

# Orcas Power and Light Cooperative



Resource Plan and  
HB1010 Filing Final

July 2008

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# 1 Introduction

Orcas Power and Light Cooperative (OPALCO) contracted EES Consulting (EESC) to develop a resource plan consistent with Engrossed Substitute House Bill 1010 (HB 1010) for Washington State utilities. OPALCO is currently a full requirements customer of the Bonneville Power Administration (BPA) which means that BPA provides all power requirements at cost-based rates. However, OPALCO's power supply portfolio will change and be impacted in the future due to fundamental changes to the pricing structure of BPA power sales beginning in October 2011. BPA has developed two pricing tiers to capture the difference in costs associated with existing BPA resources (Tier 1), and new resources or market priced purchases (Tier 2) required to meet customers' loads in excess of the current capability of the BPA system.

The intent of HB 1010 is to pursue safe, clean, and reliable energy resources to meet demand in Washington. HB 1010 requires all utilities, regardless of size, to develop resource plans that consider renewable and conservation resources. Because OPALCO serves fewer than 25,000 customers, HB 1010 requires that OPALCO develop a resource plan that:

1. Estimates loads for the next five and ten years;
2. Enumerates the resources that will be maintained and/or required to serve those loads; and
3. Explains why the resources in (2.) were chosen and, if the resources chosen are not renewable or conservation resources, why such a decision was made.

This report addresses each of these requirements and is meant as a planning document for meeting OPALCO's future energy requirements. First, OPALCO's current loads and resources are discussed. Then energy and demand forecasts are described and planned future resources identified. These planned resources include a combination of federal (Bonneville Power Administration, BPA) resources, demand-side resources, and other local resources. Lastly, a resource summary describes the resource choice identified in the forecasted loads and resource balance section.

