

**2008**  
**CITY OF CENTRALIA**  
**ELECTRIC UTILITY**  
**RESOURCE PLAN**



**AUGUST 26, 2008**  
**(FINAL)**

## TABLE OF CONTENTS

1	SUMMARY	3
2	BACKGROUND	3
3	BASE YEAR	5
3.1	LOADS	5
3.2	RESOURCES	6
4	FIVE-YEAR FORECAST	7
4.1	LOADS	7
4.2	RESOURCES	8
5	TEN-YEAR FORECAST	11
5.1	LOADS	11
5.2	RESOURCES	12
6	FUTURE CONSIDERATIONS	13
7	CONCLUSION	16
8	APPENDIX A: FORECASTED LOADS	17

## **1 SUMMARY**

The City of Centralia's Electric Utility (the City) is required by the State of Washington under RCW 19.280.030 to develop an Electric Utility Resource Plan (Plan) that must be submitted to the Washington State Department of Community, Trade and Economic Development (CTED) by September 1, 2008.

The reason for this is to assure that future resources are adequate to meet projected loads especially as the Bonneville Power Administration (BPA) changes the way it charges the City for energy.

This Plan proposes that the City will continue to purchase power from the BPA and that it will also seize the opportunity to increase the level of energy efficiency.

The City's energy future is essential to our community's economic health. The City has long benefited from having access to low-cost electricity from the federally based system. However, as the world and the energy industry change, the City faces a challenge to its economy in the form of rising electricity costs.

## **2 BACKGROUND**

The City currently serves approximately 9,800 residential and commercial power consumers. At present, all City Light customers fall in the following four categories:

- Residential & Farm
- Commercial (less than 50 kVA)
- Commercial Power (over 50 kVA)
- Public Street Lighting

While this Plan is not a legally binding document, it provides a description of current power loads and resources, as well as the forecasted power loads and resources for 2013 and 2018 time periods as required by RCW 19.280.030. The Plan is available to the public and will next be updated in 2010. It is anticipated that the 2010 Plan update will provide more substantive information regarding the City's future power sales contract with the BPA and the resulting rate impacts.

The City has less than 25,000 customers and is exempt from meeting the mandatory conservation and renewable portfolio standards required for utilities. The proposed 2008 Plan still places emphasis on energy efficiency and conservation opportunities.

The State of Washington requires that in its projection of resources estimated to serve future loads, the City's Plan must delineate what specific supply resources were chosen. Moreover, the City must provide an explanation on why such a decision was made if those chosen supply resources were not conservation, efficiency or renewable energy technologies.

The Plan is based on typical customer growth rates, the trends in customer energy use, and the City's current and anticipated future mix of resources<sup>1</sup>. Figure 1 shows electricity consumption by rate class from January 2001 through December 2007. The chart demonstrates the seasonality of the loads and the City's annual winter consumption peak.

