2,945	38,696	2,934	7.58
Vera Irrigation District #15	Political Subdivision	11,623	230,996	17,032	7.37
Adjustment 2017	Other	22,993	494,455	42,450	0.00