Appendix F

Current Resource Portfolio

City Light uses a combination of conservation and power resources to meet its customers' energy needs. The utility's current resource portfolio includes conservation, owned generation resources and long-term contract resources, supplemented with power exchange agreements and near-term purchases and sales made in the wholesale power market. City Light owns transmission facilities and depends primarily on Bonneville Power Administration (BPA) for electric transmission outside its service area.

The following sections discuss existing conservation, generation, and market resources City Light uses to meet its customers' need for energy services.

Conservation

City Light meets the power needs for its service area with a high degree of reliability. Conservation was introduced into the resource mix over 30 years ago and has remained the resource of first choice for the utility to meet load growth. The conservation partnership between the utility and its customers has successfully deferred acquisition of expensive new resources, especially those that negatively affect the environment.

Conservation programs encourage customers to use power more efficiently and allow the utility to defer the acquisition and expense of new resources. Conservation is low cost and has low environmental impacts, including no greenhouse gas emissions. It is integral to developing City Light's Integrated Resource Plan, to maintaining its status as a greenhouse gas neutral utility, to supporting the City's climate change policy goals, and to meeting the requirements of I-937. It has also been good policy in a transforming energy market because it reduces price risk and availability risk.

Conservation programs are designed for all customer classes and address specific energy end-uses such as efficient lighting, water heaters, laundry appliances, HVAC (heating, ventilation and air conditioning), and motors and manufacturing equipment. They also encourage weatherization and high-efficiency construction methods. Monetary incentives to utility customers include rebates, loans, or outright purchase of savings for installed energy efficient measures.

Using information from City Light's most recent Conservation Potential Assessment, conducted in 2006, the 2010 IRP assumes there are approximately 135 aMW of cost-effective energy savings potential available over the 20 years of the planning horizon.

Energy Saved by Conservation Programs

From 1977 through 2009, City Light's conservation programs saved over 15 million megawatt-hours by increasing the efficiency of electricity use in Seattle homes, businesses and industries. Ten years ago, the average City Light residential customer used 10,739 kilowatt-hours of electricity per year, 500 kilowatt-hours more than the national average. Today, the average City Light residential customer uses approximately 8,975 kilowatt-hours, about 1,000 kilowatt-hours fewer than the national average.

City Light's new conservation measures saved about 14.2 average megawatts of power in 2009, including credit for avoided transmission and distribution losses. These savings prevented 74,600 tons of carbon dioxide emissions from entering the atmosphere, which is roughly equivalent to removing 16,600 automobiles from Seattle streets for a year.

City Light's conservation programs have been guided by its Five Year Conservation Action Plan, developed in 2008 with guidance from the 2008 IRP and covering the period from 2008-2012.

Generation Resources

Over 90 percent of City Light's power is generated by hydropower, including its own low-cost hydroelectric facilities in Washington state. As a municipal utility, City Light enjoys preferential status in contracting for the purchase of additional low-cost power that the Bonneville Power Administration (BPA) markets. The utility has contracts with several other owners of hydroelectric projects in the region. In 2002, City Light signed a 20-year contract with the Stateline Wind Project; in 2007, City Light began purchasing power from a biomass plant owned by Sierra Pacific Industries in Burlington. More recently, City Light contracted with Waste Management Renewable Energy for output from the Columbia Ridge Landfill Gas Project, on-line in 2009, and with King County for output from a planned cogeneration plant at the West Point Treatment Plant in Discovery Park, online in 2013.

The West Point Treatment plant is within City Light's service area. Its other resources and their locations are shown on the map in Figure 1. See Figure 2, following the descriptions of City Light resources, for the amounts generated by City Light resources over the period 1999-2009.

Figure 1. City Light's Generation Resources

City Light Resources

Boundary Dam is City Light's largest resource with a peaking capability of 1,055 MW and average generation of about 490 aMW annually. Under the Federal Energy Regulatory Commission (FERC) license, part of Boundary output must be sold to Pend Oreille County Public Utility District No. 1 to meet the PUD's load growth. In addition, about five aMW of energy must be delivered to the PUD in compensation for Boundary Project's encroachment on its Box Canyon Dam. Energy from Boundary is delivered to consumers over BPA's transmission grid.