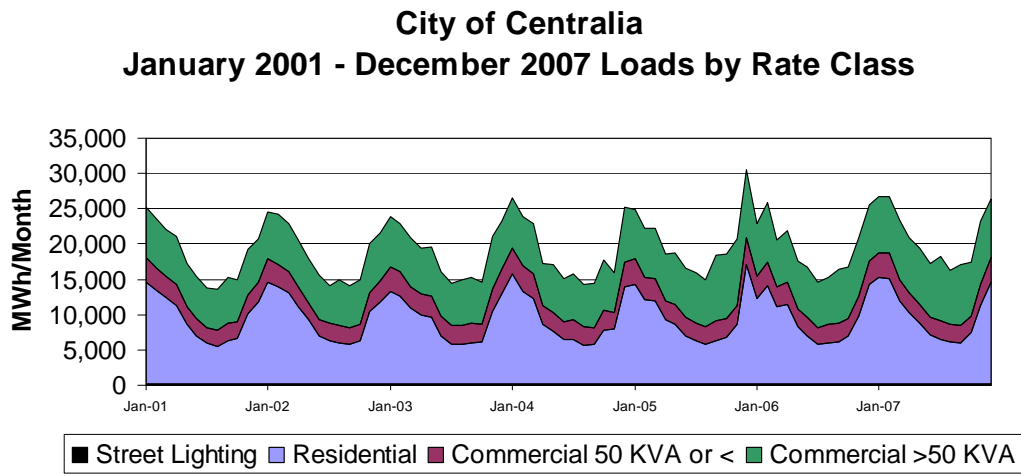


Figure 1

<sup>1</sup> As requested by the CTED, the following reporting units are Annual Energy in Average Megawatts (aMW) that are calculated as kWh/(1000 kWh per MWh)/(8760 hours per year).

### 3 BASE YEAR

The base year started on January 1, 2007 and concluded on December 31, 2007. The maximum average peak consumption for the City occurred in December of 2005 (30,544 MW-hrs) with an actual peak demand of 54.45 MW. In January of 2008, the system reached new maximum loads of 31,709 MW-hrs with a peak demand of 64.912 MW. 2007 represents a more “average” year compared with previous and subsequent years so is a good choice for base year.

#### 3.1 LOADS

As shown in Figure 2, the majority of the City load is residential, 119,262 MW-hrs in 2007.

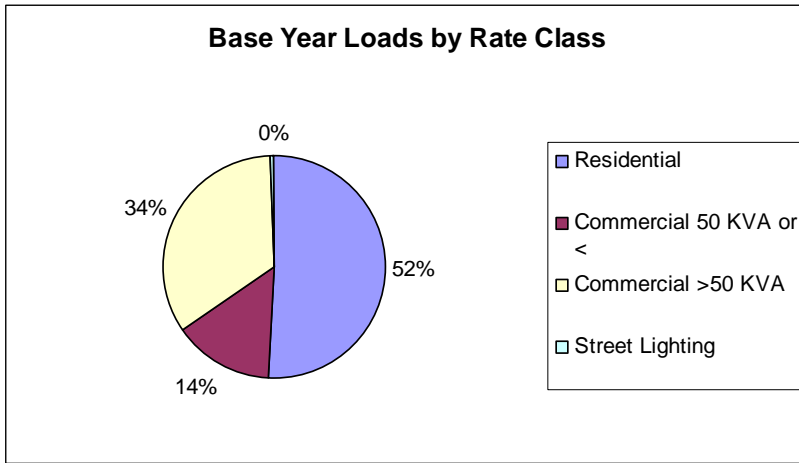


Figure 2

All rate classes are served by the City’s distribution system, and the total of their loads totaled 28.88 aMW during the Base Year. As calculated from historical records, distribution system losses and utility usage are roughly 4.5% of the total distribution system load or 1.28 aMw during the Base Year<sup>2</sup>. This information is presented in greater detail in Table 1.

<sup>2</sup> City Light’s distribution system losses are typical; standard averages for the electric utility industry normally range from 3% to 5%. The losses on our Yelm transmission line typically run about 3% of net Yelm generation and are not included in this total.

**TABLE 1: Base Year Loads for the City of Centralia**

<b>SERVICE CLASS</b>	<b>Annual aMW</b>
Residential	13.61
Commercial (50 kVA or less)	3.96
Commercial (>50 kVA)	11.17
Street Lighting	0.13
Losses/Utility Usage	1.28
<b>Total Loads</b>	<b>30.16</b>

**3.2 RESOURCES**

Centralia City Light operates the Yelm Hydroelectric Project. The project was built in 1929 and was licensed in 1997 as Federal Energy Regulatory Commission (FERC) project #10703, with a maximum rated capacity of 12 MW. Because of streamflow restrictions on the canal, the project maximum capacity is now rated at 10.9 MW and operated during the Base Year with an average capacity factor of 66%, providing around 7.04 aMW to the distribution system.

Centralia City Light has been a BPA full service customer since 1941. The Base Year 2007 electricity resources supplied by the BPA were Priority Firm (PF) purchases totaling 23.1 aMW. Thus, as shown in Table 2, the sum of power resources matched the City’s total load of 30.16 aMW.