## 2 Current Loads and Resources

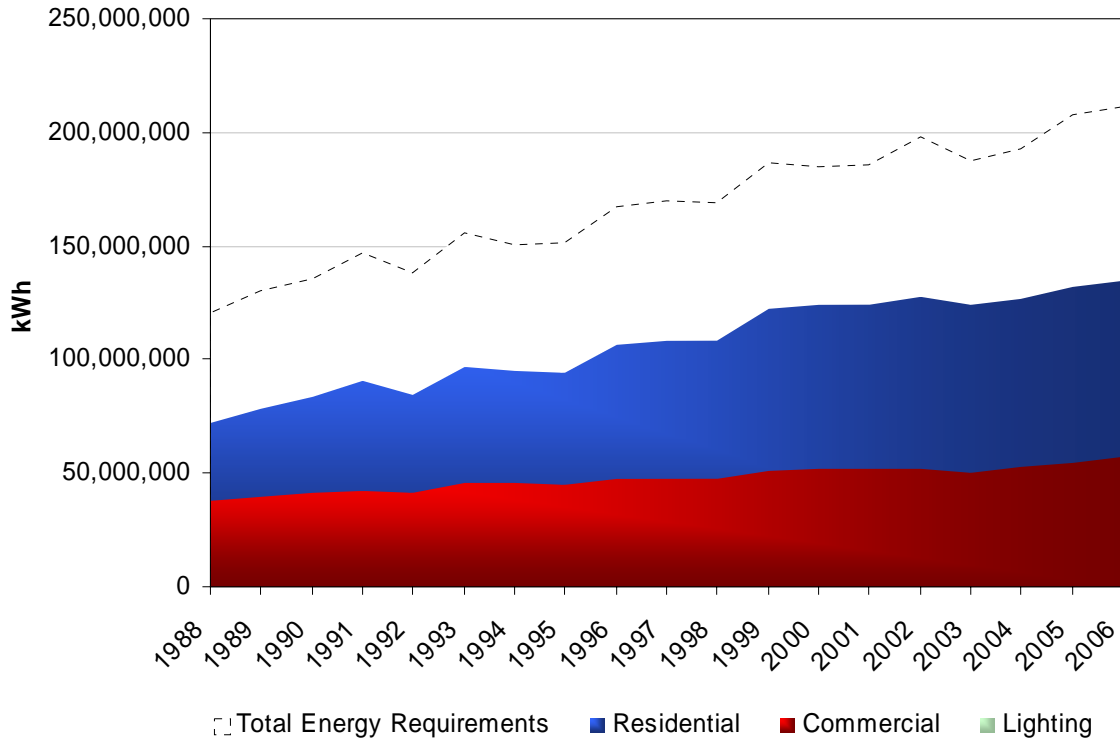
### Background

Orcas Power and Light Cooperative (OPALCO) is a rural electric cooperative serving 20 islands in San Juan County including Orcas, San Juan, Shaw, and Lopez. OPALCO serves approximately 13,000 residential, commercial, and lighting customers. Due to the rural nature of their service territory, OPALCO's customer base is primarily residential. Friday Harbor, located on San Juan Island, is the only incorporated town in the county. Tourism is the largest employer in San Juan County and tourism related services compose the majority of service related employment. The population in San Juan County nearly doubles during the peak of the tourist season (in the summertime).

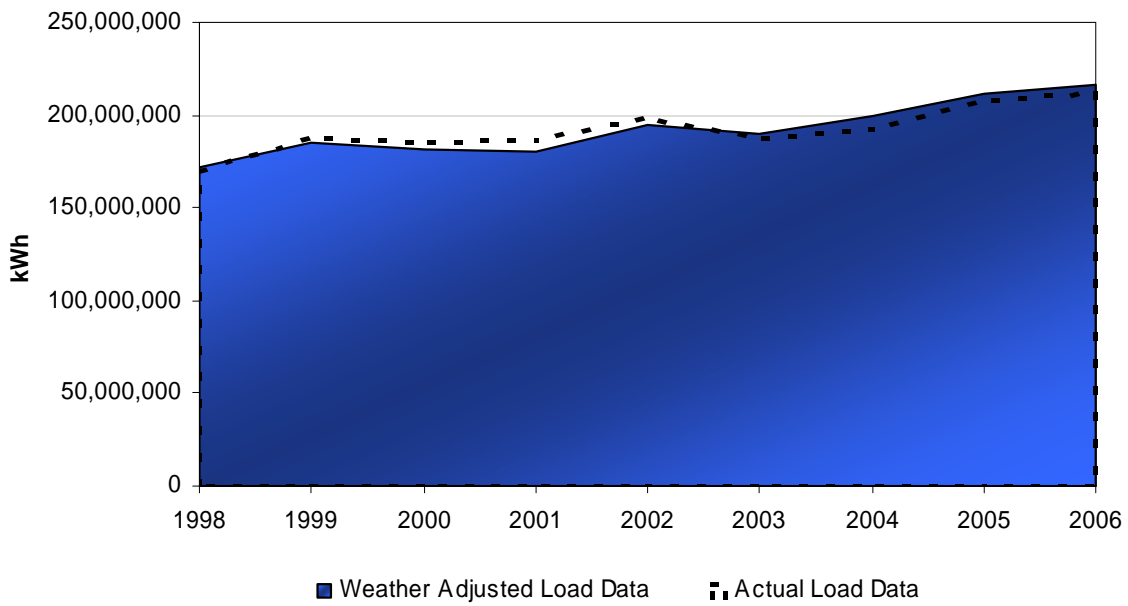
### Historic Loads

Figure 1 shows historic energy loads by customer. The lighting customer use is low (2,274 kWh in 2006) so is not visible on the graph. Total energy requirements have increased from 120,500 MWh in 1988 to 211,396 MWh in 2006. The increase is due to an average annual residential energy sales growth of 3.5 percent and 2.3 percent growth in commercial energy use. Lighting usage decreases over the same period from 104 MWh in 1988 to just over 2 MWh in 2006 due to decreasing average use per customer. Peak demand increased from 30.3 MW in 1988 to 55.6 MW in 2006. Figure 2 shows weather adjusted loads for the period 1998 through 2006. The total requirements in Figure 2 were calculated using Heating Degree Days (HDD) from the Friday Harbor Airport weather station provided by NOAA (National Oceanic and Atmospheric Administration).

**Figure 1  
Historic Energy Sales 1988 through 2006**



**Figure 2  
Weather Adjusted Total Requirements  
1998 through 2006**



## Existing Resources

### Bonneville Power Administration Resources

OPALCO is a BPA full requirements customer; they rely solely on BPA to provide their energy and demand requirements at low rates. Under BPA's current rate structure, when BPA acquires additional resources to serve its customers' increasing loads (load growth), the cost of purchasing additional power is averaged or "melded" with the cost of the existing resources. As a result, BPA's current rates reflect the average cost of both its existing and new resources.