Skagit Project includes the Ross, Diablo and Gorge projects, which have a combined one-hour peak capability of 690 MW. City Light's transmission lines carry the power generated from the Skagit Project to Seattle

Newhalem is located on Newhalem Creek, a tributary of the Skagit River. City Light-owned transmission lines deliver its two megawatts of power.

South Fork of the Tolt has a one-hour peaking capability of less than 17 MW. Project costs are offset by BPA billing credits. Power from this project is delivered over a line owned by Puget Sound Energy.

Cedar Falls dam has capacity of 30 MW. Power is transmitted by Puget Sound Energy.

Contracted Resources

Bonneville Power Administration City Light's largest power purchase contract is with BPA. The contract allows the utility to receive power from 29 hydroelectric projects and several thermal and renewable projects in the Pacific Northwest. Energy is delivered over BPA's transmission grid.

Under the contract, power is delivered in two forms: a shaped Block and a Slice. Through the Block product, power is delivered in monthly amounts shaped to City Light's monthly net requirement, defined as the difference between City Light's projected monthly load and the resources available to serve that load under critical water conditions. Under the Slice product, City Light receives a fixed percentage of the actual output of the federal system and pays the same percentage of the actual costs of the system. Power available under the Slice product varies with water conditions, federal generating capabilities, and requirements for fish and wildlife protection and restoration.

In December 2008, City Light signed a contract with BPA to continue City Light's access to the power resources the BPA markets through September 2028. BPA is involved in structuring contracts that will fairly apportion its least expensive base system generation among its customers. All other BPA power will be available as variously designed products. Power will be sold primarily at two rate levels – one for the base system generation and the other, a market rate for power from other resources. Decisions affecting the marketing of BPA power can significantly affect City Light's resource portfolio cost, risk and reliability.

High Ross Agreement In an 80-year agreement with the Canadian Province of British Columbia, City Light abandoned plans to raise the height of Ross Dam in exchange for power purchases from British Columbia Hydro (Powerex). Power delivery and price is similar to the generation and costs City Light would have experienced had construction taken place. Through 2020, the power City Light receives from the contract has a relatively high cost. In 2020, the cost reduces to a few dollars per MWh because the cost portion, equivalent to debt service that would have been issued to build the High Ross Dam, will terminate. BPA delivers the power over their transmission lines.

Lucky Peak Because of its location near Boise, Idaho, Lucky Peak can sell power to all major western trading hubs (Mid-C, COB, PV, Mead, and Four Corners) without encountering normal transmission constraints. City Light has the option to sell to the highest price market. City Light has contract rights to Lucky Peak output (approximately 34 aMW annually) until 2034.

Priest Rapids Project The Priest Rapids Project consists of two dams: the Priest Rapids Dam and Wanapum Dam. City Light purchases power from this project under two agreements

with Grant PUD, who owns and operates the project. The term of the agreements is to the end of the current federal license for the project, which is April 2052. Seventy percent of Priest Rapids Project's output has been allocated to Grant PUD. Under one agreement, City Light purchases about two to three average megawatts of output. Under the second agreement, City Light has the option to receive a share of proceeds, if any, from an auction of 30% of the output, or to purchase the share of the output at the price set in the auction. BPA provides transmission.

Grand Coulee Project Hydroelectric Authority City Light has contracts to buy half of the output, or about 27 aMW, from five Columbia River Basin hydroelectric projects. City Light's contracts expire over the period 2022-2027. The projects are part of three irrigation districts, so electric generation is mainly in the summer months. BPA and local agencies transmit the power to Seattle.

Northern California Power Agency Under its exchange agreement with the Northern California Power Agency (NCPA), City Light delivers 60 MW of capacity and 90,580 MWh of energy to NCPA in the summer. In return, NCPA delivers 46 MW of capacity and 108,696 MWh of energy to City Light in the winter. Deliveries to NCPA started in 1995 and will continue until the agreement is terminated.