**TABLE 2: Base Year 2007 Resources for the City of Centralia**

<b>RESOURCE</b>	<b>Annual aMW</b>
Yelm Hydroelectric Project	7.04
BPA Priority Firm Purchases	23.12
<b>Total Resources</b>	<b>30.16</b>

Figure 3 graphically shows the division between Yelm and BPA generation to meet City Light loads since 2001. The base year is typical – Yelm generates roughly 23% of total generation requirements for the City.

### City of Centralia January 2001 - December 2007 Resources

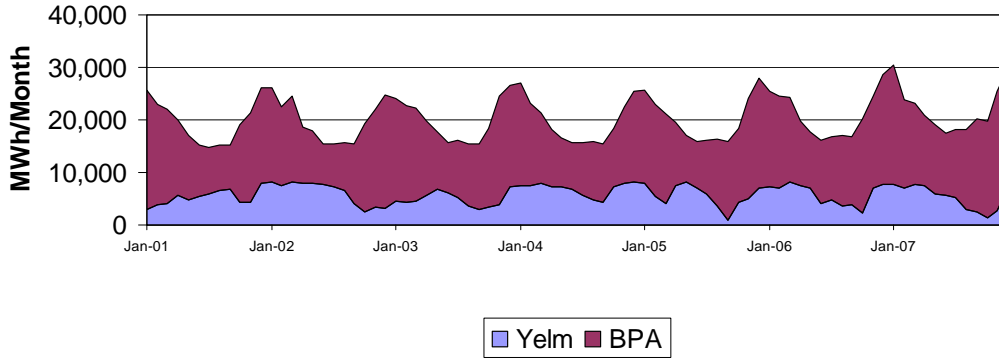


Figure 3

## 4 FIVE-YEAR FORECAST

The five-year forecast targeted the 2013 calendar year. All loads are estimated before reductions from conservation or demand response programs are considered. Both of these are treated as a power resource that is eligible to meet loads. The forecast is based on typical customer growth rates and average customer use patterns that the City has experienced as calculated by BPA’s forecasting department.

### 4.1 LOADS

As shown in Figure 4, the majority of the City load continues to be residential, 142,780 MW-hrs in 2013.

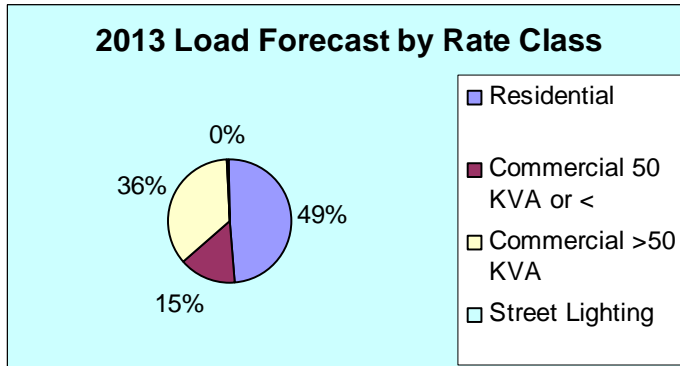


Figure 4

Total loads are shown in the following table:

TABLE 3: Five-Year Forecasted Loads for the City of Centralia

SERVICE CLASS	Annual aMW
Residential	16.30
Commercial (50 kVA or less)	4.96
Commercial (> 50 kVA)	12.21
Street Lighting	0.13
Losses/Utility Usage	1.18
Total Loads	34.78

Note that the forecasted 2013 system load represents a 15% increase over the Base Year. The forecast is based on data provided by BPA, which assumes load growth in the Centralia system (a) similar to what has been experienced to date, and (b) similar to growth in the region in similar-sized utilities. BPA has also taken historical weather patterns into account in determining likely growth. <sup>3</sup>

#### 4.2 RESOURCES

The Northwest Power and Conservation Council (NWPCC) developed a conservation target calculator<sup>4</sup> that may be used to determine electric utility conservation targets. The calculator is designed to determine a specific “Utility Share of Regional Target” that can be attributed to any utility located within the region. While the actual conservation savings may vary from the amount projected by the calculator, this tool estimated that the 2013 conservation and efficiency savings attributable to the City’s efforts should be 0.26 aMW.