In addition to the preference power OPALCO purchases, OPALCO also purchases 0.33 aMW of green power from BPA. OPALCO is able to offer customers the option to buy their power from green resources.

### Local Resources

OPALCO has acquired several local renewable resources in their service territory through BPA's CR&D and CAA programs. Table 1 shows capacity and energy produced for each type of resource. OPALCO has a combination of solar, wind, and micro-hydro projects located in their service territory. Solar projects are most prominent. A more detailed table of local renewable resources is provided in the appendix.

**Table 1**  
**Small Renewable Resources**

	<b>Capacity (watts)</b>	<b>kWh per Year</b>	<b>aMW</b>
<b>Solar</b>	84,834	108,008	0.012
<b>Micro-Hydro</b>	720	25,820	0.003
<b>Wind</b>	-	16,000	0.002
<b>Total</b>	87,354	152,404	0.017

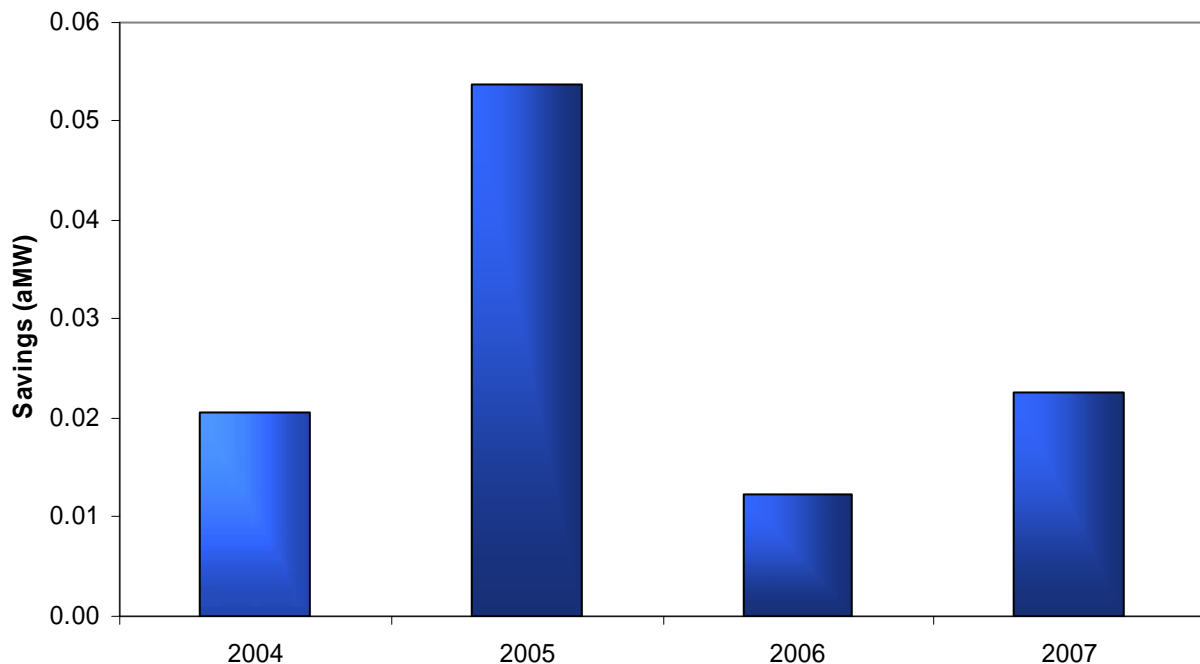
### Demand-Side Management

In the past, OPALCO has participated in Bonneville's conservation programs. These programs include commercial and residential CAA, CR&D, and ConAug programs. Table 2 provides historic conservation data for the period 2004 through 2007. Figure 3 illustrates annual savings for each year. Early start savings and expenditures (via BPA credit) for are included in the 2007 figures. Overall, Orcas Power and Light has saved an average of 0.03 aMW each year through several conservation and energy efficiency measures including: residential and commercial lighting, heat pump upgrades, Energy Star® New Homes (manufactured), energy efficient water heaters and appliances.

