



Seattle City Light

STRATEGIC RISKS & THE UTILITY OF THE FUTURE

City Light Review Panel

Jaya Bajpai | January 2018

CONTENTS

- Setting the stage: key concepts & methodology
- The global winds of change reach City Light
 - Structural changes in retail and wholesale energy
 - Over-the-horizon: disruptive technologies and innovations
- City Light's unique challenges
 - Responding to customer needs in a digital world
 - Adapting a highly structured organization to changes
- Climate change and the environment
 - Influencing industry and leading the nation at a critical juncture in history
- Building the Utility of the Future

Throughout this presentation, we discuss City Light's current response to challenges, actions it is contemplating or proposing and, for illustrative purposes, potential avenues it might consider in the future. Illustrative examples will be clearly demarcated and should not be viewed as policy or as decisions under active consideration.

SETTING THE STAGE

- We focus solely on strategic risks driven by structural (non-cyclical) changes

Sector/Entity	Strategic	Operational
Taxicabs	Technology that undercut an oligopoly by connecting an army of independent contractors with customers, on-demand.	Fuel prices and Fleet O&M costs.
Traditional Retailers	Competitors unburdened by legacy costs and organizational structures built sophisticated logistics & supply chain operations, eliminated middlemen and focused on customer service.	Improving billing systems.
Kodak	Digitization and discount Japanese film imports	Securing enough silver halide for film.

- Structural Vs. Cyclical: Some challenges are relatively fleeting and, for resilient adaptive firms, pass with time while others fundamentally alter the landscape.
 - In power, oil & gas markets, a cyclical slowdown is a boom in construction/drilling leading to oversupply until price elasticity (lower prices stimulating demand) and organic demand growth (more homes, ships and cars) rebalance the market. A structural change is shale technology permanently increasing supply at low cost.



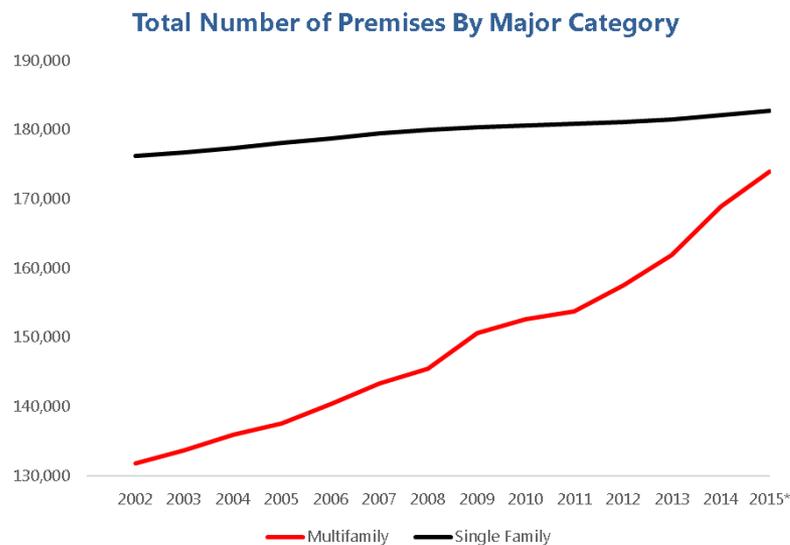
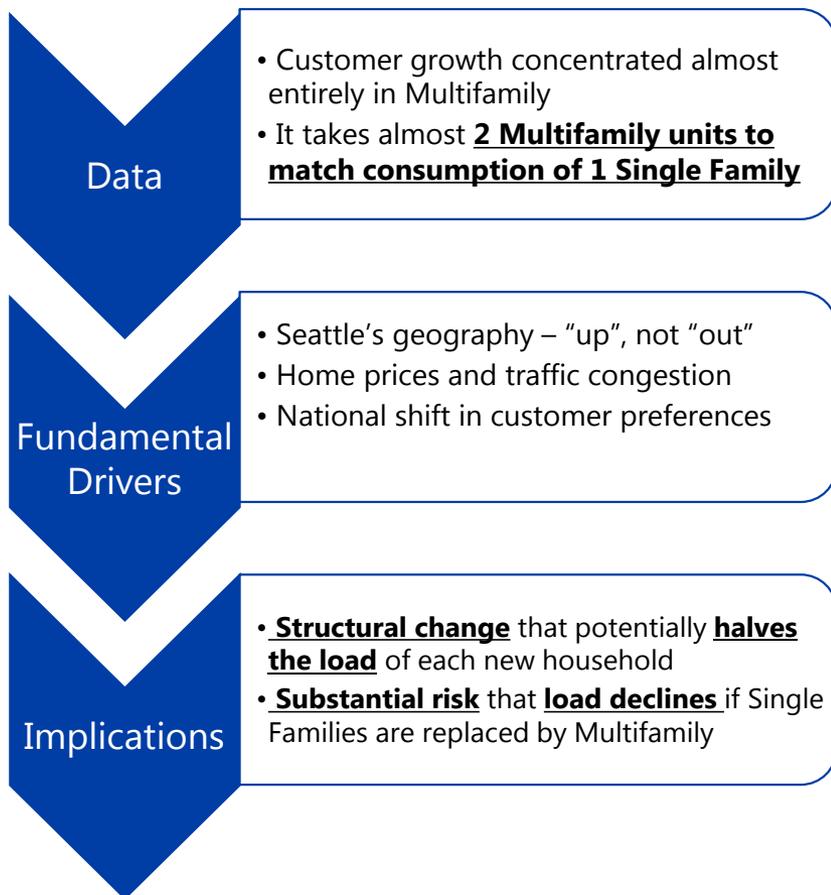
Seattle City Light