Stateline Wind Project City Light has an agreement with J.P. Morgan Global Commodities to purchase wind-generated electrical energy and associated environmental attributes from the Stateline Wind Project on the Washington and Oregon border outside Walla Walla, Washington. City Light receives wind energy at an aggregate maximum delivery rate of 175 MW per hour through December 2021. Energy delivered under the contract is expected to average about 45 aMW. City Light has also entered into an agreement through 2011 to purchase integration and exchange services from PacifiCorp. BPA and PacifiCorp provide transmission for delivery to City Light's service area.

Burlington Biomass Facility City Light has a 10-year power contract (2007-2016) with Sacramento Municipal Utility District (SMUD) to deliver 15 MW of the output of a 23 MW capacity biomass generating plant (Sierra Pacific Industries' sawmill and co-generation plant in Burlington, Washington) to the California-Oregon border. City Light purchases energy and environmental attributes equal to the difference between the plant output and the 15 MW SMUD delivery obligation. The amount is expected to average about 3 aMW over the course of the year. City Light will also receive energy from SMUD from unspecified resources during December, January, and February, in exchange for City Light's delivery service. Puget Sound Energy provides transmission from Burlington to Seattle; City Light uses BPA transmission to deliver the energy to California.

Columbia Ridge Landfill Gas Project City Light has a 20-year power purchase agreement with Waste Management Renewable Energy to purchase the output, approximately 6 aMW, from the Columbia Ridge Landfill Gas project in Arlington, Oregon. As organic materials decay in a landfill, a by-product is methane, which can be collected and burned to produce electricity. The plant began commercial operations in December 2009. The Columbia Basin Co-Op and BPA provide transmission.

King County Wastewater Treatment West Point Treatment Plant City Light has a 20-year power purchase agreement with King County to purchase the output from a cogeneration plant at the West Point Treatment Plant in Discovery Park. The planned on-line date is 2013, and average output is 2.5 aMW. Methane is a by-product of the treatment process, and the methane will be collected and burned to produce electricity. The plant is inside City Light's service area so no transmission is required.

Power from Existing Generation Resources

Figure 2 shows the recent history of annual power production from each of the generation resources described above, as well as some no longer part of City Light's portfolio. The table demonstrates how the portfolio has changed in recent years and illustrates power production variability caused by weather.

Figure 2. Power Generated Annually from Existing Resources in Average Megawatts

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
OWNED GENERATION											
Boundary	508.1	431.7	267.1	452.2	408.1	398.8	395.1	493.1	414.6	435.1	410.3
Skagit - Gorge	135.4	109.3	70.4	117.0	106.3	105.2	88.7	99.6	122.9	104.4	95.9
Skagit - Diablo	116.7	92.7	54.5	102.8	84.9	88.5	74.8	85.1	95.3	86.1	78.9
Skagit - Ross	109.9	84.4	44.9	95.6	83.1	77.6	64.3	73.2	98.1	75.0	71.0
Newhalem		0.4	1.1	1.1	0.9	1.4	0.7	1.0	0.6	0.2	0.3
South Fork Tolt	8.0	5.0	4.6	8.9	5.6	6.9	5.1	6.1	6.4	6.5	5.8
Cedar Falls	8.1	5.7	7.4	9.1	7.3	7.0	4.2	8.6	7.6	9.8	8.7
Centralia (sold 2000)	78.7	31.5									
Total Owned Generation	**965.1**	**760.8**	**449.9**	**786.7**	**696.2**	**685.3**	**633.0**	**766.7**	**745.5**	**717.1**	**671.0**
PURCHASE CONTRACTS											
Bonneville Power Administration	180.6	193.7									
Bonneville Power Administration Block			200.7	152.3	147.1	137.8	109.4	174.4	242.2	239.0	237.6
Bonneville Power Administration Slice			71.5	322.4	390.9	392.8	385.1	451.1	411.3	412.1	379.4
High Ross (B.C. Hydro)	35.2	33.8	35.1	33.9	36.0	34.8	35.4	36.1	35.8	35.3	35.7
Boundary Encroachment (BC Hydro)	1.7	2.0	0.9	1.2	1.6	1.5	1.7	2.6	1.9	1.9	1.7
Lucky Peak	48.6	38.8	21.5	33.0	33.4	31.3	25.8	46.5	31.2	35.4	36.9
Priest Rapids (Grant County PUD)	47.1	41.4	29.9	37.3	35.5	36.0	32.9	2.8	2.9	2.6	3.8
Grand Coulee Project Hydroelectric Authority	28.6	27.2	30.9	28.3	26.9	28.9	28.5	27.6	29.1	29.6	29.7
Stateline Wind				12.2	24.7	39.7	37.4	43.9	44.0	49.2	40.2
Klamath Falls (expired 2006)			37.2	81.0	74.7	81.8	66.4	11.4			
Pend Oreille PUD (expired 2005)	8.1	6.6	4.9	5.0	5.4	6.7	3.0				
Metro CoGeneration (expired 2004)	0.9	0.8	1.4	1.7	1.6	0.7					
Columbia Storage Power Exchange (expired 2003)	16.1	12.1	11.6	11.3	3.0						
Columbia Ridge											0.2
Total Purchase Contracts	**366.9**	**356.5**	**445.8**	**719.5**	**780.8**	**792.0**	**725.6**	**796.4**	**798.4**	**805.1**	**765.2**