**Table 2**  
**Historic Conservation Savings**

Year	Expenditures nominal \$	Savings aMW	Early Start Expenditures	Early Start Savings
2004	62,634	0.02		
2005	46,906	0.05		
2006	41,088	0.01		
2007	31,124	0.02	18,123	0.01

**Figure 3**  
**Historic Conservation Savings 2004 to 2007**



### Northwest Energy Efficiency Alliance Savings

The Northwest Energy Efficiency Alliance (NEEA) is an organization that coordinates regional conservation efforts through a multitude of programs. The Bonneville Power Administration contributes money each year toward NEEA's conservation efforts, and so each BPA customer (utility) can claim their pro rata share of BPA savings. For this resource plan, EES Consulting estimated OPALCO's share of the BPA NEEA savings. This estimate is based on the assumption that BPA funds 50 percent of NEEA's total budget and so BPA can claim 50 percent of the savings. Also, OPALCO's pro rata share of BPA's conservation savings is calculated using the high watermark data released in August 2007. OPALCO's actual share of NEEA savings may vary depending on actual

load data. OPALCO’s average NEEA savings from 2001 through 2006 is approximately 0.06 aMW per year. Table 3 shows the details of the NEEA estimates.

**Table 3**  
**Orcas Power & Light Cooperative Share of NEEA Savings**

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Average</b>
BPA and Utility Programs	115.92	110.66	99.48	103.23	100.16	95.81	<b>104.21</b>
Alliance Programs	30.17	35.39	33.53	35.14	28.89	24.53	<b>31.27</b>
BPA Share of NEEA	15.09	17.70	16.76	17.57	14.44	12.27	<b>15.64</b>
Orcas	0.06	0.07	0.06	0.07	0.05	0.05	<b>0.06</b>

# 3 Forecasted Loads and Resources

## Electric Load Forecast

OPALCO provided an electric load forecast developed in 2007. The 20-year forecast projects energy and demand for the period 2007 through 2026. Each customer class energy use per customer and number of customers is forecasted separately taking into account projected weather, heating degree days, population, and average price of electricity. Three scenarios were developed; however, the medium scenario is used for HB 1010 planning purposes. Forecasted peak demand is calculated using total energy requirements and assumed load factor. OPALCO’s load factor generally falls between 45 and 50 percent with peaks occurring in January. Table 4 below summarizes the medium scenario load forecast and Table A1 in the appendix shows the details of the forecast.

**Table 4  
Medium Scenario Load Forecast Summary (kWh)**

Year	Residential	Commercial	Lighting	Total Sales	Utility Use	Losses	Total Energy Requirements	Loss as % of Total Req.	Peak Demand kW	Load Factor
2006*	134,638,062	57,535,531	2,274	192,175,867	789,547	18,430,889	211,396,303	8.7%	55,640	43%
2010	143,798,392	59,528,043	2,275	203,328,710	824,241	15,366,351	219,519,302	7.0%	55,687	45%
2013	152,925,458	61,329,600	2,275	214,257,333	849,216	14,953,931	230,060,480	6.5%	58,361	45%
2018	169,330,572	64,587,735	2,275	233,920,582	892,534	14,988,071	249,801,187	6.0%	63,369	45%
2026	199,011,766	70,490,709	2,275	269,504,750	966,487	17,264,122	287,735,359	6.0%	72,992	45%
Avg Growth	2.0%	1.0%		1.7%	1.0%					

\*2006 values are actuals

## Planned Resources

### Bonneville Power Administration Resources

Beginning in October 2011, BPA will implement a tiered rate system where the traditional low rates will be available for only the first block of power. The first block is known as the utility’s high water mark (HWM) and is equal to 2010 loads. Loads above a utility’s HWM will be met with either Tier 2 BPA resources (at higher rates than Tier 1 resources) or non-federal resources chosen by the utility. Tier 1 is intended to capture the costs of BPA’s current resources and Tier 2 is intended to capture the costs of additional resources acquired by BPA to serve its customers’ loads in excess of their Tier 1 allocation. The general structure of the products that BPA intends to make available at Tier 1 rates is likely to remain essentially unchanged from the products that it currently provides. However, BPA and its customers are still working on finalizing the tiered rates methodology, rate design and product catalog. It is therefore difficult, at this time, to determine the impact of these changes on OPALCO.