Centralia City Light will continue to operate the Yelm hydroelectric plant. There may be opportunities for additional efficiency or generation improvements (making more and better use of the water available in the canal) and those will be explored via consultant investigations in 2009 and 2010.

<sup>3</sup> Given the difficulty of predicting weather, this injects substantial uncertainty into the figures. Also, City Light system growth may be substantially higher than predicted by BPA. Applying the BPA predictor to the first part of 2008 tended to underestimate actual load by approximately 2,000 MW-hrs per month.

<sup>4</sup> <http://www.nwcouncil.org/energy/UtilityTarget.htm>. This calculator (updated 7/17/08) “may be used to determine public utility conservation targets under draft rules implementing I-937 in Washington State.”

The City's current BPA contract will expire on September 30, 2011. However, BPA is currently engaged in a regional process that will result in the City having to make a decision by December of 2008 about what type of contract we will have beginning in October 2011. It is likely that we will select a "load following" contract, which essentially means we will continue to be a full service customer of BPA for our energy requirements in excess of the Yelm Hydroelectric Project. However, there will be cost consequences to selecting BPA for all our needs, as BPA is introducing what is referred to as "Tier 2 rates". Tier 2 costs will be roughly double our existing rates.<sup>5</sup> While many elements of BPA's proposed Tier 2 rate have yet to be revealed by that agency, one critical factor is to develop an estimate of the "High Water Mark" (HWM) load that would be eligible for the BPA's continued Tier 1 load following rate. This is key, as the difference between the HWM and any residual load requirement will be the power block subject to the new Tier 2 rate schedule<sup>6</sup>.

While there are certainly more complicated methods that could be employed to estimate the City's HWM, a simple proxy is to use the base load forecast for each month in 2010, and then assume all loads in future months that exceed that amount will be billed at Tier 2 rates. See Appendix A for a forecast graph that uses this methodology to show the likely amount of Tier 2 power required to meet City Light load beginning in 2012.

The sum of the attributable conservation resource, the Yelm Hydroelectric Project, and the HWM BPA Tier 1 came to 32.36 aMW. As the estimated total load came to 34.78 aMW, the amount of Tier 2 (or equivalent) power resources needed to match the City's total load was calculated to be 2.42 aMW. The forecast of resources required for the City is provided in Table 4.

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<sup>5</sup> For instance, in one recent model provided by BPA, the Tier 1 rate in 2012 was estimated at \$0.02901 per kW-hr whereas the Tier 2 rate was estimated at \$0.05049.

<sup>6</sup> Why this issue is important is that any new load growth experienced by the federal power system will require additional sources of supply that will be more expensive to build and operate than the current existing capacity. The BPA proposes to use the Tier 2 rate schedule to charge customers the total incremental cost of these costly new power resources.

TABLE 4: Five-Year (2013) Forecasted Resources for the City of Centralia

RESOURCE	Annual aMW
Conservation/Efficiency	0.26
Yelm Hydroelectric Project	7.53
BPA Tier 1 Purchases	24.57
BPA Tier 2 Purchases	2.42
<b>Total Resources</b>	<b>34.78</b>

While not a relatively large number, the projected Tier 2 “Gap” represents an average of about 7% of the forecasted 2013 load, after conservation efforts are implemented, and could total some 21,200 MWh if no additional measures are taken to reduce it. The financial implications of this gap and options that could be used to reduce it will be addressed in a following section. While the City may have options other than using one of the three listed BPA Tier 2 products, the preliminary staff recommendation is that the City would remain a full-service BPA customer<sup>7</sup>.