City Light's current generation resource portfolio is more than 90 percent hydro. Its hydro storage capability has the advantage of operational flexibility but the disadvantage of being significantly affected by weather conditions. The amount of water available for power generation is affected by the amount and the timing of precipitation, run-off from snow melt, and regulations governing the recreational use of lakes, irrigation, protection of fish habitat and other environmental concerns.

Operational flexibility allows the utility to meet peak load easily most of the time, but the ability to serve year-round load can be greatly diminished when water levels are low. Prior to 2006, the West experienced six consecutive years of drought conditions, with 2001 as the most severe. Water conditions in 2010 on the federal hydroelectric system are the fifth lowest since 1929. Thus, City Light's resource portfolio must be able to serve load under prolonged drought conditions that do occur in the region.

As shown in Figure 2, the amount of power produced from owned generation in 1999 was nearly twice the amount produced in 2001, illustrating the risks associated with hydropower production. To make up the shortfall in 2001, City Light increased its purchases from Bonneville Power Administration (BPA), but was still forced to make purchases from the market. By 2002, City Light had signed a new contract with BPA, that nearly doubled its purchases, which phased in over the next five years. Wind power from Stateline came online in 2002, and power from that source increased over the next two years to its current level.

Future Outlook for Current Generation Resources

Over the next 20 years, not all of the generation resources described above will remain as they are in the existing portfolio. Some contracts will expire or be modified over the planning period.

City Light's license to operate Boundary Dam expires in 2011; in April 2010 City Light submitted a settlement agreement to FERC establishing the habitat and fishery improvements City Light will make in exchange for keeping operational flexibility. City Light has requested a 50-year license term for its new contract. The Skagit Project license expires in 2024, and under FERC's current rules, City Light will begin the relicense process at least five years before license expiration.

The Stateline wind contract that provides for about 45 aMW expires in December 2021. City Light's share of Priest Rapids generation output gradually declines over the 20-year planning horizon at the rate of Grant County PUD's load growth. City Light's contracts with the Grand Coulee Project Hydroelectric Authority begin to expire in 2022.

In December 2008, City Light and BPA executed a contract for the period 2011 to 2028. The new 17-year contract continues City Light's purchase of the Block and Slice products, although the specific amount will not be known until 2011. BPA's new policy will include a two tier pricing system. Tier 1 priced power will be based on the cost of the existing Federal Base System resources. Tier 2 priced power will be based upon either the actual or marginal price of new resources. Presently, City Light has no plans to purchase Tier 2 power. The amount of power priced at Tier 1 (High Water Mark) that a public power customer will be eligible to purchase will be based on the customers' actual weather-adjusted loads placed upon BPA in 2007 and 2008, with certain adjustments. Many uncertainties remain with respect to the quantity of power (High Water Mark) that Seattle will be eligible to purchase and the price for Tier 1 power.