STRUCTURAL CHANGES IN RETAIL ENERGY

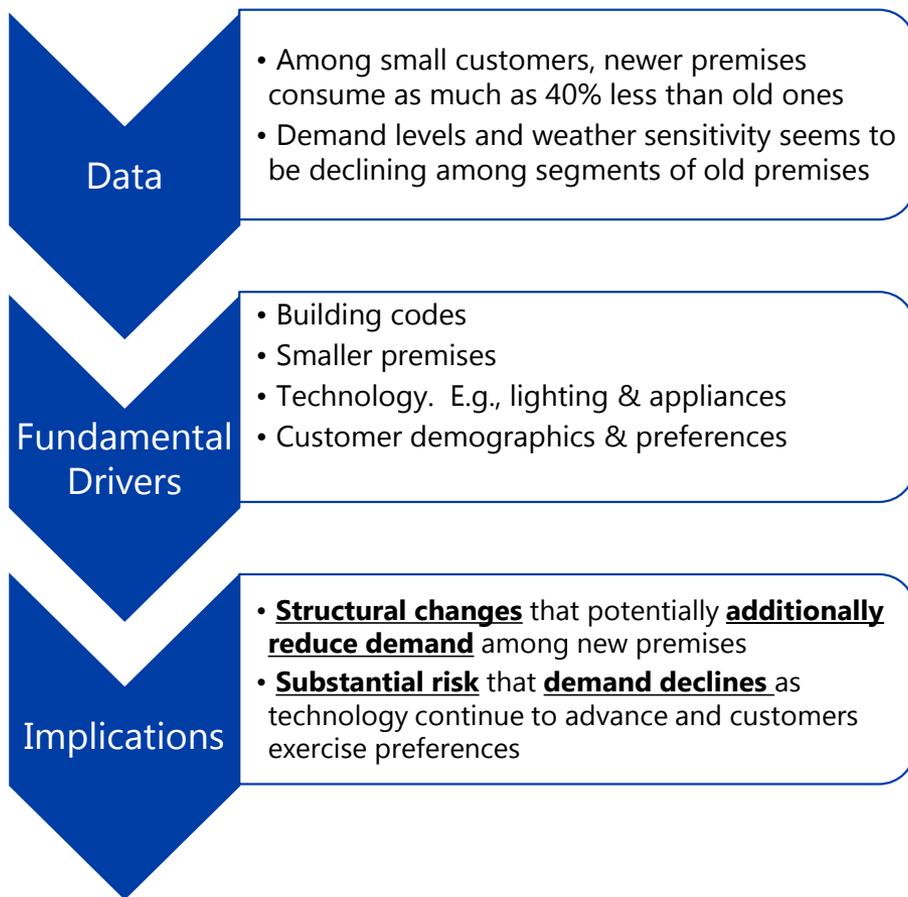


STRUCTURAL CHANGE IN HOUSING STOCK

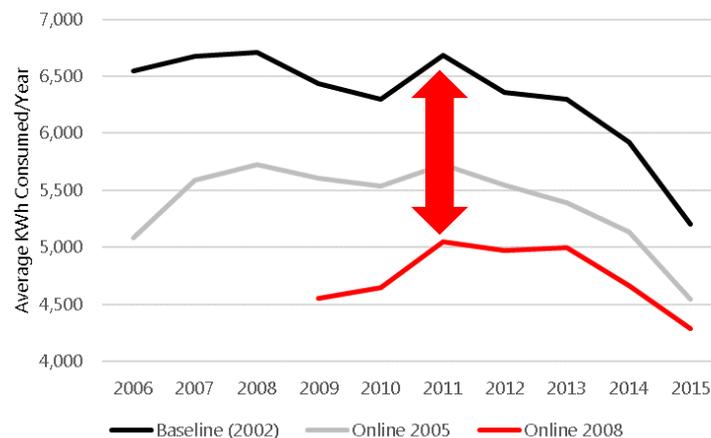


City Light Billing System Classification of units as Single Family, Apartment or Condo. Excludes Townhouses, Quads etc. 2015 data is preliminary. Overall Trend validated with King County Building Permit data.