Given the current uncertainty, this option may be the best available to mitigate potential power supply costs and risks. Other relatively small municipal utilities (eg Port Angeles) are also considering using the BPA Tier 2 Short-Term Rate offering to fill the “Gap” as it requires the least time commitment compared to the other Tier 2 product offerings. However, “due to the short-term nature of the of potential customer commitments, BPA does not intend to permanently assign the costs of longer-term resources to this cost pool. It may be the case that some longer-term resource costs will be allocated temporarily to this cost pool, until those costs are allocated to a longer purchase period rate pool.” This statement, taken from the CTED “Short Form” instructions used to prepare this Plan, suggests that the trade-off for not executing a 20-year power purchase agreement with the BPA presents the potential for some greater short-term price volatility.

<sup>7</sup> Under the proposed terms of the new BPA power sales agreement, this category will be renamed a “load-following” customer.

## 5 TEN-YEAR FORECAST

The ten-year forecast targeted the 2018 calendar year. As with the previous forecast, all loads were projected before the estimated reductions from conservation or demand response programs are considered.

### 5.1 LOADS

As shown in Figure 5 the distribution of loads is forecasted to be very similar to the base year and to the five-year forecast year (2013). Residential load constitutes 142,780 MW-hrs in 2018.

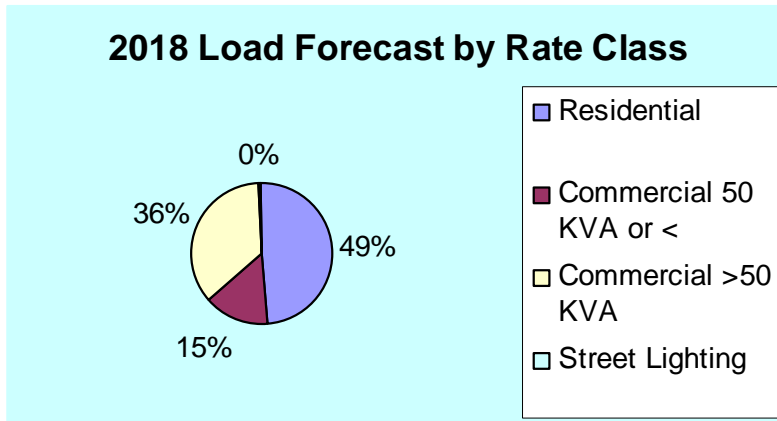


Figure 5

Customer loads totaled 37.97 aMW for the ten-year forecast. Distribution system losses and utility usage are about 4% of the distribution system load, or 1.33 aMW. The total load provided by the City to its customers for the ten-year forecast, including losses and utility usage, came to 39.30 aMW. This information is provided in greater detail in Table 5.

TABLE 5: Ten-Year (2018) Forecasted Loads for the City of Centralia

SERVICE CLASS	Annual aMW
Residential	18.42
Commercial (50 kVA or less)	5.62
Commercial (> 50 kVA)	13.80
Street Lighting	0.13
Losses	1.33
Total Loads	39.30

Note that the forecasted system load for 2018 is about 31% higher than the Base Year.

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## 5.2 RESOURCES

The City will continue to operate the Yelm Hydroelectric Project. Similar to the five-year forecast, this project is estimated to operate in 2018 with an average capacity factor of around 66% and provide 7.53 aMW. Using the NWPPC calculator, the estimated 2018 conservation and efficiency savings attributable to the City’s efforts would be 0.20 aMW.

The sum of the attributable conservation resource, the Yelm Hydroelectric Project, and the HWM BPA Tier 1 came to 32.3 aMW. As the estimated total load came to 39.30 aMW, the amount of Tier 2 (or equivalent) power resources needed to match the City’s total load was calculated to be 7.00 aMW. The forecast of resources required for the City is provided in Table 6.