At the time of this resource plan, OPALCO's Tier 1 energy is estimated based on the data provided. OPALCO's forecast Contract High Water Mark (CHWM) is 25.04 aMW per year using OPALCO's latest load forecast and historic local resources. OPALCO's 2010 forecasted total requirements are 25.06 aMW and local resources are 0.017 aMW. Therefore, OPALCO's assumed CHWM and Tier 1 allocation is 25.04 aMW annually.

### **Local Resources**

This resource plan assumes that no additional renewable energy resources are installed during the ten-year planning period. Historic renewable energy in OPALCO's service territory sums to .017 aMW per year. While projects may be installed during the planning period, the power supply provided by these new projects is likely to remain too small to include in this plan.

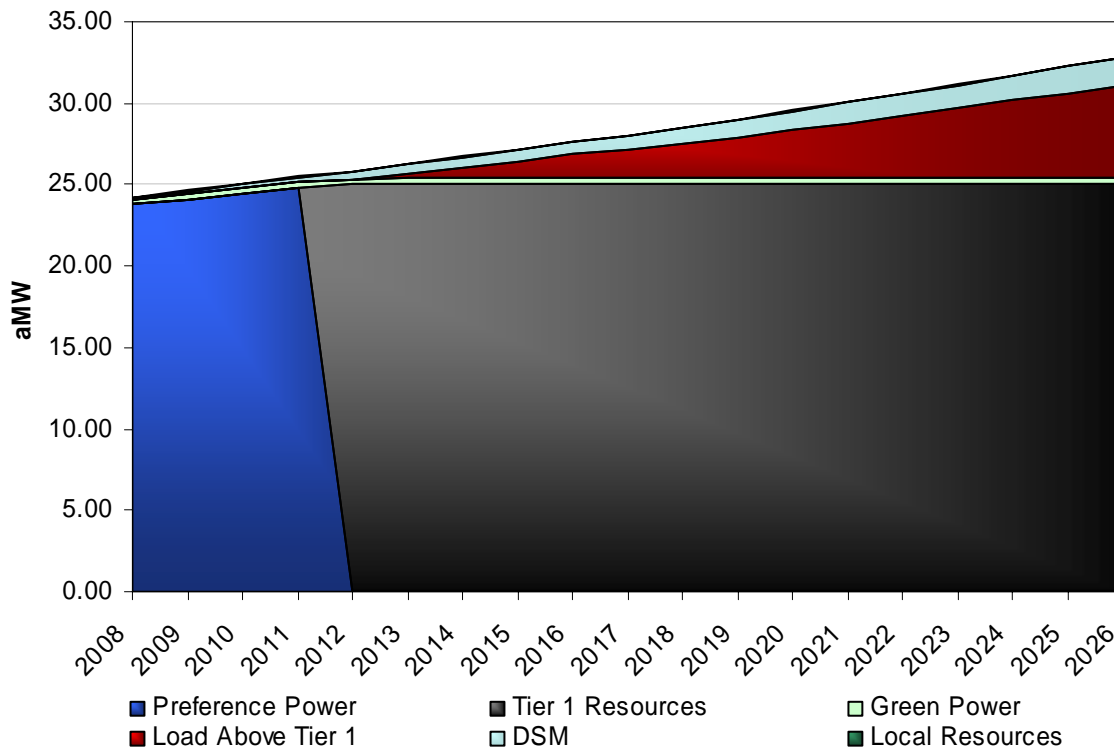
### **Demand-Side Management**

Together, historic OPALCO program savings and NEEA savings amount to an average of 0.09 aMW per year of conservation resources. This average is used as an estimate of future annual savings. OPALCO will continue to work with BPA to determine and implement cost effective programs in the service area.

### **Load Resource Balance**

Figure 4 illustrates OPALCO's load resource balance for the period 2008 through 2026. OPALCO's continued conservation efforts reduce power requirements above Tier 1 resources. Since energy produced from local resources is small, it does not show prominently in Figure 4. Also, based on current information, OPALCO plans to continue offering the option for customers to purchase green power through the end of the planning period. Green power purchased from BPA is shown below in Figure 4.