STRUCTURAL DROPS IN PER-PREMISE DEMAND

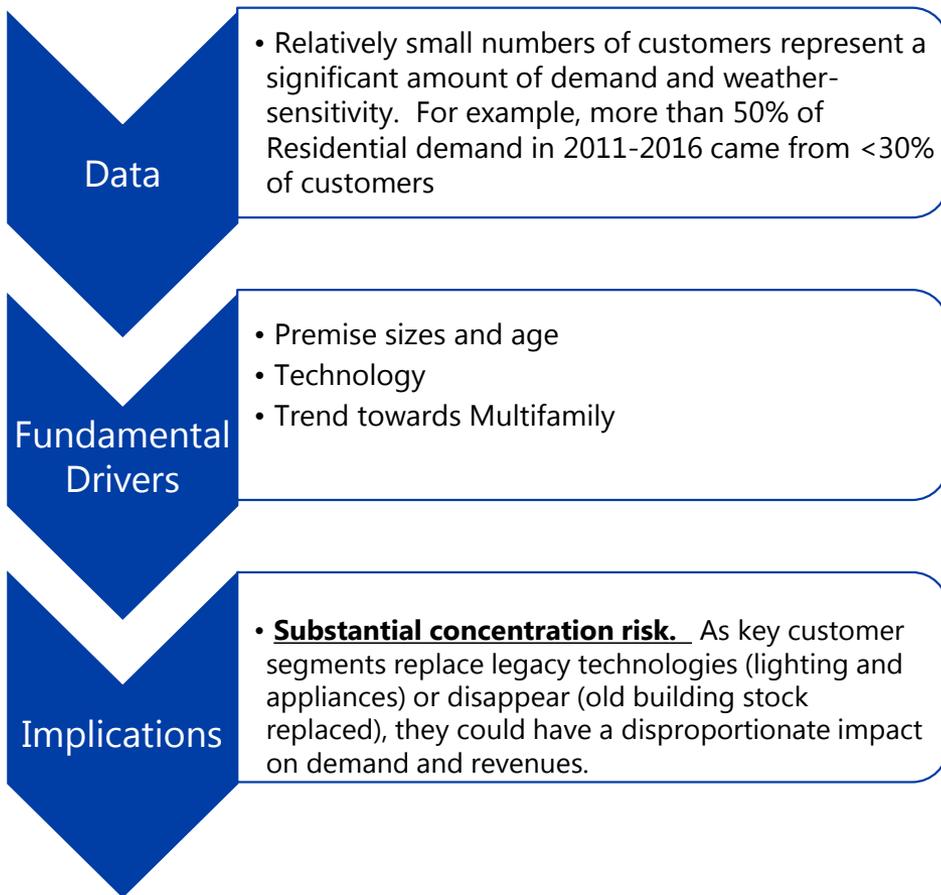


Multifamily Units' Annual Average Consumption By Year Built

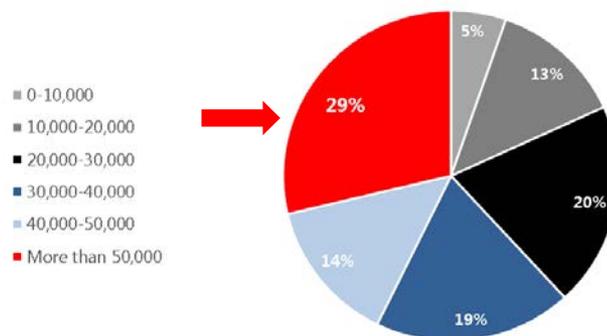


City Light billing system classifications. Annual average consumption for premises by year billed. 2015 data is preliminary. Similar trends in SF. 2014 and 2015 data shows drop in number of reads but high-level consumption differential based on year built remains the same.

HIGH DEPENDENCE ON KEY SEGMENTS



Residential Premises By KWh Consumed: 2011-2016



Total KWh billed for all billing periods falling in period 2011-2016. 2015-16 data goes through August 2016 and is preliminary.

CITY LIGHT'S MULTI-PRONGED RESPONSE

- Understand & quantify the problem to provide decision-makers with best-in-class analytics & data
 - New load forecast methodology
 - In-depth surveys of customer preferences and end-use technologies
 - Dialog with key stakeholders
 - Data science platform that leverages 15+ years of customer-level data to analyze retail sales and quantify risks
- Redesign rates to disaggregate bundled charges, bringing transparency to the cost of service (proposed Strategic Initiative)
- Respond to customer demands for products and services that are extensions of existing business and that we are uniquely positioned to provide
 - Building charging stations for electrical vehicles (proposed Strategic Initiative)
- ***More broadly, shift our thinking from “vertically integrated utility with a marketing arm” to “reliable values-driven nonprofit energy partner”***
 - For illustrative purposes only: If legislation permitted, should we consider building solar/wind farms for commercial customers interested specifically in those products? Should we offer our hydro expertise as a service to other utilities? (These are examples only, not policy or decisions under active consideration.)





Seattle City Light



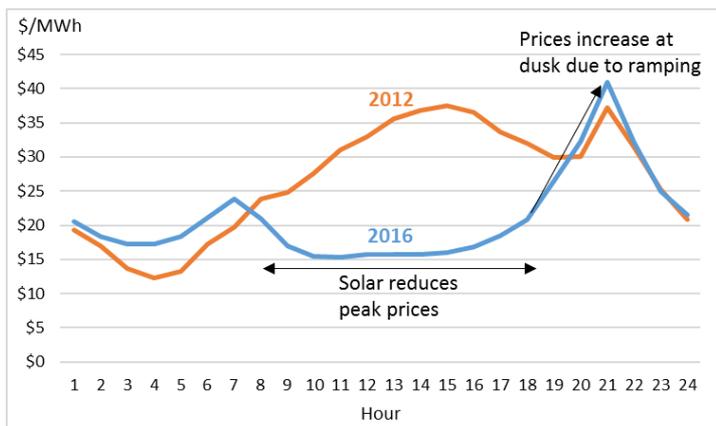
STRUCTURAL CHANGES IN WHOLESALE ENERGY



CHANGES IN FUEL SUPPLY & POWER PRICES

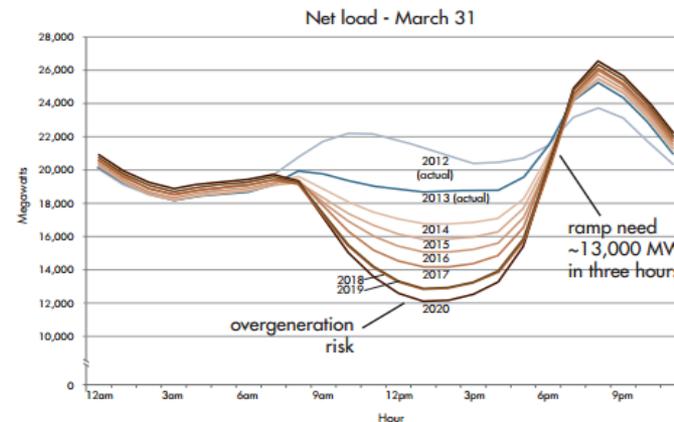
- City Light's wholesale power market revenues have declined over 60% from their peak owing to structural changes in the power & gas markets
 - Shale gas ("fracking") has structurally reduced the price of natural gas, lowering wholesale power market prices
 - Growth in solar & wind farms put substantial amounts of power on the grid at low, \$0 or even negative prices. The chart below is specific to CAISO but illustrates the potential price impact of renewables in general
- *Reductions in retail sales mean City Light has to sell more energy into wholesale markets - at prices substantially lower than retail prices. Net impact is a drop in enterprise revenues*