In the future, the resource portfolio will include more renewable resources, consistent with policy direction from the City Council to meet load growth with conservation and renewables to the extent possible, and mitigate for any greenhouse gas emissions associated with meeting new load (Resolution 30144) and Initiative 937. The accelerated conservation resource will also have a substantial impact as City Light continues to fund programmatic conservation.

Market Resources

The wholesale electric power market in western North America plays an important role in meeting Seattle's power needs by allowing City Light to balance energy surpluses and shortages. Surplus power can be sold and power shortages can be made up with purchases both seasonally and over a period of years. Power can also be obtained from the wholesale market through seasonal capacity contracts, although City Light currently has no such contracts. In order to ensure winter reliability, the Resource Adequacy analysis for the 2010 IRP assumes that a maximum of 200 aMW of energy is available to City Light for purchase in the wholesale power market to meet short-term winter needs. Any needs above 200 aMW in the plan must be met by new conservation and new firm resources.

With colder winter temperatures driving Seattle's power demand to peak in November through February and the spring snow melt driving hydropower production to peak in April to June, a seasonal mismatch exists between demand and supply of power. Keeping sufficient power generation capability to meet winter demand leads to excess generation capability the rest of the year. In addition to seasonal variation in supply and demand, precipitation may vary substantially from year to year, making it difficult to predict the supply of hydropower.

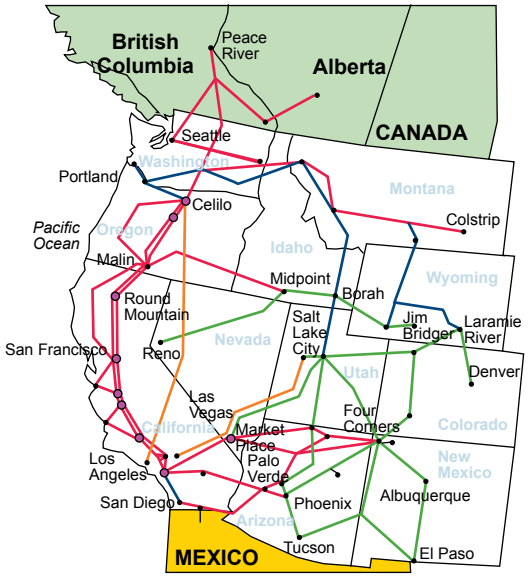
City Light actively manages its portfolio of power supply resources by purchasing and selling power in the wholesale markets and transacting seasonal exchanges of power. These transactions lower the rates charged to the utility's retail customers by generating revenues from sales of surplus energy and allowing purchases of lower cost power.

Western States Transmission System

The western electric transmission system physically defines the wholesale market for electricity in western North America. This market is broadly made up of 11 western states, two Canadian provinces, and northern Baja California, Mexico, as shown in Figure 3.

Constructed primarily in the 1950s and 1960s, the high-voltage transmission system is owned by a number of both private and public utilities. In the Pacific Northwest, the Bonneville Power Administration (BPA) operates about 75 percent of the transmission system, with other large transmission owner/operators, including PacifiCorp, Puget Sound Energy, Avista, Idaho Power, British Columbia Transmission Company and Portland General Electric, operating the rest. The high voltage transmission system is near capacity in many parts of the West, including the Pacific Northwest.

Figure 3. Western Electric Transmission System



Market transactions and seasonal exchanges are facilitated by City Light's ownership share of transmission capacity rights on the Third AC Intertie. This ownership share was acquired in 1994, when City Light signed an agreement with BPA for rights to 3.33% (up to 160 MW) of transmission capability over BPA's share of the Third AC Intertie. The Third AC Intertie is an alternating current line that connects the Northwest region with California and the Southwest.