**Figure 4  
Load Resource Balance - ENERGY**



**Load Above Tier 1**

At this time, OPALCO plans to meet load above Tier 1, DSM, and Local resources with BPA’s load following product. Since OPALCO’s estimated load growth is low (1.8 percent), and local resources are available, only a small portion of OPALCO’s load requirements are subject to BPA Tier 2 rates. OPALCO will continue to explore other resource options, such as DSM or renewable resources, as they become available.

# Resource Summary

Orcas Power and Light Cooperative has developed this plan in response to HB1010 requirements. Table 5 summarizes the planned resources for the period 2012 through 2026. Additional detail and the Cover Sheet and Summary of Biennial Utility Resource Plans form required by HB1010 can be found in the attached appendix. The forecast below is based on actual 2007 data for the base year and average historic resources.

**Table 5**  
**Planned Resources 2012-2026 (aMW)**

	<b>Total Power Requirements</b>	<b>Local Resources</b>	<b>DSM</b>	<b>Green Power</b>	<b>Preference Power</b>	<b>Tier 1 Resources</b>	<b>Load Above Tier 1</b>
2008	24.20	0.017	0.09	0.33	23.77		0.00
2009	24.63	0.017	0.18	0.33	24.10		0.00
2010	25.06	0.017	0.27	0.33	24.44		0.00
2011	25.50	0.017	0.36	0.33	24.79		0.00
2012	25.81	0.017	0.45	0.33		<b>25.01**</b>	<b>0.00</b>
<b>2013</b>	<b>26.26</b>	<b>0.017</b>	<b>0.54</b>	0.33		<b>25.04</b>	<b>0.33</b>
2014	26.72	0.017	0.63	0.33		25.04	<b>0.70</b>
2015	27.20	0.017	0.72	0.33		25.04	<b>1.09</b>
2016	27.68	0.017	0.81	0.33		25.04	<b>1.48</b>
2017	28.02	0.017	0.9	0.33		25.04	<b>1.73</b>
<b>2018</b>	<b>28.52</b>	<b>0.017</b>	<b>0.99</b>	0.33		<b>25.04</b>	<b>2.14</b>
2019	29.02	0.017	1.08	0.33		25.04	<b>2.55</b>
2020	29.54	0.017	1.17	0.33		25.04	<b>2.98</b>
2021	30.06	0.017	1.26	0.33		25.04	<b>3.41</b>
2022	30.60	0.017	1.35	0.33		25.04	<b>3.86</b>
2023	31.15	0.017	1.44	0.33		25.04	<b>4.32</b>
2024	31.70	0.017	1.53	0.33		25.04	<b>4.78</b>
2025	32.27	0.017	1.62	0.33		25.04	<b>5.26</b>
2026	32.85	0.017	1.71	0.33		25.04	<b>5.75</b>

\*Since "Load above Tier 1" is less than 1 aMW, it will be part of the Tier 1 load following product and not subject to Tier 2 rates.

\*\*The full HWM amount is not purchased due to green power purchases. This analysis is consistent with current knowledge of BPA rate structures and may change based on the products BPA offers post 2011.

## Resource Choice

OPALCO plans on continue purchasing all power requirements in excess of DSM and local resources from BPA. To meet power needs in excess of Tier 1, BPA plans to offer Tier 2 products. Tier 2 is intended to be power from sources other than the existing federal system, offered at approximately the cost of the resources. For example, a Tier 2 product may consist of wind project output purchased by BPA or market purchases. At this time, BPA's customers do not know what products will be available

from BPA, how much they will cost, or any other details about the terms. Therefore, it is assumed in this analysis that Tier 2 power is simply some combination of supply-side resources, renewable or non-renewable, that can be purchased from BPA instead of other vendors. It is not considered to be a distinct resource for purposes of the resource plan.

Orcas Power and Light Cooperative plans to continue active conservation resource acquisition to further reduce load requirements above Tier 1 resources. Also, local renewable resources are currently available. While this plan does not assume further investment in these resources, OPALCO may have opportunity to expand local renewable resources and benefit from reduced load requirements above Tier 1.