TABLE 6: Ten-Year (2018) Forecasted Resources for the City of Centralia

Resources	Annual aMW
Conservation/Efficiency	0.20
Yelm Hydroelectric Project	7.53
BPA Tier 1 Purchases	24.57
BPA Tier 2 Purchases	7.00
Total Resources	39.30

The projected Tier 2 “Gap” represents about 18% of the forecasted 2018 load and could equal around 61,300 MWh – almost equal to the Yelm Project output - if no additional

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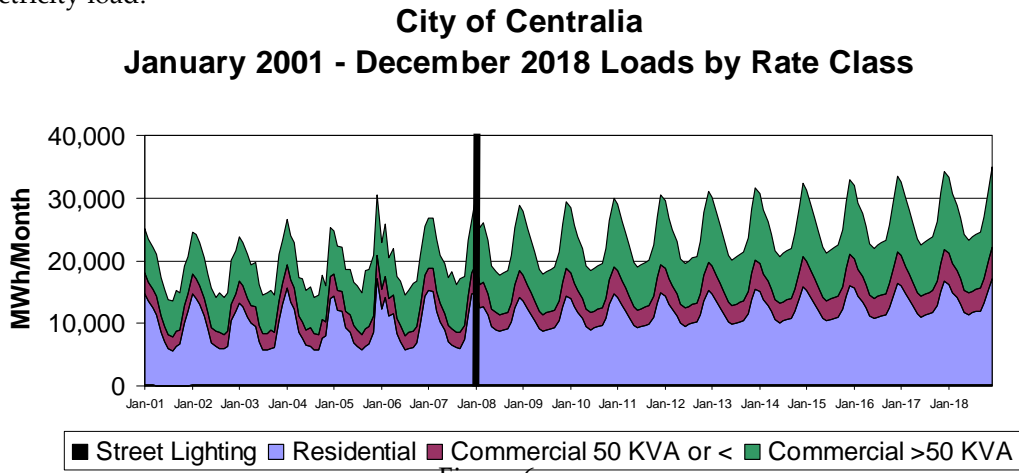
measures are taken to reduce it. The financial implications of this gap and options that could reduce it will be discussed in the next section.

Again, the most likely option is that the City will remain a BPA full-service customer, possibly using the BPA Tier 2 Short-Term Rate.

There are many situations that could occur that would render the 2013 or 2018 projections meaningless. For example, there is significant discussion about converting a majority of the country's vehicle fleet from gasoline to plug-in hybrid cars using electricity. While other consumer items such as a plasma television consumes about four times the electricity as recharging a plug-in hybrid, there would be a significant load impact if thousands of these new vehicles came on line simultaneously in the City Light service territory. Other local load impacts could be related to the City's contemplated annexation plans and who will ultimately serve those loads. There have already been substantial load increases due to expansion at the Port of Centralia.

### 6 FUTURE CONSIDERATIONS

Figure 6 shows electricity consumption by rate class from January 2001 projected through December 2018. As with the previous time series chart, it demonstrates load seasonality and the City's annual winter consumption peak. It also continues to demonstrate that the residential load will continue to be around 50% of the City's total electricity load.



This Plan proposes that the City will continue to remain primarily reliant on the BPA as a full-service customer. However, the City also has the opportunity to further increase the deployment of its own efficiency and renewable resources, and thus further diversify its resource portfolio.

This opportunity should be seriously considered, as the Tier 2 “Gap” represents about 18% of the 2018 load. While the BPA has not specified any rates for its Tier 1 or Tier 2 products, the financial implications of the Tier 2 “Gap” and opportunities that could be used to reduce it must be addressed even if only a general trend is revealed instead of a precise answer.

For example, including local distribution system line losses, the City’s wholesale power cost averaged ~~very close to~~ 3.0 ¢/kWh during the Base Year. Although the cost of Tier 2 power could be much higher, assume that the “Gap” power is provided to the City at a wholesale cost of 6.0 ¢/kWh. 7.1 aMW in 2018 will cost about \$3.7 million in 2008 dollars. The rest of the 2018 load will cost about \$8.5 million; of the total \$12.2 million<sup>8</sup>, the Tier 2 power will constitute 30% of the cost for 18% of the load.

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Given this potential exposure, it would seem prudent to reduce the projected Tier 2 “Gap” starting with two priorities that incorporate a lowest-cost/lowest-risk analytical approach to meeting future loads.