Day-Ahead Prices at SP-15 (\$/MWh)



Source: SparkLibrary, based on data from CAISO

CAISO Load: "Duck Curve"



Source: SparkLibrary and CAISO

CITY LIGHT'S MULTI-PRONGED RESPONSE

- Progressively reduced the estimate of wholesale revenues in its forecasting and budgeting process, reducing the potential for rate shocks if wholesale prices decline precipitously
- Switched the type of power product purchased from Bonneville Power Administration (“Slice of System” to “Block”), lowering administrative costs and reflecting lower potential needs for power
- Joining Western Energy Imbalance Market (EIM) to leverage the operational flexibility of our fleet (proposed Strategic Initiative)
- ***City Light plans to comprehensively review its entire power supply portfolio to reflect the new reality of slowing/shrinking retail sales, low wholesale prices and high fixed costs***
 - Assess the long-term viability of some of the plants in our fleet, given their forecasted capital and O&M needs
 - Review whether to renew long-term power purchase agreements
- In the long run, City Light may need to shift how it thinks about power supply.
 - For illustrative purposes only: it could install, integrate and maintain distributed generation (battery + renewable) for customers, increasing the amount of power supplied from its low-cost fleet and reducing expensive purchases from BPA and long-term contracts. (Example only, not policy or decisions under active consideration.)





Seattle City Light



OVER-THE-HORIZON: DISRUPTIVE INNOVATIONS



TECHNOLOGIES IMPACTING CITY LIGHT

- Broadly, innovations and technologies can be grouped into 3 categories, with varying revenue impact on City Light
- This is not an exhaustive list, merely ones that have the greatest potential impact today

Distributed Generation

- Mature category, ranging from rooftop solar to evolving fuel-cell technologies
- Effectively turns City Light into a part-time or backup energy provider, potentially reducing retail sales

Storage

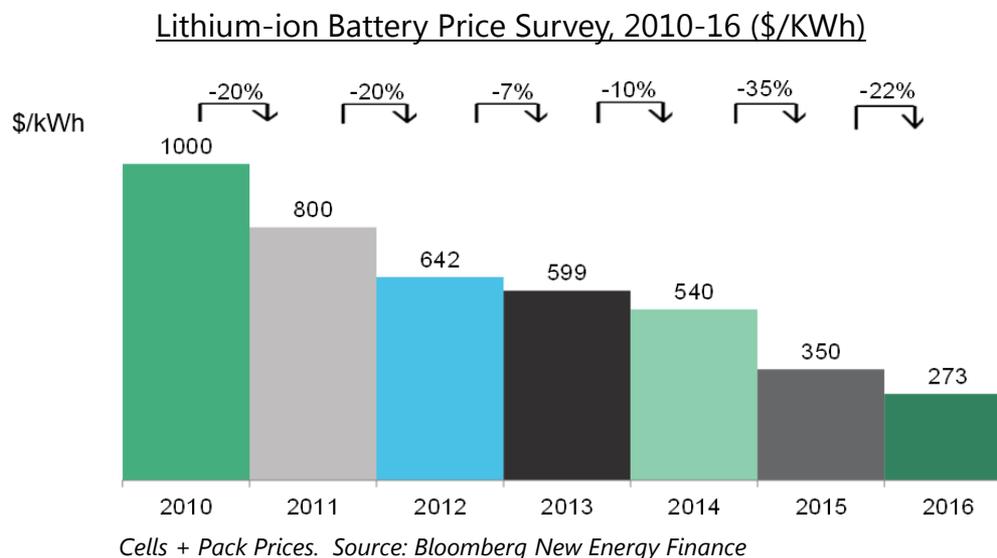
- Rapidly developing category, ranging from batteries to molten salt
- Shifts demand from one period of day to another. Low impact on retail sales. May reduce wholesale revenues and fleet value

End-use Consumption

- Mature category, ranging from LED bulbs to more efficient appliances
- Potential to reduce retail sales. E.g., 60 watt incandescent can be replaced by 10-12 watt LED

KEY RISK: COMMERCIALIZATION AND SCALE

- ***It is impossible to predict which technology will become commercially viable when.*** But given the speed with which LED bulbs gained scale and battery prices are dropping (below), it is prudent to assume that disruptive technologies reducing retail sales will appear in the next 10 years
- Vehicle electrification may not be a panacea. Growing public transit options, the size of the potential EV customer base and potential miles driven all mute the boost to retail sales



CITY LIGHT'S MULTI-PRONGED RESPONSE

- Created an Innovation team to research and deploy new technologies
- Sponsor of the Lighting Design Lab
- Ongoing dialog with industry and national labs
- ***As part of its shift to becoming an energy partner, City Light may consider responding to customer demand for products and services that we are uniquely positioned to provide***
 - Charging stations for EVs (proposed Strategic Initiative)
 - For illustrative purposes only: installing and integrating distributed generation into the grid on a larger scale



Seattle City Light



RESPONDING TO CUSTOMER NEEDS & ADAPTING THE ORGANIZATION



MULTIPLE CHALLENGES STEMMING FROM A COMMON SET OF CAUSES

- City Light has a unique “hybrid” personality – it is a business with a government department’s highly structured job classification, salary and management organization
- Loss of institutional memory and specialized skills as employees retire
- Strong economic growth has driven up median incomes, particularly for skilled positions in areas like IT, engineering and quantitative analysis.
 - Limited ability to compete with private sector
 - Limited ability to move staff internally as employees retire or leave
 - Reliance on consultants and short-term temporary help is expensive and does not build institutional capacity

Seattle area’s jobless rate drops to 3.6 percent

Washington state’s unemployment rate stayed the same, while the Seattle-Bellevue-Everett area’s jobless figure hit a low not seen since 2007.



Source: state Employment Security Department THE SEATTLE TIMES

Median household income in Seattle-area cities

Among Washington cities with at least 65,000 people, Kirkland has the highest median household income.

CITY	MEDIAN HOUSEHOLD INCOME, 2015	CHANGE FROM '14
Kirkland	\$102,420	\$8,088
Bellevue	\$98,804	\$3,658
Seattle	\$80,349	\$9,374
Marysville	\$75,120	\$14,491
Auburn	\$70,602	\$9,023
Renton	\$68,656	\$1,030
Kent	\$66,790	\$4,488
Federal Way	\$62,174	\$9,734
Tacoma	\$52,437	\$484

Source: U.S. Census MARK NOWLIN / THE SEATTLE TIMES

THIS DIRECTLY AFFECTS CUSTOMER OPERATIONS

- Staffing imbalances within City Light means bottlenecks cascade across the organization
- More and more core business functions are digitizing or require enhanced skills
- Customers expect more in the digital age. A customer can view their Amazon.com order live, register problems electronically, receive callbacks within minutes and potentially get resolution within 1 business day. With the best of intentions, City Light cannot do so
 - Legacy processes, which cannot easily be changed
 - Limited ability to compete for talent, even when positions can be requisitioned
 - Reliance on outsourced IT provider (Seattle IT) for most IT functions. Limited in-house IT expertise



CITY LIGHT'S MULTI-PRONGED RESPONSE

- Renewed emphasis on and prioritization of customer operations and services under new CEO
- Digitizing some processes and systems, such as Enterprise Content Management. Exploring ways to digitize more operations to speed operations and reduce impact of bottlenecks and retirements
- Enterprise-wide process improvement program (proposed Strategic Initiative)
- Comprehensive succession planning program, salary competitiveness review and job classification review (proposed Strategic Initiative)
- Expand digital customer experience and build customer hub (proposed Strategic Initiative)



Seattle City Light



CLIMATE CHANGE & ENVIRONMENTAL CHALLENGES



CLIMATE CHANGE AND THE ENVIRONMENT

- Seattle will see substantial impacts from climate change over the next 50 years. While the magnitude of the impact on streamflows and retail sales are difficult to quantify a decade in advance, they are undeniable
- Beyond the numbers, protecting the environment and maintaining a sustainable planet are one of City Light's and its customers' highest priorities
- ***This is what distinguishes a values-driven partner from a commodity electricity supplier.*** City Light has a long and proud history of environmental leadership. Given the national debate on the environment, it is more important than ever that City Light continue to be a role model

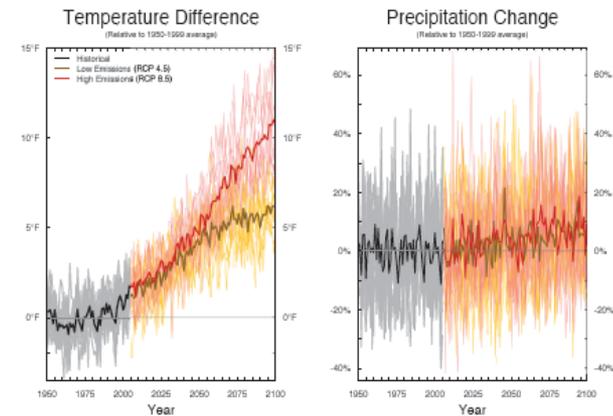


Figure 1. All Scenarios Project Warming in the Puget Sound Region for the 21st Century.

	NOW	2035		2060	
	A	B	C = A + B	D	E = A + D
	Water Level*	Projected Sea Level Rise	Water Level	Projected Sea Level Rise	Water Level
100 Yr Storm (Surge) [†]	3'	1'	4'	2'	5'
Annually	2'	1'	3'	2'	4'
Monthly	1'	1'	2'	2'	3'
Daily	0	1'	1'	2'	2'

* Above average daily high tide (MHHW)

[†] Current projections do not show a change in storm surge as a result of sea level rise.

Table 2. Current and Projected Water Levels for the 100-Year Surge Event, Annual, Monthly, and Daily High Tides. Changes are based on a combination of projected sea level rise (+1 foot in 2035 and +2 feet in 2060) and the historical 100-year event storm surge (3 feet above the average daily high tide). Results are relative to the current average daily high tide (MHHW = 9.01 feet). (Source: National Research Council; Graphic: GGL0)

Source: *Preparing for Climate Change*. Seattle Office of Sustainability & Environment. August 2017

CITY LIGHT'S MULTI-PRONGED RESPONSE

- Proposed an enhanced Strategic Initiative on environmental stewardship, geared towards climate adaptation plan implementation, climate resiliency and environmental equity
- Hired a Climate Change Advisor and developed a Climate Change Vulnerability Assessment and Adaption Plan, following on from the Climate Initiative in an earlier Strategic Plan
- Renewed emphasis on environmental leadership by executive team, with a particular focus on being a role model and influencer for the industry



Seattle City Light



SUMMARY



BUILDING THE UTILITY OF THE FUTURE

- The traditional “vertically integrated monopoly utility business model”, predicated on steady sales growth and an extremely stable business and regulatory environment, faces substantial challenges over the next decade
- City Light is already executing on several fronts to understand, quantify and formulate effective responses to these challenges. More work remains to be done.
- More broadly, addressing these challenges will require City Light’s executive team and stakeholder community to fundamentally shift their thinking and reexamine the role the business plays in its customers’ lives and its community
- City Light’s long history of innovation and bold visionary decisions reflect our ability to meet the most significant challenges of our time



CITY LIGHT

OUR MISSION

Seattle City Light is dedicated to delivering customers affordable, reliable and environmentally responsible electricity services.

OUR VISION

We resolve to provide a positive, fulfilling and engaging experience for our employees. We will expect and reinforce leadership behaviors that contribute to that culture. Our workforce is the foundation upon which we achieve our public service goals and will reflect the diversity of the community we serve.

We strive to improve quality of life by understanding and answering the needs of our customers. We aim to provide more opportunities to those with fewer resources and will protect the well-being and safety of the public.

We aspire to be the nation's greenest utility by fulfilling our mission in an environmentally and socially responsible manner.

OUR VALUES

Safety, Environmental Stewardship, Innovation, Excellence, Customer Care



Seattle City Light