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# Appendix A

**Table A1**  
**Orcas Power & Light Cooperative**  
**Forecasted Energy Sales, Requirements, and Peak Demand - Medium Growth (kWh)**

Year	Residential	Annual % Change	Commercial	Annual % Change	Lighting	Total Sales	Annual % Change	Utility Use	Losses	Total Energy Requirements	Loss as % of Total Req.	Peak Demand	Annual Load Factor
2006	134,638,062		57,535,531		2,274	192,175,867		789,547	18,430,889	211,396,303	8.7%	55,640	43.40%
2007	135,174,045	0.40%	57,803,851	0.50%	2,275	192,980,171	0.40%	800,000	14,585,604	208,365,776	7.0%	52,858	45.00%
2008	137,993,791	2.10%	58,378,113	1.00%	2,275	196,374,179	1.80%	808,000	14,841,669	212,023,848	7.0%	53,786	45.00%
2009	140,868,779	2.10%	58,953,078	1.00%	2,275	199,824,132	1.80%	816,080	15,101,951	215,742,163	7.0%	54,729	45.00%
2010	143,798,392	2.10%	59,528,043	1.00%	2,275	203,328,710	1.80%	824,241	15,366,351	219,519,302	7.0%	55,687	45.00%
2011	146,783,668	2.10%	60,103,008	1.00%	2,275	206,888,951	1.80%	832,483	15,634,947	223,356,381	7.0%	56,661	45.00%
2012	149,825,664	2.10%	60,716,304	1.00%	2,275	210,544,243	1.80%	840,808	14,695,217	226,080,268	6.5%	57,352	45.00%
2013	152,925,458	2.10%	61,329,600	1.00%	2,275	214,257,333	1.80%	849,216	14,953,931	230,060,480	6.5%	58,361	45.00%
2014	156,084,149	2.10%	61,942,896	1.00%	2,275	218,029,320	1.80%	857,708	15,216,745	234,103,773	6.5%	59,387	45.00%
2015	159,302,854	2.10%	62,594,523	1.10%	2,275	221,899,652	1.80%	866,285	15,486,402	238,252,339	6.5%	60,439	45.00%
2016	162,582,715	2.10%	63,246,150	1.00%	2,275	225,831,140	1.80%	874,948	15,760,316	242,466,404	6.5%	61,508	45.00%
2017	165,924,893	2.10%	63,897,777	1.00%	2,275	229,824,945	1.80%	883,697	14,726,084	245,434,726	6.0%	62,261	45.00%
2018	169,330,572	2.10%	64,587,735	1.10%	2,275	233,920,582	1.80%	892,534	14,988,071	249,801,187	6.0%	63,369	45.00%
2019	172,800,959	2.00%	65,277,693	1.10%	2,275	238,080,927	1.80%	901,459	15,254,195	254,236,581	6.0%	64,494	45.00%
2020	176,337,284	2.00%	65,967,651	1.10%	2,275	242,307,210	1.80%	910,474	15,524,533	258,742,217	6.0%	65,637	45.00%
2021	179,940,799	2.00%	66,695,940	1.10%	2,275	246,639,014	1.80%	919,579	15,801,612	263,360,205	6.0%	66,809	45.00%
2022	183,612,781	2.00%	67,424,229	1.10%	2,275	251,039,285	1.80%	928,775	16,083,068	268,051,128	6.0%	67,999	45.00%
2023	187,354,530	2.00%	68,190,849	1.10%	2,275	255,547,654	1.80%	938,063	16,371,429	272,857,146	6.0%	69,218	45.00%
2024	191,167,372	2.00%	68,919,138	1.10%	2,275	260,088,785	1.80%	947,444	16,661,887	277,698,116	6.0%	70,446	45.00%
2025	195,052,659	2.00%	69,685,758	1.10%	2,275	264,740,692	1.80%	956,918	16,959,422	282,657,032	6.0%	71,704	45.00%
2026	199,011,766	2.00%	70,490,709	1.20%	2,275	269,504,750	1.80%	966,487	17,264,122	287,735,359	6.0%	72,992	45.00%
<b>Compound Annual Growth Rates Average</b>											<b>Average</b>	<b>Average</b>	
2007-2012	2.1%		1.0%		0.0%	1.8%		1.0%	7.0%	1.6%	6.9%	1.6%	45.0%
2012-2017	2.1%		1.0%		0.0%	1.8%		1.0%	6.5%	1.7%	6.4%	1.7%	45.0%
2017-2022	2.0%		1.1%		0.0%	1.8%		1.0%	6.0%	1.8%	6.0%	1.8%	45.0%
2022-2026	2.0%		1.1%		0.0%	1.8%		1.0%	6.0%	1.8%	6.0%	1.8%	45.0%

**Table A2  
Member Owned Alternative Electric Generating Systems**

<b>Inter-Connect Date</b>	<b>Renewable Source</b>	<b>Installed Capacity (watts)</b>	<b>Capacity (kWh/year)</b>	<b>Incentive Amount</b>	<b>Net metered or Buy/sell</b>
Blakely Island	Micro-Hydro		24,000		Buy/sell
August 10, 2000	Solar	900	1,288	\$900.00	Buy/sell
January 5, 2001	Soar	1,800	2,576	\$1,800.00	Buy/sell
January 5, 2001	Micro-Hydro	720	720	\$360.00	Buy/sell
March 31,2004	Solar	3,184	4,556	\$330.00	Buy/sell
April 18, 2001	Solar	900	1,288		educational site
May 1, 2001	Solar	900	1,288		educational site
May 9, 2001	Solar	900	1,288		educational site
April 1, 2001	Solar	1,808	2,639	\$1,808.00	Buy/sell
April 1, 2001	Micro-Hydro		1,100	\$550.00	Buy/sell
May 1, 2001	Wind		16,000	\$3,000.00	Buy/sell
June 1, 2001	Solar	900	1,288	\$900.00	Buy/sell
June 5, 2002	Solar	1,080	1,545	\$1,080.00	Buy/sell
July 8, 2002	Solar	30,000	37,021	\$3,000.00	Buy/sell
October, 30,2002	Solar	660	963	\$660.00	Net metered
January 24, 2003	Solar	2,880	4,343	\$2,880.00	Buy/sell
February 5, 2003	Solar	2,970	3,800	\$2,970.00	Buy/sell
January 30,2004	Solar	2,560	3,660	\$3,840.00	Net metered
March 21, 2005	Solar	7,515	9,200	\$4,500.00	Buy/sell
April 27, 2005	Solar	3,060	3,800	\$4,500.00	Net metered
May 24, 2005	Solar	1,485	1,800	\$2,227.50	Net metered
May 15, 2006	Solar	3,000	3,850		Net metered
May 15, 2006	Solar	2,500	3,200	\$4,200.00	Net metered
September 14, 2006	Solar	952	1,450	\$1,428.00	Net metered
November 14, 2006	Solar	2,000	2,600	\$3,000.00	Net metered
November 21, 2006	Solar	1,140	1,500	\$1,710.00	Net metered
March 1, 2007	Solar	3,420	4,000	\$4,500.00	Net metered
July 5, 2007	Solar	2,520	2,691	\$3,780.00	Net metered
October, 30,2002	Solar	600	700		
May 2, 2008	Solar	4,000	4,400		
May 14th, 2008	Solar	3000	3,850		

**Cover Sheet and Summary of Biennial Utility Resource Plans  
2008 Report**

**Orcas Power and Light Cooperative**

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**Base Year of RP:  
Loads/Resources  
CY 2007**

**Projected Energy**

	<b>Annual Energy (MWa)</b>	<b>2013</b>	<b>2018</b>
<b>(1) Loads</b>	24.65	26.26	28.52
<b>Resources</b>			
(2) Conservation/Efficiency	N/A	0.54	0.99
(3) Demand Response	N/A		
(4) Cogeneration (minor)			
(5) Hydro (minor)	0.003	0.003	0.003
(6) Wind (minor)	0.002	0.002	.002
(7) Other Renewables (solar)	0.012	0.012	0.012
(8) BPA Tier 1 Load Following	24.638	25.71	25.04
(9) BPA Tier 2: Load Growth Rate			2.47
(10) BPA Tier 2: Market Purchase			
(11) BPA Tier 2: Green Product			
(12) Non BPA Load Following			
(13) Non BPA: Market Purchase			
(14) Other (Specify)			
(15) Total (sum lines 2 through 7)	0.017	0.56	1.01
<b>(16) Load/Resource Balance</b>	24.63	25.71	27.51

If a resource other than Conservation and renewables is included in the plan (rows 9, 10, 12,13 or 14) please explain the choice:

Please see attached document.