The first priority should be to seek all cost-effective conservation opportunities as the favored resource for meeting anticipated future loads, and look for options to accelerate those energy savings beyond the current estimates. All other things being held equal, rising costs will enlarge the pool of cost-effective alternative resources. Beyond conservation, the City should also pursue distribution system peak-load management, possibly through consideration of time of use rates via our automated meter reading system. Other possible considerations are renewable energy and conservation voltage reduction.

This approach would be a logical extension of the City’s existing conservation initiatives, where the programs range from conservation tips and incentives for

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<sup>8</sup> The City’s annual BPA bill in 2008 will be approximately \$7,000,000.

residences to incentives for custom energy conservation projects for commercial and industrial customers<sup>9</sup>.

Other utilities have pursued some non-traditional approaches such as the Pacific Northwest GridWise Testbed Demonstration Project<sup>10</sup>.

This effort was a field demonstration where residential electric water heaters and thermostats, commercial building space conditioning, municipal water pump loads and several distributed generators were coordinated to manage electrical loads by communicating electric price signals in real-time. While a somewhat futuristic experiment, one practical result was this resource was well documented to produce significant power savings when market prices were presented to consumers and they could respond accordingly. Again, the City's AMR system is perfectly positioned to take advantage of such an approach.

Conservation Voltage Reduction emphasizes cost-effective design, construction and operational decisions that optimize the regulation of local distribution service voltage, or CVR. A total of 13 Northwest utilities participated in the initial phase of a test initiative, and the results indicated "operating a utility distribution system in the lower half of the acceptable voltage range (120-114 volts) saves energy, reduces demand, and reduces reactive power requirements without negatively impacting the customer. The energy savings results are within the expected values of 1%-3% total energy reduction, 2%-4% reduction in kW demand, and a 4%-10% reduction in kvar demand<sup>11</sup>."

Also in 2009/2010, City Light proposes to conduct a Conservation Potential Assessment (CPA) to help better determine where the most cost-effective resources lie and where to target future program efforts to maximize returns. This study will help to determine how much conservation potential is available within the City Light service territory, and help determine the value of conservation to the electric utility as well as other items such as the impact of conservation efforts on the load factor. One key deliverable with the CPA will be to develop a supply curve of conserved energy that identifies those measures having levelized costs that are less than the projected cost for Tier 2 power.

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<sup>9</sup> BPA will terminate in 2009 its funding for the various energy efficiency activities it provides to utilities within its service territory. A successor program is being planned by the BPA, but few details are currently available.

<sup>10</sup> [http://gridwise.pnl.gov/docs/op\\_project\\_final\\_report\\_pnnl17167.pdf](http://gridwise.pnl.gov/docs/op_project_final_report_pnnl17167.pdf)

<sup>11</sup> <http://rwbeck.com/nea/>

In addition to BPA-funded programs, City Light has maintained a \$150,000 line item in the budget to provide rebate incentives for continued residential conservation measures such as use of Energy Star-qualified appliances. That program should continue.

City Light up to this point has coordinated some activities with the Lewis County PUD in the areas of conservation offerings. Future discussions could include jointly reviewing an exploration of the BPA's product choices, as well as the possibility of obtaining some power from renewable energy resources. After conservation, small hydro, biomass/landfill gas, tidal energy and geothermal, and wind could become energy resources of high priority.

## ***7 CONCLUSION***

The City's energy future is essential to our community's economic health. The City has long benefited from having access to low-cost electricity from the federally based system. As the world and the energy industry change, the City faces challenges in the form of rising electricity costs.

The Plan's objective is to create and implement a means to help ensure that sufficient electrical resources are available to meet projected future loads at affordable costs. Achieving this objective will require consideration of all feasible options and developing a cost-effective plan that is adaptable to rapidly changing circumstances. City Light currently has an effective conservation program in place and is actively looking for new opportunities that will be evaluated in 2009 and 2010.

## 8 APPENDIX A: FORECASTED LOADS

January, 2001 to December 2018 Resources required to meet loads, showing the growing impact of Tier 2 Power Requirements beginning with a new BPA contract in October of 2011:

