



CITY LIGHT REVIEW PANEL MEETING

Wednesday, April 14, 2021

9:00 AM – 11:00 AM

Microsoft Teams Meeting

Proposed Agenda

<u>Item</u>	<u>Lead</u>
1. Welcome, Introductions (<i>5 min.</i>)	Leon Garnett, Panel Chair
2. Public Comment (<i>5 min.</i>)	
3. Standing Items: (<i>5 min.</i>)	
a. Review of agenda (Karen Reed)	
b. Action: Review and approval of meeting minutes of March 25, 2021	
c. Chair's Report (Leon)	
d. Communications to Panel (Leigh Barreca)	
e. Panel recruitment update (Maura Brueger)	
4. General Manager's update (<i>30 min.</i>)	Debra Smith
a. Skagit Study Plan	
5. 2022-2026 Strategic Plan (<i>75 min.</i>)	
a. Outreach update	Jenny Levesque
b. Review & Discuss draft plan, including appendices	Leigh/Vanessa Lund
c. Review Panel letter drafting	Karen
6. Adjourn	



**City Light Review Panel Meeting
Meeting Minutes**

**Date of Meeting: March 25, 2021 | 10:00 AM – 12:00PM |
Meeting held via Microsoft Teams “Draft”**

MEETING ATTENDANCE					
Panel Members:					
Names		Name		Name	
Gail Labanara	√	John Putz	√	Mikel Hansen	√
Sara Patton	√	Anne Ayre	√	Leon Garnett	√
Scott Haskins	√				
Staff and Others:					
Debra Smith	√	Jen Chan	√	Karen Reed (Consultant /RP Facilitator)	√
Kirsty Grainger	√	Mike Haynes	√	Tom DeBoer	
Jim Baggs		DaVonna Johnson	√	Craig Smith	
Kalyana Kakani		Emeka Anyanwu		Michelle Vargo	
Julie Moore	√	Chris Ruffini	√	Maura Brueger	
Greg Shiring	√	Carsten Croff	√	Leigh Barreca	√
Eric McConaghy	√	Toby Thaler	√	Angela Bertrand	
Kathryn Aisenberg		Chris Tantoco	√	Will Hallett	√
Tim Skeel	√	Rollin Fatland	√	Vanessa Lund	√

Welcome\Introductions. Panel members and Staff introduced themselves and welcomed Tim. It was noted that this was Gail Labanara’s last meeting and staff and members thanked Gail for her service.

Public Comment. There was no public comment.

Standing Items:

Review Agenda. Karen Reed reviewed the agenda.

Approval of March 11, 2021 Meeting Minutes. Minutes were approved as submitted.

Chair’s Report. No report.

Communications to Panel/Panel Member Recruitment. Leigh Barreca noted that three letters of interest were received for the Residential Customer representative and one for the Suburban Franchise City vacancy. These are in addition to the Economist position to which Tim Skeel has been nominated. We will be sending nominees for all for all three positions to the Council in coming weeks.

Debra Smith will be joining the meeting in a few minutes; the group proceeded with the Apprenticeship Presentation pending Debra’s joining.



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Apprenticeship & Workforce Diversity/IBEW Wage discussion.

DaVonna Johnson presented materials that were recently shared with the City Council. The presentation is in member packets.

Q. Are there similar statistics for Puget Sound Energy?

A. They use the vendor Petelco to provide many of their services. Petelco's compensation structure is in line with ours. Some of the PSE data is not available.

Q. Why do the numbers of women leaving look so high?

A. The greatest number of women who leave are retiring. We do exit interviews to understand why women leave. Due to state law, we are not able to consider race and gender in our hiring processes.

Q. Do you have a sense of other careers that you are competing with for internships?

A. Our internship program is broad within many of our lines of business-- especially for College interns. For our high school interns, we work with high schools to reach underserved populations. For apprenticeships we tend to get interest from construction and military workers.

Q. What is engagement for pre-apprentice for programs like ANEW?

A. South Seattle Community College administers our programs and exams. We are trying to be more deliberate in our outreach to attract applicants to our large range of professions.

Q. What is your view of what isn't working/What opportunities are there?

A. Recruitment is hindered by a lack of qualified candidates coming from high schools. We need to work more closely with the schools to ensure applicant readiness. We are rolling out a robust outreach and engagement strategy to attract more applicants. A lot of kids just see themselves in tracks to go to college rather than the trades.

Q. Re: Wages, you operate in a labor management context. Are you looking for feedback from us?

A. I am reporting the situation regarding labor. This presentation was developed for the City Council to gain their support for the wage adjustments we are seeking.

Q. Have you looked at demographic trends in King Co since 2010 to see how they compare to the workforce demographic?

A. We can add that to our analysis going forward.

Q. Have you looked at the comparables for IBEW in terms of total compensation, not just salary?

A. Our total compensation is on parity with other utilities in the region for similar bodies of work.

General Manager's update. Debra Smith reported.

Debra gave a brief update on the Skagit relicensing project. SCL is working well with the new negotiating team to respond to requests. We expect to revise our study plan in early April and will include a letter from me emphasizing our commitments.



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Strategic Plan outreach continues. We are presenting the “bones” of the document to stakeholder groups, including internal teams. The PIAs are being fleshed out. We are getting good feedback and support. We also met with Councilmember Dan Strauss to provide a high-level overview and discussion about our rate strategy. Future and pending meetings will be with NWECC, Franchise Cities, and others.

We are working on our Executive Dashboard. We selected metrics this week and will be able to share this report with the Panel in May. The We Power Seattle dashboard will be developed working with our new Utility Technology Director. Division level dashboards are also in process; they will be completed in 6-12 months.

The 2021-2022 rate plan is going to Council next week.

Last week there was another successful launch for the customer portal. Each launch includes new functionality. The most recent launch included move in/move out and is already showing impressive usage statistics. The Escrow functionality was rolled out in a soft launch.

Q. Will we get a briefing about FERC requirements and the revised study plan for Skagit Relicensing?

A. Yes, we can bring that to you in mid to late April.

2022 – 2026 Strategic Plan.

Review Panel letter - Karen Reed reviewed the process for writing the Review Panel letter that will accompany the strategic plan when it is transmitted to the Mayor’s office and City Council. Materials are in member packets.

Q. Will we go through each section of the plan and agree how to respond?

A. Yes.

C. I think the past letters have been too long.

Q. I don’t have enough detail to comment at this point? Will we see more content?

A. Yes, this will be presented at future meetings.

Strategic Plan outline and draft content - Vanessa Lund presented.

C. One of the themes we discussed was equity, diversity, and inclusion. Perhaps include in the executive summary.

C. Include social justice efforts in the document, such as the apprenticeship information.

C (via chat): I would like to see more financial metrics included on the debt strategy.

C: Gail Labanara requested that her position be listed as vacant in the Plan.

Q. Will the financial section include how SCL plans to come out of the pandemic financially?



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A. This is very relevant and will be included, such as our Road to Recovery efforts since many will occur next year.

Q. Rate redesign?

A. Yes. we can include this in the plan.

The Panel was invited to send additional suggestions on the Plan outline to Leigh, who will forward the outline to the Panel as a word document. The Panel will see a more robust draft at the next meeting, including the appendices which are ready. Kirsty Grainger and Carston Croft expect the financial appendix will be ready to be shared with the Panel in advance of the next meeting.

Adjourn: Meeting adjourned at 11:51 a.m.

Next meeting: April 14, 2021



Over 900,000 people in the Seattle area rely on Seattle City Light every day to keep their homes running, businesses operating, and communities vibrant. It is our duty—and our greatest source of pride—to provide our customers power that is affordable, reliable, safe, and environmentally responsible.

Like many things in 2020, our Strategic Planning process was halted abruptly when the COVID-19 pandemic struck our region. At that time, we recognized the need to pause this long-term planning effort and focus on the immediate safety and wellbeing of our community, customers and employees.

Now, with a hopeful eye to the future, we have returned to our Strategic Plan with the new perspective that the challenges of the past year have given us. The 2022–2026 Strategic Plan

highlights our ongoing commitment to providing essential energy services and outlines our pathways to building a shared energy future with the communities we serve.

The new City Light Strategic Plan is a five-year plan that focuses on building stronger relationships with our customers, improving core service areas, and preparing our utility and our region for large-scale, long-term changes to the energy industry.

Key activities such as grid modernization, technology upgrades, partnerships with customers, and business process improvements will put us in the best possible position to help the Seattle area recover from the pandemic and build a more equitable, sustainable future for all of us.



BUSINESS STRATEGIES:



Improve the Customer Experience

We will meet the needs of our customers by empowering our employees to deliver targeted solutions in a consistently responsive way. Using information gathered from our customers, we will develop programs and services to meet their individual needs and redesign old processes to strengthen and improve core service delivery. We will empower our employees to fulfill our “Customers First” commitment.



Create our Energy Future

To prepare for the future, we will build and maintain smart, resilient, flexible, dynamic, and reliable grid infrastructure that will support long-term decarbonization and electrification efforts. We will prepare for greater integration of distributed energy resources and increased customer options. We will work to reverse historical inequities and avoid unintended harm to historically underrepresented populations by intentionally prioritizing their needs as we create our energy future.



Develop Workforce and Organizational Agility

As we prepare for major transformations in our industry and the environment in which we operate, we will foster an organization that is nimble, adaptable, and responsive. We will cultivate an agile, accountable, and inclusive workforce that reflects the diversity of our community to meet our organization’s emerging needs. We will implement a robust, cross-functional business process framework in consistent, scalable, and data-driven ways.



Ensure Future Financial Stewardship and Affordability

We will support long-term affordability in Seattle by offering rates that are transparent, understandable, reasonable, equitable and consistent for all customers, including vulnerable populations. This commitment includes developing a sustainable and predictable approach to setting rates over time, one that continues to encourage efficient use of the products and services we provide. We will reform our capital prioritization process to deliver a capital plan that is prudent, efficient, and community focused.



We Power Seattle

City Light will continue to advance our mission of providing our customers with affordable, reliable, and environmentally responsible energy services. We will prioritize diversity, equity, and inclusion in all that we do and we will actively manage and mitigate the constraints, risks, and uncertainty of operating in a COVID-adjusted environment.

Connect with Us

To learn more about the 2022-2026 Strategic Plan, visit seattle.gov/city-light/about-us/strategic-plan-and-review-panel. Feedback and comments can be sent to SCL_StrategicPlan@seattle.gov.



2022-2026 Seattle City Light Strategic Plan

4-12-21 **DRAFT**

EXECUTIVE SUMMARY

Over 900,000 people in the Seattle area rely on Seattle City Light every day to keep their homes running, businesses operating, and communities vibrant. It is our duty—and our greatest source of pride—to provide our customers power that is affordable, reliable, safe, and environmentally responsible.

Like many things in 2020, our Strategic Planning process was halted abruptly when the COVID-19 pandemic struck our region. At that time, we recognized the need to pause this long-term planning effort and focus on the immediate safety and wellbeing of our community, customers, and employees.

Now, with a hopeful eye to the future, we have returned to our Strategic Plan with the new perspective that the challenges of the past year have given us.

The 2022–2026 STRATEGIC PLAN highlights our ongoing commitment to providing essential energy services and outlines our pathways to building a shared energy future with the communities we serve.

The new City Light Strategic Plan is a five-year plan that focuses on building stronger relationships with our customers, improving core service areas, and preparing our utility and our region for large-scale, long-term changes to the energy industry.

Key activities such as grid modernization, technology upgrades, partnerships with customers, and business process improvements will put us in the best possible position to help the Seattle area recover from the pandemic and build a more equitable, sustainable future for all of us.

To learn more about the plan, go to seattle.gov/city-light/about-us/strategic-plan-and-review-panel. Feedback and comments can be sent to SCL_StrategicPlan@seattle.gov

2022-2026 Seattle City Light Strategic Plan

Recover, Refocus, Restart

Letter from the General Manager and CEO, Debra Smith

[CONTENT FORTHCOMING]

ABOUT CITY LIGHT

Seattle City Light, a department of the City of Seattle, is one of the nation's largest publicly owned utilities in terms of the number of customers served. Our customers include the cities of Seattle, Shoreline, Burien, Lake Forest Park and portions of Normandy Park, Tukwila, Renton, SeaTac, and unincorporated King County.

We are funded by customer revenue, not taxes, and governed by the elected leaders of the City of Seattle.

As a recognized national leader in energy efficiency and environmental stewardship, Seattle City Light provides low-cost, reliable, and environmentally responsible electric power. We meet over half of our customers' electric needs from hydropower dams owned and operated by Seattle City Light; most of the remaining by hydropower purchased from the Bonneville Power Administration and investments in renewable and conservation resources. We are proud to offer our customers some of the lowest electricity rates in the nation.

By the Numbers

Service Area Population: 940,000
Customers
Residential: 419,601
Non-residential: 50,779
Personnel (FTE): 1,791
Meters: 461,496 (97% Advanced Meters)
Distribution Circuit Miles: 2,330.9
Major Substations: 16
Commercial/Industrial Power Transformers: 56
Network Distribution Circuit Miles: 309
1,806,000kW: Peak Use
\$13.59 aMW: Annual Energy Savings from Conservation

Source: 2019 Annual Report and 2018 Fingertip Facts

MISSION, VISION, VALUES

Our Mission

Seattle City Light provides our customers with affordable, reliable, and environmentally responsible energy services.

Our Vision

Create a shared energy future by partnering with our customers to meet their energy needs in whatever way they choose.

Our Values

CUSTOMERS FIRST: We believe customer service is everyone's job. We pledge to be approachable, respectful, and responsive in providing products and services that our customers want and need.

ENVIRONMENTAL STEWARDSHIP: We care about the environment and we are dedicated to enhancing, protecting, and preserving it for future generations.

EQUITABLE COMMUNITY CONNECTIONS: We are proud to be a local, community-owned utility. We are visible and actively involved in the communities we serve. We are rooted in our commitment to racial diversity, social justice, and the equitable provision of services to all.

OPERATIONAL AND FINANCIAL EXCELLENCE: We strive for excellence, are forward-focused, and seek new and innovative solutions to meet the challenges of today and tomorrow. We prioritize our investments and operating choices to build upon our strong financial foundation and solid, reliable infrastructure.

SAFE AND ENGAGED EMPLOYEES: We actively practice our commitment to employee and public safety. We treat each other with kindness and respect, are personally accountable, and work effectively in teams.

FROM PANDEMIC TO PROGRESS

In 2020, the utility faced unprecedented challenges — the coronavirus pandemic, the shuttering of businesses and massive job losses, dangerous air quality, and heightened calls to address racial disparities and injustice. Throughout these difficult times, the utility adapted to provide safe work environments for its employees, maintain essential services to customers, and learn from the experience to build a stronger utility moving forward.

Progress Highlights:

Responded to Covid-19

We mobilized quickly and comprehensively to continue delivering services during a severe public health, economic, and social crisis. Our employees found new ways to adapt their work – from rethinking how crews deploy to setting up home offices (often next to home-school classrooms.) We also restricted planned outages to reduce impacts to customers.

COVID-19 forced us to adjust plans and practices to respond to new norms and changing demands for service. Our workforce was agile, resilient, and caring. In the face of great uncertainty and distress, we honored our mission, lived by our values, and provided help to the most vulnerable among us.

Advanced Our Carbon-Neutral Transportation Future

The utility's Transportation Electrification Strategic Investment Plan identifies what's necessary to expand transportation electrification to meet our carbon-neutral goal. The plan describes how data and community and stakeholder input will help build an equitable and electrified transportation system.

The plan is already in action. We're working with King County Metro and Washington State Ferries to build the necessary electrical infrastructure to support public transit electrification. This will significantly benefit communities that rely on public transit and will reduce air and noise pollution where impacts are greatest. In addition, as part of our Utility Next initiative, we've expanded electric vehicle charging infrastructure, invested in electrification of our fleet, and started constructing a charging depot for municipal and private fleets.

We'll build on these existing commitments to develop future offerings to support equitable electric transportation for all and reduce emissions across the region.

Utility Relief for Customers in Response to COVID-19:

In coordination with the City of Seattle, City Light:

- Provided more flexible payment plans
- Helped eligible residential customers self-certify for Utility Discount Program
- Reached out to small businesses with delinquencies to offer flexible payment plans
- Waived interest charges/late fees on delinquencies for eligible businesses

Made Customer Service More Personal and Convenient

We pride ourselves on continually improving our service to customers. As customer expectations and technologies change, so must our business practices. We've transformed many important customer services, including improving our online payment system for mobile use, launching a Business Customer Service Center pilot program that provides concierge services, and developing an online customer portal with improved account management tools and the ability to see and respond to real-time usage data. This means customers can easily open and close accounts through self-serve options and businesses have tools to make their work easier.

Invested in Critical Infrastructure and Assets

We continue to make strategic, reliability-enhancing investments in our generation, transmission, and distribution systems.

Hydropower is clean, carbon-free energy and provides about half of our customers' power. We upgraded our hydroelectric generation with improvements in dam safety, outage management, and long-term system and facility planning.

The replacement of aging wooden utility poles was particularly important and challenging in 2020 due to the need to limit planned outages. Thanks to committed crews and staff, we were able to significantly accelerate our pole replacement schedule and develop a robust strategy to replace poles that require long-duration permitting efforts.

Additionally, we invested in undergrounding facilities along the Seattle waterfront and added capacity for light rail.

Joined the Western Energy Imbalance Market

City Light joined the Western Energy Imbalance Market (WEIM) in 2020. This advanced market system automatically finds low-cost energy to serve real-time consumer demand across the West. WEIM enhances grid reliability and generates cost savings for participating utilities. In addition to providing economic advantages, the market improves the integration of renewable energy, which leads to a cleaner, greener grid. The City Light team successfully entered WEIM during an unusually challenging time and our first year of participation has had positive financial results.

Earned the Highest Reliable Public Power Provider Designation from the American Public Power Association (APPA)

In 2021, City Light was one of only 47 utilities to earn the Diamond Reliable Public Power Provider (RP3)[®] designation from the APPA. This award recognizes public power utilities for proficiency in reliability, safety, workforce development, and system improvement. This three-year designation shows the utility's dedication to safety, reliability, and sound business practices.

PERFORMANCE METRICS

Purpose	Measure	2016	2017	2018	2019	2020	TARGET 2021
Reliability	Outage Duration: SAIDI ¹	61.0	64.5	58.3	71.9	67.0	64.3
	Outage Frequency: SAIFI ²	.50	.40	.50	.50	.49	.47
	Generator Availability	83.8%	81.5%	89.1%	84.1%	77.1%	81.4%
	Miles of Line Trimmed ³	553	417	373	408	323	400
Clean Energy	Energy Efficiency Incremental Average (aMW) ⁴	14.0	15.4	14.4	13.0	14.2	10.6
Social Justice	Utility Discount Program Participants	28,000	33,000	31,924	34,028	42,094	47,094 ⁵
	Purchases from Women & Minority Business Enterprises	\$15.20	\$14.00	\$11.50	\$13.00	\$19.70	\$16.37
Finance	Debt Service Coverage	1.70	1.90	1.80	2.10	1.67 ⁶	1.79

[NOTE: UDP target is being confirmed.]

¹ SAIDI – System Average Interruption Duration Index (average total number of minutes per year of sustained outage per customer served)

² SAIFI – System Average Interruption Frequency Index (average number of times a customer's electric service was interrupted in the year)

³ Tree trimming and vegetation management as measured by transmission line miles

⁴ Measures our performance toward reaching our state-mandated energy savings target

⁵ UDP Participation number is a projection of net 5,000 new enrollees as opposed to a target

⁶ Unaudited

ABOUT PLANNING

Our customers rely on us to keep the power on, no matter the situation. To do this, we need a clear vision of where we want to go and plans for how to get there. These plans have to continually adapt to changes in our community, the industry, and the world.

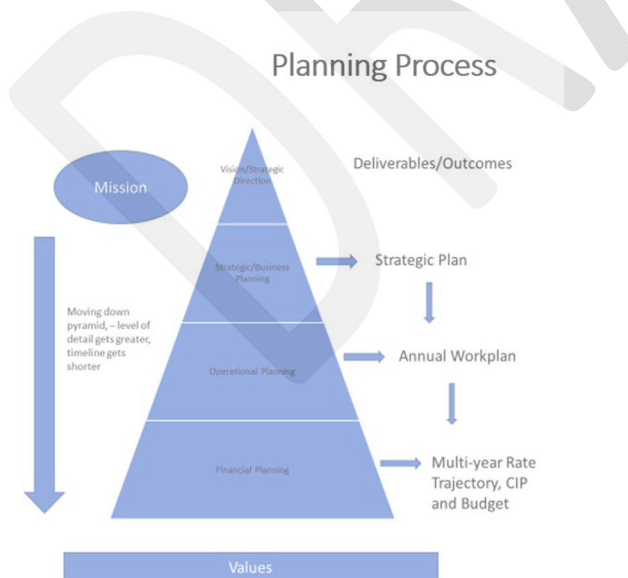
Our values, mission, and vision shape all our planning. They reflect who we are, why we're here, and what we aspire to. Our vision is the 'North Star' -- the beacon we're headed towards and our source of inspiration.

The strategic plan charts potential paths to get to our North Star. It takes a high-level, longer term view; it identifies our key strategic assets; and it leverages these assets to help us navigate uncertainty.

The strategic plan informs other, detailed and more frequently updated plans.

Our annual workplan sets service and performance goals and guides our day-to-day operations. Financial plans such as the Capital Improvement Program, rate trajectory, and budget help us manage our resources wisely.

[This graphic is temporary. A new version is being designed.]



Strategic Plan 101:

WHAT? A framework for making informed decisions to meet current and future needs of SeattleCity Light and its customers.

WHO? Seattle City Light's executive team leads the planning effort with input from the Seattle City Light Review Panel, City of Seattle policymakers, community members, business representatives, customers, employees, and other stakeholders.

WHY? Disruption is the new normal. Pandemics, climate change, evolving customer needs, technology changes, and a generational wave of retirements are just a few of the disruptive forces creating major challenges for our industry.

COMMUNITY VOICES

[NOTE: This section will be updated when outreach summary is complete.]

We Heard From You

Outreach efforts for the 2021–2026 Strategic Plan built on what we heard from customers and stakeholders over the last two years and informed development of our priorities and programs. Seattle City Light is committed to hearing from customers and the community and using these insights to inform our strategic planning and daily work.

Here are a few ways we reached out:

CUSTOMERS

- Community, business, and franchise city 'preview' presentations
- Residential and small business customer market research survey
- Customer outreach, including direct mail postcard, email invitations, and advertising to drive input to our survey
- Stakeholder forums
- Outreach to franchise cities

COMMUNITY

- Media outreach (traditional, social and ethnic media)
- Strategic scenario planning think tanks and workgroups
- Rate redesign outreach (stakeholder meetings, focus groups, and peer review)
- Equity and environmental justice-focused outreach
- Public electric vehicle charging outreach (open houses, presentations, workshops, surveys, and materials distribution)
- Transportation electrification planning engagement

EMPLOYEES

- Employee outreach (news, meetings, and forums)
- Employee engagement survey

Diversity, Equity, and Inclusion

[Content forthcoming - in development with SCL's Race and Social Justice Change team.]

CITY LIGHT REVIEW PANEL

The City Light Review Panel* provides advice and recommendations to the Mayor and City Council on the utility's strategic plan and rates. The panel includes representatives from private, public, and nonprofit sectors, utility experts, business leaders, and community representatives. They met with City Light leaders regularly and provided valuable input that shaped this effort.

Leon Garnett (Chair), Low-Income Customer

Mikel Hansen (Co-Chair), Commercial Customer

Anne Ayre, Industrial Customer

Scott Haskins, Financial Analyst

Sara Patton, Non-Profit Energy Efficiency Advocate

John Putz, At-Large Customer

Tim Skeel (pending), Economist

*The Seattle City Light Review Panel was created March 22, 2010 through City Ordinance Number 123256

OUR BUSINESS STRATEGIES

Improve the Customer Experience

The energy industry is evolving, and with it, customers will benefit from more customized services.

Seattle City Light has always kept the customer at the heart of our work. We are focused on customer engagement and helping employees see the impact of their actions from a customers' perspective.

As a result of this work, customers will have the tools they need to make smart energy choices that help them and the planet.

Objective:

- Consistently meet customers' needs by empowering employees to deliver targeted and responsive solutions.

Success Measures:

- Customer satisfaction scores (e.g., JD Power rating and Seattle City Light longitudinal survey)

Projects, Initiatives, Activities:

- **Integrate 'Customers First' into organizational culture:** Make use of customer research ('Voice of the Customer' research synthesis) and engage and listen to our workforce's operational challenges, needs, and priorities.
- **Strengthen and fix core customer services:** Redesign old processes to improve service delivery (e.g., Advanced Metering Infrastructure implementation, service-to-bill improvements, customer engineering resource plan, and service delivery time improvements.)
- **Expand customer service options:** Develop programs and services to meet customers' individual needs. For example, grow programs such as the business customer service center pilot, energy efficiency programs, and public and residential home charging pilots. Also, work with community partners and the City to increase the effectiveness of our utility bill assistance programs.

CREATE OUR ENERGY FUTURE

Our energy future is based on carbon-free renewable resources but moving away from fossil fuels will be a challenge. New infrastructure is needed to ensure electricity can be accessed wherever people need it. Similarly, customers will need more options for accessing and paying for electricity.

Our energy future also includes serious and evolving threats. Our city and society rely on the electric system to deliver essential services that, in turn, support other critical sectors such as financial services, communications, transportation, and other utilities. This makes us a top target for attack. We must be vigilant in continually tracking risks, addressing vulnerabilities, and securing our assets.

Objectives:

- Build and maintain a smart, resilient, flexible, dynamic, and reliable grid infrastructure.
- Prepare for the increased integration of distributed energy resources and more customer options.
- Work to reverse historic inequities and avoid collateral harm to underserved populations by intentionally prioritizing their needs as we create our energy future.

Success Measures:

- Increased load and revenue associated with electrification
- Penetration of automation on our grid
- Reduction of emissions in Environmental Justice communities

Projects, Initiatives, Activities:

- **Fund and implement the 'Utility Next' portfolio:** Utility Next will enable projects that are key to Seattle's clean energy vision. This includes transformation of our grid, while also contributing to the long-term economic recovery, and clean energy development of our region. Projects in this portfolio will modernize the grid, support large-scale renewables and storage, expand transportation electrification, develop the workforce, reinvent large capital projects, and advance building electrification. (See appendix for more details.)
- **Implement grid modernization roadmap:** Our vision of a carbon-free future depends on the electrification of transportation and other sectors of our economy. This will require a stronger, smarter grid to handle the increased consumption.
- **Implement electrification plans:** Deliver the Transportation Electrification Strategic Investment Portfolio, building electrification objectives that are consistent with City policies and codes, and support the development of the clean energy workforce.

- **Integrate distribution system and resource planning:** Integrate and align resource planning, Integrated Resource Plan, transmission & distribution, environmental planning, Clean Energy Implementation Plan, and customer service engineering resources.
- **Demonstrate leadership and collaboration:** Lead long-term regional decarbonization and electrification planning. Collaborate to ensure the capacity and availability of carbon-free generation resources and support development of regional solutions. As part of Skagit Relicensing, partner with government, Tribal, and regional partners on environmental studies and mitigations to continue to deliver environmentally responsible, safe, renewable energy.

DRAFT

DEVELOP WORKFORCE AND ORGANIZATIONAL AGILITY

Our industry is transforming quickly, and so are our customers' needs. Our products and services must keep pace. Seattle City Light employees are essential to this evolution, which is why we must continue to build their skills, create a supportive and diverse culture, and make sure there's a talent pipeline to fill the jobs of the future.

Our jobs aren't easy – and some are very dangerous – so making sure our workforce is prepared is critical.

Investing in our people and processes will pay off for customers through increased accountability, new efficiencies, better customer service, and new service offerings.

Objective:

- Foster an organization that is nimble, adaptive, and responsive and cultivate a workforce empowered to support social justice.

Success Measures:

- Workforce development and culture metrics (e.g., diversity, recruitment, employment, promotion and retention measures, and employee culture survey results)
- Development of foundational and equitably distributed tools

Projects, Initiatives, Activities:

- **Embrace organizational change management:** Establish a new change management program to provide consistent structure, standards, training, coaching, and resources to enhance capacity and improve results.
- **Build an agile workforce:** Anticipate new staffing requirements, prepare for strategic workforce staffing, and build a workforce that reflects our community's diversity. Work in this area will focus on employee culture, career development, safety, facilities and real estate, and developing the next generation of skilled tradespeople.

ENSURE FINANCIAL HEALTH AND AFFORDABILITY

Financial stability is essential to everything we do. Responsible financial planning makes it possible to develop innovative energy solutions, plan for critical investments, and keep our rates affordable.

Some of this work is internally focused, with long-term debt plans and improved budget monitoring. But when we make progress in these areas, our customers get more choices and stable and affordable prices.

Objective:

- Support long-term affordability in Seattle by offering rates that are transparent, understandable, reasonable, equitable, and consistent for all customers, including vulnerable populations. This commitment includes developing a sustainable and predictable approach to setting rates over time, which continues to encourage efficient use of the products and services we provide.

Success Measures:

- Rate path delivered according to SP commitments.
- 1.8X+ debt service coverage ratio.
- Capital financed 60% or less by debt.

Projects, Initiatives, Activities:

- **Control rate increases:** Rates need to keep up with costs to keep the lights on, but City Light is committed to keeping rates increasing at a trajectory at or below inflation. To do this, the utility will reduce labor costs, improve budget tracking, right-size the capital program, and develop a long-term debt strategy.
- **Price services for the future:** In our new energy future, clean energy technologies will power our homes and businesses, and small generation sources, like solar, will become more common, and transportation electrification will continue to grow. The way we structure our rates needs to adapt to the new energy future, too. Building on new technology from advanced meters and billing system upgrades, City Light will continue to deliver the strategies outlined in our 2018 Rate Design Report by rolling out new pricing options that encourage decarbonization and grid flexibility and help residents and businesses manage their energy costs.

WE POWER SEATTLE

'We Power Seattle' is central to all we do—more than 90 percent of our workforce is focused on delivering this promise to our customers. As we work on new efforts outlined in the strategic plan, we will remain committed to our core business operations and delivering value to our customers.

Objectives:

- Continue to advance our mission of providing our customers with affordable, reliable, and environmentally responsible energy services.
- Prioritize diversity, equity, and inclusion in all that we do.
- Actively manage and mitigate the constraints, risks and uncertainty of operating in a COVID-adjusted environment.

Success Measures:

- Operational dashboards will track performance metrics for each line of business.

DRAFT

KEEPING CUSTOMERS BILLS AFFORDABLE AND STABLE

City Light's rates are designed to collect the revenue needed to maintain existing and planned operations while also moving forward on the strategies, programs, and investments in this plan. Our revenues must cover debt service, operations and maintenance, and costs associated with delivering power.

Factors Driving Rates

Infrastructure Investments – These are the costs for capital work, and to repay bonds taken out to fund past, present and future capital programs. Major capital projects currently in progress include replacing utility poles, Boundary Hydroelectric Project licensing mitigation, and Skagit River Hydroelectric Project relicensing.

Debt Service Coverage – City Light financial policy (Resolution 31187) requires us to have debt service coverage well above (1.8 times) what is required to pay our debt obligation. Our strong financial record gives us a favorable bond rating and lower borrowing costs.

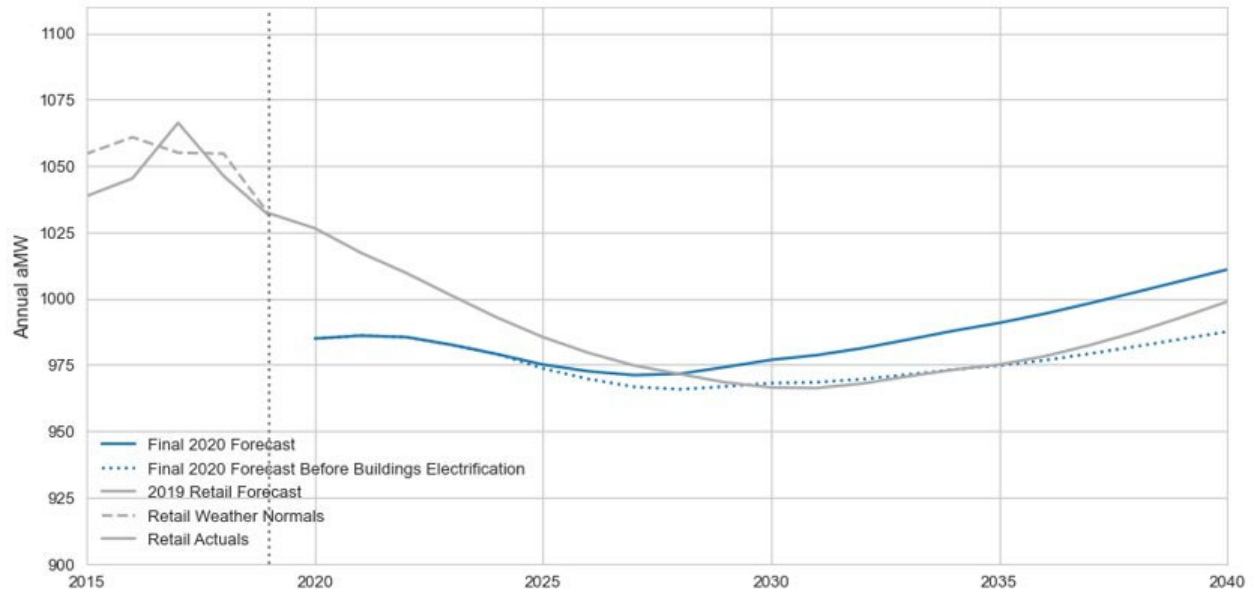
Operations and Maintenance, Taxes and Other – These are the costs to run the utility and maintain our plants and equipment. This broad category includes costs associated with power production, distribution and transmission, customer services, and administrative support.

Power Costs – These are the costs to purchase power and the transmission of electricity. These costs can vary dramatically due to climate and market forces. More snowpack in the mountains gives us more hydro resources, for example. By the same token, drought may reduce our revenue. City Light's largest contract to purchase power is with the Bonneville Power Administration.

Declining Retail Demand – City Light customers' energy consumption continues to decline due to advancements in efficiency. The economic consequences of COVID have also reduced energy demand. This decline in electricity consumption creates rate pressure. Our current rate structure is primarily based on how much electricity our customers use; if customers use less electricity, the utility collects less revenue. Maintaining the power infrastructure is very capital intensive, and these fixed costs do not shrink with less energy use. In fact, pressures associated with population growth, new safety and security requirements, renewable portfolio requirements (I-937), and inflation of costs like labor, raw materials, and construction contribute to our cost of operation.

Retail Energy Demand Forecast

[NOTE: This graphic is being updated to improve readability.]



DRAFT

FUNDING THE PLAN: OUR 5-YEAR RATE PATH

Seattle City Light is committed to providing a strong, secure, and flexible energy infrastructure so all our customer-owners can get reliable and affordable electricity, wherever they are.

We have a long history of doing just that. Yet, looking ahead, we must confront major challenges, including the COVID-19 response and recovery. This will exacerbate the need to balance essential investments with our shared financial reality.

In line with our commitment to deliver rate increases in line with inflation, Seattle City Light recommends the rate path shown in the table below, to ensure the utility can deliver the best customer service in an affordable, equitable, reliable, and environmentally responsible manner.

The Strategic Plan proposes a five-year rate path that increases 3.5 percent annually, on average.

Proposed Rate Increase Summary

2022	2023	2024	2025	2026	Avg
3.9%	3.8%	3.8%	3.0%	3.0%	3.5%

The table below shows potential bill impacts as examples, only. Customers who decrease their consumption through energy efficiency measures will experience smaller bill impacts.

Customer Bill Impact Examples: Monthly Increase Per Year

Bill Example	2021	2022	2023	2024	2025	2026
	Average bill/ month	Increase				
Residential*	\$76.77	\$3.00	\$3.04	\$3.18	\$2.61	\$2.68
Residential- UDP (60% Discount)	\$30.71	\$1.20	\$1.22	\$1.27	\$1.04	\$1.07
Small Commercial- Car Wash	\$465	\$18	\$18	\$19	\$16	\$16
Medium Commercial-Retail Store	\$7,436	\$290	\$294	\$308	\$252	\$259

*Assumes a typical residential customer using 634 kWh/month

APPENDICES:

- A. Transportation Electrification Strategic Investment Plan
- B. Utility Next Portfolio
- C. Grid Modernization Plan
- D. Financial Forecast
- E. Outreach Summary



Seattle City Light

Transportation Electrification

Strategic Investment Plan

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Letter from Debra Smith, General Manager and CEO

At Seattle City Light, we are redefining electricity services to meet the evolving demands of our customers and our rapidly growing metropolitan area. City Light envisions a utility of the future that is responsive to the wants and needs of community members most impacted by environmental inequities, operates a modernized grid that enables real-time smart technology interaction and provides economic opportunities through infrastructure investments and upgrades. A modernized electric grid will allow for resource optimization and prepare the region to withstand growing climate impacts.

City Light is seizing transportation electrification as an opportunity to deliver on this vision. With our clean energy, the Pacific Northwest is in a unique position to electrify the transportation sector and deliver a triple win for our customers, the environment and the utility.

City Light leaders and staff bring passion and expertise to facilitate this transformation. Through engagement with community members, technical analysis, collaboration with their City colleagues and partnership with industry leaders, City Light will capitalize on this opportunity for innovation and future investment. Now is the time for re-envisioning energy services that elevate communities throughout our greater Seattle region—especially those that have been historically excluded. We are ready; and our infrastructure, our people, our region and our future stand to benefit. Join us!

Executive Summary

Seattle City Light is embarking on a transformation. For over a century, the utility has provided power to the Puget Sound region while being responsive to customer needs – highlighted by our more than 40 years of energy efficiency offerings and our status as the first electric utility to achieve net-zero greenhouse gas emissions (GHG). Yet, with the intense urgency of eliminating the human causes of climate change and as new technologies evolve, City Light must rise to the occasion to meet customer needs and expectations. For example, a quickly growing electric vehicle (EV) market offers an opportunity for City Light to play an important role in reducing the climate and environmental impacts of our transportation sector, the region’s largest source of hazardous air pollutants. Personal vehicles make up one part of the EV market, but the market includes, and the largest benefits of transportation electrification are expected to accrue from, electrified transit buses, ferries, commercial fleets, medium- and heavy-duty trucks, shared mobility vehicles, and other forms of micro-mobility, including e-bikes and scooters.

Transportation electrification also offers significant opportunities to address the environmental inequities that exist in our region. Neighborhoods where marginalized populations are a relatively large share of residents are more likely to be located near the city’s major transportation routes, especially the city’s high-volume freight routes. This means the city’s Black, Indigenous, and people of color residents are significantly more likely than white residents to be exposed to air pollution that research has shown to cause the development and aggravation of many health conditions, including asthma, heart disease, and cancer. City Light’s Transportation Electrification Strategic Investment Plan is a component of the City’s work to address these inequities and City Light will focus on the wants and needs of environmental justice communities, which includes Black, Indigenous, and people of color as well as immigrants, refugees, persons experiencing low incomes, English

language learners, youth and seniors, in advancing the Plan. The continued focus on equity is central to the utility’s values framework.

This Plan is a result of the Washington state legislature’s 2019 passage of House Bill 1512, which enables electric utilities to incorporate transportation electrification into utility modernization. City Light, along with City of Seattle leadership and departments, has already been moving toward that envisioned future with the Drive Clean Seattle Initiative and the Green New Deal. City Light has conducted in-depth transportation electrification analyses as well as piloting public and residential EV charging, partnering with regional public transit agencies, and launching time-of-day electricity rates to better understand potential impacts of this growing market.

The Plan reflects City Light’s engagements with the cities in our service area, with communities we serve, and with partner agencies to further our modernization and customer-focused missions. New authority resulting from the approval of this Plan will activate even greater progress toward our vision. The Seattle City Council’s approval of this Plan will open the door to committing resources and making investments that will enable the transformation of the Seattle area’s transportation ecosystem, bolster and modernize our electric grid to enable public transit charging, support freight and commercial fleets, and provide flexibility for personal mobility, foster new economic and workforce opportunities, and ensure that investment in transportation infrastructure results in equitable outcomes.

This Seattle City Light Transportation Electrification Strategic Investment Plan describes how the utility is using our strategic investments and building upon previous analyses within our values framework to achieve a vision of the healthy future that our region depends on: equitable, carbon-neutral, modernized, and future-enabled.



Context

It is a time of once-in-a-century transformation in the electric power sector. Technology, regulation, market development and customer demand are changing rapidly. Electric utilities worldwide are responding to the shifting preferences of their customers, testing new business models, launching new services and technologies, and making innovative investments to restructure their grids to make them more resilient, bi-directional and flexible.

The transportation sector is also changing rapidly as buses, ferries, freight trucks, fleets and personal modes of travel are shifting to electricity for fuel rather than relying on gasoline and diesel. Alongside the evolution of the market, policy choices have in many places accompanied technological innovation to support the health and security of residents and the natural and built environments. The City of Seattle has in recent years redoubled its own commitments, from the Drive Clean Seattle Initiative in 2016 to the Green New Deal in 2019. City Light supports the transition to an electrified transportation system by enabling a grid that efficiently meets the demand of our customers today and tomorrow.

The City of Seattle's vision is that in Seattle's future, everything that moves people, goods and services in and around the City is electrified. Seattle will lead the transition to an electrified economy, supplying residents with clean electricity via a reliable, carbon-free electric grid. People will

take electric buses, ferries or light rail to work, shopping and other destinations. A robust bike lane network will make it easy for Seattleites to leave cars behind and use bikes, e-scooters and e-cargo bikes or walk. Ships at port are plugged in, every package delivered to your doorstep comes on an electric van, truck or e-bike. Silent, clean, electric trash and utility trucks will service neighborhoods. While not all of this technology is available today, Seattle City Light and our partners aim to pursue and help accelerate the new technologies necessary to electrify transportation at scale.

Our utility is a publicly owned asset and, as such, the intention of this Transportation Electrification Strategic Investment Plan is to sustain and maximize the value of the utility grid to our customers as we work to achieve a fully electrified transportation future. The processes and offerings to achieve our vision as a utility of the future will require City Council support, utility investments, engagement with communities and customers, and close collaboration with other City departments, as well as partnerships with transportation agencies and other external partners. We have already begun this journey. City Light is actively engaging with communities most impacted by environmental inequities and racial, social and economic burdens; identifying essential investment requirements; conducting pilots and technical analyses; and establishing critical partnerships with transportation providers.

History

City Light has been working in the transportation electrification space over the past five years and has made investments in innovative offerings and partnerships based on technical and feasibility analyses. These have built on City Light's long legacy of innovation and conservation, including the elevation of environmental stewardship and protection as a core operating value. Attention to innovation has also led to investments in service delivery that support customer adoption of new technologies, including transportation electrification.

More recently and alongside other City of Seattle partners, City Light has been engaging communities, implementing new pilot projects and conducting technical and policy analysis throughout 2019 and 2020 to support the development of this Transportation Electrification Strategic Investment Plan. Important transportation electrification milestones are highlighted below.



City Light's Road to Transportation Electrification

City of Seattle and electric utility leaders have been shaping transportation electrification transformation for the past five years.

2015-2016: City Light conducted a technical analysis of the evolving transportation electrification market and potential utility impacts.

2017: Drive Clean Seattle Initiative launched City investments to accelerate transportation electrification, including City Light's public and residential charging pilots.

January 2019: City Light's 6-year Strategic Plan highlighted challenges, opportunities and priorities in meeting future and continuing market, utility and customer demands.

June 2019: City Light released its Transportation Electrification Strategy with a values framework to shape the utility's strategic direction in transportation electrification.



July 2019: The Washington State Legislature passed a law (HB 1512) granting public utilities the authority, already established for investor-owned utilities, to offer incentives and services to their customers to electrify transportation.

December 2019 – Ongoing: City Light has engaged community leaders and stakeholder groups to help inform the utility's strategic investment priorities.

Citywide Alignment

City Light's vision and desired outcomes for a future electrified transportation system are aligned with the City of Seattle's existing and emerging effort to adopt a set of 2030 "North Star" goals driving the transition to an electrified and zero-carbon transportation system. The Citywide Transportation Electrification Plan Framework spans the whole of the City of Seattle government and identifies and integrates priority focus areas to:

- Build partnerships in environmental justice communities.¹
- Install and support transportation electrification infrastructure.
- Create jobs and employ people from environmental justice communities.
- Prioritize mode shift and dismantle policies and regulatory frameworks that incentivize fossil fuel transportation.
- Support the electrification of government and commercial fleets.

Environmental justice communities
refer to communities defined in Seattle's Equity and Environment Agenda and include communities of color, immigrants, refugees, people with low incomes, youth and English language learners. We refer to environmental justice communities throughout this Plan.

- Implement new fee structures that reduce barriers to transportation electrification, including time-of-day rates.

City Light and several other City departments that have a role in transportation electrification are collaborating to support the broader Citywide Transportation Electrification Plan Framework. Each City department contributes critical services to deliver on the goals of the Plan.

Figure 1.
 Citywide coordination
 of Seattle departments



¹Seattle Office of Sustainability and Environment. "Equity and Environment Agenda."
<https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

City Light continues to build and implement business-critical strategies to optimize its grid while pursuing equitable and environmentally sound outcomes. The utility supports the City's workforce development efforts, namely Priority Hire, and is coordinating with apprenticeship programs to strengthen pathways to energy industry jobs. In addition, the utility supports the City's efforts to encourage contracting with Women & Minority Business Enterprise (WMBE) firms, thereby assisting WMBE firms in creating generational wealth and advancing equity in our contracting process. According to research conducted for Drive Clean Seattle,² the King County Metro area could support the maximum potential of 14,310 EV and electric vehicle service equipment (EVSE) related jobs, earning an average of \$26.76 per hour, if EV adoption were to reach 100%. At the current EV adoption rate of 3%, we estimate there are 429 jobs supporting this new market.

City Light provides electric power to more than 460,000 customer meters, which translates to more than 906,000 individuals in Seattle and eight adjacent jurisdictions: Burien, Renton, Tukwila, SeaTac, Normandy Park, Shoreline, Lake Forest Park and parts of unincorporated King County in White Center and Bryn Mawr-Skyway. Citywide coordination on transportation electrification is inclusive of our franchise cities. Similar to our alignment with the City of Seattle, City Light will work with our franchise city partners to achieve our shared long-term, regional transportation electrification goals.



Figure 2. Seattle City Light customer service area map



²Hays Witt. "Connecting Disadvantaged Communities to Quality Jobs in the Transportation Electrification Sector: An Initial Assessment." Strategic Action LLC for the Drive Clean Seattle Program. December 2018



Inputs

The key factors informing the Transportation Electrification Strategic Investment Plan—each of which represent a body of work that has been built in recent years and expanded leading up to this Plan—are grouped into two categories. First, the primary technical and feasibility analyses; and second, the values that guide City Light’s buildout of transportation electrification programs and supporting grid investments.

Technical and Feasibility Analyses

City Light’s commitment to transportation electrification has been supported by its analyses of the market potential for electrification of personal vehicles, medium- and heavy-duty trucks and buses and the potential impact of increased transportation electrification on the grid and the utility’s business. Two technical and feasibility analysis reports have laid the foundation to guide City Light’s Transportation Electrification Strategic Investment Plan.

TRANSPORTATION ELECTRIFICATION BENEFIT ANALYSIS (2016)

In 2015 and 2016, City Light worked with Energy and Environmental Economics, Inc. (“E3”) and a consortium of public and investor-owned Northwest energy utilities to understand the environmental, grid and economic benefits of transportation electrification. This analysis concluded that City Light receives a net utility system benefit of

roughly \$1,250 per personal EV over the vehicle’s lifetime and \$120,500 per bus or other heavy-duty EV. While there are system costs associated with increased transportation electrification (e.g., distribution and transmission infrastructure upgrades), with proactive utility planning and intervention, the system benefits (e.g., new revenue) are estimated to outweigh the costs, spreading the economic benefits of transportation electrification to all customers.

Recommended utility offerings from City Light Transportation Electrification Strategy Report (2019)

Invest in charging infrastructure with emphasis on universal access and expanding coverage.



Develop new rates and improve customer service for the transportation market.



Prepare for heavy-duty electrification.



Figure 3. Recommended offerings

TRANSPORTATION ELECTRIFICATION STRATEGY REPORT (2019)

Building on the Benefit Analysis, City Light engaged Rocky Mountain Institute over 2018 and 2019 to co-develop a Transportation Electrification Strategy Report. The report, which included detailed market research and insights, concluded that City Light should play a key enabling role in spurring EV adoption across multiple sectors that includes extensive and proactive planning to optimally accommodate the resulting increased demand for electric power. The strategy report recommends that City Light engage in three key intervention areas (Figure 3) to support transportation electrification adoption across five customer types: personal vehicles, shared mobility and transportation network companies (TNCs), medium-duty vehicles, heavy-duty vehicles and transit. The technical evaluation addressed City Light's system capacity as well as market projections for EV adoption across customer types.

Leading with Values

City Light is centering this future-focused work on three key values: equity, environment and operating the grid as an asset to deliver public good (Figure 4). Initially established in the Strategy Report, City Light has reinforced these values during the development of this Plan—particularly, through engagement with environmental justice communities (see below and the attached Seattle City Light Transportation Electrification Strategic Investment Plan: 2021-2024 – Community and Stakeholder Outreach and Engagement Summary). City Light will focus investments in transportation electrification where there are opportunities to improve the lives of and outcomes in the communities we serve.

EQUITY

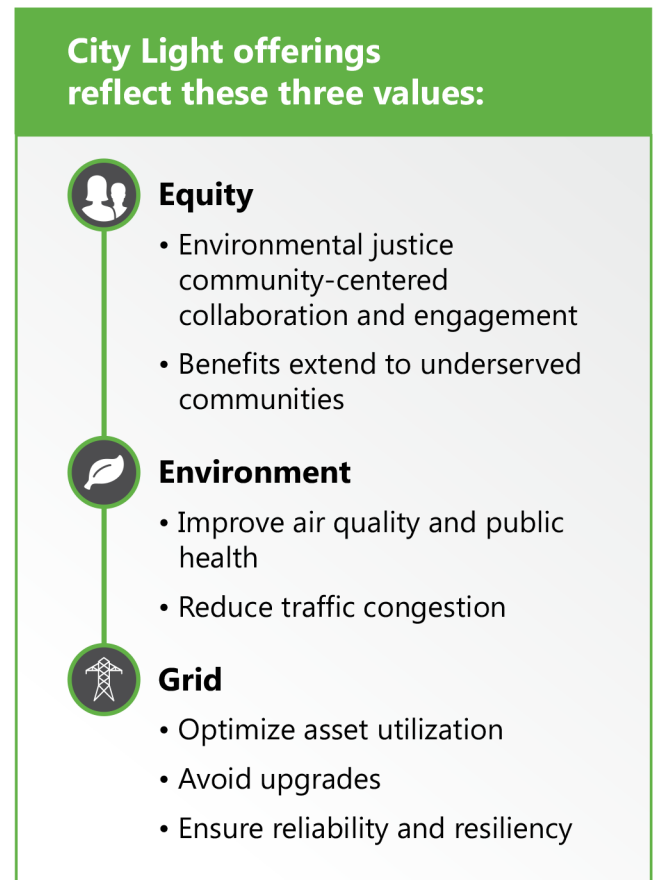
City Light strives to incorporate and elevate the voices of environmental justice communities who have traditionally been excluded in transportation electrification planning and development. By centering people and communities experiencing environmental inequities, community outreach and engagement will result in solutions that meet the needs of all our customers. This is critical to the long-term success of any City infrastructure improvement plan.

To ensure meaningful inclusion across our service area, City Light conducted a transportation electrification racial equity analysis, which included: (1) leveraging the City of Seattle's Race and Social Justice Initiative (RSJI) Racial Equity Toolkit and (2) conducting in-depth outreach and engagement.

RSJI Racial Equity Analysis

City Light conducted a comprehensive analysis of existing information on environmental justice communities' transportation electrification wants and needs. City Light reviewed relevant reports by regional stakeholders and

Figure 4. City Light transportation electrification values framework



community-based organizations as well as feedback from several sources, including the City's Environmental Justice Committee, community-based organizations and stakeholder surveys. See the attached Seattle City Light Transportation Electrification Strategic Investment Plan: 2021-2024 – Racial Equity Analysis Summary for more information.

Community and Stakeholder Outreach and Engagement

Seattle City Light is partnering with the Seattle Department of Neighborhoods to engage environmental justice communities. The input we received has informed the investment priorities included in Table 2 (page 13). The main priorities we have heard from environmental justice community leaders and stakeholder groups include:

- 1 Conduct customer and stakeholder outreach and awareness on transportation electrification:** Many environmental justice community members are unfamiliar with EVs. Communicating in local languages, highlighting communities of color in advertising and focusing on multimodal transportation electrification can help increase equitable access.³
- 2 Prioritize buses for electrification:** This was the number one priority for both community leaders and stakeholders. Low-income communities and communities of color are more likely to depend on buses for most, if not all, of their transportation needs.⁴ Electrifying public transit will benefit communities who most rely on public transit by reducing air and noise pollution where impacts are greatest.
- 3 Electrify commercial and local government fleets that run through the Duwamish Valley:** Environmental justice communities are exposed to—and concerned about—poor air quality and suffer from geographic and social health disparities. Commercial fleet electrification can reduce harmful tailpipe emissions in the Duwamish Valley.
- 4 Expand at-home and near-home charging for multifamily residents:** Currently, there is a lack of access to EV charging for multifamily units. Expanding at-home and near-home charging solutions for multifamily residents in environmental justice communities will increase equitable access to transportation electrification as 52 percent of City Light's customers are renters and a majority live in multifamily properties.
- 5 Electrify high-mileage ride-hailing vehicles:** High-mileage ride-hailing vehicles (e.g., TNCs and shared mobility, such as Lyft, Uber, taxis) drive three to five times more than regular passenger vehicles and electrifying them can have a large impact on tailpipe emissions.^{5,6} In addition, high-mileage ride-hailing vehicles are frequently driven by immigrants and members of communities of color and targeted incentives can increase equitable access to transportation electrification.^{7,8}

³Environmental Justice Committee. "EJC Feedback Summary on Drive Clean Seattle." July 2017.

⁴King County. "The Determinants of Equity: Identifying Indicators to Establish a Baseline of Equity in King County." January 2015. https://www.kingcounty.gov/~media/elected/executive/equity-social-justice/2015/The_Determinants_of_Equity_Report.ashx

⁵Puget Sound Clean Air Agency. "Electrifying Ride-Hailing in Seattle." September 2019. <https://www.pscleanair.gov/DocumentCenter/View/3976/Electrifying-Ride-Hailing-in-Seattle>

⁶Peter Slowik, Lina Fedirko and Nic Lutsey. "Assessing ride-hailing company commitments to electrification." International Council on Clean Transportation. February 2019. https://theicct.org/sites/default/files/publications/EV_Ridehailing_Commitment_20190220.pdf

⁷Puget Sound Clean Air Agency. "Electrifying Ride-Hailing in Seattle." September 2019. <https://www.pscleanair.gov/DocumentCenter/View/3976/Electrifying-Ride-Hailing-in-Seattle>

⁸Lyft. Economic Impact Report 2020. <https://www.lyftimpact.com/impact/drivers/expanded>

Table 1. Equity outcomes to guide City Light's strategic investments in transportation electrification

COMMUNITY COLLABORATION

Environmental justice communities see their wants and needs reflected in City Light transportation electrification programs.

HEALTHY PLANET, HEALTHY LIVES

Reduce tailpipe emissions that impact local air quality and public health where environmental justice communities live, learn, work and play. Reduce carbon emissions that have a disproportionate burden on the most vulnerable populations and communities.

EQUITABLE ACCESS

Environmental justice communities learn about our transportation electrification programs, can readily understand and access materials and resources, see themselves reflected in communications, and participate in and benefit from City Light's transportation electrification programs.

COMMUNITY ASSETS

City Light's programs invest in infrastructure that are community assets so environmental justice communities can enjoy the benefits of transportation electrification in their current neighborhoods.

ECONOMIC OPPORTUNITIES AND YOUTH PATHWAYS

City Light enables environmental justice communities to participate in and benefit from the local transportation electrification economy.

ELECTRICITY AFFORDABILITY

Widespread transportation electrification increases revenue to put downward pressure on electricity prices.

Community leaders and stakeholders have emphasized the importance of community engagement, collaboration and buy-in on public charging station development. Without proper public engagement, a public charging station may create conflicts between use of public space, increase housing costs, exacerbate community displacement or increase the risk of gentrification. Overall, multiple environmental justice groups emphasized the importance of considering and including anti-displacement strategies in infrastructure project designs so that communities can enjoy the benefits of transportation electrification and stay in place.

City Light will work to minimize harm and maximize benefits by engaging communities on public charging infrastructure developments. Through education and engagement, communities have an opportunity to learn about transportation electrification and its benefits. Collaborating with communities on site design, site location and pairing projects with other investments, can help to create infrastructure that is welcomed by the local community as an asset. See the attached Seattle City Light Transportation Electrification Strategic Investment Plan: 2021-2024 – Community and Stakeholder Outreach and Engagement Summary for more information.

Leading with our values and incorporating what we have heard from environmental justice communities and other stakeholders – including learning from the City of Seattle's Equity and Environment Agenda framework and the Duwamish Valley Action Plan – City Light has established six racial equity outcomes to guide its transportation electrification strategic investment priorities (Table 1).^{9,10} These outcomes build upon the values framework and will continue to guide City Light through program development and implementation. On-the-ground engagement and dialogue will be considered alongside in-depth technical analysis.

⁹Seattle Office of Sustainability and Environment. "Equity and Environment Agenda." <https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

¹⁰City of Seattle. "Duwamish Valley Action Plan" June 2018. http://greenspace.seattle.gov/wp-content/uploads/2018/06/DuwamishValleyActionPlan_June2018.pdf

ENVIRONMENT

Transportation accounts for two-thirds of carbon emissions in the greater Seattle area and is also associated with increased air, noise and surface water pollution. Diesel exhaust is often associated with negative health impacts, such as asthma. According to Public Health – Seattle & King County, the highest rates of asthma hospitalization are found in Beacon Hill, Southeast Seattle, Downtown and Central Seattle and some south King County communities, which are predominantly environmental justice communities. A recent study of national data found that long-term exposure to air pollution is associated with higher COVID-19 mortality rates,¹¹ and local data from Public Health – Seattle & King County show that the disease is disproportionately impacting communities of color with higher infection, hospitalization and death rates.¹²

Addressing health disparities and reaching the City's goal of carbon neutrality by 2050 will require City Light's investments to support electrification of all modes of transportation throughout the utility service area. Key partnerships, cost structures and programming are critical for enabling EV charging infrastructure and adoption with public transit agencies, companies managing large commercial fleets, shared mobility companies and drivers and personal vehicle owners.

Several partnerships and pilot efforts to advance transportation electrification are already in place. Utility investments will scale offerings and help the City make progress toward meeting its carbon reduction goals, while also reducing pollution and traffic congestion.

¹¹Xiao Wu, Rachel C. Nethery, Benjamin M. Sabath, Danielle Braun, Francesca Dominici. "Exposure to air pollution and COVID-19 mortality in the United States." April 2020. <https://www.medrxiv.org/content/10.1101/2020.04.05.20054502v2>

¹²Public Health Insider. "New Analysis Shows Pronounced Racial Inequities Among COVID-19 Cases, Hospitalizations and Deaths." Public Health – Seattle & King County. May 2020. <https://publichealthinsider.com/2020/05/01/new-analysis-shows-pronounced-racial-inequities-among-covid-19-cases-hospitalizations-and-deaths>



GRID VALUE

City Light's electric grid is a complex system of power generation, transmission and distribution assets. City Light's industry-leading legacy of conservation means there is sufficient power to meet increasing customer demand, but the infrastructure capacity to transmit, distribute and deliver electricity to meet transportation needs varies throughout the system. City Light seeks to meet the increased transportation load with intentional and directed investments, rather than reacting to market-driven demand that can put unpredictable stresses on the system and require inefficient short-term fixes. In making these investments, the utility must reimagine the very structure and architecture of the grid and its components and seek to use the best available techniques and technologies to optimize system performance and efficiency.

Implementing City Light's Transportation Electrification Strategic Investment Plan will result in greater return on this valuable publicly owned asset and thus drive more affordable electricity rates in the long term as demonstrated in both the Benefit Analysis and Strategy Report. Renewing the ability of the utility to continue to deliver public value over the coming decades depends on City Light making smart investments today that continue the utility's commitment to energy efficiency, integrate strategies for managing customer demand and support the deployment of transportation electrification at scale.

City Light is committed, as it looks to make these needed investments in grid modernization and technological innovation, to analyzing not solely the economic costs and benefits, but also the impacts on communities across its service area. Responsible innovation and modernization are driven by the utility's commitment to equity.



Strategic Investments

To help deliver on the City’s goals, City Light has started work, in partnership with regional agencies, communities and private companies, to electrify multimodal transportation. These initial partnerships and programs will require ongoing flexibility to build to the scale required. City Light’s pursuit of priorities outlined in this Plan will necessitate a dynamic portfolio of electrification investments. City Light seeks to respond to and build customer demand, continuously explore partnerships throughout our region, learn from and iterate on pilots, and build out grid capabilities. The utility is also focused on creating strategic partnerships to enable access to charging infrastructure and to reduce customer and market barriers to the adoption of electric vehicles across all vehicle types, including micro-mobility options like e-bikes and scooters.

City Light’s strategic investments are characterized as: program offerings—including customer-facing incentives, services, education and promotions—and electrification enablement—including the development of future-focused infrastructure needed to support transportation electrification.

Program Offerings

Having identified the core factors influencing transportation electrification investments, City Light will draw on our long history of developing, building and evaluating innovative, public-facing programs. City Light will continue to support transportation electrification through existing, expanded and new offerings that achieve our vision of equitable and electrified transportation to maximize community, environmental and electricity grid benefits. These offerings fall into three categories: incentives, services and education/promotion.

Incentives reduce barriers, encouraging customers to make decisions that support the overall goal of equitably electrifying transportation to benefit the grid. Financial incentives can be in the form of cash, rebates, financing, discounts, in-kind and/or turnkey/ready-made utility



contributions to reduce the cost barrier of customer-owned transportation electrification equipment. For example, incentives could include a cash rebate toward the purchase of a smart, networked Level-2 charging station.

Services are what City Light provides to encourage and enable transportation electrification and can include utility-owned and -operated charging infrastructure, rate design, technical support, priority service queues, interconnection policies, interdepartmental permitting coordination (i.e., with Seattle Department of Construction and Inspections and Seattle Department of Transportation) and information transparency. City Light’s Transportation Electrification Strategy Report identified customer service as a key intervention area to build upon existing services to accelerate transportation electrification.

Education & Promotions strengthen City Light’s—and the broader region’s—transportation electrification objectives through outreach, communication and engagement. Promotions could include advertising for the utility’s services, incentives or rebates. Education raises awareness about the customer, the grid and the community benefits of transportation electrification, such as how managed charging helps keep City Light’s electricity rates low. An example is “ride and drive” events for customers to learn more about electric buses or personal vehicles. Education and promotions are critical components of successful community engagement.

INVESTMENT PRIORITIES

Considering all types of program offerings and based on comprehensive analyses of technical research and community engagement, City Light has developed an initial prioritization of future investments to guide its support of regional transportation electrification. These priorities are directly informed by the Transportation Electrification Strategy Report recommendations (Figure 3, page 6) and have evolved with community input.

Table 2 (next page) outlines the broad areas where City Light will invest to deliver the types of program offerings outlined above—many of them in partnership with other public and private entities. The offerings and outcomes listed are not exhaustive, nor certain; these are examples of offerings and outcomes City Light could provide given regulatory authority. The table includes “equity outcomes” to incorporate accountability to communities. The next phase of community and stakeholder engagement (as described in City Light’s Community and Stakeholder Outreach and Engagement Summary) will continue to refine these priorities and uphold our commitment to community collaboration in program design and delivery.

City Light gathered feedback from community leaders and stakeholders on priorities most important to them for transportation electrification. The order of the priorities identified in Table 2 is a direct result of the feedback City Light received from 25 environmental justice community leaders and over 40 stakeholder groups. The priorities were informed by the racial equity analysis.



TRANSPORTATION USES	INVESTMENT PRIORITIES	EXAMPLE CITY LIGHT OFFERINGS	EQUITY OUTCOMES
 <p>All</p>	<p>Customer and stakeholder outreach and awareness</p>	<ul style="list-style-type: none"> • Information, education, events and resources on the benefits of electric vehicles 	<ul style="list-style-type: none"> • All customers have increased access to City Light’s transportation electrification educational materials and resources • Environmental justice community members see themselves reflected in communications
 <p>Public Transit (Buses, Ferries, Trains, Light Rail)</p>	<p>Electrify buses, ferries and other public transit</p>	<ul style="list-style-type: none"> • Financial incentives and technical assistance with site and design requirements to provide electric charging infrastructure for King County Metro, Washington State Ferries and other public transit • Partnerships with City of Seattle and King County departments to electrify first- and last-mile public transportation options, such as paratransit shuttles and e-mobility hubs 	<ul style="list-style-type: none"> • Transit riders and those who do not own or drive a personal vehicle participate in and benefit from City Light’s transportation electrification offerings
 <p>Commercial, Government & Non-Profit Fleets</p>	<p>Electrify commercial, local government and non-profit fleets</p>	<ul style="list-style-type: none"> • Financial incentives for electric charging infrastructure for companies that transport people, goods and services • Fee-based City Light-owned charging infrastructure for public and private fleet vehicles (such as school buses and solid waste vehicles) • Incentives and turn-key charging infrastructure for electrification of non-profit fleet vehicles 	<ul style="list-style-type: none"> • Communities with higher exposure to air pollution benefit from reduced tailpipe emissions that impact local air quality and public health

Table 2. Transportation electrification investment priorities, potential program offerings and equity outcomes


TRANSPORTATION USES	INVESTMENT PRIORITIES	EXAMPLE CITY LIGHT OFFERINGS	EQUITY OUTCOMES
 <p>Personal Mobility (Cars, Bikes, Scooters, etc.)</p>	Expand at-home and near-home charging	<ul style="list-style-type: none"> • Incentives, qualified installers and special payment terms to help reduce barriers to installing charging stations in multifamily housing • Near-home charging solutions for those with no access to off-street parking 	<ul style="list-style-type: none"> • Multifamily residents and those with no access to off-street parking participate in and benefit from City Light’s transportation electrification offerings
	Electrify high-mileage vehicles	<ul style="list-style-type: none"> • Provide lower costs to charge at different times of day that meet the needs of high-mileage vehicle drivers while benefiting the grid 	<ul style="list-style-type: none"> • High-mileage vehicle drivers, especially drivers in environmental justice communities, participate in and benefit from the local transportation electrification economy
	Accelerate transportation electrification adoption in environmental justice communities	<ul style="list-style-type: none"> • Charging infrastructure for community car share • Provide discounts toward the cost to charge electric vehicles for people with low to moderate incomes 	<ul style="list-style-type: none"> • Environmental justice communities collaborate with City Light and see their wants and needs reflected in City Light’s transportation electrification offerings
	Expand public fast charging	<ul style="list-style-type: none"> • Financial incentives to help reduce the upfront cost of public charging stations • Community collaboration on City Light-owned public charging stations 	<ul style="list-style-type: none"> • Communities collaborate with City Light to ensure that public charging infrastructure serves as a community asset
	Expand workplace charging	<ul style="list-style-type: none"> • Provide EV-ready electricity service to workplaces for future charging infrastructure 	<ul style="list-style-type: none"> • All customers benefit from more affordable electricity rates driven by widespread transportation electrification

Table 2 (continued). Transportation electrification investment priorities, potential program offerings and equity outcomes

PARTNERSHIPS AND PILOTS

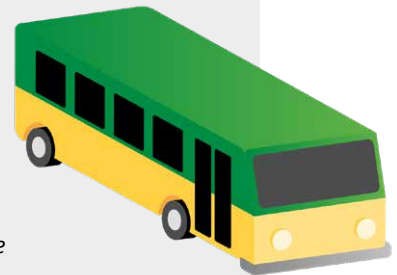
City Light has already established partnerships with other agencies, communities and private companies to implement key projects and innovative pilots in our priority investment areas. City Light will build upon these existing commitments to develop future offerings.

Public Transit: City Light is working with key partners from King County Metro and Washington State Ferries to study, plan for and build the necessary electrical infrastructure to support public transit electrification for buses and ferries as part of our commitment to citywide and regional transportation electrification.

guides the Port's efforts and investments to reduce fossil fuel usage and impacts at its maritime facilities.

Personal Mobility: City Light is expanding EV charging access for individuals' personal use as well as for those who use their personal vehicle as a source of income. City Light is installing more than 20 public fast chargers with the intent of addressing gaps in access and therefore mitigate a known barrier to EV adoption. Public fast charging will allow high-mileage ride-hailing vehicle drivers (e.g., TNCs and shared mobility, such as Lyft, Uber, taxis) to quickly recharge with clean electric power. In the residential space, City Light has a pilot program to install smart, networked Level 2 EV

King County Metro has committed to achieving a zero-emissions fleet by 2040 and has purchased its first round of battery-electric buses to reach this goal. King County Metro is prioritizing electrifying routes originating from its South Base in Tukwila. Critical to this is Metro's ability to charge buses to meet route demands and distances while not adversely impacting or overloading the electrical grid. Metro and City Light have been analyzing feasibility and capacity and requirements to plan for future infrastructure and begun making electrical capacity upgrades to support the South Base station's operations as these initial buses are phased in. Source: King County Metro.



Commercial & Government Fleets: City Light is partnering with PACCAR/Kenworth Truck Company to demonstrate the electrification of heavy-duty trucks along the UPS freight corridor between Seattle and Portland. This will reduce noise and improve air quality along high-traffic routes, many of which pass through low-income communities and communities of color. City Light also participated in the West Coast Clean Transit Corridor Initiative, an industry collaborative effort with nine electric utilities and two agencies representing more than two dozen municipal utilities along the West Coast to study the electrification of the I-5 corridor to support electric freight haulers and delivery trucks.

City Light is supporting government organizations such as the City of Seattle and the Port of Seattle to develop approaches for electrifying their large fleets that maximize grid interactivity. Further, City Light is supporting the Port of Seattle's Waterfront Clean Energy Strategic Plan, which

chargers at customers' homes using a lease-to-own model. To further grid stability and efficiency, City Light is gathering usage statistics from the chargers installed under this pilot to learn about the load and demand needs from at-home EV charging. Participants will be candidates for other City Light offerings, such as the rate pilots mentioned below to encourage charging at certain times of the day, resulting in increased efficiency and savings for both the customer and City Light.

Rates: Under the Rate Pilot Programs Ordinance (125957), City Light is conducting rate pilots to test new approaches to rate design that best meet the needs of our customers and provide value to the grid. These include two time-of-day rate pilots that enable transportation electrification by encouraging off-peak vehicle charging for residential and commercial customers. New rate designs will also benefit transit agency partners as they transition to battery electric buses, allowing them to save money on fuel expenses and

avoided maintenance.¹³ These rate pilots will launch in 2020 and will inform future rate design to continue to reduce barriers to transportation electrification, increase grid efficiency and offer cost-saving options to customers.

Technology Demonstration Pilots: City Light is working on a demonstration pilot to install power pedestals to provide electrical power to food trucks to replace their gas generators.

FUTURE OFFERINGS

The partnerships and pilots outlined above will yield both substantial learnings and quantifiable results. However, these activities alone will not be enough to meet existing policy goals or create the lasting structural fixes that will ensure equitable and reliable access to electric transportation and transit for all our customers.

These initial efforts must be augmented and accelerated as City Light learns from and scales pilot projects and technology demonstrations and continues to build partnerships. Specifically, City Light anticipates:

- Developing entirely new program offerings for customers.
- Driving higher customer adoption with incentives, rebates, discounts and through promotion.
- Integrating demand-side management components into new program offerings to avoid or reduce the need for traditional transmission and distribution upgrades and optimize the grid and City Light's resources.

- Exploring opportunities to increase customer access to substantial private capital investments in our region.
- Continuing to expand public charging infrastructure where there are gaps in private market investments to ensure access for all customers.

City Light will follow a metrics-based, stage-gate process to develop and manage customer-facing programs. The process helps determine when a customer-facing program should be explored, launched, modified or ended. To achieve the goals outlined within our values framework, our program and project development process will seek to align with the outcomes and metrics identified in section 5a of this Plan's RSJI Racial Equity Toolkit. These metrics may measure equitable access to transportation electrification, reduced carbon emissions, grid management outcomes, revenue generation, charging infrastructure investments and inclusive contracting outcomes. As we develop the portfolio and future offerings, we will work with stakeholders as feasible to develop metrics that will measure success and accountability.



¹³Horrox, J., and M. Casale. "Electric Buses in America: Lessons from Cities Pioneering Clean Transportation." U.S. PIRG Education Fund. 2019. https://uspirg.org/sites/pirg/files/reports/ElectricBusesInAmerica/US_Electric_bus_scrn.pdf

Electrification Enablement

In addition to the direct program offering investments and strategies outlined above, City Light plans to undertake efforts to reduce the barriers to electric transportation adoption and maximize its value for the grid and its customers. These efforts include a Master Infrastructure Plan and a Grid Modernization Plan.

City Light will develop the Master Infrastructure Plan in conjunction with the Seattle Department of Transportation and the Seattle Office of Planning and Community Development. This plan will seek to streamline the process for installation of EV charging infrastructure, including permitting, easements and an efficient and transparent interconnection and service upgrade process for new and existing customers installing charging infrastructure. These process innovations will enable expedient and safe installations.

Given the pace of customer adoption and the crucial tie to broader climate impacts, City Light is taking steps today to build the platform for fully electrified transportation in the future. In addition to being reliable, resilient, safe and clean, the electric grid needs to be dynamically controllable and offer customers more innovative and efficient energy choices.

In order for the grid to be a true public asset where the value of our investments accrue across the broadest group of customers, City Light must specifically direct investments to uplift and improve the lives of individuals in environmental justice communities.

Toward this end, City Light plans to deliver a Grid Modernization Plan by the end of 2020. This plan will provide the template for next generation grid architecture, outlining the initial investments that establish the foundation for the first "FutureGrid" in the Pacific Northwest.

This work to make the grid more flexible and efficient will be a decades-long effort that will benefit all of City Light's customers by:

- Empowering customers with new sources of information, related to their energy usage and options.
- Enhancing reliability and resiliency through implementation of new grid technologies.
- Identifying and building optimized electrification infrastructure.
- Managing the impacts of electrification infrastructure on the grid via demand-management strategies such as managed charging.
- Improving grid integration and enabling additional adoption of distributed energy resources.
- Building out the necessary, enabling backbone systems.

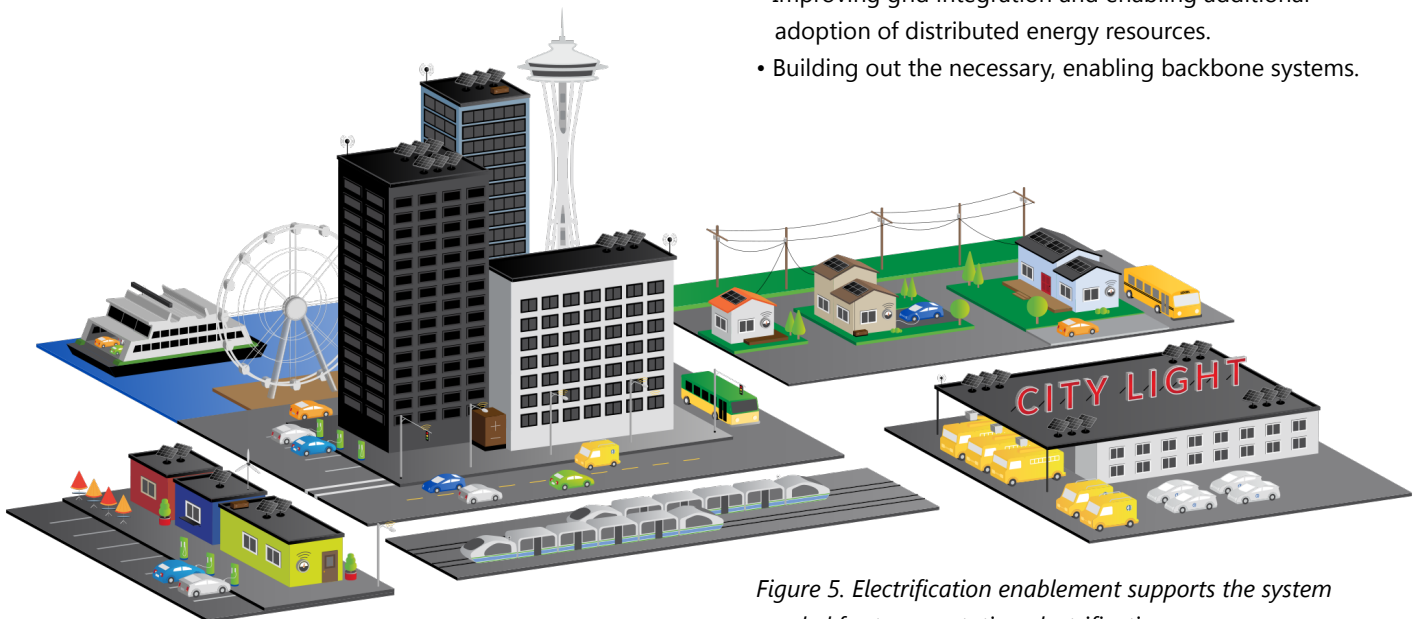


Figure 5. Electrification enablement supports the system needed for transportation electrification

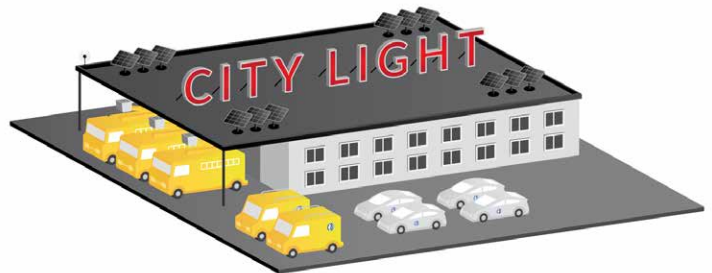
City Light will achieve these objectives by making strategic, phased investments in key areas, such as customer experience and data analytics, transmission and distribution modernization and automation, radio and cellular infrastructure and cybersecurity.

Distributed energy resources are grid-connected devices that generate (e.g., solar photovoltaic, wind), store and/or discharge (e.g., batteries), or otherwise contribute to electric power flows and their regulation. These devices can be owned by the utility, customers or other third parties, and may be utility-grade or comparatively smaller devices located behind-the-electric meter.

City Light seeks to begin this grid modernization effort now to prepare the grid for increased electrification. While doing so, the utility will tap into the innovations being developed around transmission and distribution system architecture, design and planning. The Grid Modernization Plan will allow EVs and other distributed energy resources to become true grid assets that flexibly match supply and demand. These investments are also crucial to maintain and enhance the reliability of the grid in a scenario where transportation needs are served by clean electricity rather than fossil fuels.

Financial Impacts

City Light anticipates both financial cost and benefit from the transition to transportation electrification. As more EVs charge within the service area, the utility sells more electric power. The retail revenue from the new sales are expected to be greater than the costs required to procure and deliver the additional electricity (as demonstrated by our Transportation Electrification Benefit Analysis summarized above in Section 2). This will eventually lower rates and provide overall benefit to customers. In the short term, however, achieving the future vision of innovative, customer-centric service delivery will require investments. Appropriations for any new or expanded capital projects that require additional funding will be approved through City Light’s standard budget process. Throughout the development of program offerings, the utility will ensure that certain transportation electrification offerings—specifically incentives, promotions and some utility services covered under the RCW 35.92.450—do not increase net costs to ratepayers by more than 0.25 percent. Budgetary authority for transportation electrification-related infrastructure investments, incentives or rebates will be included in City Light’s submitted budget(s). Additionally, where possible, City Light will pursue grant funding opportunities to supplement and provide the necessary resources to accelerate investment in electrification enablement.





Next Steps

The long-term effort of transportation electrification requires immediate action. City Light’s carbon-neutral electricity is crucial to achieving the City’s carbon-neutral goal by 2050. Now is the time to elevate communities and support the transition to a just economy by investing in program offerings and electrification enablement that will both accelerate market adoption and maximize the value that electrification brings to all of City Light’s customers.

The timeline (Figure 6 on next page) depicts the transportation electrification milestones that City Light will achieve over the next two years and beyond, including:

- Rapid creation and deployment of new program offerings.
- Enabled electrification infrastructure delivered to our customers.
- Strong partnerships with key customers that expand and redefine the traditional relationship between customer and utility.
- A modernized grid that meets and manages increasing demand and enhanced customer choice.
- Established cross-departmental processes streamlining permitting and treatment of EV infrastructure.

Reporting

Consistent with reporting as part of City Light’s Strategic Plan, City Light will track performance and report annually to the Mayor and the City Council on transportation electrification progress. City Light’s Transportation Electrification portfolio will be managed to provide clear, quantifiable evidence of our progress as well as inform any needed portfolio adjustments to continue delivering on our commitments as a utility and as part of the City’s broader transportation electrification initiative.



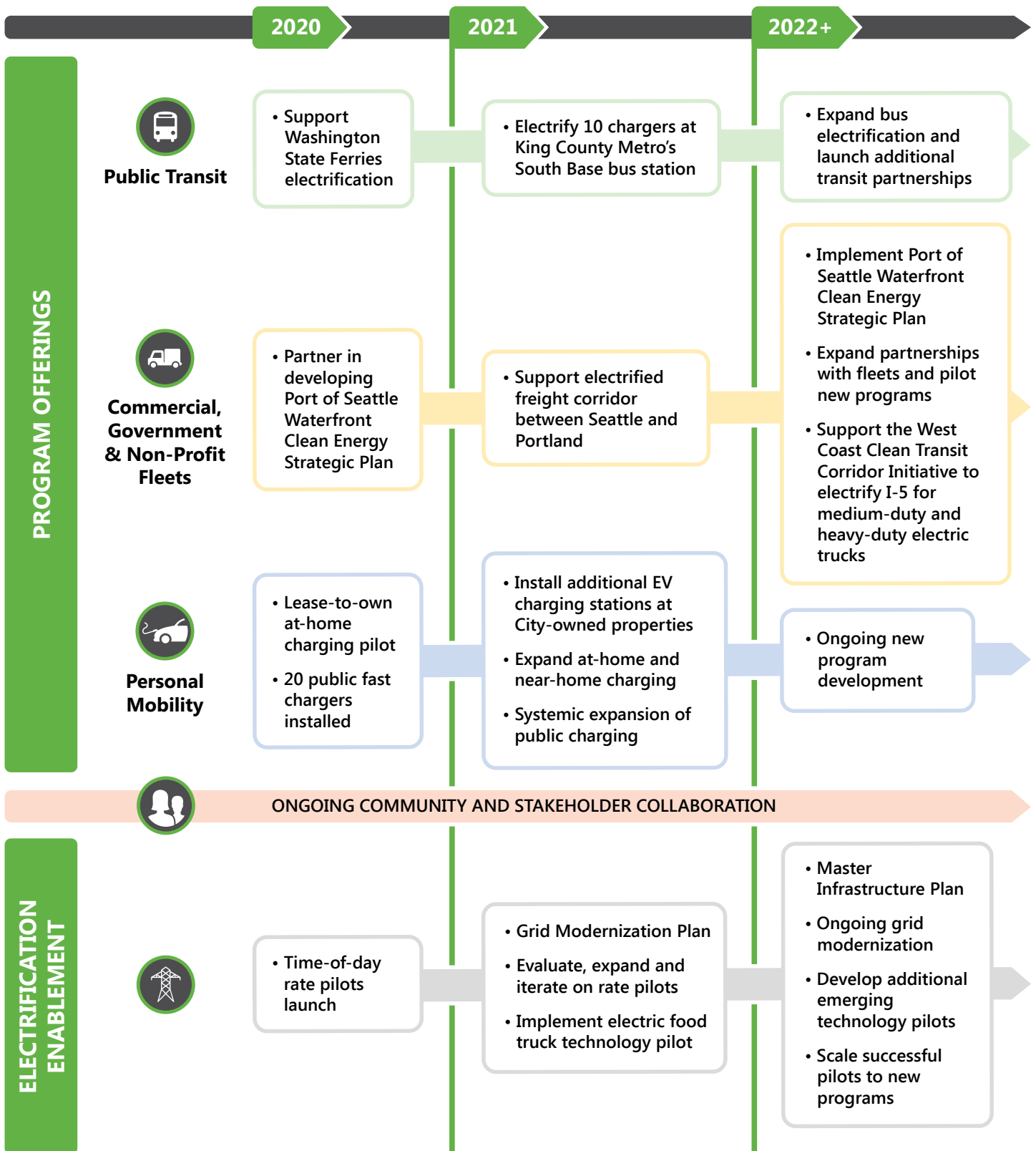
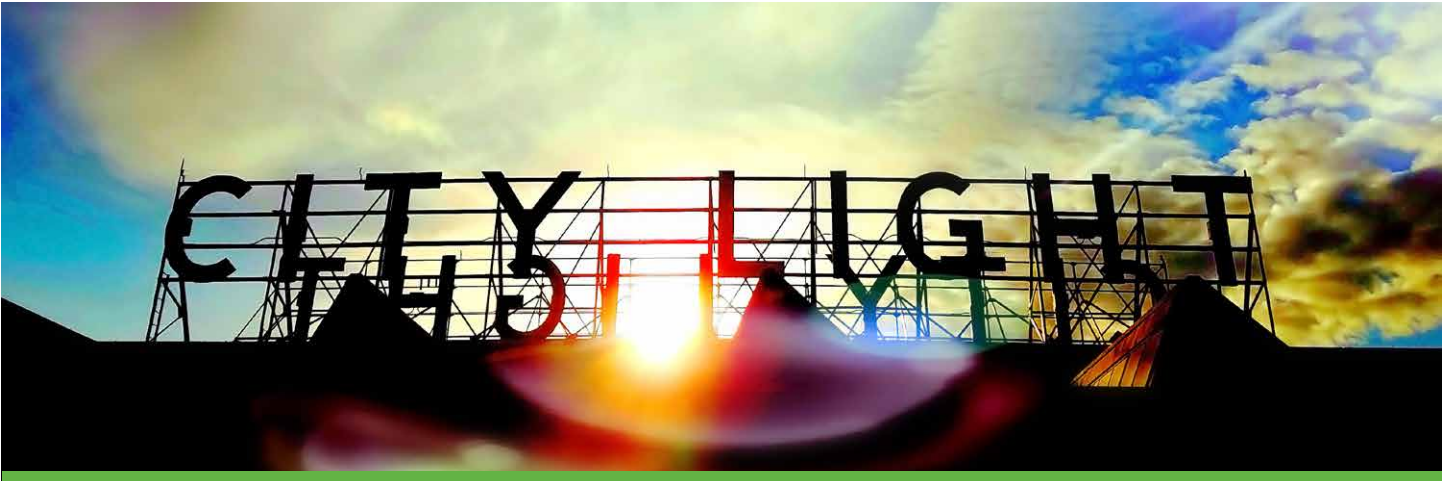


Figure 6. Milestones for City Light transportation electrification investments



Conclusion

City Light has long been committed to enabling customer choices and guaranteeing sustained public value is the utility’s core mission. As an increasing number of City Light customers are making the choice to electrify their fleets and personal vehicles based on a wide variety of factors, City Light has sought to understand and accelerate customer adoption of electric transportation in a manner that equitably and sustainably maximizes grid benefits for our customers since 2015. This Plan outlines the investment priorities City Light will undertake to ensure that the utility can honor its commitment to bringing maximum value and convenience to our customers as we work to enable this transformation. This will be an iterative, ongoing, long-term commitment—one in which City Light, and Seattle, are poised to lead the Pacific Northwest region into a clean, carbon-free energy future.





Seattle City Light

seattle.gov/light





AUGUST 2020

Seattle City Light Transportation Electrification Strategic Investment Plan: 2021-2024 – Community and Stakeholder Outreach and Engagement Summary

EXECUTIVE SUMMARY

Seattle City Light's Transportation Electrification Strategic Investment Plan: 2021-2024 – Community and Stakeholder Outreach and Engagement Summary describes our two-phase approach to community and stakeholder outreach and engagement. This approach was guided by City Light's Race and Social Justice Initiative (RSJI) and Environmental Equity Program. City Light's Transportation Electrification Strategic Investment Plan: 2021-2024 will serve all our customers and will target those with the most significant barriers to accessing the benefits of transportation electrification first. By centering equity in our outreach and engagement, the solutions that will result from the Transportation Electrification Strategic Investment Plan will be positioned to meet the needs of all our customers. The first phase of our outreach and engagement approach leads up to the Plan's review by City Council in Q3 2020. The second phase will follow City Council approval and is a long-term strategy to engage key audiences in the four-year Transportation Electrification Strategic Investment Plan. In this document, we detail our approach for each phase as well as our key findings from Phase 1.

City Light is partnering with the City of Seattle's Department of Neighborhoods to prioritize and engage environmental justice community leaders in Phase 1. Environmental justice communities refer to communities defined in the City of Seattle's Equity and Environment Agenda (EEA) and include communities most impacted by environmental inequities, including communities of color, immigrants,

refugees, people with low incomes, youth and English language learners.¹ The feedback and input we received during this process informed the investment priorities in City Light's Transportation Electrification Strategic Investment Plan: 2021-2024. At a high level, here is what we heard from community leaders and stakeholders:

- 1. Conduct customer and stakeholder outreach and awareness on transportation electrification:** Many environmental justice community members are unfamiliar with electric vehicles (EVs). Furthermore, existing EV advertising leaves out people of color and focuses on white, single-occupancy vehicle owners. Communicating in local languages, highlighting communities of color and their artwork in advertising and focusing on multimodal transportation electrification can increase equitable access.²
- 2. Prioritize buses for electrification:** This was the number one priority for both community leaders and stakeholders. Low-income communities and communities of color are more likely to depend on buses for most, if not all, of their transportation needs.³ Electrifying public transit will benefit communities who most rely on public transit by reducing air and noise pollution where impacts are greatest.
- 3. Electrify commercial and local government fleets that run through the Duwamish Valley:** Environmental justice communities are exposed to—and concerned about—poor air quality and suffer from geographic and social health disparities like increased rates of asthma and shorter life expectancy. Commercial fleet electrification can reduce harmful tailpipe emissions in the Duwamish Valley. In addition, supporting nonprofit/small business fleet electrification is an opportunity to increase equitable access to transportation electrification.
- 4. Expand at-home and near-home charging for multifamily residents:** Currently, there is a lack of access to electric vehicle charging for multifamily units. Expanding at-home and near-home solutions for multifamily residents in environmental justice communities will increase equitable access to transportation electrification as 52 percent of City Light's customers are renters and a majority live in multifamily properties.
- 5. Electrify high-mileage ride-hailing vehicles:** High-mileage ride-hailing vehicles (e.g., Lyft, Uber, taxis) drive three to five times more than regular passenger vehicles and electrifying them

¹ Seattle Office of Sustainability and Environment. "Equity and Environment Agenda."

<https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

² Environmental Justice Committee. "EJC Feedback Summary on Drive Clean Seattle." July 2017.

³ King County. "The Determinants of Equity: Identifying Indicators to Establish a Baseline of Equity in King County." January 2015. https://www.kingcounty.gov/~media/elected/executive/equity-social-justice/2015/The_Determinants_of_Equity_Report.ashx

can have a large impact on tailpipe emissions.^{4,5} In addition, high-mileage ride-hailing vehicles are frequently driven by immigrants and members of communities of color and targeted incentives can increase equitable access to transportation electrification.^{6,7}

Community leaders and stakeholders have emphasized the importance of community engagement, collaboration and buy-in on public charging station development. Without proper public engagement, a public charging station may create conflicts between use of public space, increase housing costs, exacerbate community displacement or increase the risk of gentrification. Overall, multiple environmental justice groups emphasized the importance of considering and including anti-displacement strategies in infrastructure project designs so that communities can enjoy the benefits of transportation electrification and stay in place.

City Light will work to minimize harm and maximize benefits by engaging communities on public charging infrastructure developments. Through education and engagement, communities have an opportunity to learn about transportation electrification and its benefits. Collaborating with communities on site design, site location and pairing projects with other investments, can help to create infrastructure that is welcomed by the local community as an asset. In addition, environmental justice community leaders expressed a strong interest in transportation electrification investments that provide economic opportunities for communities of color.

Overall, we learned that customers want us to prioritize investments that maximize equitable access, a healthy planet and healthy lives, economic opportunities and youth pathways, community collaboration, community assets and rate affordability. We are confident that the Transportation Electrification Strategic Investment Plan will help us achieve these outcomes.

BACKGROUND

In July 2019, the Washington State legislature passed House Bill 1512, granting public utilities the authority to offer “incentive programs in the electrification of transportation for its customers, including the promotion of electric vehicle (EV) adoption and advertising programs to promote the utility’s services, incentives or rebates”⁸. The legislation adds a new section to RCW 35.92 which provides that

⁴ Puget Sound Clean Air Agency. “Electrifying Ride-Hailing in Seattle.” September 2019. <https://www.atlasevhub.com/wp-content/uploads/2019/09/Electrifying-Ride-hailing-in-Seattle-WWCC-Report.pdf>

⁵ Peter Slowik, Lina Fedirko and Nic Lutsey. “Assessing ride-hailing company commitments to electrification.” International Council on Clean Transportation. February 2019. https://theicct.org/sites/default/files/publications/EV_Ridehailing_Commitment_20190220.pdf

⁶ Puget Sound Clean Air Agency. “Electrifying Ride-Hailing in Seattle.” September 2019. <https://www.atlasevhub.com/wp-content/uploads/2019/09/Electrifying-Ride-hailing-in-Seattle-WWCC-Report.pdf>

⁷ Lyft. Economic Impact Report 2020. <https://www.lyftimpact.com/impact/drivers/expanded>

⁸ State of Washington. “House Bill 1512, State of Washington, 66th Legislature, 2019 Regular Session.” 2019. <http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/House%20Bills/1512.pdf>

the “governing authority of an electric utility formed under this chapter may adopt an electrification of transportation plan.” In response, City Light is developing a Transportation Electrification Strategic Investment Plan: 2021-2024 that details the investments City Light will make to expand equitable access to electric transportation, while reducing carbon emissions and bringing value to the grid and our customers over the next four years.

The Transportation Electrification Strategic Investment Plan, which will be updated every four years, will focus on solutions that align with City Light’s transportation electrification value framework of equity, environment and viewing the grid as an asset to deliver public good. Approval of the Plan will open the door to committing resources and making investments that will bolster and modernize our electric grid and enable public transit charging, support freight and commercial fleets and provide flexibility for personal mobility.

RACIAL EQUITY OUTCOMES

The City of Seattle’s Equity and Environment Agenda identifies communities most impacted by environmental inequities, including communities of color, immigrants, refugees, people with low incomes, youth and English language learners. City Light strives to incorporate and elevate the voices of environmental justice communities who have traditionally been excluded in transportation electrification planning and development. By centering people and communities experiencing environmental inequities, community outreach and engagement will result in solutions that meet the needs of all our customers. This is critical to the long-term success of any City infrastructure improvement plan.

City Light is dedicating space for environmental justice communities to participate in the development of the Transportation Electrification Strategic Investment Plan and transportation electrification programs, including identification of alternatives and preferred solutions.⁹ Collaboration with environmental justice communities will help City Light build infrastructure that is welcomed as a community asset and helps to realize prosperity in place for these communities. Robust and equitable transportation electrification programs can address cumulative impacts of multiple environmental hazards and social, economic and racial burdens; prepare these communities for climate change; and support connections between residents, workers, government agencies and industries.¹⁰

INTRODUCTION TO STAKEHOLDER ENGAGEMENT STRATEGY

To ensure meaningful inclusion across our service area, City Light conducted a transportation electrification racial equity analysis, guided by City Light's RSJI and Environmental Equity Program. This analysis included leveraging the City of Seattle’s RSJI Racial Equity Toolkit and conducting in-depth outreach and engagement. Step 2 of the RSJI Racial Equity Toolkit is to gather information from community members on how an issue benefits or burdens the community in terms of racial equity. City

⁹ International Association for Public Participation. “IAP2 Spectrum of Public Participation.” 2018. https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf

¹⁰ Seattle Office of Sustainability and Environment. “Equity and Environment Agenda.”

<https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

Light conducted a comprehensive review of existing information to identify impacted communities, as well as how transportation electrification could benefit or burden environmental justice communities. City Light developed some initial investment priorities and examples of potential program offerings based on this research to share with community leaders and stakeholders through in-depth outreach and engagement. This document outlines our community and stakeholder outreach and engagement strategy in two phases:

- **Phase 1:** City Light engaged key audiences for their initial feedback and input for the Transportation Electrification Strategic Investment Plan: 2021-2024. Specifically, City Light asked community leaders and stakeholders to weigh in on what potential program offerings and racial equity outcomes should be prioritized for investment and implementation. Table 1 in the Transportation Electrification Strategic Investment Plan shows the outcomes that will guide City Light’s strategic investments in transportation electrification. Table 2 in the Plan shows City Light’s investment priorities, potential program offerings and equity outcomes. City Light met with community leaders and stakeholders starting in the fall of 2019 and we will continue to meet with community-based organizations and stakeholder groups leading up to the delivery of the Transportation Electrification Strategic Investment Plan: 2021-2024 to City Council.
- **Phase 2:** Community outreach and engagement efforts in Phase 2 will be focused on more deep and meaningful engagement with community members. This will start with education about transportation electrification and building customer and stakeholder awareness about the benefits of electric transportation. City Light will engage communities through a collaborative process, with an emphasis on input and feedback for program design, development and implementation. Phase 2 will start once the Transportation Electrification Strategic Investment Plan has been approved by City Council and we will move forward with collaborating with community members.

METHODOLOGY

Key Audiences

City Light identified key audiences for outreach and engagement. Key audiences for the Community and Stakeholder Outreach and Engagement Strategy includes customers who:

- experience high barriers to accessing electric transportation
- represent environmental justice communities and those who have been historically excluded
- can help expand the market of potential electric vehicle owners
- can partner with City Light to manage grid impacts
- have a vested interest in furthering environmental sustainability through a lens of race and social justice

Engagement Approach

Each phase of engagement is grounded in an audience-centered approach. This approach is important to fostering an equitable process for inclusion and toward achieving meaningful, transformative action. This section outlines the approach used for each phase of outreach and engagement.

Phase 1

In Phase 1, City Light's Community and Stakeholder Outreach and Engagement Strategy was focused on in-person, in-depth small group or one-on-one conversations with key audiences. City Light planned, initiated and implemented an engagement strategy that successfully elicited key audience input from environmental justice community leaders and stakeholder organizations, including public and private entities, franchise cities, labor unions, advocacy groups, service providers and neighborhood associations. Representatives from over 50 groups were engaged in conversations centered on identifying transportation electrification investment priorities as well as stakeholder engagement considerations in the development of the Plan.

The discussions generated wide-reaching input from community leaders, concerned residents, business owners and neighborhood advocates that extended beyond the target topic of transportation electrification and prioritizing strategies. The findings from the Phase 1 Community and Stakeholder Outreach and Engagement Strategy are presented on page 15.

Environmental Justice Community Leaders

In Phase 1, City Light partnered with the Seattle Department of Neighborhoods to reach over 22 environmental justice community leaders at 16 different groups. This outreach was focused on leaders in the following neighborhoods: Beacon Hill, Central Area, Chinatown-International District, Delridge, Duwamish Valley/South Park, Lake City, Rainier Beach and Rainier Valley. City Light prioritized these meetings in our outreach and engagement efforts. We met with individuals at their offices or preferred location and during their preferred times. We asked community leaders how they would like to be engaged or participate in the process moving forward. The slide deck used for community leader meetings is available in Appendix A – Environmental Justice Community Leader Transportation Electrification Presentation.

Our strategy for meetings with community leaders adhered to the framework and utilized many of the best practices for community engagement as outlined in the Statement of Principles to Engage Environmental Justice Communities on Transportation Electrification, signed by the Seattle Office of Sustainability & Environment, Seattle City Light, Department of Transportation and Department of Neighborhoods on January 10, 2020.

For each meeting, City Light began engagement efforts by:

- Defining community goals and determining if the outreach effort was informing or engaging.
- Understanding and communicating what is already known and established (this included climate and transportation electrification project background for context).
- Being transparent about constraints that are not shapeable by communities.

- Being clear about what is being asked of communities, specifically the question(s) they are being asked in the context of what is open for communities to shape.
- Ensuring leadership was on board prior to conducting outreach.

City Light will continue to use this approach for Phase 2 meetings with environmental justice community members.

In parallel with City Light’s Phase 1 community engagement effort, the Seattle Office of Sustainability and Environment (OSE) partnered with the Environmental Coalition of South Seattle (ECOSS), a local community-based organization (CBO), to conduct interviews with a sample of environmental justice community leaders on communication and engagement preferences for transportation electrification projects, programs and policies in support of the 2019 Equity Plan for Drive Clean Seattle.

OSE and ECOSS found that environmental justice community leaders preferred communication about services, changes to policy and partnership opportunities via the following methods¹¹:

- Hire community liaisons to facilitate engagement by communicating in the primary languages of the communities
- In-person conversations
- Social Media
- Ads on buses

In addition, OSE and ECOSS found that these community leaders preferred to be involved in projects, plans and policies via the following formats⁸:

- Small working groups that meet regularly
- Work with organizations they are already involved with and trust to gather input
- Focus groups
- Gather input at a meeting the City already attends

City Light plans to leverage and build upon these approaches in its Phase 2 communication and engagement strategy.

Key Audience Stakeholders

City Light also conducted outreach to stakeholders in key audience groups. City Light focused on engaging multiple stakeholders from key audience groups for a diversity of perspectives. As part of our Phase 1 engagement efforts, City Light met with over 35 stakeholder groups. A sample slide deck used at a stakeholder meeting is available in Appendix B – Stakeholder Transportation Electrification Presentation.

¹¹ Drive Clean Seattle. “Equity Outreach.” Office of Sustainability and Environment. 2019.

Phase 2

The focus in Phase 2 will be on more deep and meaningful engagement with community members to develop program offerings. Continuing the community outreach and engagement efforts started in Phase 1 will be essential to educating and engaging customers, informing them of planned improvements and getting their buy-in and future participation in program offerings.

The collaborative approach we are envisioning will require a high level of interaction, in accordance with guidance from public health authorities (Public Health - Seattle and King County, Washington State Department of Health and the Centers for Disease Control and Prevention) regarding COVID-19, between City Light, community representatives and other City departments to fulfill the Transportation Electrification Strategic Investment Plan's outcomes. With this approach, City Light will work with community members to identify community concerns and collaborate on solutions. City Light will benefit from community input as well as increased knowledge of the Transportation Electrification Strategic Investment Plan's desired outcomes within local communities.

Our Phase 2 approach will continue efforts to reach out to and connect with a range of audiences. Collaboration time will be expanded and extended to achieve the desired outcomes and to nurture meaningful conversations. City Light will take this approach to achieve innovative, transformative action on behalf of the communities we serve.

This approach will generate a substantial amount of qualitative data from environmental justice community members and stakeholder groups. City Light will need to invest time to review, codify and analyze the growing body of qualitative input from community discussions and other data collection methods. The analysis is an iterative process to extract common themes as well as unique perspectives and outlier perceptions. Analysis of the qualitative data will help City Light understand community concerns and contribute to endorsement of the Transportation Electrification Strategic Investment Plan and to ensuring success of its implementation among diverse groups of customers.

Environmental Justice Communities

In Phase 2, engagement efforts to contact and connect with environmental justice community members will be two-fold:

- Expand the connections to additional groups that were not engaged in Phase 1 community conversations, especially in franchise cities and unincorporated King County.
- Extend the reach into key communities by reconnecting with environmental justice group representatives who offered initial input in Phase 1 discussions.

This is an essential component to establishing a collaborative exchange of information and to generating an effective alliance of engaged community partner organizations in developing City Light's offerings.

For each meeting, City Light will continue to use the best practices highlighted in the Statement of Principles to Engage Environmental Justice Communities on Transportation Electrification. The agreement states that City departments should:

- Prioritize equity in all actions.
- Focus on meeting communities where they are, in the languages they speak.
- Translate materials and offer interpretation services for community meetings in neighborhoods with large non-primary English-speaking populations.
- Build authentic relationships, form convening groups, partner with local community-based organizations and/or Department of Neighborhoods.
- Ask communities how they want to be engaged and adapt strategy as needed.
- Ensure project budget and scope supports equity including providing childcare, food, interpretation, stipends, etc., within legal guidelines.
- Coordinate with other City departments on opportunities for engagement on the topic of transportation electrification more broadly.

Key Audience Stakeholders


In Phase 2, City Light will identify additional stakeholder groups from across the transportation sector to engage with that will contribute varying perspectives on future program offerings. City Light will collect data through focused discussions with the additional stakeholders that have been identified.

City Light will establish a means to loop back with the stakeholder organizations in order to share information and build a working relationship. This will allow City Light to collect stakeholder feedback on an ongoing basis and contribute to overall awareness and understanding of the Transportation Electrification Strategic Investment Plan's desired outcomes while also promoting positive customer relationships.

Level of Engagement

When engaging key audiences, City Light used the Public Participation Spectrum as outlined by the International Association for Public Participation (IAP2) as a tool to aid in selecting the appropriate level of participation and defining the public's role in the process. As you move from left to right, the public has an increasing impact on the decision. In Phase 1, City Light focused on involving community leaders and stakeholders. For Phase 2, City Light will involve and collaborate with community members and stakeholders on what is shapeable within our program offerings.

IAP2's Public Participation Spectrum¹²

Increasing Impact on the Decision 					
	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
Public Participation Goal	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
Promise to the Public	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

¹² IAP2 International Federation. "IAP2 Spectrum of Public Participation 20181112_v1". 2018. https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf

TRANSPORTATION ELECTRIFICATION STRATEGIC INVESTMENT PLAN STAKEHOLDER ENGAGEMENT STRATEGY: KEY AUDIENCES

This section outlines the key audiences that City Light has identified for community and stakeholder outreach and engagement.

KEY AUDIENCES	AUDIENCE DEFINITION	REASON FOR SELECTION	EXAMPLES OF AUDIENCE MEMBERS
Environmental Justice Communities	Environmental justice communities are made up of community members most impacted by environmental inequities including communities of color, immigrants and refugees, people with low incomes, youth and English language learners.	Environmental justice communities experience high barriers to accessing clean, electric transportation and have been traditionally excluded in the decision-making process when it comes to receiving the benefits of investment(s) in transportation electrification.	<p>Residents in the following neighborhoods represent many of the environmental justice communities in the City of Seattle:</p> <ul style="list-style-type: none"> • Central Area • Beacon Hill • Rainier Beach • Rainier Valley • South Park • Duwamish Valley • Lake City • Chinatown-International District • Delridge • University District • Haller Lake • Bitter Lake <p>The following cities and areas represent environmental justice communities in City Light’s service territory outside of the City of Seattle:</p> <ul style="list-style-type: none"> • SeaTac • Tukwila • Renton • Burien • Shoreline • White Center • Bryn Mawr-Skyway

Environmental Justice Organizations	Environmental justice organizations work towards climate justice by organizing people and centering on racial justice and equity to make deep system changes and foster resilient and empowered communities.	Environmental justice organizations have established relationships with environmental justice communities and have conducted community-based participatory research on environmental justice communities' wants and needs.	Local environmental justice organizations include: <ul style="list-style-type: none"> • Puget Sound Sage • Transportation Choices Coalition • 350 Seattle • Got Green • Front and Centered • Duwamish River Cleanup Coalition
Labor Unions/ Organized Labor/Labor Councils	Labor unions bargain collectively with employers over wages, benefits and rights.	Labor unions represent industries that may be impacted by City Light's investments in transportation electrification including electrical workers.	Impacted labor unions and labor councils that represent the interests of organized labor include: <ul style="list-style-type: none"> • International Brotherhood of Electric Workers (IBEW) Local 46 • IBEW Local 77 • Laborers Local 1239 • Martin Luther King County Labor Council • Electrical Industry Group Northwest
Environmental Advocacy Organizations	Environmental advocacy organizations are nonprofit groups that work to influence policies and systems to accelerate clean energy solutions that reduce contribution to climate change.	Environmental advocacy organizations can influence if policies and programs are accepted by City Council.	Local environmental advocacy organizations include: <ul style="list-style-type: none"> • Northwest Energy Coalition (NVEC) • Puget Sound Clean Air Agency • Climate Solutions • Emerald Cities • Rainier Valley Greenways

<p>Shared Mobility Companies & Transportation Network Companies (TNCs)</p>	<p>Shared Mobility Companies and TNCs use smart phone applications to link individual drivers with individuals who need transportation. They provide navigation, payment and other services.</p>	<p>TNCs contract many environmental justice community members including people of color and immigrants as drivers.^{13,14}</p>	<p>The following TNCs are present in Seattle:</p> <ul style="list-style-type: none"> • Lyft • Uber
<p>Taxi Companies</p>	<p>Taxi companies provide dispatch services to individual drivers for individuals who need transportation.</p>	<p>Taxi companies contract many environmental justice community members including people of color and immigrants as drivers.^{15,16}</p>	<p>The following taxi companies are present in Seattle:</p> <ul style="list-style-type: none"> • Orange Taxi Company • Seattle Yellow Cab
<p>Electric Vehicle Supply Equipment (EVSE) Companies and Electric Vehicle Service Providers (EVSPs)</p>	<p>EVSE companies manufacture electric vehicle charging stations for light-, medium- and heavy-duty charging. EVSPs develop software that sits on-top of the charging station, enabling end-users to use, pay for and track charging services.</p>	<p>EVSE companies and EVSPs will provide the equipment and software services for transportation electrification programs and services. City Light currently partners with two of these organizations.</p>	<p>The major EVSE companies are:</p> <ul style="list-style-type: none"> • Greenlots • ChargePoint • eMotorWerks/EnelX <p>The major EVSP companies are:</p> <ul style="list-style-type: none"> • Electrify America • EVGo • Tesla

¹³ Puget Sound Clean Air Agency. "Electrifying Ride-Hailing in Seattle." September 2019. <https://www.atlasevhub.com/wp-content/uploads/2019/09/Electrifying-Ride-hailing-in-Seattle-WWCC-Report.pdf>

¹⁴ Lyft. Economic Impact Report 2020. <https://www.lyftimpact.com/impact/drivers/expanded>

¹⁵ Interview with Seattle Yellow Cab on 2/4/2020.

¹⁶ Interview with Orange Taxi Company on 1/23/2020.

Commercial, Local Government and Non-Profit Fleets	Commercial, local government and non-profit fleets are a collection of vehicles owned or leased by an individual or organization that support the business by transporting people, goods and services.	Several commercial, local government and non-profit fleets in City Light's service territory are actively or planning to electrify their fleets. These fleets may create large local electrical loads.	Commercial, local government and non-profit fleets planning on electrifying include: <ul style="list-style-type: none"> • King County Metro • UPS/PACCAR • Recology • Zipcar • Amazon • City of Seattle • University of Washington • UW Urban Freight Lab
City Light Franchise Cities and Unincorporated King County	City Light franchise cities are cities within City Light's service territory outside of the City of Seattle. Unincorporated King County is made up of census-designated places in King County that do not belong to a city.	Due to the cost of living in Seattle, some City Light customers have relocated and live in franchise cities and unincorporated King County. It is important to hear from all of City Light's customers across our entire service territory.	Franchise cities include: <ul style="list-style-type: none"> • Shoreline • Lake Forest Park • Burien • Renton • Tukwila • SeaTac • Normandy Park • Unincorporated King County: <ul style="list-style-type: none"> ○ White Center ○ Bryn Mawr-Skyway
Public Agencies	Public agencies are agencies within the Pacific Northwest that play different roles in electrifying transportation regionally.	Regional alignment is critical to widespread transportation electrification.	Some of the public agencies that City Light is currently coordinating with or plans to coordinate with in the future include: <ul style="list-style-type: none"> • King County • Washington State Ferries • Port of Seattle • State of Washington Department of Commerce • State of Washington Department of Ecology • Sound Transit

Seattle City Light Customers	City Light customers covers all City Light customers.	The Transportation Electrification Strategic Investment Plan impacts all customer groups. City Light's plan will serve all our customers and will target those with the most significant barriers to accessing the benefits of transportation electrification first. By centering equity in our outreach and engagement, the solutions that will result from the Transportation Electrification Strategic Investment Plan will be positioned to meet the needs of all our customers.	Seattle City Light customers include the following and those groups that speak on behalf of or serve our customers: <ul style="list-style-type: none"> • Residential • Business/Commercial/ Industrial • Owners/Property Managers • Affordable Housing Providers • Community Associations • Neighborhood Associations • Advocacy Groups • Low-Income Service Providers
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TRANSPORTATION ELECTRIFICATION STRATEGIC INVESTMENT PLAN STAKEHOLDER ENGAGEMENT KEY FINDINGS: PHASE 1

The first phase of the Stakeholder Engagement Strategy was focused on engaging the selected key audiences for the Transportation Electrification Strategic Investment Plan leading up to the delivery of the Strategic Investment Plan to City Council. The complete list of meetings is in Appendix C.

This section outlines feedback, input and priorities for the Plan from the community leaders and stakeholders City Light met with during Phase 1 outreach and engagement.

KEY FINDINGS

City Light conducted outreach to environmental justice communities along with other stakeholders to gather feedback on their priorities for City Light's Transportation Electrification Strategic Investment Plan. The following are key findings from our community and stakeholder outreach and engagement efforts in Phase 1. The priorities City Light heard are reflected in the Transportation Electrification Strategic Investment Plan's investment priorities framework.

Environmental Justice Community Leaders

Program Offerings

- **Electrify buses:** Electrify buses was the number one priority for environmental justice community leaders. Community leaders expressed a desire for improved and electrified public transit as community members primarily rely on public transit for getting around. One community group was supportive of transportation mode-shifting to reduce the overall number of vehicles on the road.
- **Customer and stakeholder outreach and awareness:** Increasing customer and stakeholder outreach and awareness was the second priority. They recommended integrating education in public school systems; exploring partnerships with car dealerships, electric vehicle service equipment (EVSE) suppliers and City departments; and hosting networking events, info sessions and ride and drive events. As an outreach approach, they recommended using storytelling, multi-media and demographic-specific tactics. Multiple community leaders emphasized the importance of involving community members and community-based organizations to be successful. One organization suggested training youth ambassadors on electric vehicle education.
- **Electrify commercial, local government and non-profit fleets:** As a third priority, community leaders identified commercial and local government fleet electrification as an opportunity to reduce tailpipe emissions in the Duwamish Valley. Multiple community leaders also identified nonprofit/small business fleet electrification as an opportunity to increase equitable access to transportation electrification. One leader supported electrifying school buses that park in the Duwamish Valley.
- **Accelerate transportation electrification adoption in environmental justice communities:** As a fourth priority, community leaders spoke to accelerating transportation electrification adoption in their communities to ensure that we include individuals who have been traditionally left out. One group mentioned that a lower rate for electric vehicle charging for low-income families could help achieve this. Another group was interested in Women Minority Business Enterprise (WMBE) ownership models for public charging stations.
- **Electric Vehicle Rate:** Community leaders also prioritized reducing the cost of charging and incentivizing the transition to electric vehicles through affordable rate structures.
- **Additional Commentary:**
 - Electrify King County Metro's Via to Transit, a pilot program that addresses the first- and last-mile to Link Light Rail in southeast Seattle.
 - Electrify drayage trucks¹⁷ driven by independent contractors that serve the Port of Seattle.
 - Provide financing for multifamily property owners to install electric vehicle charging stations.
 - Provide incentives to TNC drivers to adopt electric vehicles.
 - Provide support and incentives for public charging stations at community centers.

¹⁷ Drayage trucks are Class 8 heavy duty trucks that do local and regional shipping runs, usually in and out of ports.

- Provide more support for property owners to negotiate the City of Seattle’s system for installing charging stations.

Racial Equity Outcomes

- **Equitable Access:** Community leaders recommended City Light conduct in-language, inclusive, community- and generation-specific advertising, communications and engagement. In addition, leaders suggested we communicate through multi-media channels (e.g., Instagram, videos). One group emphasized the importance of connecting with community members in franchise cities in Phase 2 outreach and engagement.
- **Healthy Planet, Healthy Lives:** Community leaders requested that City Light prioritize communities most impacted by poor air quality first for investment and that we act quickly to address the climate crisis.
- **Economic Opportunities and Youth Pathways:** Community leaders prioritized providing investment, economic and job opportunities for environmental justice communities including apprenticeships and internships. One group spoke to City Light about supporting a ‘just transition’ to transportation electrification jobs for folks currently dependent on carbon-based infrastructure economic systems. Another recommendation was that we set supportive policies and reduce barriers in City Light contract procurement processes.
- **Community Collaboration/Community Assets:** Community leaders encouraged City Light to collaborate with community members on public charging infrastructure. Many requested we identify off-street parking lot/private property solutions rather than locating stations in the public right-of-way. One group requested we pair public charging investments with additional community investments, to help create infrastructure improvements that would feel like an asset to communities.

Environmental Justice Organizations

Program Offerings

- **Electrify buses:** The number one priority for environmental justice organizations was to improve, increase and electrify public transit options. Overall, environmental justice organizations expressed the need to invest in public transit over personal vehicles to increase equitable access to transportation electrification and reduce carbon emissions. In addition, one group wanted to see electrified buses with longer ranges that serve communities further out in King County. One organization identified that local environmental justice community members want local government to prioritize reduced public transit fares.¹⁸
- **Additional Commentary:**
 - Electrify services that provide first- and last-mile transit services to public transit like King County Metro’s Via to Transit and electric bus service to and from ferry terminals.
 - Invest in infrastructure to support electric foot ferries, such as the route of the Kitsap Fast Ferry.

¹⁸ Puget Sound Sage. “Powering the Transition.” 2020. https://www.pugetsoundsage.org/wp-content/uploads/2020/06/PugetSoundSage_PoweringTransition_June2020-1.pdf

- Electrify government and commercial car fleets. Provide charging infrastructure for vehicles that are co-located and/or in predictable locations.
- Electrify taxis and high-mileage rideshare vehicles as these vehicles have the highest city vehicle miles driven. Electrify drayage trucks driven by independent contractors that serve the Port of Seattle.
- Electrify school buses that park in the Duwamish Valley.
- Work with Seattle Parks and Recreation Department to replace mowers and blowers with electric or human-powered equivalents to reduce climate pollution and air pollution (particularly to benefit the health of the workers).¹⁹

Racial Equity Outcomes

- **Healthy Planet, Healthy Lives:** All environmental justice groups we met with emphasized the importance of improving air quality as environmental justice communities are disproportionately impacted by air pollution. Several environmental justice groups requested that City Light prioritize communities most impacted by poor air quality first for investment.
- **Economic Opportunities and Youth Pathways:** Multiple groups prioritized economic opportunities and youth pathways in the transition to electrified transportation. Environmental justice groups spoke to providing youth, apprenticeship and job pathways with good labor standards and livable wages to environmental justice communities.
- **Equitable Access:** Environmental justice organizations emphasized the importance of equitable access in offerings and Phase 2 outreach and engagement efforts:
 - When completing Phase 2 outreach and engagement, they recommended City Light identify the specific languages spoken in that community and ensure we have translated materials and language interpretation services available. One group shared there is an opportunity to connect with youth through video or other phone connections. In addition, one group communicated the importance of connecting with community-based organizations and community members in franchise cities.
 - Target drivers who have inadequate access to public transit and are reliant on cars because they have been displaced further out from their place of work and other services due to affordability.
- **Community Collaboration/Community Assets:** Multiple environmental justice groups emphasized the importance of pairing infrastructure investments with anti-displacement strategies so that communities can enjoy the benefits of transportation electrification and stay in place. One environmental justice group requested we pair public charging investments with additional investments, to help create infrastructure improvements that would feel like an asset to the local community.
- **Rate Affordability:** One environmental justice organization identified rate affordability as an important racial equity outcome. If their community member's energy bills increase by \$50 a

¹⁹ Letter from 350 Seattle on 2/13/2020.

month, community members will start to cut basic services like groceries, medicine, childcare, eldercare or rent/mortgage payments.²⁰

Labor Unions

Racial Equity Outcomes

- **Economic Opportunities and Youth Pathways:** The number one racial equity outcome for labor unions was Local Economies and Youth Pathways. Unions expressed concerns about job loss, re-training and workforce development in the shift to electric transportation. One union was interested in the development of apprentice programs for utility construction workers involved in the build-out of charging infrastructure. Another union recommended City Light include apprenticeship utilization requirements in bid specifications for our offerings. In addition, they recommended we target environmental justice community members for contracts and implementing youth pathways.
- **Additional Commentary:**
 - City Light should plan for how expanding transportation electrification will impact grid infrastructure and future transmission and distribution (T&D) investments
 - Stressed the need for an ongoing focus on safety for both customers and field crews as new energized services come online.

Environmental Advocacy Groups

Program Offerings

- **Electrify buses:** The number one priority for environmental advocacy groups was to electrify and expand public transit. One group voiced support for transportation mode-shifting to reduce the overall number of vehicles on the road.
- **Customer and stakeholder outreach and awareness:** Multiple groups recommended City Light focus on education and outreach to increase awareness and excitement around transportation electrification.
- **Electrify high-mileage vehicles:** Groups emphasized that TNC drivers drive three to five times more than regular passenger vehicles and electrifying these vehicles can have a large impact on tailpipe emissions. In addition, these vehicles are frequently driven by communities of color and targeted incentives can increase equitable access to transportation electrification. For electrifying high-mileage vehicles, organizations recommended providing at-home and near-home level 2 charging at residential charging rates or specific rates for TNC drivers. They also recommended adding public fast charging stations near pick up and drop off locations for TNC drivers, dedicated for their use, if possible. Multiple groups also recommended electrifying drayage trucks driven by independent contractors that serve the Port of Seattle.

²⁰ Puget Sound Sage. "Powering the Transition." 2020. https://www.pugetsoundsage.org/wp-content/uploads/2020/06/PugetSoundSage_PoweringTransition_June2020-1.pdf

- **Electrify commercial, local government and non-profit fleets:** Multiple environmental advocacy groups emphasized the importance of electrifying large and heavy-duty commercial and government fleets.
- **Expand at-home and near-home charging:** Multiple groups recommended that City Light include dedicated transportation electrification services to renters (specifically multifamily residents) as they make up 52% of the customers in our service territory. One encouraged City Light to invest in charging infrastructure on utility poles at at-home charging rates.
- **Electric Vehicle Rate:** Multiple groups spoke to the importance of electric vehicle charging rates. One group recommended City Light provide affordable electric vehicle charging. Another encouraged City Light to incentivize transportation electrification through rate structures.
- **Additional Commentary:**
 - Electrify King County Metro’s Via to Transit, a pilot program that addresses the first- and last-mile to Link Light Rail in southeast Seattle.
 - Focus on large capital projects that create jobs and support companies/groups with the biggest barriers to electrification.
 - Pair targeted electric vehicle education and community collaboration on public charging stations with an avenue for electric vehicle adoption in the communities, such as community carshare.

Racial Equity Outcomes

- One group recommended City Light collaborate with high-mileage vehicle drivers on public charging and right-size investments with their need for charging. Another group emphasized the importance of overall rate affordability.

Transportation Network Companies (TNCs)

Program Offerings

- **Public Charging:** One organization emphasized the importance of public fast charging (i.e., above 50 kWh). Drivers need to spend as little time charging as possible in order to reduce downtime and maximize money earned.

Taxi Companies

Program Offerings

- **Electrify high-mileage vehicles:** According to taxi companies, the most important aspect of electrifying high-mileage vehicles is making the transition cost effective. One organization expressed that at-home and near-home charging is the most important solution because drivers want to start their morning with a full tank and do not want to have to think about refueling downtown. Installing fleet fast chargers at taxi company headquarters might also be an effective solution for drivers to refuel but requires more investigation.

Electric Vehicle Supply Equipment (EVSE) Companies and Electric Vehicle Service Providers (EVSPs)

Program Offerings

- **Electric Vehicle Rate:** EVSE companies and EVSPs encouraged City Light to explore creative rate solutions that help make the business case for public charging stations.
- **Transportation Electrification Customer Service:** EVSE companies and EVSPs expressed concern around permitting and interconnection. They shared that City Light’s timeframe for interconnection can be too long and the lack of transparency around costs can slow down organizational infrastructure plans. One group requested standardized interconnection standards and rules for charging stations across utilities. A desire for a central point of contact or group focused on EVs at Seattle City Light was also expressed.
- **Additional Commentary:**
 - Partner with major corporations on education and outreach (specifically in workplaces).
 - Support infrastructure for buses, multifamily, high-mileage, workplace, public and fleet charging.

Commercial, Local Government and Non-Profit Fleets

Program Offerings

- **Electrify commercial, local government and non-profit fleets:** Fleets prioritized incentives for charging infrastructure. In addition, one group requested fast induction charging options for heavy-duty vehicles.
- **Electric Vehicle Rate:** Fleets expressed interest in incentives for charging, cheaper rates for overnight slow charging, demand charge holidays and electric vehicle-specific rates.
- **Transportation Electrification Customer Service:** Fleets prioritized improving the electrical permitting process for installing charging stations including reducing the number of steps it takes to obtain a permit, the time it takes to obtain a permit and the amount it costs. One group shared that City Light’s timeframe for interconnection can be too long and can slow down organizational infrastructure plans. They also shared that government facilities are often old and do not have sufficient power capacity to meet their electrification outcomes. They voiced that solutions are needed to help solve for this problem.
- **Additional Commentary:**
 - Increase access to charging stations throughout the service area so that government fleets have access to charging stations beyond a centralized hub to mitigate range anxiety and support government vehicles that do not return to base. Opportunity to site public charging stations at Seattle Public Utility pumping stations.
 - Support solutions for at-home charging for government issued vehicles. Currently, gift of public funds regulations prevents departments from investing in at-home charging solutions for take-home fleets, resulting in the need for internal combustion engine fleet vehicles.

Seattle City Light Franchise Cities

Program Offerings

- **Customer and stakeholder education and outreach:** Franchise cities were very supportive of education and outreach. Multiple cities identified events for City Light to attend and present at including Touch-a-Truck events, Green/Sustainability events, Resource Environmental Fairs and a Permit 'How To' Fair.
- **Expand public fast charging:** Franchise cities emphasized the importance of public charging for their residents. They recommended installing public chargers at city centers, community centers and in private parking lots.
- **Expand workplace charging:** Franchise cities also identified workplace charging as a priority. SeaTac specifically spoke to providing charging at the Seattle Tacoma International Airport's north employee parking lot, located within City Light's service territory.
- **Electrify buses:** Franchise cities supported electrifying buses that pass through their cities.
- **Electrify commercial, local government and non-profit fleets:** Franchise cities identified opportunities to electrify their city fleets. Specifically, they requested case studies and lessons learned from the City of Seattle's fleet electrification process including technical, operational and institutional support.
- **Additional Commentary:**
 - Electrify last mile to transit services including King County Metro's Via to Transit and TNCs.
 - Support at-home and near-home charging for multifamily residences by working with multifamily private property developers.

Public Agencies

Program Offerings

- **Electrify buses:** King County requested that City Light support them in meeting their bus electrification target.
- **Customer and stakeholder outreach and awareness:** One public agency recommended City Light emphasize education and outreach as a discrete investment.

Racial Equity Outcomes

- **Community Collaboration:** One agency recommended City Light focus on education and awareness before collaborating with communities on offerings to ensure community members are aware of transportation electrification and feel confident in their participation.

Seattle City Light Customers

Program Offerings

- **Electrify buses, ferries and other public transit:** Multiple groups supported electrifying transit including buses and ferries.
- **Additional Commentary:**
 - Offer time-of-day rates that are lower for off-peak electric vehicle charging.
 - Provide education about transportation electrification.
 - Support access to charging stations for individuals without garages and TNC drivers.

- Collaborate with affordable housing on access to charging for residents.
- Provide workplace charging.
- Support charging options for electric bikes in public settings and at workplaces.

Racial Equity Outcomes

- **Community Collaboration:** Many customer groups requested that City Light locate public charging stations away from arterials, pedestrian, cycling and transit paths. One group recommended that City Light refrain from using right-of-way locations in areas of high population density and identify parking lot sites. They thought right-of-way locations would be less problematic in areas of lower population density. One group requested that City Light collaborate with communities of color and other environmental justice communities on public charging site locations and design.
- **Equitable Access:** One group recommended that City Light work with affordable housing to ensure affordability and equitable access to transportation electrification solutions.



TRANSPORTATION ELECTRIFICATION STRATEGIC INVESTMENT PLAN

Presentation for Community Leaders

Seattle City Light

SEATTLE CITY LIGHT QUICK FACTS

Service Area Population	906,595
Service Area Size	131 sq. mi.
Customers Served	460,609
Employees	1,770
Generation – City Light Dams	7

CUSTOMER SERVICE AREA MAP



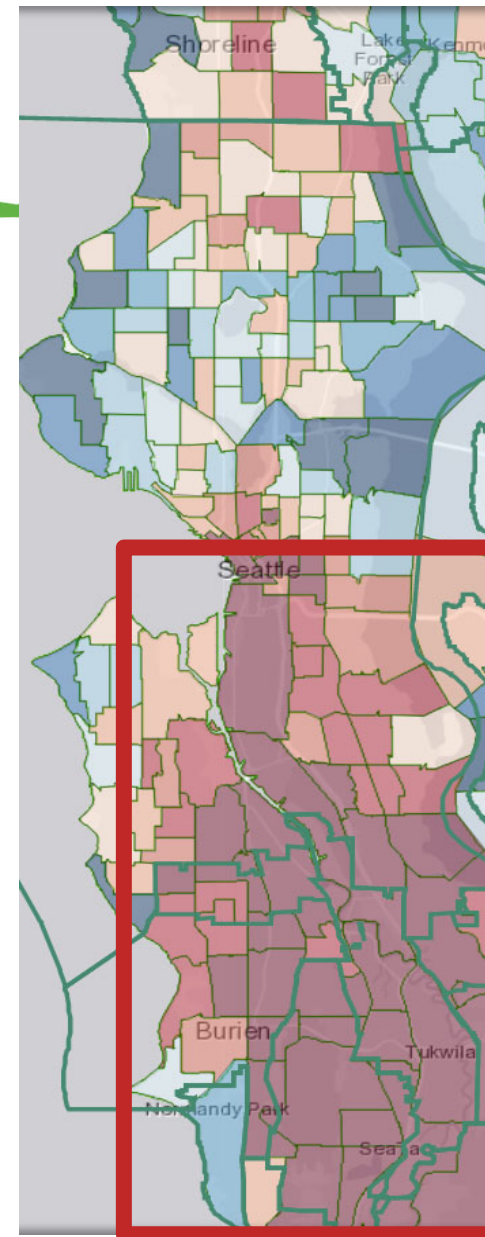
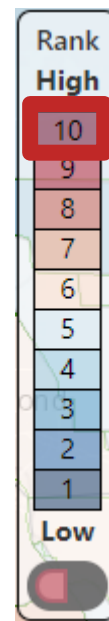
WHAT IS TRANSPORTATION ELECTRIFICATION?

- Moving people, goods, and services around the greater Seattle area using Seattle City Light's clean electricity
- Electrifying Seattle's entire transportation system
 - buses
 - personal vehicles
 - rideshare
 - ferries
 - heavy-duty vehicles
 - goods delivery
 - local government and commercial fleets

BREATHE EASIER

DIESEL POLLUTION

No dirty soot comes out of tailpipes of electric buses or cars.

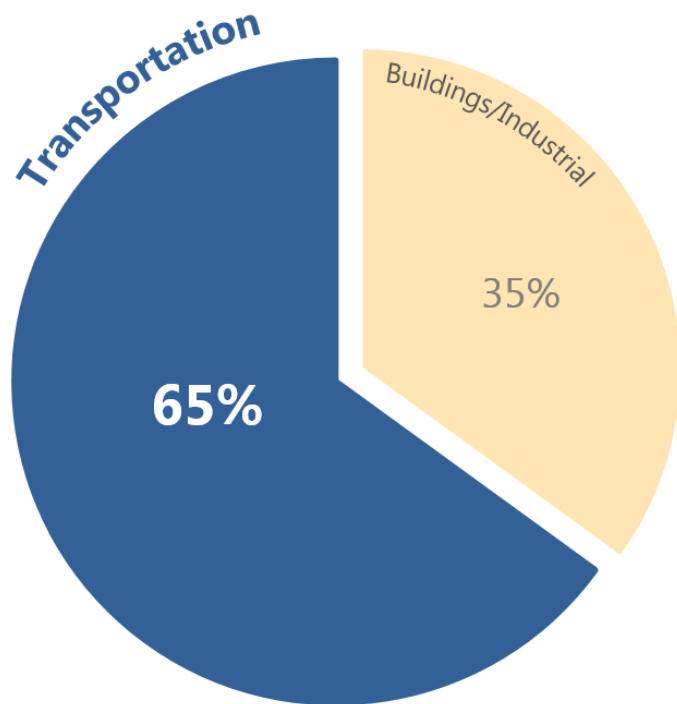


REDUCE IMPACT

GREENHOUSE GAS EMISSIONS



SEATTLE

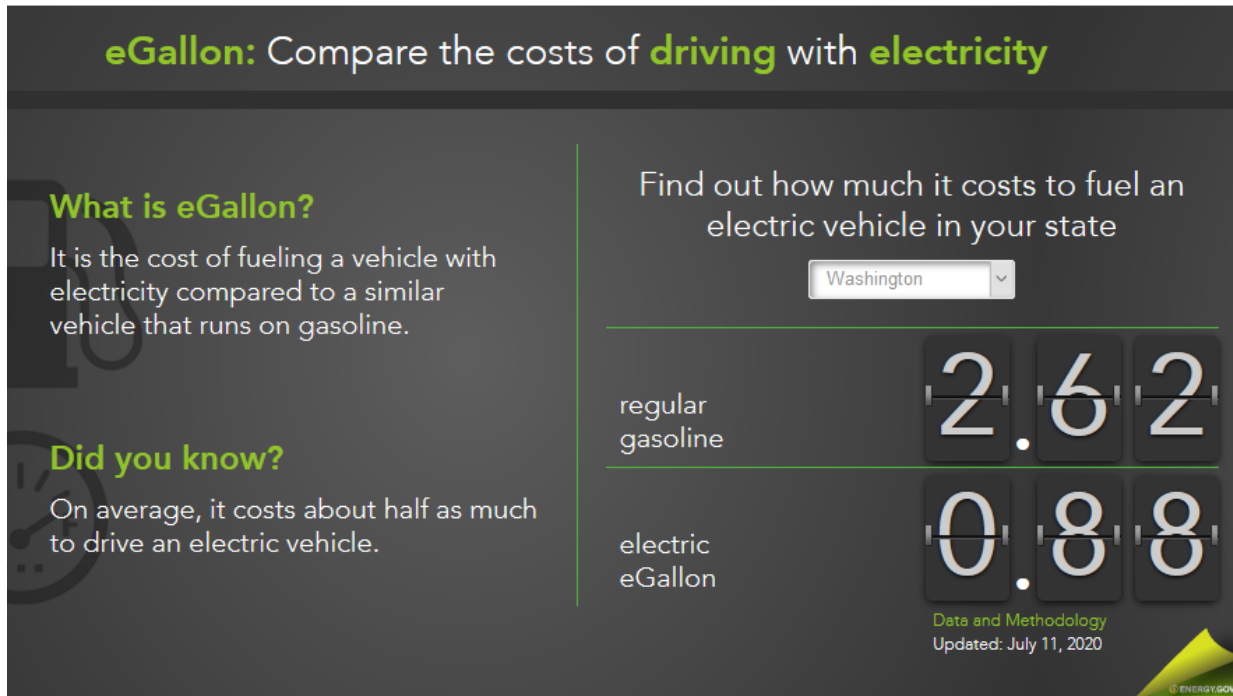


Vehicles powered by our clean electricity have **zero carbon emissions** and **do not contribute to our climate pollution.**



SAVE MONEY

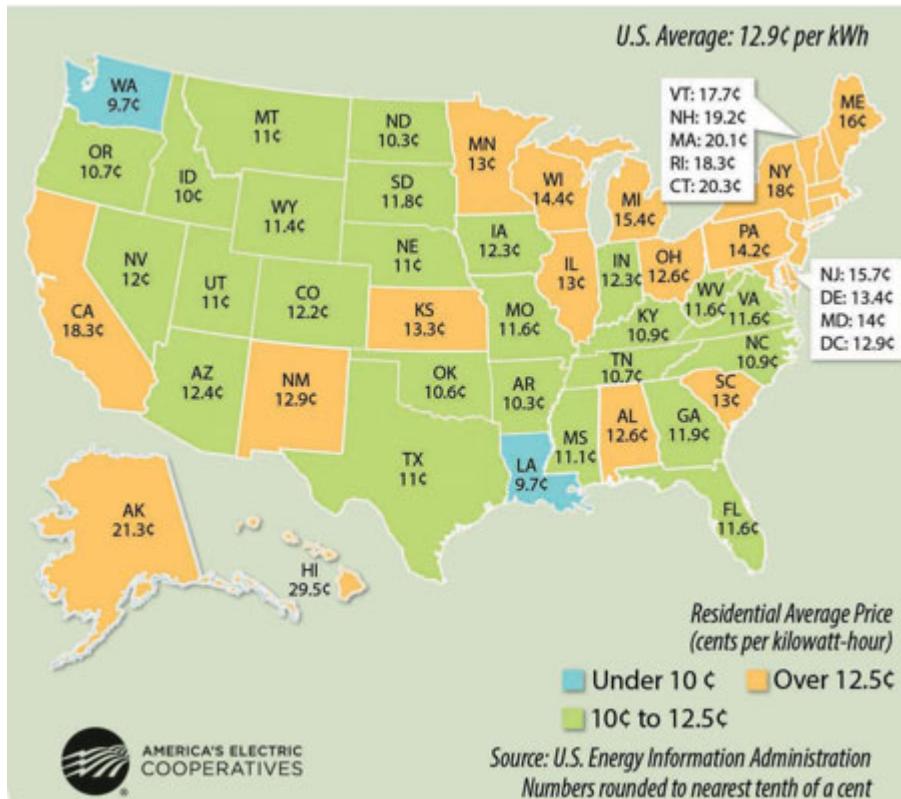
ELECTRIC VEHICLE FUELING PRICES



Electric vehicles have 50% average annual operating savings over gas-powered vehicles.

SAVE MONEY

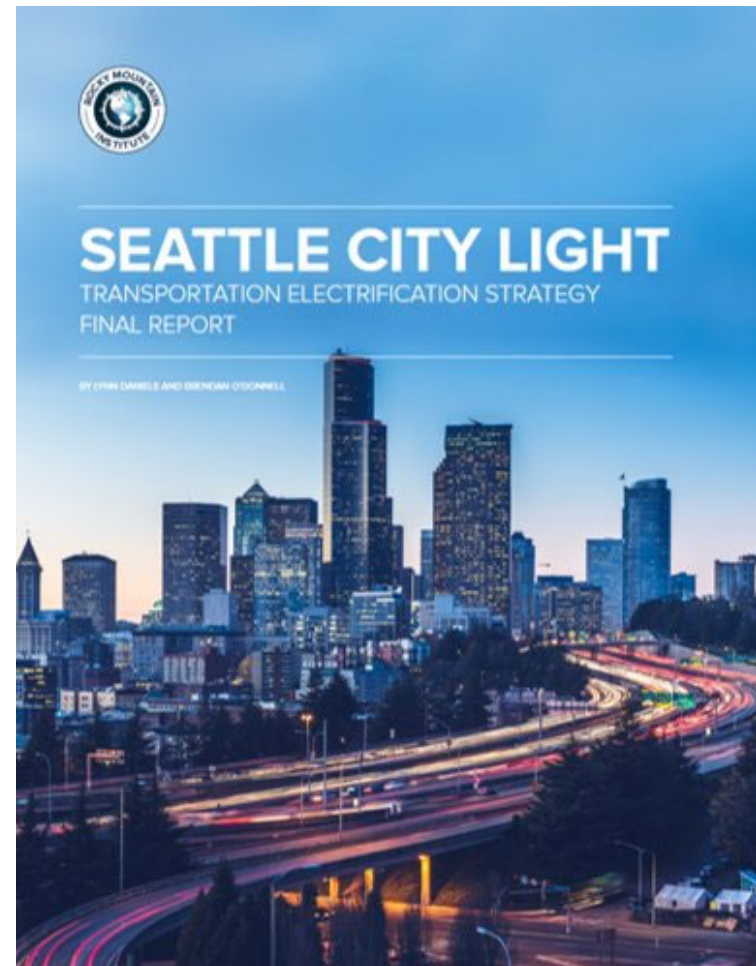
RESIDENTIAL ELECTRICAL PRICES



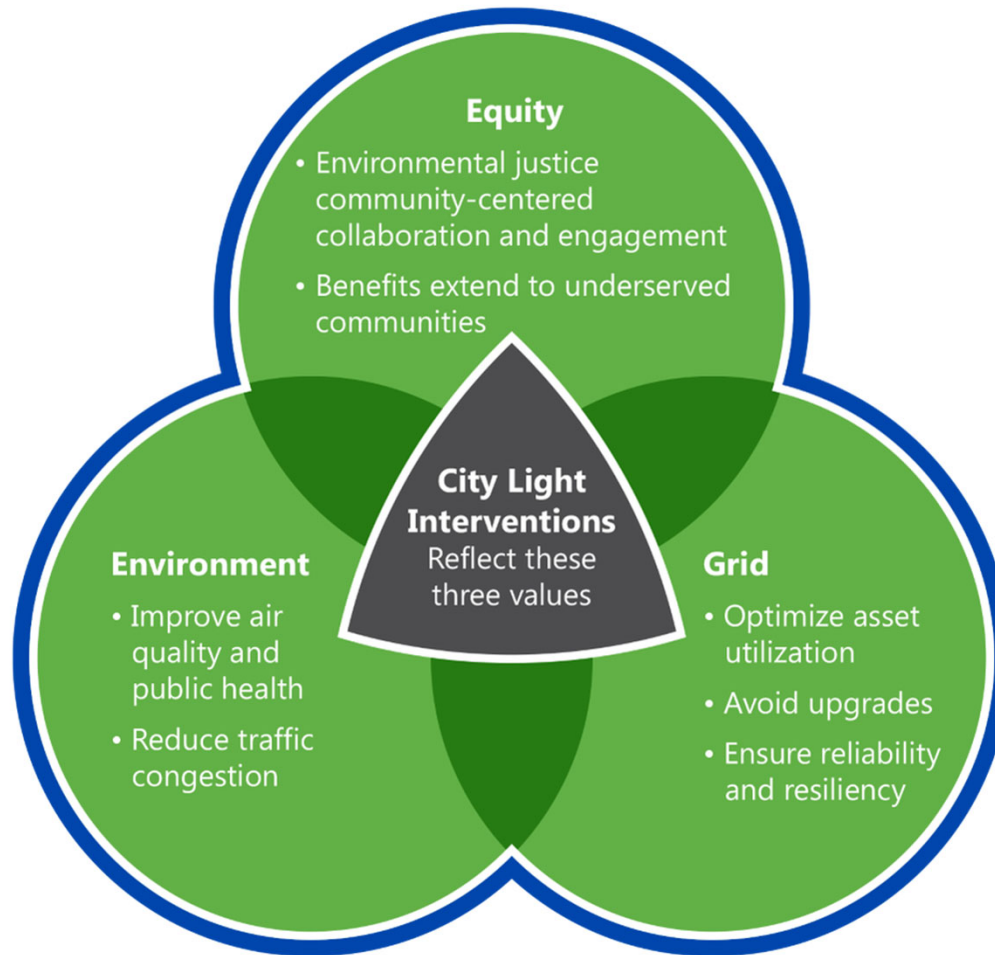
Mass adoption of electric vehicles can help **keep electricity prices low for all.**

CITY LIGHT'S ROLE

- Developing programs to enable and promote bus, car and truck electrification
- Reliable and affordable charging



CITY LIGHT'S VALUES FRAMEWORK



HOW CITY LIGHT IS EMBEDDING EQUITY



We are here!



WHAT WE'VE HEARD SO FAR

What We've Heard from Community	Potential Solutions from Community
Communities of color suffer from poor air quality and health disparities	Prioritize these areas for investments
Need increased/improved public transit	Provide charging infrastructure for buses
Most people are unfamiliar with EVs	Support community-based education
Many community members cannot afford cars	Provide charging infrastructure for community carsharing
Provide economic opportunities for communities of color	Support economic opportunities related to transportation electrification
Lack of access to charging for multifamily units	Provide at-home and near-home affordable charging solutions
Without proper planning, public charging may contribute to increased housing costs, exacerbate community displacement, and increase the risk of gentrification	Utilize community-based decision making for public charging infrastructure to design and locate stations with community input



RACIAL EQUITY GOALS



Community Assets

City Light's programs invest in infrastructure that are community assets so Environmental Justice Communities can enjoy the benefits of transportation electrification in their current neighborhoods.



Community Collaboration

Environmental Justice Communities see their wants and needs reflected in City Light transportation electrification programs.



Healthy Planet, Healthy Lives

Reduce tailpipe emissions that impact local air quality and public health where Environmental Justice Communities live, learn, work and play. Reduce CO₂ emissions that have a disproportionate burden on the most vulnerable populations and communities.



Equitable Access

Environmental Justice Communities learn about our transportation electrification programs, can readily understand and access materials and resources, see themselves reflected in communications, and participate in and benefit from City Light programs.



Economic Opportunities and Youth Pathways

City Light enables Environmental Justice Communities to participate in and benefit from the local transportation electrification economy.







Electricity Affordability

Widespread transportation electrification increases revenue to put downward pressure on electricity prices.



 **Transportation Electrification**



TRANSPORTATION USES	INVESTMENT PRIORITIES	EXAMPLE CITY LIGHT OFFERINGS
 All	Customer and stakeholder outreach and awareness	<ul style="list-style-type: none"> • Information, education, events and resources on the benefits of electric vehicles
 Public Transit (Buses, Ferries, Trains, Light Rail)	Electrify buses, ferries and other public transit	<ul style="list-style-type: none"> • Financial incentives and technical assistance with site and design requirements to provide electric charging infrastructure for King County Metro, Washington State Ferries and other public transit • Partnerships with City of Seattle and King County departments to electrify first- and last-mile public transportation options such as paratransit shuttles and e-mobility hubs
 Commercial, Government & Non-Profit Fleets	Electrify commercial, local government and non-profit fleets	<ul style="list-style-type: none"> • Financial incentives for electric charging infrastructure for companies that transport people, goods and services • Fee-based City Light-owned charging infrastructure for public and private fleet vehicles (such as school buses and solid waste vehicles) • Incentives and turn-key charging infrastructure for electrification of non-profit fleet vehicles
 Personal Mobility (Cars, Bikes, Scooters, etc.)	Expand at-home and near-home charging	<ul style="list-style-type: none"> • Incentives, qualified installers and special payment terms to help reduce barriers to installing charging stations in multifamily housing • Near-home charging solutions for those with no access to off-street parking
	Electrify high-mileage vehicles	<ul style="list-style-type: none"> • Provide lower costs to charge at different times of day that meet the needs of high-mileage vehicle drivers while benefiting the grid
	Accelerate transportation electrification adoption in environmental justice communities	<ul style="list-style-type: none"> • Charging infrastructure for community car share • Provide discounts toward the cost to charge electric vehicles for people with low to moderate incomes
	Expand public fast charging	<ul style="list-style-type: none"> • Financial incentives to help reduce the upfront cost of public charging stations • Community collaboration on City Light-owned public charging stations
	Expand workplace charging	<ul style="list-style-type: none"> • Provide EV-ready electricity service to workplaces for future charging infrastructure

QUESTIONS FOR YOU

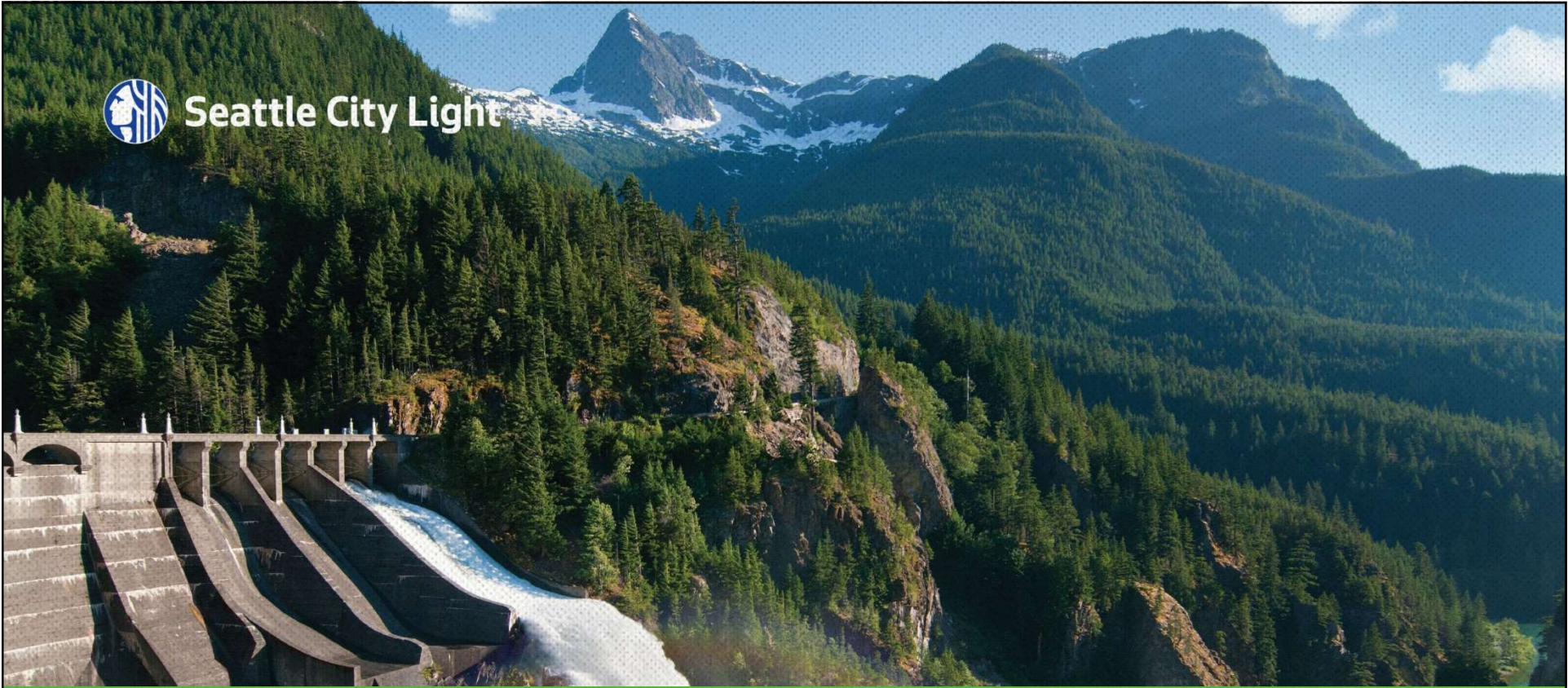
- What is #1 for you? What should we make sure to include in the plan?
- Based on the options listed, how should we prioritize them? What is missing?
- How does this work fit in with other priorities for your organization or in your neighborhood?

NEXT STEPS

- When we get this approved, how would you like to be involved?
- Do you have suggestions for other organizations that we should plan to engage with?



Seattle City Light



TRANSPORTATION ELECTRIFICATION STRATEGIC INVESTMENT PLAN

Presentation for Stakeholders

Seattle City Light

WHAT IS TRANSPORTATION ELECTRIFICATION?

- Moving people, goods, and services around the greater Seattle area using Seattle City Light's clean electricity
- Electrifying Seattle's entire transportation system
 - buses
 - personal vehicles
 - rideshare
 - ferries
 - heavy-duty vehicles
 - goods delivery
 - local government and commercial fleets

CITYWIDE COORDINATION ON TRANSPORTATION ELECTRIFICATION



BENEFITS



No dirty soot comes out of tailpipes of electric buses or cars.

Vehicles powered by our clean electricity have **zero carbon emissions** and **do not contribute to our climate pollution.**



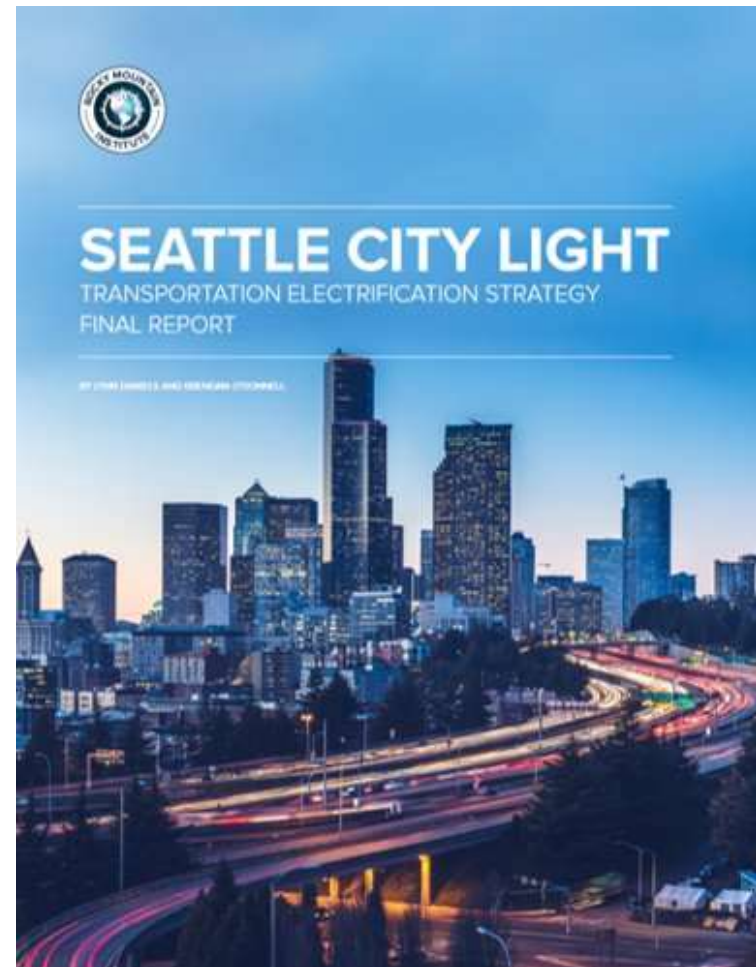
Average of **50% savings** in annual operating costs for electric vehicles over gas-powered vehicles.

Mass adoption of electric vehicles can help **keep electricity prices low for all.**

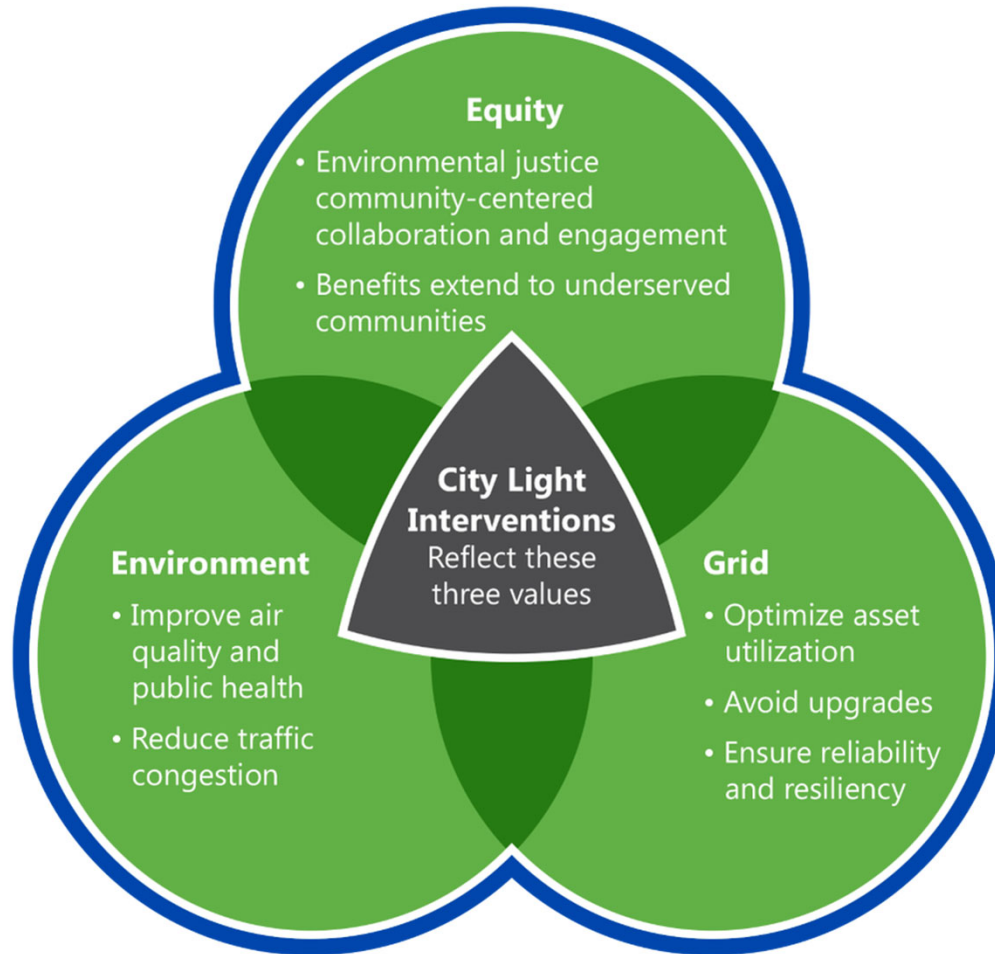


CITY LIGHT'S ROLE

- Developing programs to enable and promote bus, car and truck electrification
- Reliable and affordable charging
- Act on HB 1512's clear authority



CITY LIGHT'S VALUES FRAMEWORK



STRATEGIC UTILITY INTERVENTION AREAS



Invest in charging infrastructure with emphasis on universal **access** and expanding **coverage**



Develop new **rates** and improve customer **service** for the transportation market



Prepare for **medium & heavy-duty commercial fleet** electrification



EQUITY IN ENGAGEMENT



We are here!

WHAT WE'VE HEARD SO FAR

What We've Heard from Communities	Potential Solutions from Communities
Communities of color suffer from poor air quality and health disparities	Prioritize these areas for investments
Need increased/improved public transit	Provide charging infrastructure for buses
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RACIAL EQUITY GOALS



Community Assets

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Healthy Planet, Healthy Lives

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Equitable Access

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Economic Opportunities and Youth Pathways

City Light enables Environmental Justice Communities to participate in and benefit from the local transportation electrification economy.



Electricity Affordability

Widespread transportation electrification increases revenue to put downward pressure on electricity prices.







FUTURE OF WORK & WORKFORCE DEVELOPMENT



- **Guiding goal:** ensure utility workforce is well prepared to adapt to the changing energy landscape
 - Focus on infrastructure
 - Stay ahead of new and changing information and operational technologies
 - Collaborate and partner with labor unions on job training
 - Find ways to uplift communities through our efforts

 **Transportation Electrification**

TRANSPORTATION USES	INVESTMENT PRIORITIES	EXAMPLE CITY LIGHT OFFERINGS
 All	Customer and stakeholder outreach and awareness	<ul style="list-style-type: none"> • Information, education, events and resources on the benefits of electric vehicles
 Public Transit (Buses, Ferries, Trains, Light Rail)	Electrify buses, ferries and other public transit	<ul style="list-style-type: none"> • Financial incentives and technical assistance with site and design requirements to provide electric charging infrastructure for King County Metro, Washington State Ferries and other public transit • Partnerships with City of Seattle and King County departments to electrify first- and last-mile public transportation options such as paratransit shuttles and e-mobility hubs
 Commercial, Government & Non-Profit Fleets	Electrify commercial, local government and non-profit fleets	<ul style="list-style-type: none"> • Financial incentives for electric charging infrastructure for companies that transport people, goods and services • Fee-based City Light-owned charging infrastructure for public and private fleet vehicles (such as school buses and solid waste vehicles) • Incentives and turn-key charging infrastructure for electrification of non-profit fleet vehicles
 Personal Mobility (Cars, Bikes, Scooters, etc.)	Expand at-home and near-home charging	<ul style="list-style-type: none"> • Incentives, qualified installers and special payment terms to help reduce barriers to installing charging stations in multifamily housing • Near-home charging solutions for those with no access to off-street parking
	Electrify high-mileage vehicles	<ul style="list-style-type: none"> • Provide lower costs to charge at different times of day that meet the needs of high-mileage vehicle drivers while benefiting the grid
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	Expand public fast charging	<ul style="list-style-type: none"> • Financial incentives to help reduce the upfront cost of public charging stations • Community collaboration on City Light-owned public charging stations
	Expand workplace charging	<ul style="list-style-type: none"> • Provide EV-ready electricity service to workplaces for future charging infrastructure

WHAT IS CITY LIGHT DOING NOW?



Heavy Duty Pilots

King County Metro Transit & Kenworth/UPS



Residential Charging Pilot

Full-service program for equipment & install



Public Charging Pilot

Install 20 public DC fast charging stations

QUESTIONS FOR YOU

- What is #1 for you? What would your members want us to include in the plan?
- Based on the options listed, how should we prioritize them? What is missing?
- How does this work fit in with other priorities for your organizations and communities?

THANK YOU!



APPENDIX C: LIST OF COMMUNITY LEADER AND STAKEHOLDER MEETINGS

This appendix shows the meetings conducted in Phase 1 of our community outreach and engagement efforts by key audience.

Environmental Justice Community Leaders

Neighborhood	Organization	Meeting Status	Date
Central Area	Central Area Collaborative	Complete	9/20/2019
Central Area	New Hope Missionary Baptist Church	Complete	1/7/2020
Central Area	Northwest African American Museum	Complete	1/7/2020
Central Area	First African Methodist Episcopal Church	Complete	1/14/2020
Central Area	Byrd Barr Place	Complete	1/24/2020
Central Area	Historic Central Area Arts and Cultural District	Complete	2/10/2020
Beacon Hill	Greater Beacon Hill Council of Seattle	Complete	12/3/2019
Beacon Hill	Beacon Business Alliance	Complete	1/15/2020
Rainier Beach	Rainier Beach Action Coalition	Complete	2/25/2020
Rainier Valley	Rainier Valley Greenways	Complete	1/22/2020
Duwamish Valley	Duwamish River Cleanup Coalition	Complete	1/16/2020
Duwamish Valley	Green-Duwamish Watershed Symposium	Complete	2/24/2020
Lake City	Lake City Collective	Complete	12/18/2019
Chinatown- International District	Seattle Chinatown International District Preservation and Development Authority	Complete	1/22/2020
Chinatown- International District	InterIm Community Development Association	Complete	2/7/2020
Chinatown- International District	Chong Wa Benevolent Association	Complete	2/24/2020
Delridge/West Seattle	District 1 Community Network	Complete	1/8/2020

Environmental Justice Organizations

Organization	Meeting Status	Date
Puget Sound Sage	Complete	12/19/2019 1/29/2020
Transportation Choices Coalition	Complete	12/19/2019 1/29/2020
Duwamish River Cleanup Coalition	Complete	1/16/2020
350 Seattle	Complete	2/13/2020

Labor Unions and Labor Councils

Organization	Meeting Status	Date
IBEW Electricians Local 46	Complete	1/8/2020
Electrical Industry Group Northwest	Complete	1/8/2020
Martin Luther King County Labor Council	Complete	1/24/2020 2/19/2020
IBEW Local 77	Complete	2/10/2020
Laborers Local 1239	Complete	2/10/2020

Environmental Advocacy Groups

Organization	Meeting Status	Date
Northwest Energy Coalition (NWECC)	Complete	10/18/2019 12/12/2019
Puget Sound Clean Air Agency	Complete	1/13/2020
Climate Solutions	Complete	1/17/2020
Rainier Valley Greenways	Complete	1/22/2020

Transportation Network Companies (TNCs)

Organization	Meeting Status	Date
Lyft	Complete	11/12/2019

Taxi Companies

Organization	Meeting Status	Date
Orange Cab Company	Complete	1/23/2020
Seattle Yellow Cab	Complete	2/4/2020

Electric Vehicle Supply Equipment (EVSE) Companies and Electric Vehicle Service Providers (EVSPs)

Organization	Meeting Status	Date
EVGo	Complete	5/30/2019
ChargePoint	Complete	12/12/2019
Electrify America	Complete	12/3/2019
Greenlots	Complete	1/31/2020
eMotorWerks/EnelX	Complete	12/16/2019
Tesla	Complete	2/20/2020

Commercial, Local Government and Non-Profit Fleets

Organization	Meeting Status	Date
UW Urban Freight Lab	Complete	11/7/2019
UPS/PACCAR	Complete	8/13/2019 1/17/2020
Recology	Complete	1/16/2020
Waste Management	Complete	1/23/2020
Zipcar	Complete	1/23/2020
City of Seattle Fleet	Complete	12/2/2019
City Light Fleet	Complete	12/19/2019
Seattle Public Utilities Fleet	Complete	2/11/2020

Seattle City Light Franchise Cities

Organization	Meeting Status	Date
City of Lake Forest Park	Complete	12/6/2019
City of SeaTac	Complete	1/29/2020
City of Shoreline	Complete	1/31/2020

Public Agencies

Organization	Meeting Status	Date
King County	Complete	12/9/2019
State of Washington Department of Commerce	Complete	1/2/2020

Seattle City Light Customers

Organization	Meeting Status	Date
Jones Lang LaSalle (JLL)	Complete	1/7/2020
Seattle 2030 District	Complete	1/29/2020
District 1 Community Network	Complete	1/8/2020
Central Seattle Greenways	Complete	2/5/2020
Cascade Bicycle Club	Complete	2/7/2020
Phinney Ridge Community Council	Complete	7/23/2020
Greenwood Community Council	Complete	7/23/2020
Fremont Neighborhood Council	Complete	7/27/2020
43rd District Environmental Caucus	Complete	8/10/2020
Ballard District Council	Complete	8/12/2020
Laurelhurst Community Club	Scheduled	9/14/2020



JULY 2020

Seattle City Light Transportation Electrification Strategic Investment Plan: 2021-2024 – Racial Equity Analysis Summary

EXECUTIVE SUMMARY

Seattle City Light's Transportation Electrification Strategic Investment Plan: 2021-2024 – Racial Equity Analysis Summary provides an overview of City Light's research to understand and document the impacts of transportation electrification investments on environmental justice communities. Environmental justice communities refer to communities defined in the City of Seattle's Equity and Environment Agenda (EEA) and include communities most impacted by environmental inequities, including communities of color, immigrants, refugees, people with low incomes, youth and English language learners.¹ This analysis process was guided by City Light's Race and Social Justice Initiative (RSJI) and Environmental Equity Program. City Light's Transportation Electrification Strategic Investment Plan: 2021-2024 will serve all our customers and will target those with the most significant barriers to accessing the benefits of transportation electrification first. By centering equity in our outreach and engagement, the solutions that will result from the Transportation Electrification Strategic Investment Plan will be positioned to meet the needs of all our customers. In this document, we detail our key findings to support the development of City Light's Transportation Electrification Strategic Investment Plan.

¹ Seattle Office of Sustainability and Environment. "Equity and Environment Agenda."

<https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

City Light gathered and analyzed data from City of Seattle departments, regional published reports and communities on the benefits and burdens of transportation electrification on environmental justice communities. Leading with our values of equity, environment and grid as an asset to deliver public good and incorporating what we have heard from environmental justice communities and other stakeholders – including learning from the City of Seattle’s Equity and Environment Agenda framework and the Duwamish Valley Action Plan – City Light has established six racial equity outcomes to guide transportation electrification strategic investment priorities.^{2,3} Our outcomes are:

1. **Community Collaboration**

Environmental justice communities see their wants and needs reflected in City Light transportation electrification programs.

2. **Healthy Planet, Healthy Lives**

Reduce tailpipe emissions that impact local air quality and public health where environmental justice communities live, learn, work and play. Reduce carbon emissions that have a disproportionate burden on the most vulnerable populations and communities.

3. **Equitable Access**

Environmental justice communities learn about our transportation electrification programs, can readily understand and access materials and resources, see themselves reflected in communication and participate in and benefit from City Light’s transportation electrification programs.

4. **Community Assets**

City Light’s programs invest in infrastructure that are community assets so environmental justice communities can enjoy the benefits of transportation electrification in their current neighborhoods.

5. **Economic Opportunities and Youth Pathways**

City Light enables environmental justice communities to participate in and benefit from the local transportation electrification economy by providing youth, apprenticeship and job pathways with good labor standards and livable wages.

6. **Electricity Affordability**

Widespread transportation electrification increases revenue to put downward pressure on electricity prices.

² Seattle Office of Sustainability and Environment. “Equity and Environment Agenda.”

<https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

³ City of Seattle. “Duwamish Valley Action Plan” June 2018. http://greenspace.seattle.gov/wp-content/uploads/2018/06/DuwamishValleyActionPlan_June2018.pdf

The concerns and potential solutions offered by communities will be used to prioritize future transportation electrification investments and collaborate on strategies that increase opportunity and minimize harm to communities that have been most impacted by environmental inequities.

BACKGROUND

In July 2019, the Washington State legislature passed House Bill 1512, granting public utilities the authority to offer “incentive programs in the electrification of transportation for its customers, including the promotion of electric vehicle (EV) adoption and advertising programs to promote the utility’s services, incentives or rebates”⁴. The legislation adds a new section to RCW 35.92 which provides that the “governing authority of an electric utility formed under this chapter may adopt an electrification of transportation plan.” In response, City Light is developing a Transportation Electrification Strategic Investment Plan: 2021-2024 that details the investments City Light will make to expand equitable access to electric transportation, while reducing carbon emissions and bringing value to the grid and our customers over the next four years.

The Transportation Electrification Strategic Investment Plan, which will be updated every four years, will focus on solutions that align with City Light’s transportation electrification value framework of equity, environment and operating the grid as an asset to deliver public good. Approval of the Plan will open the door to committing resources and making investments that will bolster and modernize our electric grid and enable public transit charging, support freight and commercial fleets and provide flexibility for personal mobility.

RACIAL EQUITY OUTCOMES

Environmental justice communities refer to communities defined in the City of Seattle’s Equity and Environment Agenda (EEA) and include communities most impacted by environmental inequities, including communities of color, immigrants, refugees, people with low incomes, youth and English language learners.⁵ City Light strives to incorporate and elevate the voices of environmental justice communities who have traditionally been excluded in transportation electrification planning and development. By centering people and communities experiencing environmental inequities, community outreach and engagement will result in solutions that meet the needs of all our customers. This is critical to the long-term success of any City infrastructure improvement plan.

City Light is dedicating space for environmental justice communities to participate in the development of the Transportation Electrification Strategic Investment Plan and transportation electrification

⁴ State of Washington. “House Bill 1512, State of Washington, 66th Legislature, 2019 Regular Session.” 2019. <http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/House%20Bills/1512.pdf>

⁵ Seattle Office of Sustainability and Environment. “Equity and Environment Agenda.” <https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

programs, including identification of alternatives and preferred solutions.⁶ Collaboration with environmental justice communities will help City Light build infrastructure that is welcomed as a community asset and helps to realize prosperity in place for these communities. Robust and equitable transportation electrification programs can address cumulative impacts of multiple environmental hazards and social, economic and racial burdens; prepare these communities for climate change; and support connections between residents, workers, government agencies and industries.⁷

INTRODUCTION TO RACIAL EQUITY ANALYSIS

To ensure meaningful inclusion across our service area, City Light conducted a transportation electrification racial equity analysis, guided by City Light's RSJI and Environmental Equity Program. This analysis included: (1) leveraging the City of Seattle's Racial Equity Toolkit and (2) conducting in-depth outreach and engagement.

City Light used the City of Seattle's RSJI Racial Equity Toolkit to systematically understand the potential impacts of transportation electrification investments on racial equity and guide Plan development and implementation. City Light followed the steps below as part of the RSJI Racial Equity Toolkit.

- **Step 1: Set Outcomes**
- **Step 2: Involve Stakeholders + Analyze Data**
- **Step 3: Determine Benefit and/or Burden**
- **Step 4: Advance Opportunity or Minimize Harm**
- **Step 5: Evaluate**
- **Step 6: Report Back**

In the following sections, City Light outlines descriptions of and findings from each step.

STEP 1: SET OUTCOMES

In the first step of the RSJI Racial Equity Toolkit process, leadership communicates key community outcomes for racial equity to guide analysis. City Light's framework for racial equity outcomes is anchored in the City of Seattle's Equity and Environment Agenda framework and the Duwamish Valley

⁶ International Association for Public Participation. "IAP2 Spectrum of Public Participation." 2018. https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf

⁷ Seattle Office of Sustainability and Environment. "Equity and Environment Agenda." <https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

Action Plan.^{8,9} City Light developed the following six racial equity outcomes to guide analysis and Plan development:

1. **Community Collaboration**

Environmental justice communities see their wants and needs reflected in City Light transportation electrification programs.

2. **Healthy Planet, Healthy Lives**

Reduce tailpipe emissions that impact local air quality and public health where environmental justice communities live, learn, work and play. Reduce carbon emissions that have a disproportionate burden on the most vulnerable populations and communities.

3. **Equitable Access**

Environmental justice communities learn about our transportation electrification programs, can readily understand and access materials and resources, see themselves reflected in communication and participate in and benefit from City Light’s transportation electrification programs.

4. **Community Assets**

City Light’s programs invest in infrastructure that are community assets so environmental justice communities can enjoy the benefits of transportation electrification in their current neighborhoods.

5. **Economic Opportunities and Youth Pathways**

City Light enables environmental justice communities to participate in and benefit from the local transportation electrification economy by providing youth, apprenticeship and job pathways with good labor standards and livable wages.

6. **Electricity Affordability**

Widespread transportation electrification increases revenue to put downward pressure on electricity prices.

STEP 2: INVOLVE STAKEHOLDERS + ANALYZE DATA

Step 2 of the RSJI Racial Equity Toolkit requires gathering information from communities and City Light staff on how the issue benefits or burdens communities in terms of racial equity. City Light conducted a comprehensive review of existing information to identify impacted communities, as well as how transportation electrification could benefit or burden environmental justice communities.

Environmental Justice Communities

⁸ Seattle Office of Sustainability and Environment. "Equity and Environment Agenda."

<https://www.seattle.gov/Documents/Departments/Environment/EnvironmentalEquity/SeattleEquityAgenda.pdf>

⁹ City of Seattle. "Duwamish Valley Action Plan" June 2018. http://greenspace.seattle.gov/wp-content/uploads/2018/06/DuwamishValleyActionPlan_June2018.pdf

City Light began with a demographic and geographic analysis and identified the following specific environmental justice communities in neighborhoods that could be impacted by transportation electrification investments within City Light’s service area:

- Beacon Hill
- Bitter Lake
- Bryn Mawr-Skyway
- Burien
- Central Area
- Chinatown-International District
- Delridge
- Haller Lake
- Lake City
- Rainier Beach
- Rainier Valley
- Renton
- SeaTac
- Shoreline
- South Park
- Tukwila
- University District
- White Center

Community and Stakeholder Involvement

City Light then reviewed relevant reports by regional stakeholders and community-based organizations related to transportation electrification, including:

- The **2018 Puget Sound Clean Air Agency Feasibility Study** identifying opportunities and barriers for low-income residents to purchasing EVs and designing a pilot to address them.
- The **2019 Puget Sound Clean Air Agency Electrifying Ride-Hailing in Seattle Report** examining the existing state of ride-hailing services electrification, including efforts by Uber and Lyft, along with local government and utility policies and incentives to encourage ride-hailing electrification.
- The 2020 Puget Sound Sage **Powering the Transition** report summarizing data and highlighting findings from listening sessions with community-based organizations, community surveys, and interviews with community leaders, union leaders and government partners about climate change, energy injustice and other systemic inequity.

To ensure community concerns and expertise were also part of the analysis, City Light reviewed reports and feedback from the following stakeholders, partners and community members:

- **Environmental Justice Committee (EJC).** In November 2016, March 2017 and May 2018, the EJC reviewed the work of the City of Seattle’s broader Drive Clean Seattle Initiative. In March 2017 specifically, the EJC brainstormed several program improvements, worked in groups to propose high-level recommendations and voted to prioritize the recommendations. These results were shared with stakeholders, including City Light’s EV charging pilot program teams.
- **Other City departments** engaging with communities on transportation electrification.
 - In 2019, City Light, the Office of Sustainability & Environment (OSE), Seattle Department of Transportation (SDOT) and the Department of Neighborhoods (DON) developed an

- Engagement Principles Agreement* to engage communities on transportation electrification in a consistent manner following a mutually agreed upon framework and best practices.
- Seattle City Light participated in the development of SDOT’s 2018 *EVSE Roadmap for Shared Mobility Hubs*, which gathered input from communities on equitable deployment of EV charging stations in low-income communities and communities of color.
 - City Light reviewed other RSJI Racial Equity Toolkit analyses conducted for City Light’s Public and Residential EV Charging pilots, the City of Seattle’s Drive Clean Seattle Initiative and SDOT’s Electric Vehicle Charging in the Right-of-Way (EV CROW) program.
 - **Other government partners** conducting equitable outreach, engagement and program development.
 - City Light consulted the *2016 King County Metro Guide to Creating Inclusive Campaigns*, which provides guidance to run a successful, inclusive marketing campaign in conjunction with the guidelines outlined in King County’s Equity and Social Justice (ESJ) Strategic Plan.
 - City Light consulted King County’s 2015 report on *The Determinants of Equity: Identifying Indicators to Establish a Baseline of Equity in King County* which provides data on low-income and community of color household transportation access and usage.
 - **Community partner organizations:** City Light reviewed information and learnings from The Drive Clean Seattle-funded *Seattle Electric Vehicle Outreach and Education Campaign*. This campaign, led by ECOSS and Forth in 2018, focused on underserved communities in the greater Seattle area and engaged a wide spectrum of communities to educate them about EV benefits and gather information about their transportation situations.

City Light conducted direct outreach to communities about public charging, including community surveys, presentations and listening sessions at community events and meetings. City Light also reviewed community input gathered by the Seattle Office of Sustainability and Environment (OSE) during outreach events focused on the Drive Clean Seattle Initiative. These engagement opportunities are listed below.

Events & Meetings

- SEA-MAR; Fiestas Patrias South Park (2019 – OSE)
- The Coalition of Immigrants Refugees & Communities of Color (CIRCC); Eritrean Community Center (2019 - OSE)
- Hội Thánh Tin Lành Hy Vọng; Vietnamese Church (2019 - OSE)
- Magnuson Park Advisory Committee meeting (2018)
- Magnuson Park Open House (2019)
- Burien Open House (2019)
- West Seattle Transportation Coalition meeting (2019)
- Central Area Collaborative monthly meeting (2019)

- South Park Information and Resource Center (SPIARC) presentation (2019)
- SPIARC technology and education workshop (2018)
- Othello Station Community Action Team meeting (2018)
- Capitol Hill Community Council meeting (2018)
- Pike/Pine Urban Neighborhood Council meeting (2018)
- Capitol Hill Open House (2019)
- Big Day of Play (2018)
- Wallingford Community Council meeting (2018)
- Fremont Community Council meeting (2018)
- Gas Works Park Open House (2019)
- Central Area Collaborative discussion (2019)

Surveys

- West Seattle survey (2019)
- Madison-Miller neighborhood survey (2019)

Existing Racial Inequities

Through its analysis and outreach to understand transportation electrification impacts on environmental justice communities, City Light heard several concerns and observations as well as potential solutions offered by communities to mitigate for negative impacts and/or unintended consequences. These issues and solutions are summarized in the table below. City Light will be using this information and continuing to actively engage with communities as we begin to develop transportation electrification offerings and make infrastructure investments.

What We've Heard from Community	Potential Solutions from Community
Low-income communities and communities of color are more likely to depend on buses for most, if not all, of their transportation needs. ¹⁰	City Light should prioritize supporting charging infrastructure to electrify existing and expanded public transit including King County Metro buses, transit shuttles, Bus Rapid Transit routes, transit hubs, school buses, etc. ^{13,14}

¹⁰ King County. "The Determinants of Equity: Identifying Indicators to Establish a Baseline of Equity in King County." January 2015. https://www.kingcounty.gov/~media/elected/executive/equity-social-justice/2015/The_Determinants_of_Equity_Report.ashx

¹³ Puget Sound Sage. "Powering the Transition." 2020. https://www.pugetsoundsage.org/wp-content/uploads/2020/06/PugetSoundSage_PoweringTransition_June2020-1.pdf

¹⁴ Environmental Justice Committee. "EJC Feedback Summary on Drive Clean Seattle." July 2017.

What We've Heard from Community	Potential Solutions from Community
<p>People of color—especially African Americans and Native peoples—are much less likely to own vehicles than white households.¹¹</p> <p>Environmental justice communities want local governments to prioritize increasing public transit, reducing transit fares and electrifying public transit.¹²</p>	<p>Electrifying public transit would benefit communities who most rely on public transit by reducing air and noise pollution where impacts are greatest.</p>
<p>Many environmental justice community members are unfamiliar with electric vehicles.¹⁵</p> <p>EV advertising leaves out people of color.¹⁶</p> <p>Environmental justice community leaders feel very strongly about needing “education around electrification of transportation in their communities.”¹⁷</p>	<p>City Light should support targeted community-based education and outreach.¹⁸</p> <p>City Light should communicate in local languages and highlight communities of color, people and artwork in advertising.¹⁹</p> <p>EV education should include the importance of EVs, how to plan for charging an EV, what the costs will be of owning an EV and EV job opportunities.²⁰</p>

¹¹ King County. “The Determinants of Equity: Identifying Indicators to Establish a Baseline of Equity in King County.” January 2015. https://www.kingcounty.gov/~media/elected/executive/equity-social-justice/2015/The_Determinants_of_Equity_Report.ashx

¹² Puget Sound Sage. “Powering the Transition.” 2020. https://www.pugetsoundsage.org/wp-content/uploads/2020/06/PugetSoundSage_PoweringTransition_June2020-1.pdf

¹⁵ ECOSS, Forth and Drive Clean Seattle. “Seattle Electric Vehicle Outreach and Engagement Campaign.” 2018. <https://forthmobility.org/storage/app/media/Documents/seattleevoutreachecossfinalreport-1.pdf>

¹⁶ Environmental Justice Committee. “EJC Feedback Summary on Drive Clean Seattle.” July 2017.

¹⁷ Drive Clean. “Equity Outreach.” Office of Sustainability and Environment. 2019.

¹⁸ Puget Sound Clean Air Agency. “Facilitating Low Income Utilization of Electric Vehicles: A Feasibility Study.” December 2018. <https://www.pscleanair.org/DocumentCenter/View/3650/Community-Electric-Car-Sharing----Full-Report?bidId=>

¹⁹ Environmental Justice Committee. “EJC Feedback Summary on Drive Clean Seattle.” July 2017.

²⁰ Drive Clean. “Equity Outreach.” Office of Sustainability and Environment. 2019.

What We've Heard from Community	Potential Solutions from Community
Environmental justice communities are exposed to—and concerned about—poor air quality and suffer from geographic and social health disparities like increased rates of asthma and shorter life expectancy. ^{21,22}	City Light should prioritize environmental justice communities with poor air quality for investments. ²³
There is a lack of access to electric vehicle charging for multifamily units. ²⁴	City Light should provide at-home and near-home affordable charging solutions for multifamily residences.
Ride-hailing vehicles drive three to five times more distance than regular passenger vehicles and therefore electrifying them can have a large impact on tailpipe emissions. In addition, these vehicles are frequently driven by members of communities of color and targeted incentives can increase equitable access to transportation electrification. ^{25,26}	City Light should support charging infrastructure and fees specific to ride-hailing vehicles. ²⁷
Many environmental justice community members cannot afford (or have lending barriers) to purchase EVs, which are typically more expensive up front. ²⁸	Environmental justice communities support carsharing in areas not well served by

²¹ King County. "Current asthma among children King County, 2009-2013 average." King County Hospitals for a Healthier Community. January 2015. <http://www.kingcounty.gov/healthservices/health/data/~//media/health/publichealth/documents/indicators/ChronicIllness/CurrentAsthmaAmongChildren.ashx>

²² King County. "Life expectancy at birth King County, 2008-2012 average." King County Hospitals for a Healthier Community. January 2015. <http://www.kingcounty.gov/healthservices/health/data/~//media/health/publichealth/documents/indicators/LifeExpectancy/LifeExpectancy.ashx>

²³ Environmental Justice Committee. "EJC Feedback Summary on Drive Clean Seattle." July 2017.

²⁴ Office of Sustainability and Environment. "Racial Equity Toolkit." Drive Clean Seattle.

²⁵ PSCAA. "Electrifying Ride-Hailing in Seattle." September 2019. <https://www.atlasevhub.com/wp-content/uploads/2019/09/Electrifying-Ride-hailing-in-Seattle-WWCC-Report.pdf>

²⁶ Peter Slowik, Lina Fedirko, and Nic Lutsey, "Assessing ride-hailing company commitments to electrification," ICCT: February 2019, https://theicct.org/sites/default/files/publications/EV_Ridehailing_Commitment_20190220.pdf

²⁷ PSCAA. "Electrifying Ride-Hailing in Seattle." September 2019. <https://www.atlasevhub.com/wp-content/uploads/2019/09/Electrifying-Ride-hailing-in-Seattle-WWCC-Report.pdf>

²⁸ OSE. "Racial Equity Toolkit." Drive Clean Seattle.

What We've Heard from Community	Potential Solutions from Community
	public transit or for communities that cannot afford car ownership. ²⁹
Drivers for shared mobility companies, transportation network companies (TNCs) and truck drivers tend to be people of color, immigrants and refugees and could be negatively impacted by the transition from gasoline and diesel to electrified transportation. Internal combustion engine service jobs will also be reduced by transportation electrification. ^{30,31,32}	City Light should support transportation electrification job opportunities with good labor standards and livable wages for environmental justice communities, including hiring locally for charging infrastructure installation and maintenance, working with the Port, trucking and service industries on electrification initiatives and connecting environmental justice communities with training programs and opportunities. ^{33,34}
Without proper planning, a public charging station may contribute to increased housing costs, exacerbate community displacement and increase the risk of gentrification. ³⁵	City Light should utilize community-based decision making for public charging infrastructure to design and locate stations with community input that feel like assets. ³⁶

²⁹ Puget Sound Clean Air Agency. "Facilitating Low Income Utilization of Electric Vehicles: A Feasibility Study." December 2018. <https://www.pscleanair.org/DocumentCenter/View/3650/Community-Electric-Car-Sharing---Full-Report?bidId=>

³⁰ ECOSS, Forth and Drive Clean Seattle. "Seattle Electric Vehicle Outreach and Engagement Campaign." 2018. <https://forthmobility.org/storage/app/media/Documents/seattleevoutreachecossfinalreport-1.pdf>

³¹ Puget Sound Clean Air Agency. "Electrifying Ride-Hailing in Seattle." September 2019. <https://www.atlasevhub.com/wp-content/uploads/2019/09/Electrifying-Ride-hailing-in-Seattle-WWCC-Report.pdf>

³² Lyft. Economic Impact Report 2020. <https://www.lyftimpact.com/impact/drivers/expanded>

³³ ECOSS, Forth and Drive Clean Seattle. "Seattle Electric Vehicle Outreach and Engagement Campaign." 2018. <https://forthmobility.org/storage/app/media/Documents/seattleevoutreachecossfinalreport-1.pdf>

³⁴ Puget Sound Sage. "Powering the Transition." 2019. https://www.pugetsoundsage.org/wp-content/uploads/2020/06/PugetSoundSage_PoweringTransition_June2020-1.pdf

³⁵ Seattle Office of Sustainability and Environment. "2017 Drive Clean Seattle Implementation Strategy." June 2017.

³⁶ Seattle Department of Transportation. "EVSE Roadmap for Shared Mobility Hubs." November 2018. http://evsharedmobility.org/wp-content/uploads/2018/12/SDOT_EVSE_Roadmap_for_Shared_Mobility_Hubs.pdf

STEP 3: DETERMINE BENEFIT AND/OR BURDEN

Step 3 of the RSJI Racial Equity Toolkit involves analyzing how the policy, initiative, program, or budget issue will impact racial equity. City Light evaluated potential benefits as well as unintended consequences of transportation electrification investments and whether they aligned with the racial equity outcomes defined in Step 1.

Community Collaboration: City Light’s Transportation Electrification Strategic Investment Plan will shape transportation electrification work for the next four years. There is an opportunity to intentionally include environmental justice communities in program collaboration to ensure that communities can shape this work and help City Light maximize benefits for and minimize harm to environmental justice communities. A benefit of this approach is “greater power and ownership in the environmental and climate movement by people of color.”²⁷

Healthy Planet, Healthy Lives: Transportation electrification enables zero carbon emissions by using City Light’s carbon-neutral electricity. While this has global benefits in terms of preventing the existential threat of climate change, it has local benefits to environmental justice communities within City Light service area that are disproportionately vulnerable to climate change impacts such as flooding and heat waves. In addition, it enables zero tailpipe emissions, which improves local air quality.

Equitable Access: Seattle City Light’s Transportation Electrification Strategic Investment Plan is not just about developing solutions for passenger cars. It is a broad approach to supporting the electrification of transit, freight and other medium- and heavy-duty vehicles for people, goods and services. Program offerings, initiatives and education will support multimodal transportation options that impact (via air quality) or are used by environmental justice communities. A benefit of this approach is “the dissolution of the idea that electric vehicles are only for rich white people.”³⁷ It is important to note, however, that “an important unintended consequence of transportation electrification without good public policy is that the benefits accrue primarily to wealthy white people.”²⁷

Community Assets: Without proper planning, public charging installations may lead to gentrification and displacement of environmental justice communities through higher property values. With intentional planning, investments in transportation electrification can help uplift environmental justice communities by providing community assets that are designed by communities to drive economic development, education and clean air.

Economic Opportunities and Youth Pathways: City Light’s transportation electrification programs will invest in charging equipment that will require electricians for installation and maintenance. City Light will look for opportunities to hire Women & Minority Business Enterprise (WMBE) contractors for this

³⁷ Office of Sustainability and Environment. “Racial Equity Toolkit.” Drive Clean Seattle.

work. Another benefit of transportation electrification investment is “more money circulating in local economies as fuel dollars are kept at home rather than being sent to out-of-state oil companies.”²⁷ In a conversation with stakeholders, OSE found that, “one unintended consequence [of these programs is] the eventual decrease in the number of jobs which service internal combustion engine vehicles. Electric vehicles require much less maintenance than a gasoline or diesel vehicle.”²⁷

STEP 4: ADVANCE OPPORTUNITY OR MINIMIZE HARM

Step 4 of the Racial Equity Toolkit includes developing strategies to advance racial equity and/or minimize unintended consequences. To ensure that we deliver on our racial equity outcomes, City Light has identified strategies specific to transportation electrification investment for each outcome. They include:

Community Collaboration: City Light will include community voices in future program design and implementation processes through intentional and targeted stakeholder engagement. City Light will look to communities to identify additional transportation electrification portfolio offerings and prioritize them, ensuring we most effectively address environmental justice communities’ needs. City Light will also work with these communities to collaboratively design programs that impact their communities and develop solutions that better support them.

Healthy Planet, Healthy Lives: City Light will explore opportunities to create stronger partnerships and align equity initiatives across regional organizations that provide services to environmental justice communities to uplift race and social justice transportation electrification initiatives and improve public health.

Equitable Access: City Light “will seek to understand the general transportation needs of all community members.”³⁸ This will include discussions around which transportation electrification-related investments within City Light’s sphere of influence could best improve overall access and mobility. City Light will also explore opportunities to connect transportation electrification programs to environmental justice communities.

Community Assets: City Light will design programs with displacement risk in mind by connecting with community stakeholders early to consult on displacement concerns prior to site selection and exploring program design elements to limit displacement.

Economic Opportunities and Youth Pathways: City Light will engage environmental justice communities in transportation electrification and support them through the market transformation

³⁸ Seattle Department of Transportation. “EVSE Roadmap for Shared Mobility Hubs.” November 2018. http://evsharedmobility.org/wp-content/uploads/2018/12/SDOT_EVSE_Roadmap_for_Shared_Mobility_Hubs.pdf

process. This may include hiring locally from these communities and partnering with industries that heavily employ environmental justice community members on transportation electrification initiatives.

STEP 5 & 6: EVALUATE AND REPORT BACK

The final steps of the RSJI Racial Equity Toolkit include tracking and evaluating impacts on communities of color over time and reporting back on progress and lessons learned. City Light will be sharing information learned from this analysis and any unresolved issues with leadership and will continue to communicate with and involve stakeholders, documenting any unresolved issues.

City Light recognizes that authentic and successful community engagement and ability to make meaningful progress toward racial equity outcomes will be contingent on dedicating the time and resources needed for long-term relationship building. This will require buy-in from the highest levels of leadership both within City Light and on the City Council, adequate time and funding for engagement, as well as direction to move forward on policy and process changes that enable equitable transportation electrification investments.

Seattle City Light will develop program- and investment-specific metrics to evaluate progress on each of its racial equity outcomes, gathering stakeholder input first about what meaningful and appropriate metrics should be. City Light will also share lessons learned from community outreach efforts and ongoing inequities related to transportation electrification with other City departments and external partners.



SEATTLE CITY LIGHT

TRANSPORTATION ELECTRIFICATION STRATEGY

BY LYNN DANIELS AND BRENDAN O'DONNELL





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SUGGESTED CITATION

Lynn Daniels and Brendan O'Donnell, *Seattle City Light: Transportation Electrification Strategy*, Rocky Mountain Institute, 2019, <https://rmi.org/insight/seattle-city-light>

All images from iStock unless otherwise noted.

ACKNOWLEDGMENTS

The authors thank the following individuals/organizations for offering their insights and perspectives on this work:

James Baggs, Seattle City Light
Jaya Bajpai, Seattle City Light
Lynn Best, Seattle City Light
Judy Blinder, Seattle City Light
Darnell Cola, Seattle City Light
Scott Cooper, Seattle City Light
Evan Costagliola, Seattle Department of Transportation
Andrea deWees, Seattle City Light
Kate Engel, Seattle City Light
Seema Ghosh, Seattle City Light
Hutch Hutchinson, Rocky Mountain Institute
Darrin Kinney, Seattle City Light
E.J. Klock-McCook, Rocky Mountain Institute
Paula Laschober, Seattle City Light
Chris Nelder, Rocky Mountain Institute
Andrea Pratt, Seattle Office of Sustainability & Environment
Reagen Price, Seattle City Light
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Kelly Rula, Seattle Department of Transportation
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ABOUT ROCKY MOUNTAIN INSTITUTE

Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. RMI has offices in Basalt and Boulder, Colorado; New York City; the San Francisco Bay Area; Washington, D.C.; and Beijing.

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EXECUTIVE SUMMARY

The market and policy landscape for transportation electrification is changing rapidly. Every month, automakers are announcing new electric models. Private developers are investing heavily in charging stations. In the heavy-duty sector, improving technologies and government targets are accelerating the electrification of buses, ferries, freight, and fleets. With such rapid change in this space, Seattle City Light seeks to refresh its approach with a clearer understanding of how best to play an enabling role and respond to opportunities as they emerge, while simultaneously aligning with organizational priorities and the broader mobility goals of the City of Seattle.

This work builds on City Light's initial efforts. In 2015, the utility completed a study with E3 Consulting to understand the effects of electric transportation. The study found that there is a net benefit for transportation electrification and that City Light's distribution system can largely handle the increase in projected transportation load. Based on these results, the utility has invested in two pilot programs for residential and public charging.

However, as adoption scales, so too must City Light's market presence and strategic vision. To address this need, this paper examines four primary issues: (1) values framework—the core priorities for City Light that will guide its investments; (2) market intelligence—the state of the electric mobility market; (3) impact to the business—the nuanced impacts of new transportation loads; and (4) recommendations—the interventions that City Light should pursue.

To identify core values, Rocky Mountain Institute (RMI) facilitated a workshop and focused working groups with City Light staff, resulting in three core values—grid, environment, and equity. City Light's goal is to have a portfolio of programs that reflects balance: some may combine all three values while some will be more targeted.

The market intelligence focused on understanding five electric mobility segments: personally owned vehicles, medium-duty trucks, heavy-duty trucks, buses, and shared mobility. Across all segments, battery price is the primary driver of initial cost. Vehicle costs are soon to reach a tipping point as batteries reach \$150/kWh in 2019 and manufacturers produce a growing number of vehicle models. Similarly, total cost of ownership will be heavily sensitive to fuel price.

The business impact analysis addressed how scale in these market segments will impact City Light's system. This study updated projections and reconfirmed that personal electric vehicle adoption and distributed fast charging are not anticipated to pose much risk for City Light to accommodate given its current grid capacity. However, spot loads associated with electrified buses or medium- and heavy-duty trucks have the very real potential to overwhelm available capacity and require grid upgrades. As electric bus and truck technologies rapidly improve, these segments are likely to electrify quickly because they are responsive to the favorable economics of electricity as fuel.

Given this state of the mobility market and City Light's core values, we provide the following recommended interventions for City Light to pursue.

EXHIBIT 1

Key Strategies for the Electric Transportation Market

<p>Invest in charging infrastructure with emphasis on universal access and expanding coverage</p> 	<p>Continue to drive the robust development of public charging.</p> <ul style="list-style-type: none"> • Deploy City Light-owned direct current fast chargers (DCFCs). • Explore make-ready investments or equipment incentives to support private DCFC deployment. <p>Support expanded residential and workplace charging with an emphasis on multiunit dwellings and underserved communities.</p> <ul style="list-style-type: none"> • Target customers for which cost and feasibility of charging are significant barriers. • Provide incentives and technical expertise for residential and workplace charger installation. <p>Support or invest in charging infrastructure for high-mileage applications, including carsharing and ridehailing.</p>
<p>Develop new rates and improve customer service for the transportation market</p> 	<p>Pursue rates that meet the needs of electric transportation customers.</p> <ul style="list-style-type: none"> • Explore and pilot transportation-specific rate designs. • Understand the impact of demand charges on large customers and DCFC operators. <p>Improve core City Light business processes for customers investing in charging.</p> <ul style="list-style-type: none"> • Create a streamlined and transparent interconnection and service upgrade process. • Consider new queues for electric vehicle customers. • Develop digital content to help customers make informed decisions. <p>Investigate the viability of managed charging.</p> <ul style="list-style-type: none"> • Establish standards for residential smart charging. • Explore demand-response programs.
<p>Prepare for heavy-duty electrification</p> 	<p>Support the aggressive electrification commitments of partner agencies and large customers.</p> <ul style="list-style-type: none"> • Partner directly with King County Metro, the Port of Seattle, and Washington State Ferries. • Develop a deep expertise of customer needs and respond with a broad suite of solutions—responsive rates, incentives, grid infrastructure, technology demonstrations, and siting analysis. • Proactively plan for large loads. <p>Anticipate how access to charging will influence urban freight and fleet markets.</p> <ul style="list-style-type: none"> • Monitor key market tipping point metrics and engage with local fleets. • Develop packaged charging solutions, including financing, make-ready investments, smart charging, and charging depots.

SEATTLE TRANSPORTATION ELECTRIFICATION—BACKGROUND



SEATTLE TRANSPORTATION ELECTRIFICATION—BACKGROUND

Seattle is experiencing the first wave of an electric transportation awakening. It is among the top metro areas outside of California with more than 8,000 registered electric vehicles (EVs),¹ representing 5% of new vehicle sales. Moreover, policy and environmental goals have moved government agencies and businesses to consider electrification of heavy-duty vehicles, such as buses, freight, and ferries.

Seattle City Light has a vested interest in understanding this market opportunity, thereby leveraging its abundant carbon-neutral electricity. In 2015, City Light completed a study in partnership with E3 Consulting that addressed the role of utilities in accelerating this market and the potential costs and benefits to City Light's system.² The study's three primary findings were:

1. There is a net benefit to the utility system of roughly \$1,250 per passenger EV over its lifetime. There is also a positive benefit from buses and other modes of heavy-duty transportation.
2. City Light's distribution network can largely accommodate the increase in load from considerable adoption of passenger EVs, although extremely large spot loads like bus-charging bases will remain highly site specific.
3. There is very strong customer demand, particularly for electrification of the shared transportation sector.

Based on this work, City Light's initial role has been to increase access to its carbon-neutral electricity through enabling charging infrastructure, including a commitment to two early market pilot programs: installing and owning 20 DC fast-charging stations and a residential pilot leveraging a lease model to install 200 home charging stations.

Since this initial study, the market and policy landscape has changed quickly, requiring City Light to broaden its approach. The following examples illustrate the pace of change in Seattle's electric transportation market:

- Washington state's passenger vehicle market continues to see strong growth, with 2016–2017 year-over-year market share increasing 31%.³ To support this, private charging developers, with support from the Washington State Department of Transportation (WSDOT) and the Seattle Department of Transportation (SDOT),⁴ are investing heavily in EV charging stations.
- Seattle's major public transit agency, King County Metro (Metro), has established a goal to fully electrify its fleet of more than 1,400 buses by 2040.⁵ To date, Metro operates 11 all-electric buses and has plans to procure 120 more by 2020.
- In 2017, the Port of Seattle established a strategic objective to be the greenest, most efficient port in North America, including carbon neutrality by 2050 on both direct and indirect sources of greenhouse gas emissions (GHGs).⁶ Supporting this effort, the Port has implemented a Clean Truck program, as a partner in the Northwest Seaport Alliance.⁷
- The City of Seattle has set an ambitious target of 30% EV adoption, along with a commitment to a fossil-fuel-free municipal fleet, both by 2030.⁸
- State legislation, specifically HB 1512 and potential future fuel standards, creates significant financial mechanisms for clean transportation investment from the utility sector.
- The city has committed to environmental equity through its Race and Social Justice Initiative,⁹ including a particular focus on transportation equity.¹⁰ As a city department, City Light has deepened its focus on historically marginalized communities and racial equity in its decision-making process.

In addition to changes in the market, City Light has been tasked by Seattle City Council to rethink its rate design and revenue requirement, to be completed by April 2019.¹¹ Key to this effort will be identifying

both new revenue opportunities and cost-reduction opportunities for upgrades to City Light’s system.

Therefore, City Light needs a clear vision for how the utility can play an enabling role that is aligned closely with the broader mobility goals of a rapidly developing city. City Light has partnered with Rocky Mountain Institute to investigate the changing transportation electrification landscape and identify a strategic vision. This effort includes team members from across the City Light organization as well as members from the Seattle Office of Sustainability & Environment (OSE) SDOT. This report identifies a set of interventions to best position City Light to take advantage of the opportunity that transportation electrification represents while minimizing risks of under or overinvesting.

OBJECTIVES OF THIS REPORT

- Establish a values framework to guide City Light strategy.
- Assess the electrified transportation market and policy landscape.
- Identify how transportation electrification will impact City Light.
- Recommend high-impact interventions for City Light to pursue.



2

VALUES FRAMEWORK



VALUES FRAMEWORK

Electric transportation has a sweeping set of potential benefits.¹² For City Light, designing and implementing programs, partnerships, and policies requires determining which are most important. In this section, we establish a values framework to ensure that market interventions are aligned to these values on behalf of City Light's customers.

We have identified three core values for City Light—grid, environment, and equity. We define each below and highlight how they can be measured. Recognizing that not all value can be quantified, we highlight possible metrics below to consider and identify data needed to assess impacts.

The goal for City Light is to have a portfolio that reflects balance. Many programs will combine all three values, but some will be targeted. Certain programs might heavily prioritize equity, while some might focus on value to the utility system. However, each value is important and should be reflected in a portfolio approach.

1. GRID

Electric transportation at scale has the potential to bring great value to the electric grid. Vehicle charging can be a highly flexible and shiftable load. As such, it can make better use of the distribution system and integrate more variable renewable generation by matching supply with demand. However, without direction from City Light, these potential sources of value could become risks that ultimately require higher levels of infrastructure investment.

A City Light intervention that demonstrates grid benefit will:

- Ensure that transportation load is flexible and well aligned to the operation of the power system
- Avoid, defer, or minimize infrastructure upgrade costs
- Improve reliability and resiliency
- Deliver revenue sufficient to cover costs to serve transportation customers

Possible metrics to ensure benefits to City Light's grid and ratepayers include:

- Electricity demand and load from electrified transportation
- Available distribution capacity at each feeder
- Utilization of available distribution capacity
- Cost recovery/return on City Light investment

2. ENVIRONMENT

The City has established a goal to be carbon-neutral by 2050. Because transportation emissions account for two-thirds of GHG emissions, the transportation sector must be heavily electrified to meet this commitment. This will require a broad focus on electrifying many modes of transport—fleets, freight and goods movement, personal and shared mobility, marine—to replace petroleum with City Light's carbon-neutral electricity. In addition to carbon and other greenhouse gases, City Light should emphasize pollution from particulates.

A City Light intervention that is beneficial to the local environment will:

- Deliver the largest potential GHG savings benefit
- Prioritize high-usage vehicles and high-capacity modes to increase overall transportation system efficiency
- Positively impact areas with poor air quality or a history of significant environmental impacts

Possible metrics to evaluate and track to ensure benefits to the local environment include:

- GHG emissions reductions
- Electric passenger and freight vehicle miles traveled
- Air quality measures (e.g., particulate matter, ozone), including long-term and immediate exposure to emissions
- Adoption of electric vehicles in fleet and commercial applications

3. EQUITY

Though the City of Seattle has made great strides to be green, it faces the same challenge as the broader US environmental movement: structural and institutional racism continue to keep environmental benefits from reaching all people. It is primarily white, upper-income communities that shape and benefit from environmental policies, programs, and projects; and, it is disproportionately communities of color that are impacted by environmental hazards such as poor air quality and increased climate pollution. Electrified transportation has the potential to enable less costly transportation options and provide economic benefits to marginalized communities. As part of Seattle's commitment to eliminate racial disparities and achieve racial equity, the City launched the Race and Social Justice Initiative (RSJI) in 2004. City Light has additionally committed to advance racial and social justice through its Environmental Equity program.

Social justice is both process and outcome. To that end, an equitable City Light intervention will:

- Expand opportunity and access for underserved communities so that all people benefit from clean transportation
- Promote racially inclusive collaboration, ensuring that all communities are engaged in and have opportunities to lead the decision-making process to set environmental priorities
- Affect systemic change through institutional reform and changes to policies and practices
- Assess community conditions and the desired community impact using citywide tools such as the Racial Equity Toolkit

Possible metrics to evaluate and track to ensure equitable outcomes in underserved and marginalized communities include:

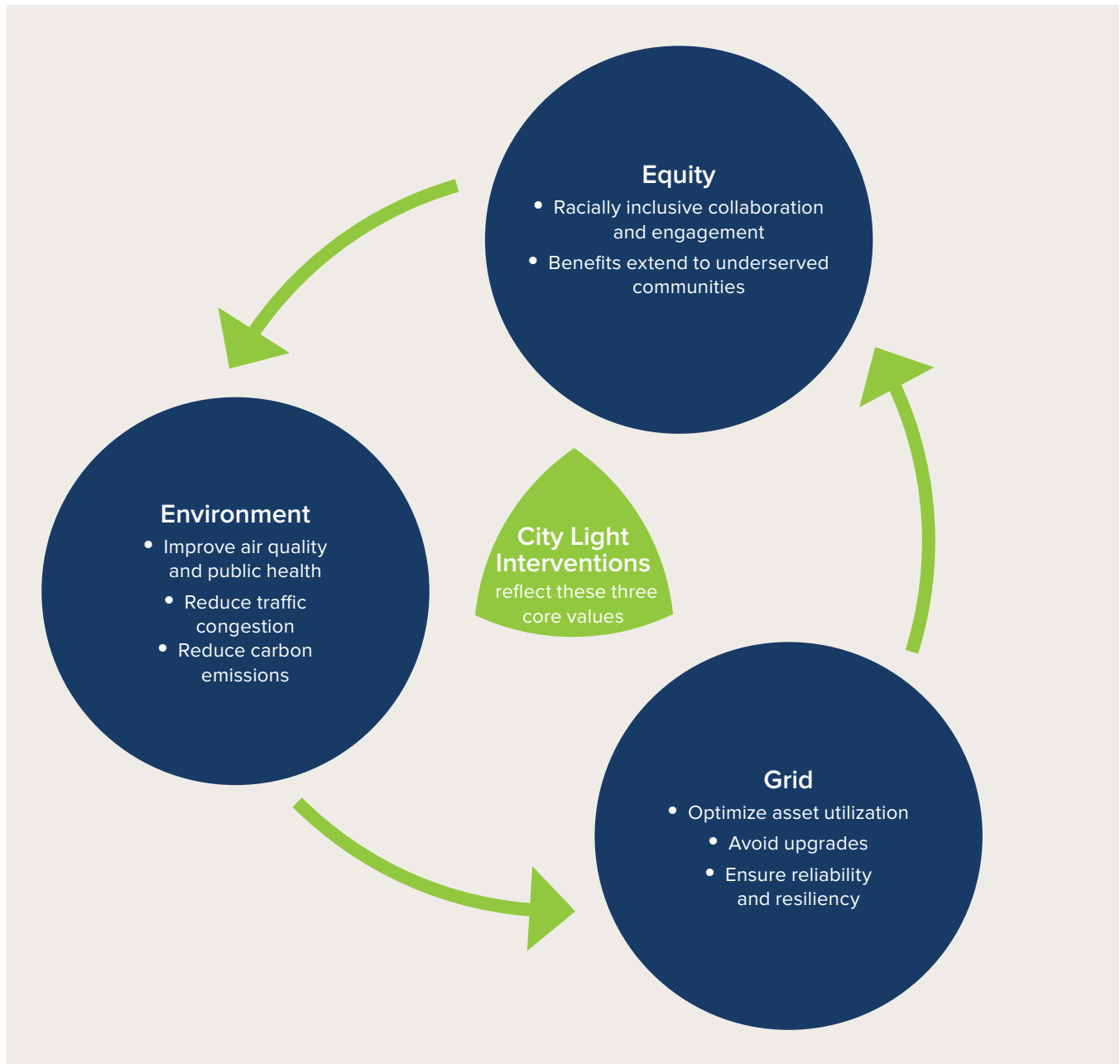
- Air quality measures in environmental justice communities
- Access to electrified transportation modes and charging infrastructure, for example number of residents within a certain distance of public charging
- Number of EV owners in environmental justice communities

BENEFITS TO THE CITY OF SEATTLE

In addition to these three core values, Seattle seeks to maintain its leadership in transportation electrification, ensuring that its clean hydropower is an accessible benefit to all citizens. Positioned to be the largest carbon-neutral transportation fuel provider in the state, City Light can be a catalyst for change for other communities and utilities. Through well-designed, equitable interventions that benefit its grid, ratepayers, and the local environment, City Light can transform the transportation sector through leadership and demonstration.

EXHIBIT 2

City Light's Core Values



3

MARKET INTELLIGENCE



MARKET INTELLIGENCE

In this section, we examine the electric transportation market in 2018 with projections to 2030 in order to identify:

- City Light partnership opportunities
- Interventions where City Light’s investment is essential and can be leveraged to have maximum impact
- Interventions where City Light’s investment is not needed or duplicative
- Ways City Light can improve EV charging network interoperability—the ability for City Light-owned charging stations to be used by any electric vehicle—and the customer experience

This section will look at trends and forecasts for adoption in five key market segments:

1. Personally owned passenger electric vehicles
2. Medium-duty electric trucks
3. Heavy-duty electric trucks
4. Electric buses
5. Electric, driverless mobility services

EXHIBIT 3

The Five Key Market Segments Examined



PERSONALLY OWNED CARS

The market for personally owned light-duty electric cars is approaching a tipping point where adoption could begin to increase rapidly: 2017 marked the first year with more than 1 million new EV sales globally, with 66% of those being battery electric.¹³ EV sales growth in the United States increased in 2018 with a compound annual growth rate of 81% despite domestic fuel prices remaining low and changes to the policy environment.¹⁴

The global battery-electric vehicle market is likely to continue its growth as automakers respond to more aggressive emissions targets and diesel bans in Europe and China, with global sales forecasts ranging from 5.7 million to 30 million units sold annually by 2030.¹⁵ Several market factors are shaping US demand for electric cars:

- **Electric vehicle model availability.** In the United States, the vast majority of available EVs—and thus sales—are small or midsize models (Tesla Model 3, Tesla Model S, Chevrolet Bolt, and Nissan Leaf are the highest sellers) with very few SUV or crossover options. In contrast, 45% of overall car sales in the United States are crossovers and SUVs. This is important because buyers will likely consider an EV purchase only if the vehicle fits their preferences and lifestyle. As a result, automakers have committed to electrify up to 289 vehicle models¹⁶ (including many crossover and SUV models) and invest at least \$90 billion in EV technologies over the next several years.¹
- **Upfront cost.** Lithium-ion battery pack costs continue to drop, averaging \$176/kWh in 2018 and projected to reach \$150/kWh or less in 2019,¹⁷ resulting in the upfront costs of EVs reaching parity with internal combustion engine vehicles on an unsubsidized basis by 2024.¹⁸ That being said,

parity in cost is insufficient to motivate customers to change technologies and incentives will continue to be an important policy lever.

- **Charging infrastructure.** Availability of public charging infrastructure could become a bottleneck that stalls market growth. Fortunately, the range of new EV models is typically greater than 200 miles per full charge, helping to eliminate range anxiety as a barrier to adoption; and roughly 60% of US households are detached single-family homes where home charging will be the most economical charging option.¹⁹ However, public charging will be driven by several needs: long-distance trips that exceed a vehicle's range; dense urban centers with limited parking space; and multiunit dwellings, where home charging is typically unavailable even with parking.

Because personally owned vehicles (POVs) are most likely to see strong adoption in the near term, the question of *how* they are charged—Level 2 versus direct current fast chargers (DCFCs)—will be of paramount interest for City Light and other utilities. In terms of charging speed, Level 2 charging will likely meet many EV owners' charging needs at home or workplace in the near term and the majority of chargers deployed to date have been Level 2. Moving forward, significant effort is focused on DCFCs, which have much higher installation and operating costs. Tesla, in particular, has built a nationwide network of fast charging stations for its customers, and EVgo recently installed its 1,000th fast charger. However, the national network of public chargers has large gaps.²⁰

Two important trends point to a greater need for both public and fast charging options: (1) to support

¹ Mercedes-Benz AWD electric SUV EQC will be available in the United States in 2020; Jaguar's i-Pace SUV in 2019; Tesla is shipping its Model X 75D; Audi is taking reservations for its electric E-Tron SUV; BMW announced its all-electric iX3 SUV for 2020. All models are expected to have more than 200 miles of range, charge up to 150 kW, and be priced in the \$70K–\$80K range.

new EV models with larger batteries and range, many drivers will demand a charging experience similar to refueling at a gas station (especially for cross-country travel where rapid recharging will be necessary); and (2) to enable EV adoption at scale for multiunit dwellings, the need for publicly available infrastructure will be all the more essential, since these households are less likely to have access to garage or off-street parking.ⁱⁱ

In addition to third-party charging infrastructure operators—such as ChargePoint, EVgo, Blink, Tesla, Greenlots, and SemaConnect—more utilities are beginning to invest in public charging infrastructure. California’s three largest investor-owned utilities (SDG&E, SCE, and PG&E) have submitted plans to support 60,000 Level 2 chargers and 234 DCFCs.²¹ Significant additional investment is needed over the next decade in public charging to meet demand, upward of 20 million chargers at a cost of \$10 billion, with about one-third being public.²²

- **Policy.** Policies can significantly impact the adoption of EVs in the United States, particularly by reducing the purchase costs for consumers, requiring public agency fleets to buy EVs, setting state targets for EV adoption, and encouraging and/or requiring automakers to manufacture more zero-emission vehicles. In the near term though, the US Environmental Protection Agency is likely to relax its vehicle emission standards; several states, including Washington, have joined California’s

lawsuit to preserve their right to set higher emissions standards.²³ The US federal government offers a tax credit up to \$7,500 for an EV purchase, but the three automakers representing the majority of US sales (Tesla, GM, and Nissan) are reaching the number of vehicles eligible for the full tax credit.²⁴ Additionally, many states have tax credits or rebates available, including Washington’s sales tax exemption reauthorized in 2019 by SHB 2042.²⁵

As these factors shape the US market, individual states are taking the lead in accelerating EV adoption. Washington state has the third-highest total annual sales and share of new vehicle sales that are electric with 7,068 EVs sold in 2017. With the majority of these sales in Seattle, the city is in a leadership position for car electrification. Further, Seattle’s electricity–gasoline price differential is more favorable to EVs: Seattle has one of the lowest electricity rates in the nation (~\$0.111/kWh) and the third-highest gasoline prices in the nation (\$3/gallon in January 2019);²⁶ this improves operational cost savings for EV owners, resulting in average annual savings of \$1,250 per vehicle.ⁱⁱⁱ Washington state ranks fourth in absolute terms of public charging availability with 1,861 chargers, 9% of which are DCFCs.²⁷

Using several years of EV registration data from Washington’s Department of Licensing, City Light has developed a methodology to create business-as-usual (BAU), aggressive, and conservative forecasts for the adoption of personally owned all-electric vehicles in Seattle.^{iv} As a standard approach for modeling

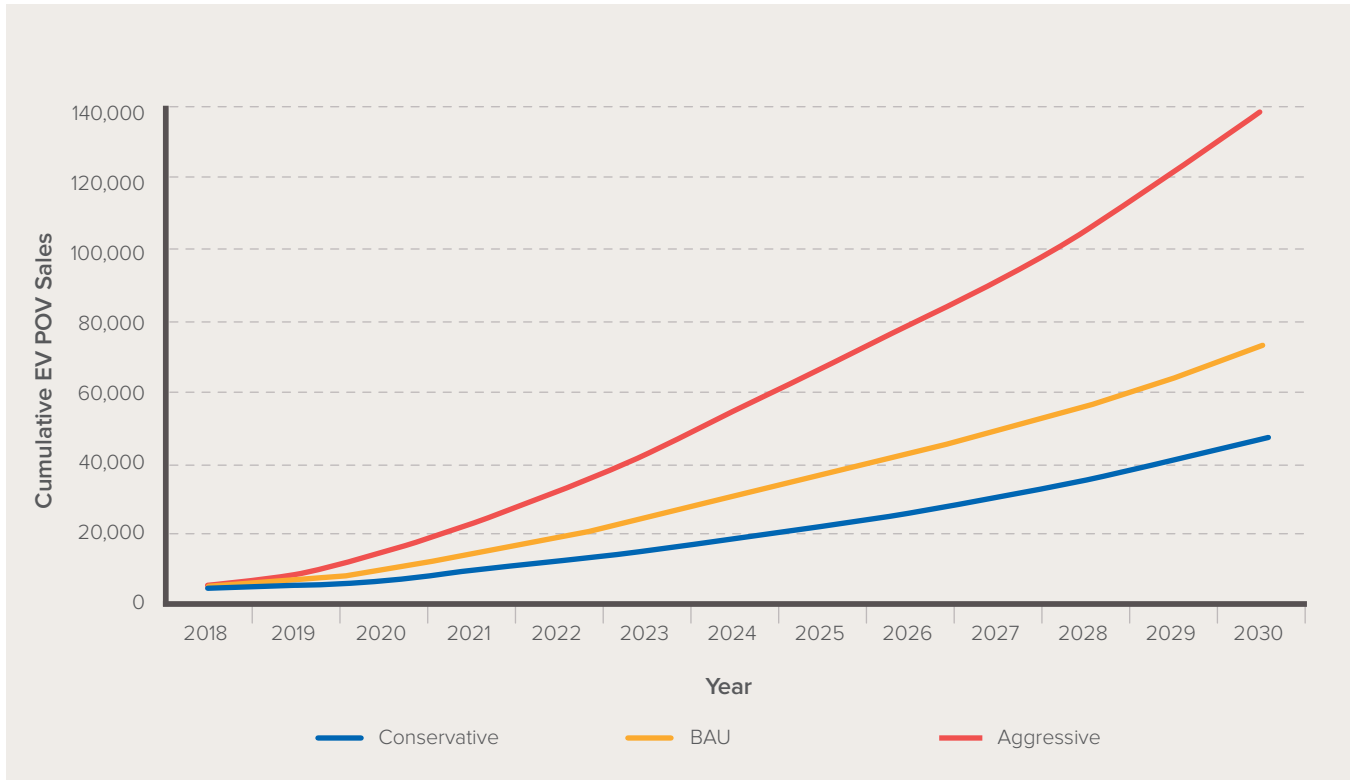
ⁱⁱ Unlike single-family homes, multiunit dwellings have a split incentive since a property manager would likely need to install, own, and operate on-site charging infrastructure. Property managers are unlikely to invest unless it puts them at a competitive advantage. This chicken-and-egg problem will perpetuate the demographic disparity in EV ownership as lower-income individuals live disproportionately in multiunit dwellings.

ⁱⁱⁱ Assumes 3.5 miles/kWh for EV and 25 miles/gal for gasoline vehicle, for 12,000 miles traveled.

^{iv} We explore only battery-electric vehicles as these will have a more significant impact on City Light’s grid than plug-in hybrids. Recent announcements by GM and other market trends also indicate that, as more EV models are produced, consumers will shift away from hybrids (<https://www.greentechmedia.com/articles/read/why-general-motors-is-ditching-the-chevy-volt#gs.9=31pWo>).

EXHIBIT 4

EV POV Forecasts for Seattle City Light Service Territory



the adoption of new technology, City Light uses a generalized Bass diffusion model based on historic adoption rates of comparable technologies.^v The resulting forecasts are shown in Exhibit 4. With the most conservative set of assumptions, City Light will see a nearly 10-times increase in the number of POVs charging within its service territory, to 50,000 vehicles

by 2030. Using more aggressive assumptions, adoption may reach 140,000 vehicles by 2030. With that number of vehicles representing new annual load ranging from 117,000 MWh to 344,000 MWh, the charging behavior of the owners (e.g., off-peak at-home charging versus fast charging during peak hours) will be critically important.

^v For the conservative case, City Light uses the historic Seattle EV market growth rate of 1.7%; for the aggressive forecast, the adoption rate of diesel cars in Europe; and the BAU forecast uses parameters averaged across the historical EV, hybrid, and European diesel car adoption. Another key input is price elasticity: City Light assumes a 4% increase in adoption for every 1% decrease in EV price.

MEDIUM- AND HEAVY-DUTY TRUCKS

Battery-electric medium- and heavy-duty trucks (MDT and HDT)^{vi} are either on the road or nearing production today and are increasingly viable as a replacement for diesel commercial vehicles. Compared to electric cars, these vehicles have larger batteries and will likely charge in more concentrated geographical locations, resulting in higher potential impact on City Light's distribution grid. But, adoption of electric trucks is at a very early stage and will vary greatly depending on the specific use case for each vehicle. We have identified several important market factors that will influence truck electrification:

- **Total cost of ownership.** Fleet purchasing decisions, in contrast to personal vehicles, place greater weight on economics; in particular, whether the total cost of ownership (TCO) for an electric truck is less than that of a diesel. TCO is a function of many variables, including:
 - battery cost, density, and durability
 - production scale of electric trucks, since truck initial costs will fall as production scales up
 - the differential between electricity and diesel costs
 - use case (for example, short-haul or long-haul routes)
 - charging needs (for example, whether or not fleets can manage charging to minimize electricity costs)
 - costs to upgrade grid infrastructure borne by fleet operators
- **Charging infrastructure.** The availability of charging infrastructure will constrain which use cases are economically viable. For example, long-haul applications where daily miles traveled exceed battery capacity mean that trucks must fast charge on-route. To be viable, long-haul applications require a network of truck “mega-chargers”²⁸—a technology still in development—to enable these use cases. By contrast, short-haul trucks where battery size is

matched to daily miles traveled can return to a centralized depot for overnight charging.

- **Policy and regulatory environment.** Policies such as diesel bans and fuel economy mandates can drive adoption if they are well designed. As a cautionary tale, the Port of Seattle adopted emissions standards in 2008 that would require all drayage trucks to have a model year 2007 or later engine by 2018.²⁹ Currently, this emissions standard requirement is at 53% compliance, in large part because independent truck operators cannot afford new trucks (whereas large fleet operators have already upgraded their trucks). It is important that policies designed to support truck electrification take into consideration the actual use cases and ownership models to ensure greater compliance and success.
- **Fleet risk tolerance.** Larger fleets may adopt electric truck technologies more quickly because owners may have greater capital availability than smaller fleets and independent operators. However, the industry is generally conservative when adopting new technologies, often requiring established credibility through demonstrations. As such, truck electrification is likely to begin with small-scale production and pilots.
- **Model availability and manufacturer response.** Many electric trucks today are being produced on a small scale by start-ups whereas fleets may prefer that traditional manufacturers produce the vehicles.³⁰ As such, model availability will likely constrain adoption in the near term even if total cost of ownership reaches parity with diesel trucks for many use cases. Many traditional manufacturers are focusing on electric light-duty trucks due to the similarity of technology to passenger vehicles though many have announced plans to produce medium- and heavy-duty electric trucks.

^{vi} For this report, medium-duty trucks are considered Class 3–7 vehicles, with a gross vehicle weight rating from 10,001–33,000 pounds. Heavy-duty is considered Class 8 with gross vehicle weight rating of greater than 33,000 pounds.

What these factors point to is that electric trucks will be viable for certain use cases earlier than others. In particular, MDTs and HDTs with short-haul local and regional routes represent the best early adopter business case to electrify: they carry predictable weights over shorter, local routes; they return to the same distribution center at the end of the day where they can be charged overnight; and battery size can be matched to typical route length to minimize upfront costs. Long-haul routes, especially those served by HDTs, may be the last segment to electrify due to weight and range constraints. Trucks on typical long-haul diesel routes drive 200–500 miles a day, requiring on-route mega-chargers along major freight corridors.

Seattle is in a unique position to lead on truck electrification. In general, US diesel cost is low, meaning TCO parity is more difficult to obtain for electric trucks.³¹ Seattle’s comparatively low electricity prices, however, shift the electricity-diesel cost differential in favor of electric trucks and may drive greater local adoption compared to the rest of the United States.

Forecasts for the adoption of electric MDTs and HDTs are fairly speculative today and serve primarily to highlight a range of possible outcomes for which Seattle City Light should be prepared. Our approach estimates business-as-usual (BAU), aggressive, and conservative scenarios for the percentage of MDT and HDT truck sales that will be electric by 2030 based on the following:

- NACFE and McKinsey estimate a range of dates when TCO parity with diesel will be reached.³² We use this range as the starting point for when sales begin, with BAU adoption beginning at the middle of the range.
- We estimate a range of 10%–20% of MDT sales and 0%–2% of HDT sales in 2030 will be all-electric, based on the highest and lowest sales projections from several sources.³³
- We assume linear growth in sales.

PORT AND FERRY ELECTRIFICATION

The Northwest Seaport Alliance (NWSA)—comprised of the Ports of Seattle and Tacoma—established a goal to reduce diesel particulate matter by 80% by 2020 and greenhouse gas emissions by 15% by 2020. With more than 4,400 trucks representing 28% of GHG emissions at the Ports, cleaner trucks and cargo-handling equipment are a core component of that strategy. As of 2016, 40% of trucks were model year 2007 or newer, meeting emissions standards.³⁴ Although currently there are no explicit goals for truck electrification, City Light should stand ready to lead or support any NWSA programs to electrify vehicles at the Port of Seattle.

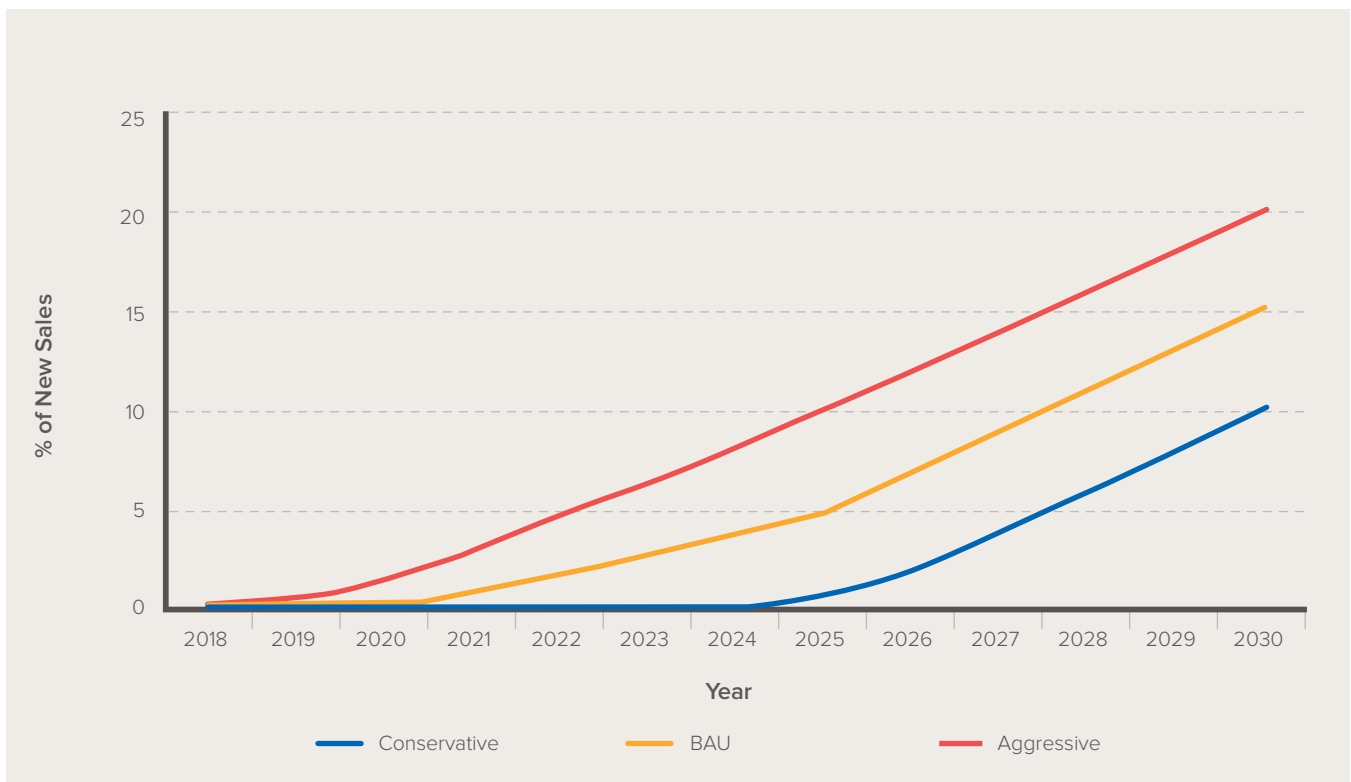
Ferry electrification is poised to move forward in 2019. The Washington State Department of Transportation ferry system is the largest in the nation and represents more than 50% of air pollution from harbor vessels. In parallel with the installation of charging infrastructure, a phased approach will enable all ferries to run fully on electric power by 2023. The power and energy requirements for these vehicles—an electric ferry launched in Norway was equipped with a 1 MWh battery with 1.2 MW fast charging—will require close partnership with City Light to ensure a successful fleet transition.

The most aggressive assumptions for medium-duty trucks, based on Washington State Department of Licensing data for new commercial vehicle registrations,^{vii} suggest 1,300 electric medium-duty trucks operating by 2025 with more than 4,000 in operation by 2030. The most conservative set of

assumptions results in negligible adoption through 2025 growing to 1,100 medium-duty electric trucks operating by 2030. For heavy-duty trucks, all forecasts project a negligible number of operating vehicles through 2030.

EXHIBIT 5

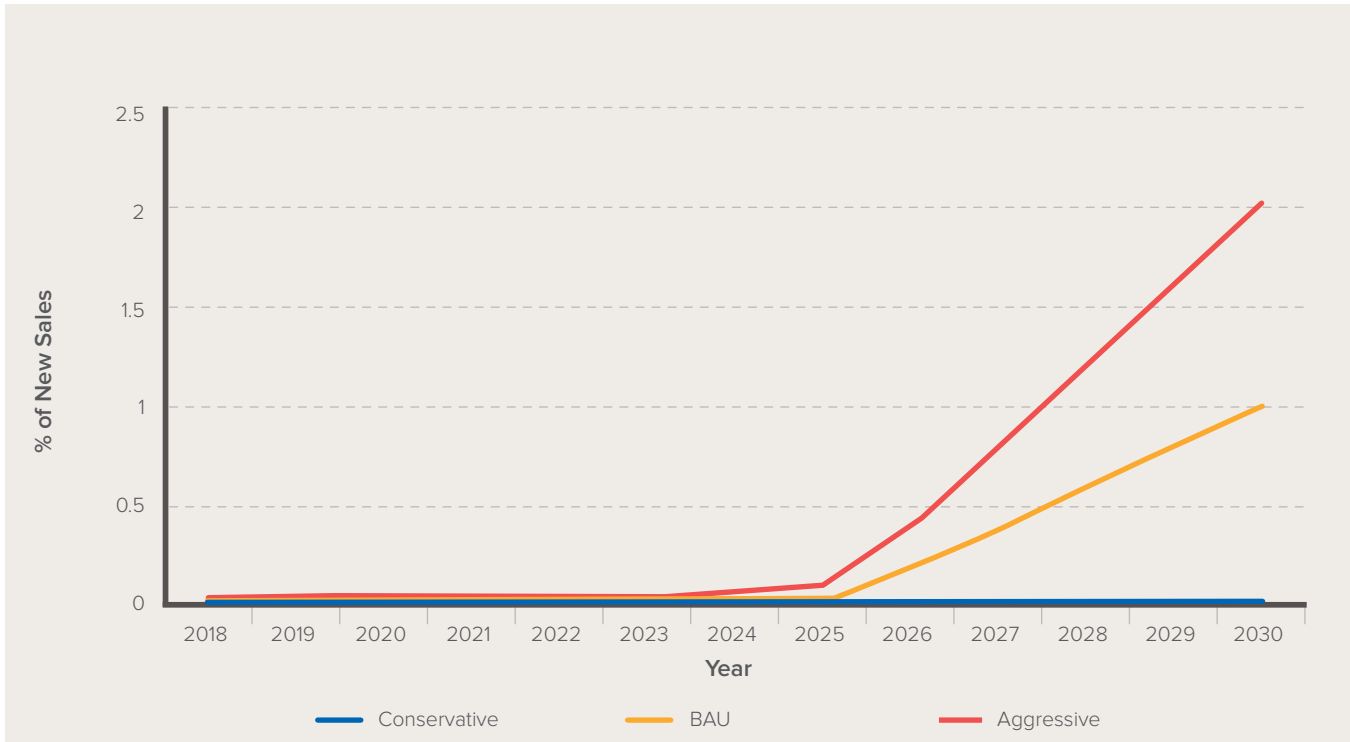
Forecasts for the Adoption of Medium-Duty Trucks in the Seattle City Light Service Territory



^{vii} Washington State Department of Licensing data does not report truck class, so we assume that Class-8 trucks represent approximately 7.5% of annual sales of all commercial trucks.

EXHIBIT 6

Forecasts for the Adoption of Heavy-Duty Trucks in the Seattle City Light Service Territory



ELECTRIC BUSES

Bus electrification is driven by similar market factors as for MDTs and HDTs, with several key differences:

- The higher upfront cost of electric buses—\$750,000 compared with a diesel bus at \$435,000³⁵—can potentially be offset by lower fuel and maintenance costs. However, the structure of electricity tariffs, in particular demand charges, strongly influences total cost of ownership for electric buses and, in some cases, can make them more expensive than diesel.
- Bus adoption may be driven by policy as cities could accept these higher upfront costs in favor of meeting environmental goals. In fact, many cities and transit agencies are announcing aggressive bus electrification goals (though actual procurement has been cautious with less than 1% of the total US bus fleet all-electric³⁶).

- There are some examples of technological or operational challenges, with electric buses unable to meet advertised range in certain climates and weather conditions or utilized on a route for which they are poorly suited. These may be isolated incidents, though, as transit agencies overcome the learning curve of adopting a new technology.
- Currently, 14 manufacturers are making electric bus models, including shuttle buses, double-decker buses, and articulated buses, indicating that the technology is available for increased adoption.³⁷

Despite these challenges, buses represent an ideal use case for electrification, similar to short-haul MDT applications. The average city bus travels 140 miles per day on a fixed route and returns to a centralized

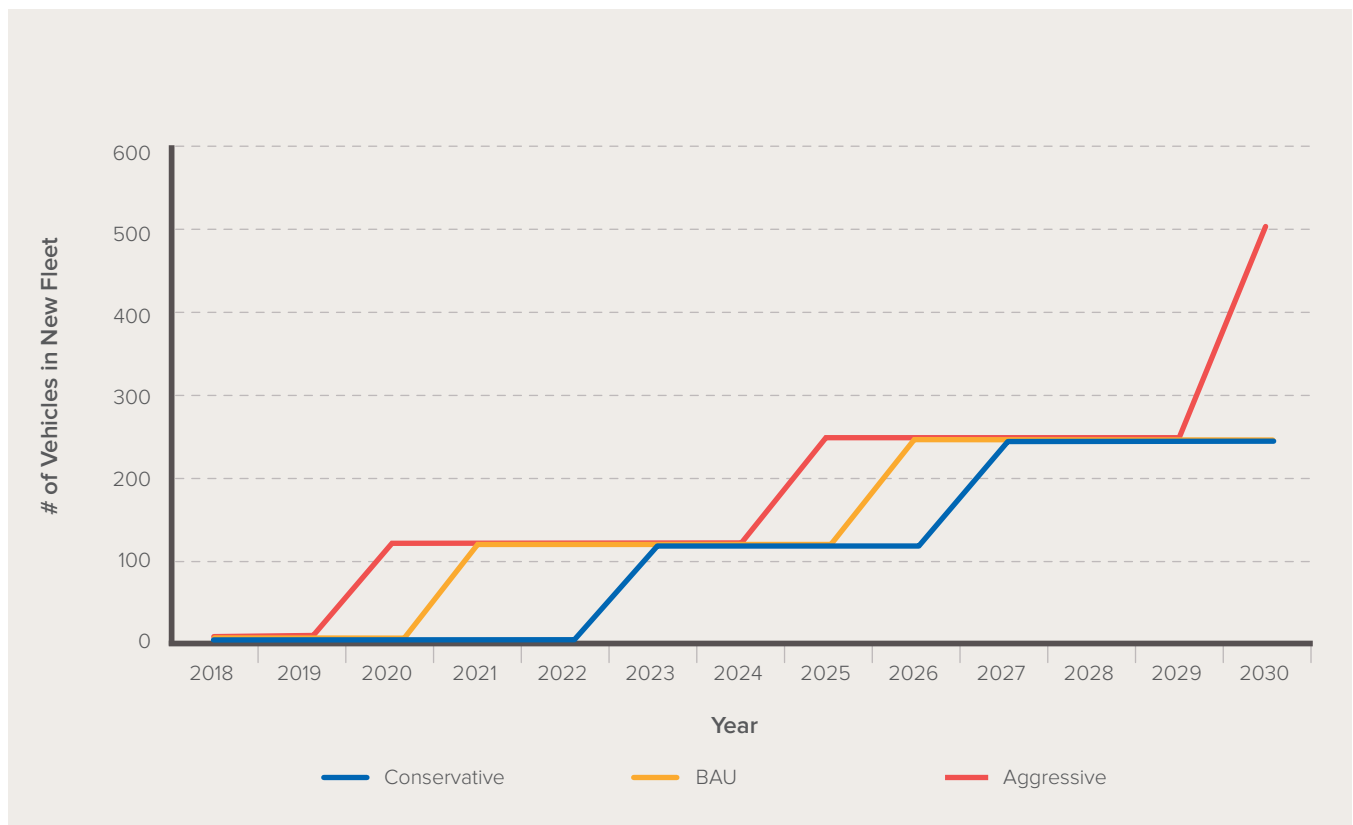
depot for overnight charging, so battery size can be matched to daily needs.

Seattle’s public transit agency, King County Metro (Metro), is a national leader in reducing emissions from its fleet and has a goal of full fleet electrification by 2040.³⁸ Metro has operated at least three electric buses since 2016 and will pilot an additional nine in

2019, with a commitment to purchase 120 by 2020. To project the adoption of electric buses in Seattle, we developed BAU, aggressive, and conservative forecasts based on these commitments as well as proposed interim goals.^{viii} In particular, the BAU case assumes the electrification goal is met by 2040, the aggressive case by 2034, and conservative case by 2045.

EXHIBIT 7

Forecast for Number of Electric Buses in Seattle City Light’s Service Territory to 2030



^{viii} Conversation with Danny Ilioiu. Proposed interim goals for KCM fleet electrification include: one bus base with 250 all-electric buses by 2025, and a second bus base with 250 additional buses by 2030.

DISRUPTION—SERVICE-BASED DRIVERLESS MOBILITY SERVICES

The possibility of fully autonomous vehicles has been receiving a significant amount of news coverage in the past few years, especially as mobility services such as Uber, Lyft, Car2Go, Zipcar, and others have been rapidly growing. Prognosticators in this space foresee a wide range of possible outcomes,³⁹ from vehicle ownership being replaced by driverless robotaxi services to meet all personal mobility needs, to a suite of mobility options (scooters, bikes, cars) that complement public transit and provide first- and last-mile options, to some coexistence of ownership- and service-based mobility paradigms.

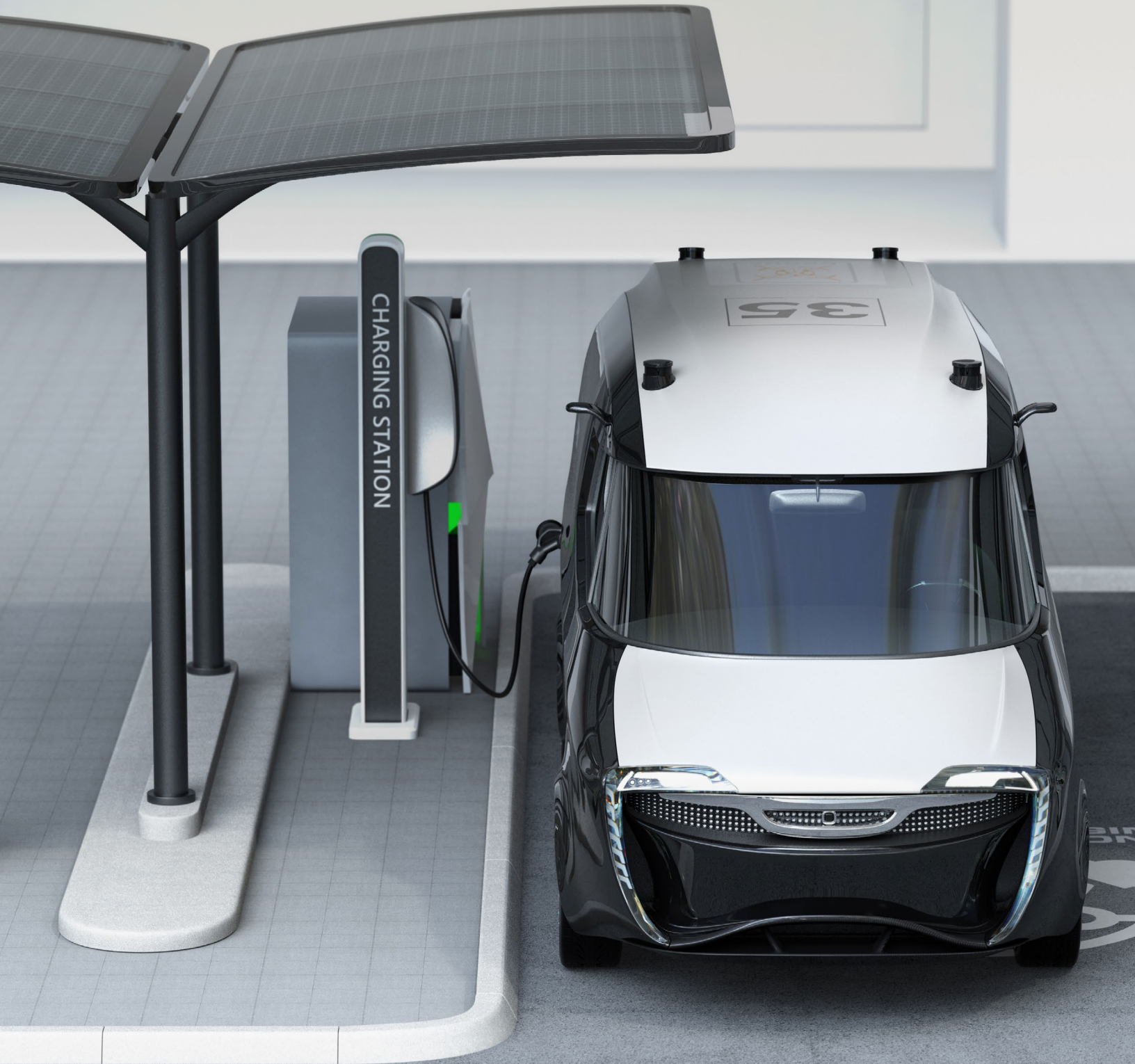
Autonomous, electric mobility-as-a-service has the opportunity to reduce personal mobility costs while creating trillions of dollars in new business opportunities and consumer savings. And this concept of an always-available fleet of robotaxis will result in higher utilization of the vehicles themselves (more miles traveled), while potentially requiring far fewer vehicles to serve a population's mobility needs (though this may depend on a user's willingness to share rides).⁴⁰ With these business models built around a centralized fleet operator, financial considerations will be key to decision-making and there will be a strong incentive for fleet operators to own all-electric fleets: operating expenses are the most important cost with high utilization vehicles, as operating costs can be significantly reduced.⁴¹

City Light has an opportunity to support electric, autonomous mobility services as new, predictable revenue streams where charging load can be managed

and optimized directly through relationships with fleet operators. Further, because many of these fleets will be light-duty vehicles, the per-vehicle grid impact is much less than that of electric trucks and buses.

Forecasts range widely on how this future plays out—from 95% of passenger miles service-based by 2030 to similar outcomes not being realized until the late 2030s (or later).⁴² At this time, it's unclear how the load of robotaxis might affect City Light's grid. What is clear is that Seattle-specific data shows consistent growth in ridehailing usage and associated vehicle miles traveled. Combined trips using Uber and Lyft have more than doubled between 2016 and 2018, topping 7 million trips during the first quarter of 2018. More data and pilots will be required with EV fleets in the future to understand how to optimize charging times while ensuring accessible vehicles for all trips on ridehailing services.

Given the early stage of this market segment, the results of pilots and success of new companies in this space has been mixed. For example, despite significant growth, Uber and Lyft are not yet profitable and have had several regulatory battles with cities in the US;⁴³ pilots with microtransit start-ups have had low ridership;⁴⁴ and a high-profile death caused by a driverless vehicle has called into question the readiness of autonomous technology for on-road pilot programs.⁴⁵ Despite these hurdles, there is significant global interest in the autonomous mobility future and its potential benefits. City Light should pay close attention to how this segment evolves over time to take advantage of opportunities to electrify these services.



IMPACTS TO SEATTLE CITY LIGHT

We examine how electrification will affect City Light so that we can understand how to address the associated risks, as a continuation of E3 Consulting’s cost-effectiveness study completed in 2015. We emphasize three types of impact:

1. Impact of transportation electrification loads on City Light’s grid
2. Financial impacts, especially limiting the need for system upgrades
3. Customer service impacts, including changes to City Light operations

IMPACTS OF POV ELECTRIFICATION

To estimate the impacts of increased adoption of electric POVs, we extend the hosting capacity analysis from City Light’s prior study with E3. Using EV registration data for each zip code in City Light’s service territory, we assume that the number of EVs registered in each zip code, as a percentage of EVs in City Light’s service territory, stays constant through 2030.^{ix} Using our electric POV adoption forecasts, we estimate how many EVs will be sold in City Light’s service territory each year then allocate these new EVs by zip code accordingly, out to 2030.

We base our analysis here on City Light’s current distribution planning. This assumes a managed charging load profile, such that the vast majority of new EV load growth occurs during off-peak hours. Most charging is via Level 2 chargers and assumes a demand of 6 kW per vehicle. We note that this represents an optimal set of assumptions as new Level 2 chargers allow for 21 kW charging and we cannot know how customers will actually charge their vehicles. However, City Light’s prior study with E3

examined in detail the revenue and cost difference between managed and unmanaged POV charging, and even unmanaged charging resulted in a net benefit to City Light.

The results of this analysis suggest that, for residential charging based on these assumptions, there will be minimal impact to City Light—in fact, there will be a net benefit, based even on our most aggressive POV adoption forecasts. There is, however, great uncertainty with this conclusion, and City Light will need to continually reexamine this result and proactively facilitate managed charging behavior. First, charging patterns and behaviors may change over time resulting in more charging events during peak hours or more drivers may prefer DCFCs. As electric vehicle supply equipment (EVSE) networks are built, the relative utilization of DCFCs versus Level 2 chargers will be an important metric to track. Second, some neighborhoods could see much greater adoption than anticipated, leading to a geographic concentration of charging loads.

With more and more City Light customers owning electric vehicles, the experience City Light offers for these customers will be an important consideration. This could include tailored customer service options such as EV-owner customer connection queues as well as new revenue opportunities through specific EV rates or packages for EV owners that might include support for on-site solar and/or storage.^x These service offerings will have to be balanced with the potential need for additional customer support staff and associated costs to serve this new customer base.

There are significant positive impacts to City Light as well. Given City Light’s ongoing rate redesign and

^{ix} We recognize the deficiencies of this assumption as it does not take into account population growth/shifts or that as EV costs go down, lower-income communities may increase adoption relative to today. And of course, City Light programs can explicitly target Seattle neighborhoods with lagging EV purchases to accelerate adoption.

^x Seattle City Light has designated queues for customer types (i.e., residential or commercial) with the potential to add new queues for new customer types.

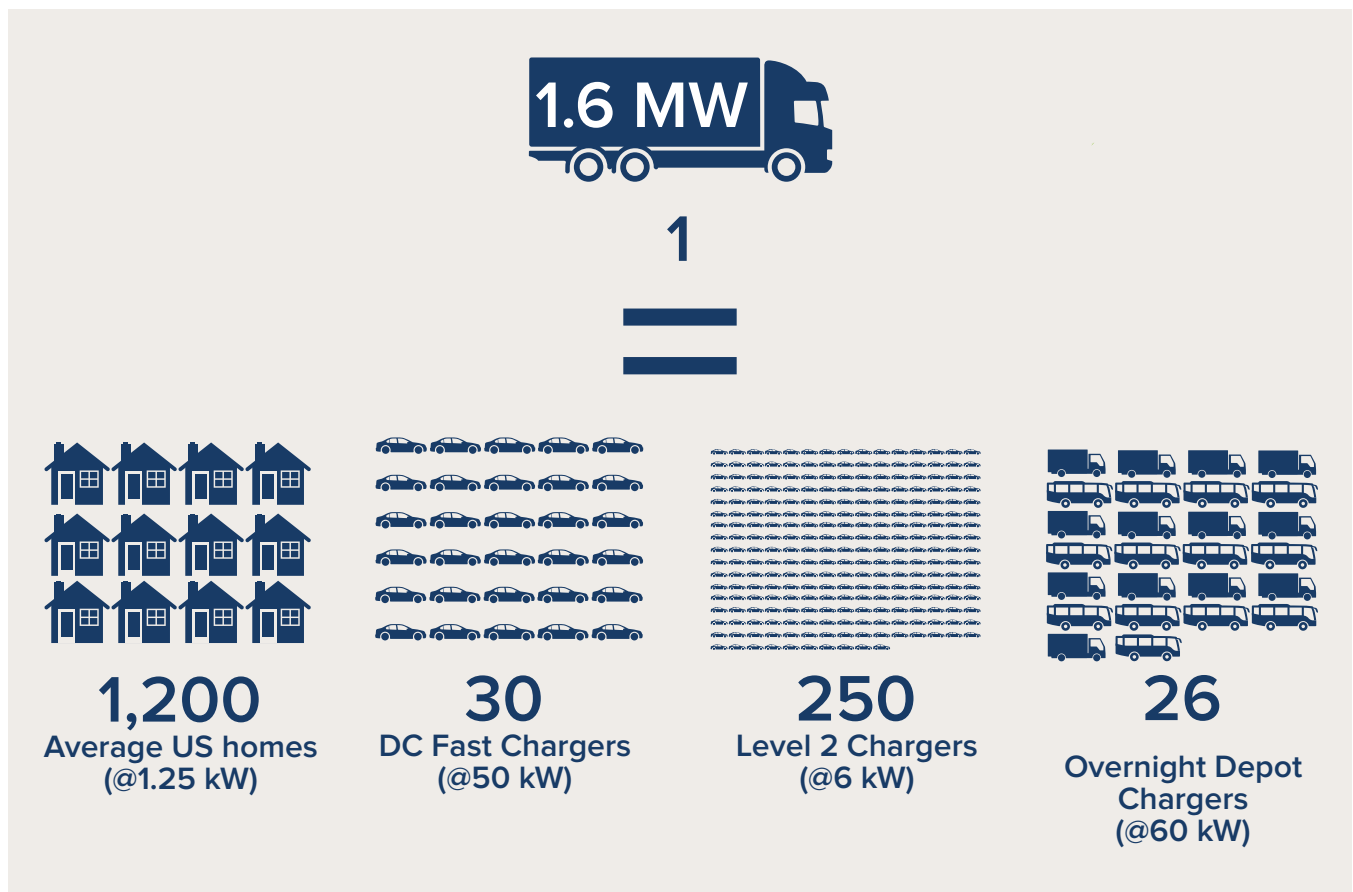
imperative to decrease rates, new revenue streams are needed to create downward rate pressure. In theory, EVs can put downward pressure on rates because of increased utilization of utility assets, with revenue from load growth exceeding costs. And since City Light’s generation mix is predominantly hydropower, the emissions profile of EVs charged on City Light’s grid has lower carbon and other greenhouse gas emissions compared with grids in other cities and states.

IMPACTS OF MEDIUM- AND HEAVY-DUTY TRUCK ELECTRIFICATION

Although trucks nationally represent only 4% of registered vehicles,⁴⁶ the impact of truck electrification to City Light may be significant. We demonstrate this in Exhibit 8, which shows the electricity demand for a single HDT mega-charging event compared with that of other appliances or vehicles.

EXHIBIT 8

Power Requirements (kW) of One Class-8 Truck “Mega-charging” Event (1,600 kW) Compared With Power Requirements of Other Vehicles and Homes



Electric trucks offer a double-edged sword in terms of their impact to the grid: they are likely to concentrate in industrial areas of cities making load planning simpler, but they draw significantly more power per charging event than POVs, potentially straining distribution grid capacity at those locations. If planned well, electric buses can improve grid asset utilization and present a new source of predictable revenue.

As noted above, fleet managers respond well to price signals that impact the total cost of ownership of their fleets. Many electric truck fleets will require their own infrastructure, which may make upfront costs prohibitively costly and require new financing mechanisms that reduce these costs for fleets. These costs and financing challenges may emerge as bottlenecks that slow overall truck electrification.

Utilities have a suite of tools that can be deployed to help accelerate and appropriately plan for truck electrification (in particular by influencing total electricity costs that can make or break the total cost of ownership for electric trucks). These include demand-charge relief, time-of-use rates, or other price signals to maximize off-peak charging, and innovative financing for on-site solar and/or storage at fleet charging depots. It is, however, uncertain how effective these approaches will be because, unlike POVs, electric trucks must charge according to vehicle operation schedules and electricity price signals may not be able to shift charging to off-peak hours. And, pairing electric truck charging depots with on-site solar and/or storage or smart charging systems will significantly increase upfront capital costs for fleet operators.

Because of the early stage of this market, it is difficult to estimate specific truck and ferry electrification impacts on City Light. Instead, we use the following approach:

For short-haul routes (primarily MDTs^{x1}):

1. Assume trucks with 100 kWh batteries charging at a 20–60 kW charge overnight at a centralized distribution center, for a typical 100-mile daily route.
2. Identify the location of most distribution centers and warehouses in Seattle (as a proxy for where charging will occur overnight) and identify distribution grid feeders assigned to these geographies. As shown in Exhibit 9, MDT charging will likely occur in Seattle’s two large manufacturing and industrial centers (MICs): Ballard/Interbay Northend and Greater Duwamish (which includes the Port of Seattle).

As shown in Exhibit 10, we identified 61 feeders assigned to either the Duwamish or Ballard/Interbay MICs, 15 of which are at or above 90% loading. Based on the above assumptions, a large fleet of 200 medium-duty trucks charging overnight at a single depot will draw 4–12 MW. Since feeders and substations can be reconfigured to balance loads, fleets requiring 4 MW for overnight charging are likely to have minimal impact on City Light’s grid. We note that capacity is only one indicator of impact on City Light’s system, and other upgrades may be required even if there is available capacity. For example, at 4 MW for a single installation, there may be need to reconductor a lateral with an estimated cost of \$1,000/foot of overhead installation or \$1,500/foot for underground installation. However, for fleets on the higher end of the range (above 10 MW), system impact studies will be required as this size load may require a dedicated feeder.

^{x1} We note that HDTs are used for short-haul routes as well; however, depending on the route, fleet operators will be able to optimize battery size, so charging patterns and power demand will likely be comparable to MDTs.

EXHIBIT 9

Map of City Light Territory Depicting Manufacturing and Industrial Centers

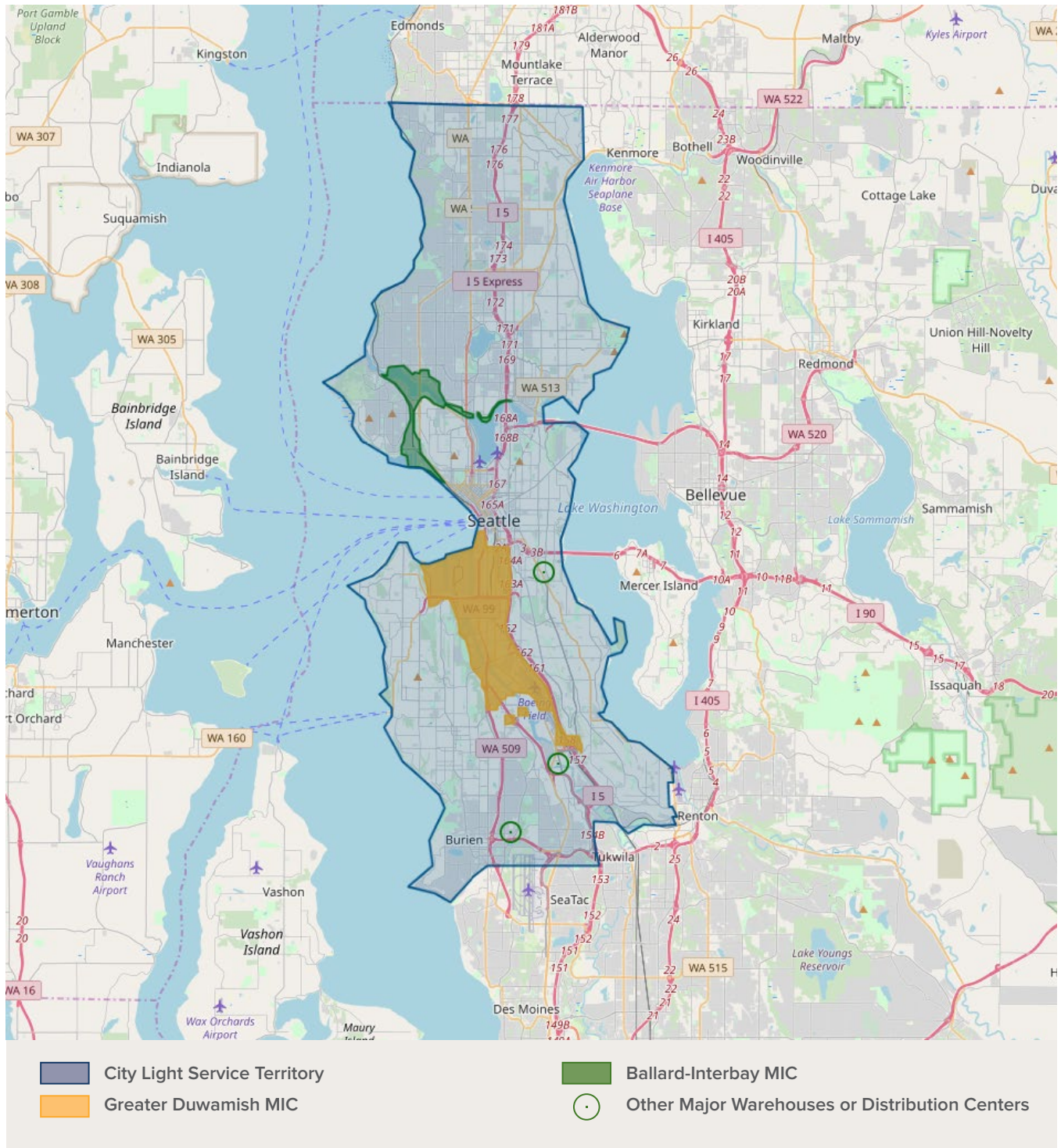
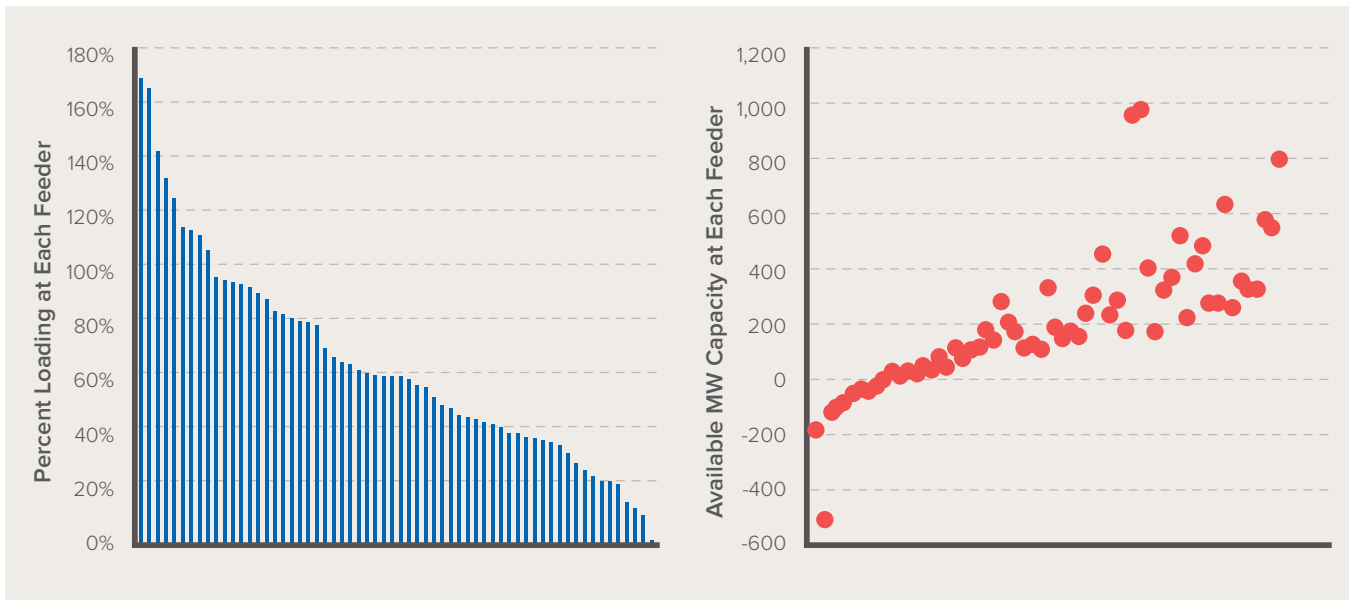


EXHIBIT 10

Percent Loading and Available Capacity (MW) at All Feeders Assigned to Either the Duwamish or Ballard/Interbay MICs. The X-Axis Represents Unique Feeder ID



For long-haul routes (primarily HDTs):

1. Assume that many trucks serving long-haul routes will mega-charge their 300–1,000 kWh batteries along major freight corridors, for a typical 200–500-mile daily route. Tesla has proposed a mega-charger providing 400 miles of range in 30 minutes, roughly a 1.6 MW load per charging event.
2. Identify the location of most freight traffic volumes in Seattle (as proxy for where mega-chargers may be located) and identify distribution grid feeders assigned to these geographies. As shown in Exhibit 11, the greatest freight traffic volumes projected to 2035 will be found in the two MICs and along WA State Route 99 north of downtown Seattle.⁴⁷

Of 24 feeders assigned along WA State Route 99 north of downtown Seattle, eight are at or above 90% loading. For fast charging of long-haul heavy-duty trucks, one truck charging could draw up to 2 MW of power over 30 minutes, so clustering these types of chargers could

have significant impact on City Light’s grid. With even a 10 MW load from five trucks charging simultaneously at a single location, there could be a need to reductor the feeder backbone.

These larger installations have the potential to significantly impact City Light’s system. However, fast charging for long-haul heavy-duty trucks is not expected until the late 2020s at earliest. Exhibit 12 demonstrates that there are some areas of constraint on City Light’s grid, but, overall, there is plenty of available capacity to handle these types of installations (notwithstanding some upgrades such as reconducting laterals or feeder backbones). Therefore, City Light must be proactive in supporting both location and operation of charging to minimize these impacts. This points to a clear impact on City Light’s customer service and the potential need for managers dedicated to fleets of trucks and buses, or a notification process so that City Light can be adequately informed and involved in fleet electrification planning.

EXHIBIT 11

Map of City Light Territory Depicting Regions and Corridors With Significant Freight Volume

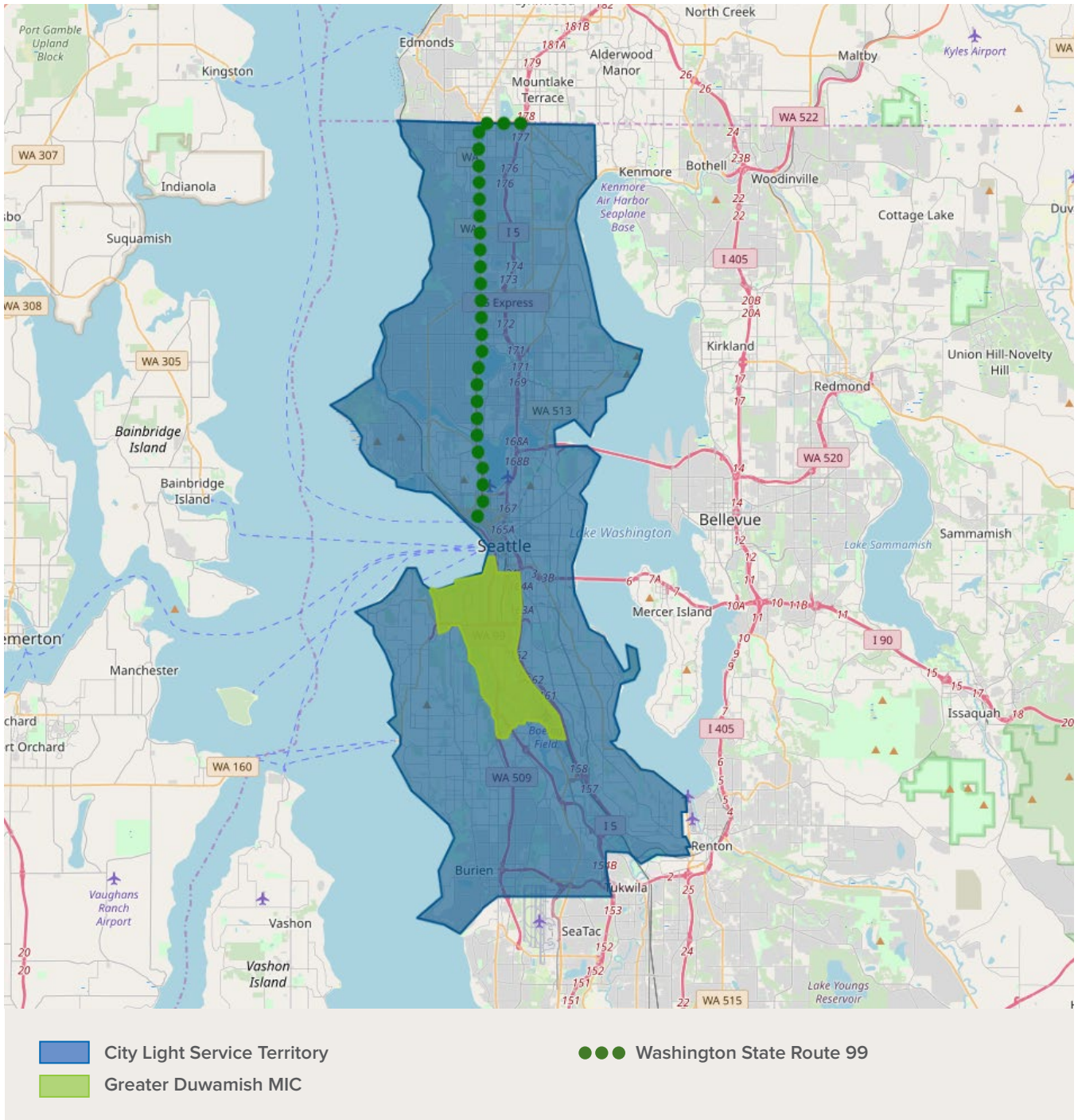
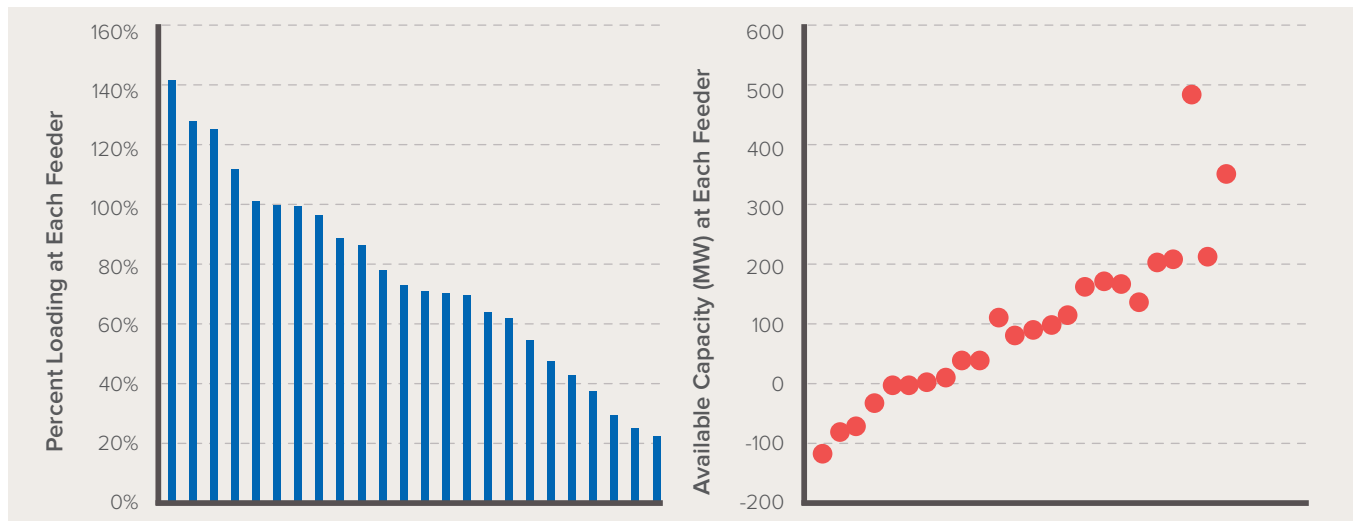


EXHIBIT 12

Percent Loading and Available Capacity (MW) at All Feeders Assigned to WA State Route 99 North of Downtown Seattle, Projected to Have the Greatest Freight Volume in City Light’s Territory by 2035. The X-Axis Represents Unique Feeder ID



IMPACTS OF BUS ELECTRIFICATION

The impacts to City Light from bus electrification are quite similar to those for medium- and heavy-duty trucks detailed above. However, the approach we follow to understand bus electrification impacts is based on Metro goals and anticipated charging behavior, based on its experience with electric buses since 2016. In particular:

1. Assume buses will primarily charge overnight at centralized bus bases. Most buses will travel a daily route of 100–140 miles with a battery size of 300–450 kWh. Overnight bus charging will occur at existing Metro bus bases. Metro will also install “opportunity chargers” for short, on-route charging events located at transit hubs, major transfer points, and the ends of major routes.
2. Identify grid distribution feeders assigned to Metro bus bases, as shown in Exhibit 13.

In Exhibit 14, of the 20 feeders identified that serve Metro bus bases and transit centers, five of the feeders are at or above 90% capacity. Although this appears to show constrained capacity to serve new electric bus load, even a bus base of 250 electric buses charging simultaneously overnight would peak between 10 and 30 MW;^{xii} all but two feeders have this much capacity available. However, any installation of this size will require a system impact study to determine if a dedicated feeder or other upgrades are required. For example, a recently completed impact study for an interim bus base for Metro estimated that upgrade costs (to replace existing overhead conductors and install regulator or capacitor banks) would be approximately \$2.2 million.

^{xii} Assuming 40–120 kW charge rate overnight.

EXHIBIT 13

Map of City Light Service Territory Depicting Bus Base Locations and Opportunity Charging Locations at Transit Centers

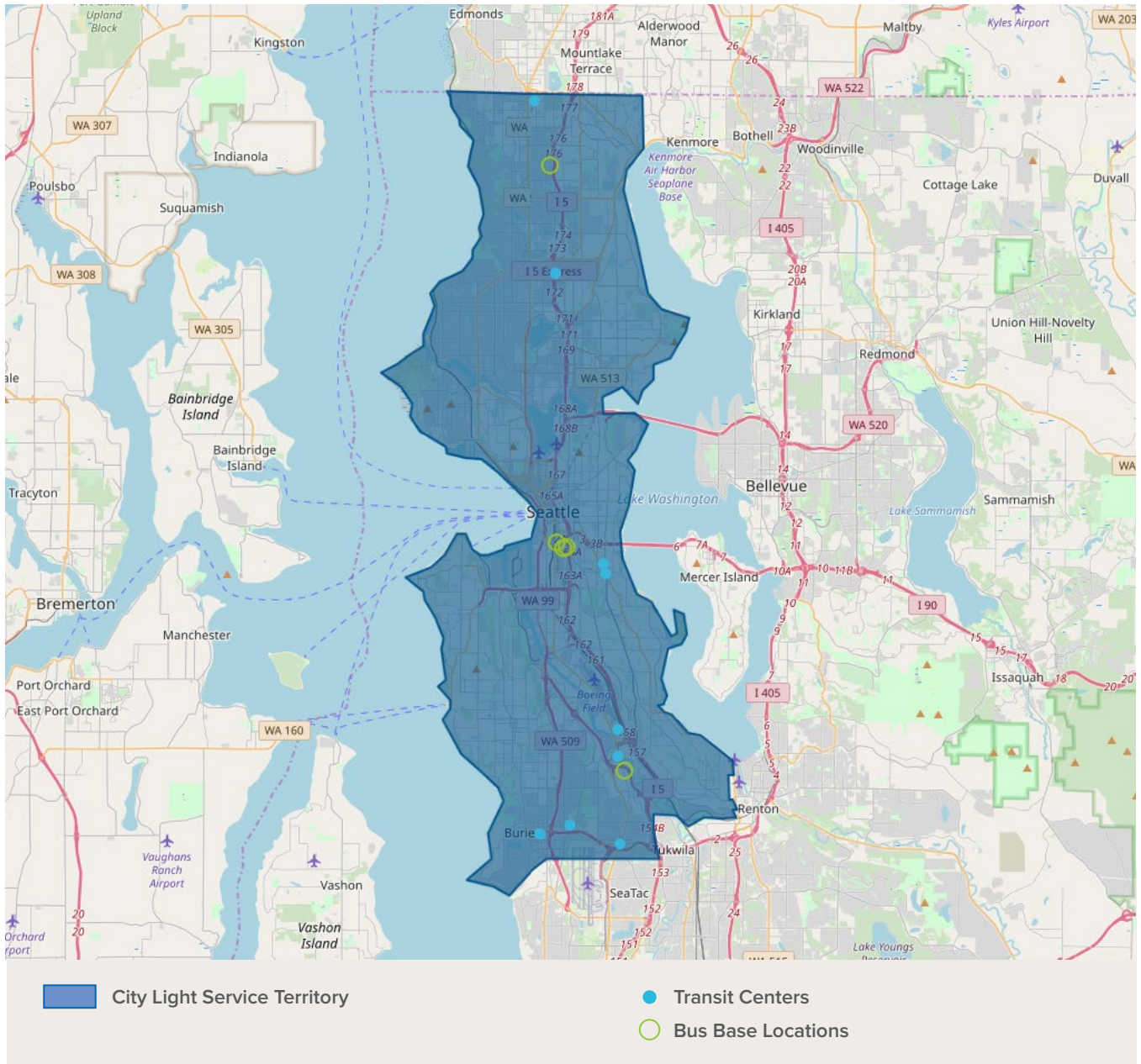
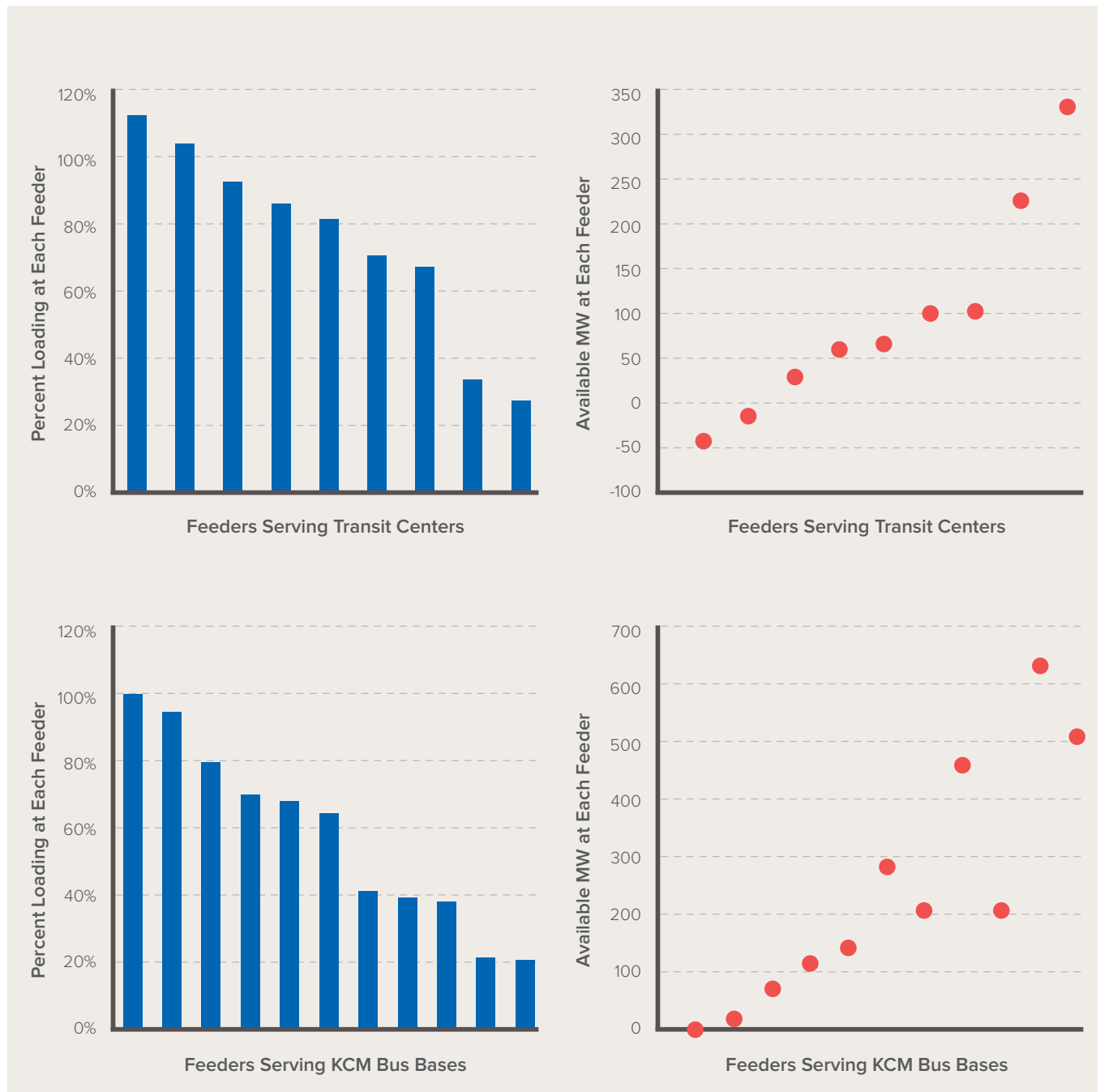


EXHIBIT 14

Feeders Assigned to Metro Bus Bases and Transit Centers and the Percent Loading and Available Capacity on Each. The X-Axis Represents Unique Feeder ID



SEATTLE CITY LIGHT INTERVENTIONS



SEATTLE CITY LIGHT INTERVENTIONS

City Light has many options available to it to accelerate the electric transportation market. Given limited resources and the need to maximize impact, this section identifies interventions that City Light should prioritize.

CRITICAL MARKET INDICATORS

Potential interventions are tightly linked to market evolution. We have identified three critical indicators to inform which forecast (BAU, aggressive, conservative) is aligned with actual adoption. Based on market research and expert interviews, we have identified three key market indicators to watch for as leading signs of accelerating electric transportation adoption.

EXHIBIT 15

Critical Market indicators

INDICATOR	IMPORTANCE	KEY METRIC, TODAY	TIPPING POINT
BATTERY COST	Batteries are 30%–40% of vehicle upfront cost and the primary driver of TCO.	\$176/kWh for the battery pack.	For both cars and trucks, \$150/kWh for the battery pack. ⁴⁸
MODEL AVAILABILITY	28% of light-duty vehicles sold annually are small or midsize cars, 10% are SUVs, and 35% are crossovers. ⁴⁹ Many gasoline car drivers won't purchase an EV unless it suits their needs and lifestyle. For trucks, few commercial models are available today.	50% of electric POV sales from January to July 2018 were for five models available from three manufacturers. ⁵⁰ These are Tesla's Model 3, Model S, and Model X, Chevrolet Bolt, and Nissan Leaf.	One electric SUV and one electric crossover model available from the majority of automakers, priced consistently within their category. ⁵¹ For trucks and buses, look for case studies that validate TCO savings for electric trucks and buses, especially as new models become available.
FUEL PRICE	For POVs, higher gasoline prices may lead to greater sensitivity to fuel economy and increase purchases of more fuel-efficient vehicles. The diesel-electricity price differential directly impacts value proposition for truck and bus fleet operators.	Seattle 2018 gasoline price ranged from \$3.00 to \$3.50. Seattle 2018 diesel price ranged from \$3.00 to \$3.20.	At roughly \$5/gallon gasoline or diesel, individuals and fleet operators begin to more heavily weigh fuel efficiency measures. This can be heavily driven by both market forces and policy.

IMPORTANT MARKET ENABLERS

In addition to the critical indicators, many other changes in the market will be important as enablers of transportation electrification. City Light should monitor these in addition to the critical indicators in order to have a more complete sense of where the market is going.

EXHIBIT 16

Important Market Enablers

MARKET ENABLER	IMPORTANCE	METRIC TO WATCH
ADVERTISING SPEND ON EV MODELS BY AUTOMAKERS	Proxy for competition for sales. ⁵²	Amount spent as a percentage of gasoline-vehicle advertising.
MULTIUNIT HOUSING EV-CHARGING BUSINESS MODELS	In Seattle, 34% of all housing is multiunit apartments, ⁵³ representing an opportunity to vastly expand the POV market.	Percentage of multiunit housing with on-site charging planned, under construction, or available.
PRODUCTION SCALE OF ELECTRIC TRUCKS	Production scale reduces upfront costs.	Percentage of trucks manufactured annually that are all-electric.
AUTONOMOUS VEHICLE PILOT PROGRAMS	Highly utilized driverless vehicles, for example those used for mobility services such as Uber and Lyft, are most cost-effective when electric. Autonomous technology can greatly accelerate the growth of EV miles traveled.	Autonomous vehicle programs that scale beyond pilots.
COSTS FOR EV CHARGING INFRASTRUCTURE, INCLUDING DC FAST CHARGING	Impacts TCO for POV owners where charging is primarily done at home and truck/bus fleets charged at fleet-owned depots.	Cost of infrastructure and installation.
PUBLIC CHARGING AVAILABILITY	Important for POV adoption to reduce range anxiety. Mega-charging may be critical for long-haul trucking applications.	Number of public Level 2 chargers and DCFCs. Announced plans to install mega-chargers on major freight corridors.
POLICY (STATE AND MUNICIPAL)	Policy incentives and mandates can alter the value proposition across markets.	State targets for EVs on the road, tax incentives, low-carbon fuel standard.

INTERVENTIONS

Market trends point to an increasingly electrified transportation future. Even in our most conservative forecast, the number of POVs in Seattle doubles by 2021 and the market share of electric trucks and buses could be even larger given their greater sensitivity to price and policy signals. Building on the work of other utilities grappling with this market transformation,^{xiii} we identify a set of interventions that City Light should pursue to prepare for even the most conservative

forecasts, while positioning City Light to take advantage of more aggressive adoption. These interventions are designed to align to City Light’s core values and positioning in the market:

- A.** Invest in charging infrastructure with emphasis on universal access and expanding coverage
- B.** Develop new rates and improve customer service for the transportation market
- C.** Prepare for heavy-duty electrification

EXHIBIT 17

INVEST IN CHARGING INFRASTRUCTURE WITH EMPHASIS ON UNIVERSAL ACCESS AND EXPANDING COVERAGE

1. Continue to drive the robust development of public charging.



Business Reason:

Electric utility investment is necessary to complement the private market in creating a robust and accessible network of DCFC stations. Consumer desire for fast charging and its currently limited availability is a bottleneck to greater adoption of EVs, a barrier that City Light can directly influence across market segments.

Connection to Values Framework:

Addressing gaps in the EVSE network increases adoption and creates downward rate pressures for all customers.

City Light Actions:

- Based on gap analysis and stakeholder engagement,^{xiv} deploy City Light-owned DCFCs to satisfy underserved or undercapitalized markets where private network operators are less likely to invest.
- Explore make-ready investments in grid infrastructure or equipment incentives to support private DCFC deployment that aligns with City Light’s core values.

^{xiii} Other sources for utility best practices include: https://www.betterenergy.org/wp-content/uploads/2018/04/MTEC_White_Paper_April_2018-1-1.pdf; <https://www.raponline.org/wp-content/uploads/2017/06/RAP-regulatory-considerations-transportation-electrification-2017-may.pdf>; https://www.swenergy.org/data/sites/1/media/documents/publications/documents/How_Leading_Utillities_Are_Embracing_EVs_Feb-2016.pdf; and https://www.theicct.org/sites/default/files/publications/Power-utility-best-practices-EVs_white-paper_14022017_vF.pdf.

^{xiv} Specifically, an EVSE infrastructure gap analysis to identify future DCFC and Level 2 charging needs by matching the anticipated number of on-road vehicles to the number of charging stations needed to meet that load, assuming one or more ratios for Level 2 versus DCFC in future years. Gaps are indicated where there is need for charging infrastructure in City Light territory but private network operators are not planning to build.

EXHIBIT 17 (CONTINUED)

INVEST IN CHARGING INFRASTRUCTURE WITH EMPHASIS ON UNIVERSAL ACCESS AND EXPANDING COVERAGE

2. Support expanded residential and workplace charging with an emphasis on multiunit dwellings and underserved communities.

**Business Reason:**

City Light can expand who can benefit from electric transportation by targeting customers for which cost and feasibility are significant barriers. This is particularly true in multiunit dwellings and for residents without access to low-cost charging solutions where they live or work.

Connection to Values Framework:

Creating benefits to the environment by reducing barriers to EV ownership and expanding the market of potential EV owners. This enables greater access to City Light's clean electricity for transportation applications and reduces emissions, especially in communities with poor air quality.

City Light Actions:

- Provide incentives for residential installations, focusing on multiunit dwellings and considering higher levels of support in target markets.
- Develop creative solutions for customers without dedicated off-street parking.
- Provide incentives and technical expertise for commercial or industrial customers to install workplace chargers.
- Participate in current efforts by City of Seattle to revise building codes and EVSE standards. Potentially provide technical assistance or financing to support compliance with updated codes.

3. Invest in charging infrastructure for high-mileage applications.

**Business Reason:**

Market trends point to rapid change over the next decade in personal mobility with a potential shift away from vehicle ownership. City Light should position itself to accelerate electrification of these new business models as they emerge and encourage scale.

Connection to Values Framework:

Electric mobility services have the potential to provide a lower-cost mobility option for Seattle residents for whom vehicle ownership is prohibitively expensive or transit coverage is poor. More affordable mobility expands access and opportunities for residents of lower-income communities.

City Light Actions:

- Support shared (eventually driverless) mobility electrification. This could include charging infrastructure installed at designated Uber/Lyft pick-up and drop-off points or new rates specifically designed for shared mobility.
- Support charging for carsharing or other equity-focused programs, such as EV community carsharing. For example, rebates or incentives for charging infrastructure installation located at carshare parking spaces.

EXHIBIT 18

DEVELOP NEW RATES AND IMPROVE CUSTOMER SERVICE FOR THE TRANSPORTATION MARKET

1. Pursue rates that meet the needs of electric transportation customers.



Business Reason:

To accelerate transportation electrification, City Light should strive to make the cost of charging highly competitive with gasoline. With significant EV adoption (especially for trucks and buses), unmanaged charging poses risks to City Light’s grid in terms of capacity and stability during peak hours—risks that City Light can directly mitigate with rate design.

Connection to Values Framework:

Creates benefits to the environment by supporting increased adoption of EVs (and associated reductions in emissions) by improving total cost of ownership for EVs. Creates grid benefits by mitigating impacts from peak-hour charging, minimizing need for upgrades. Better use of grid assets can lower utility and ratepayer costs.

City Light Actions:

- Explore and pilot time-of-use or other creative transportation-specific rate designs across all EV market segments.
- Understand the impact of demand charges on large customers (e.g., transit providers) and DCFC operators and explore options for relief to ensure fast charging network profitability.

2. Improve core City Light business processes for customers investing in charging.



Business Reason:

City Light needs to ensure a seamless customer experience for easy access to electricity as fuel. This builds on its existing expertise as a trusted advisor and leverages the utility’s investments in customer service systems.

Connection to Values Framework:

For EV owners, the utility is their fuel provider. Interactions with the utility can make or break the user experience. Positive customer experience leads to positive word of mouth which can boost EV adoption and allow earlier realization of environmental benefits.

City Light Actions:

- Create a streamlined and transparent interconnection and service upgrade process for new and existing customers to install charging infrastructure.
- Consider new queues for EV customers, in addition to City Light’s existing queues for residential, commercial, and industrial customers requesting service.
- Develop digital content that helps customers make informed decisions about their investment in electric transportation.

EXHIBIT 18 (CONTINUED)

DEVELOP NEW RATES AND IMPROVE CUSTOMER SERVICE FOR THE TRANSPORTATION MARKET

3. Investigate the viability of managed charging.

**Business Reason:**

While City Light's system can largely accommodate the increase in load from considerable adoption of EVs, large spot loads could pose a challenge. It is necessary to understand how to manage this challenge at scale.

Connection to Values Framework:

Ensures equity by allowing City Light to experiment with optimal means to mitigate grid and ratepayer impacts. In particular, to ensure EV owners pay their fair share of costs and are not subsidized by non-EV owning ratepayers.

City Light Actions:

- In collaboration with industry partners, establish standards for residential smart charging.
- Explore demand-response programs. Especially if City Light anticipates increased solar or wind generation, consider use of the EV load as a distributed energy resource to improve grid flexibility and determine how to compensate EV owners for this value.

EXHIBIT 19

PREPARE FOR HEAVY-DUTY ELECTRIFICATION

1. Support the aggressive electrification commitments of partner agencies and large customers.

**Business Reason:**

While these customers have set bold targets to electrify, many aspects of implementing nascent technology at scale remain a challenge. City Light is well positioned to offer technical assistance and a broad range of support for charging infrastructure.

Connection to Values Framework:

Electrification of institution customers leads to substantial emissions reductions, especially to historically impacted neighborhoods. Transit, in particular, is an ideal way to ensure all customers benefit from electric transportation.

City Light Actions:

- Partner directly with King County Metro, the Port of Seattle, and Washington State Ferries to enable their transition to electricity.
- Develop a deep expertise of customer needs and respond with a broad suite of solutions, including responsive rates, incentives, grid infrastructure, technology demonstrations, and siting analysis.
- Proactively plan for these large loads and minimize costs and potential constraints on City Light's grid.

EXHIBIT 19 (CONTINUED)
PREPARE FOR HEAVY-DUTY ELECTRIFICATION

2. Anticipate how access to charging will influence urban freight and fleet markets.



Business Reason:

As an emerging market segment, there is a great deal of uncertainty around the scale and speed of electrification. City Light can lead by exploring novel solutions that address the barriers to charging in this market.

Connection to Values Framework:

Diesel trucks have outsized emissions relative to the percentage of vehicles they represent on the road. Electric trucks can immediately improve air quality and benefit the environment, especially in industrial zones and residential communities near them.

City Light Actions:

- Monitor tipping point metrics, particularly model availability for delivery and truck applications, and engage with local fleets.
- Similar to the approach for transit agencies, devote resources to better understand the use cases for charging in the freight/heavy-duty industry.
- Get creative with packaged charging solutions, including financing, make-ready investments, smart charging, and incentives.

ENDNOTES



INTERSTATE 5 SOUTH
Tacoma
Portland
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To INTERSTATE 90 EAST
Bellevue
Spokane
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ENDNOTES

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Seattle City Light

2021 Grid Modernization Plan and Roadmap



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April 2021

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Sponsorship Statement

Emeka Anyanwu, Seattle City Light's Energy Innovation and Resources Officer

Our world, and our City are changing. Of that there can no longer be any doubt. Not only has the COVID pandemic been a wake-up call to help us clearly see the vulnerabilities in our societal structure, but it has also helped highlight areas of opportunity to build the future. Grid modernization has emerged clearly as an indispensable component of the future that is unfolding before our very eyes, and this document lays out the first steps in a long-term undertaking to transform our distribution system.

Meeting that quest will require Seattle City Light to evolve in ways large and small, and truly reimagine our operational and business models. In so doing we will best be able to honor our mission to *"Create a shared energy future by partnering with our customers to meet their energy needs in whatever way they choose"*. Enabling choice through partnership will require anticipating the different possible choices our customers may make (and in many cases, already are making) and building a system prepared to deliver on those choices. The expert consensus conclusion of our industry is that the grid of the future is flexible, dynamic, and smart—and therefore is the price of entry to enable such choice.

Built into this future is the urgent and compelling need to boldly face the climate crisis and take bold action to reduce the harmful effects of carbon in our atmosphere. That bold action will call for a new approach to delivering the energy that powers our customers' homes, businesses, and communities. To build that next generation energy delivery system, we must envision the future; to start from where we are to build the foundation to get us to that destination. Defining the first steps of that journey is at the heart of the approach detailed in this Grid Modernization Roadmap. As the saying goes, it is important to know where you come from to know where you are going; and so, we always will honor and live up to our legacy of operating a system that provides the highest levels of reliability for our customers. But we must also now focus on new layers to the energy chain – decarbonization/electrification, resiliency, power quality, and customer participation through behind-the-meter resources and energy management. **Above all, we absolutely must insist that our efforts be grounded in the highest principles of racial and social justice, and be willing to hold ourselves to a high standard—one of not only avoiding the creation of inequity, but truly committing to a deep and uncompromising purpose of reversing the effects of historic failures to do so.**

We are at the point of change—indeed some would say we are past that point. Our future is now in Seattle, and the transformation of our grid will ensure we are prepared to lead the way. We cannot thrive in that future without a commitment to the grid modernization journey, one that will call on the mobilization of all the creativity, ingenuity, and resourcefulness of City Lighters across the entire organization. Likewise, meeting our customers' changing energy needs requires closely partnering and jointly planning for the long-term. We look forward to engaging you all as collaborators and partners in this work!

Executive Summary

Seattle City Light (SCL) has produced this **Grid Modernization Plan and Roadmap** to support the key operational objectives of affordability and reliability, while developing the skills and technologies necessary to enable increased customer electrification and improve grid resiliency and security. This plan begins to chart a path forward for SCL employees, the Seattle City Council, and the customer-owners. It describes specific projects and tasks for the next two years, as well as laying the foundation of five-year and ten-year goals, with projects spanning across planning, operations, supporting technologies, and physical infrastructure upgrades. This work will be implemented by the Grid Modernization team and others throughout SCL. The plan is built upon industry best practice recommendations and will be regularly updated, starting this year with support from industry experts at the Electric Power Research Institute (EPRI) with an increased focus on electrification enablement and equity. An overview of the Plan can be found on the next two pages in Table 1.

Plan - Roadmap	2022	2025	2030
Tier 1: High Priority or Work Initiated (alphabetical)			
Continuing Grid Mod Planning	Update Grid Mod Plan with EPRI , increasing focus on electrification	Implementation begins —Continue to gather resources and implement projects	Project Close-out and New Project Planning — Implement Grid Mod projects and review previous work
Cybersecurity for Grid Mod Monitoring & Control	Projects integrate cybersecurity	Enhanced cyber monitoring for Grid Mod projects	Standardized cybersecurity processes, including grid edge
DA-FLISR Expansion	FLISR Expansion — Continue with implementation Integrated with OMS and centralized OT Cybersecurity system	Pilot New Technologies — Pilot with additional cutting-edge to further improve system reliability, power quality	Large scale implementation. Deploy proven, newest technologies to further improve customer satisfaction, system reliability, power quality, and operation efficiency
Demand Response Pilot	Program Pilot — Residential/small commercial pilot project with grid-interactive water heaters. Define value & needs.	Demand Response Expansion — Develop programs for load shifting, other grid services. Pilot other types of DR. Develop benefit-cost analysis tools.	DR Market Sales — Implement DERMS for DR management. Engage in regional programs at MW scale.
Duwamish Delta Test Bed Project	Outreach and Selected Pilots	Expand electrification and NWS	Review and expand program
Energy Storage Technology	Feasibility Studies — Batteries becomes a standard option for solving a variety of problems.	Technical Development and Pilot Implementation — Develop standardized benefit/cost analysis, develop in house technical & planning skills, pilot new procedures.	In-House Expertise — Storage is managed for grid benefits. Fully valued by analytical methods. Implement DERMS.
Landis and Gyr Mesh Communication Network Assessment	Operational Project Deployments — Deploy operational projects which use the L+G mesh network	Network Evaluation — Evaluate the operational capabilities of the L+G mesh network and determine possible alternatives	Long-term Network Plan — Conduct a final evaluation of the L+G mesh network to determine if it will meet the future needs of SCL and create a course of action for SCL upon contract end with L+G
Line Sensor Deployment	Pilot Deployment — Deploy ~100 sensors. Display fault data to dispatchers.	System-wide Deployment — Full scale deployment throughout SCL system.	ADMS Integration — Integration of sensor data into DMS or ADMS. Monitor trends in sensor development.

Plan - Roadmap	2022	2025	2030
PNNL Seattle Waterfront Resiliency Study	Technical Study — Conduct a technical study on the feasibility of networked microgrids at port facilities	Resiliency Planning —Based on the results of the technical study, plan projects to increase the resiliency and reliability of the Seattle waterfront	Microgrid Funding and Build-out —Begin the construction of microgrid or other resiliency projects at Seattle port terminals where most feasible
Tier 2: Needing Resources (alphabetical)			
AGA: Enhanced Electrical Connectivity Model	Plan and pilot with six OH feeder	Validate the entire electrical model in the LRDS GIS	Build the distribution system model in ADMS using verified GIS model
DA-Advanced Integration	Cybersecurity monitor system is designed & built for DA-FLISR.	Implement new OMS, integrate with DA-FLISR. Design & implement Feeder Management System (FMS), integrate with security monitoring	Integrate DA-Remote Switching with OMS, FMS.
DA-Remote Switching	Plan, develop communication architecture, lab testing	Pilot with two systems	Large scale implementation and integration
DER Interconnection Studies and Procedures	Update interconnection procedure.	Implement monitoring & control to support grid services. Pilot new procedures.	DER interconnection procedures fully integrated into planning process. Implement DERMS.
Non-Wires Solutions Analysis	Screening Criteria Evaluation — Develop NWS screening criteria for new projects	Project Deployments— Deploy NWS projects where most feasible and record lessons learned	NWS Maturation — Continue developing in-house knowledge of NWS through deployments of new projects and revise screening criteria where necessary
Managed EV Charging	Study and Analysis — Analyze EV load profiles and the effect of passive charge management on charging behavior	Managed Charging Pilot Phase — Pilot managed charging where most effective and feasible	Widespread Managed Charging and V2G Pilot — Expand managed charging across multiple classes of vehicles (heavy duty fleets, private residential) to reduce the negative effects of mass EV charging on grid infrastructure. Begin piloting V2G if technically feasible
Miller Community Center Microgrid Plan	Data collection and assessment	O&M Training for SCL staff	ADMS system integration
OT Field Area Network – Pilot Project	Design network architecture Lab testing	Pilot with two systems	Large scale implementation and usages
Targeted Lightning Arresters on OH Transformers	Study, Plan, and Limited Rollout	Execute LA Implementation Plan	Assess LA Plan for installation

Table 1: Plan and Roadmap Overview

Introduction

This report provides an overview of Grid Modernization and describes its relation to SCL's mission, vision, values, and the drivers of the future electrical grid at SCL. The report details eighteen projects which will help SCL lay the foundation for further project development and modernization efforts.

In 2020, the Grid Modernization team was formed at SCL to develop and support implementation of a comprehensive plan to start SCL on the path to the implementing the next-generation distribution system. The team has put together an actionable program of work for the Grid Modernization Plan and Roadmap, covering key areas for advancements identified by SCL's engineering and operational groups. The plan identifies two-year, five-year, and ten-year goals for each project. Existing resources will be used to implement the initial two-year work for these projects. The longer-term projects will require additional resources. Projects span across operations, planning, supporting technologies, and physical infrastructure upgrades.

The team will partner with EPRI in 2021 to update and refine the plan, guided by the City of Seattle priorities of decarbonization and equity using electrification as a key tool to advance these goals. The updates will be reflected in the 2022 Grid Modernization Plan and Roadmap. This work will be incorporated into SCL's utility-wide ten-year strategic thinking and six-year capital budget planning. These efforts will ensure that SCL is ready for the new technologies, challenges, and changing customer expectations facing the utility sector.

What is Grid Modernization?

Grid Modernization is an effort by utilities to implement new technologies and processes to create the grid of the future. The Department of Energy states that "the grid of the future will deliver resilient, reliable, flexible, secure, sustainable, and affordable electricity." ¹

Grid Modernization in the United States

States across the country have been moving forward on upgrading their electrical grids. In 2019, 46 states and the District of Columbia enacted some type of legislative or regulatory action related to Grid Modernization.² The ten most active states were Arizona, California, Colorado, Hawaii, Minnesota, New Hampshire, New York, North Carolina, South Carolina, and Virginia.

Key components of actions in 2019 included:

- Energy storage, including interconnection (AZ, CA, CO, MN, NH, NY, NC, SC)
- Microgrids, multiple issues addressed (CA, HI, NH)
- System planning and value of DERs (CA, NY, SC)
- Grid intelligence and data initiatives (AZ, CO, HI, MN, NH, NY, NC, VA)

¹ <https://www.energy.gov/grid-modernization-initiative>

² <https://nccleantech.ncsu.edu/2020/02/05/4683/>

- Rate pilots (AZ, CA, NC, VA)
- Investor-owned utility business model considerations, including performance-based regulation (CO, HI, MN)

Washington state has yet to enact or adopt any grid modernization regulatory or statutory requirements or rules.

Grid Modernization at Seattle City Light

The DOE guidance as stated above offers great foundational objectives for the SCL Grid Modernization projects. The grid must be resilient; able to withstand stresses without failing. The grid must be reliable and quickly recover from potentially disruptive impacts, both physical and cyber. The modern grid should also be flexible so it can both deliver and receive power, and quickly and automatically respond to changing conditions and fault events. The secure grid should not allow for intrusions and should be positioned to respond and recover quickly should they occur. To be sustainable, the energy delivered by (including that generated in) the grid should be carbon free. And finally, the grid should continue to be affordable so that everyone can enjoy the benefits of energy.

Not only must the City Light grid meet the needs of existing customer-owners, but it also needs to be ready for enablement of electrification, in the near-term, through support of the SCL Transportation Electrification Strategic Investment Plan³ (TESIP). The approach for strategic investments is described in the TESIP, including partnerships and pilots with public transit agencies such as King County Metro and Washington State Ferries and with fleet truck operators such as UPS.

This SCL Grid Modernization Plan will concentrate on grid and other physical assets as well as selected enterprise technologies. The Plan also identifies areas where legislative, regulatory or rate design changes may be needed that affect implementing the Grid Modernization projects.

Appendix A has a list of related terms defined for common usage at Seattle City Light. These definitions are sometimes different at other utilities.

Grid Modernization: Guided by City Light Values

Seattle City Light holds the following values as guiding principles towards its mission of delivering safe, reliable, and affordable power to its customer-owners: Customers First, Environmental Stewardship, Equitable Community Connections, Operational and Financial Stewardship, and Safe and Engaged Employees. This Grid Modernization Plan will enhance and accelerate SCL's ability to uphold all these values.

³ <https://cospowerlines-wpengine.netdna-ssl.com/wp-content/uploads/2020/09/SCL-Transportation-Electrification-Strategic-Investment-Plan-2021-2024-w-attachments.pdf>

- **Equitable Community Connections**
 - Especially as SCL rethinks the very architecture of the grid – including the meter as a point of demarcation – strong and broad community relationships will be very important to the success of projects. These kinds of integrated projects can fundamentally change the relationship the Utility has to its community partners for the better. SCL will leverage existing outreach efforts to engage with customers on the impacts and benefits of Grid Modernization projects.
- **Customers First**
 - Grid Modernization efforts allow the Utility to meet today's expectations and to adapt to changing customer needs. One example of such change is the customer desire for connection of distributed energy resources (DER). The Grid Modernization effort intends to achieve improved DER interconnection standards within the next two years. DERs will serve as a valuable resource for customer choice, resilience, and economics. These resources must also become a well-integrated and increasingly valuable part of how the grid itself is planned and operated.

Equitable Access

The prioritization of new projects in this plan will help ensure that new grid technologies are equitably distributed throughout the Seattle area. New planning methods such as non-wires solutions will help reduce capital expenditures and ensure continued access to clean, affordable electricity for all customer-owners.

Community Partnerships

New projects, especially those that utilize DERs or flexible load through demand response programs, will be strengthened through community partnerships throughout Seattle.

Healthy Air and Water

Electrification enablement is a key focus of this plan. With the electrification of key sectors such as public transit and the ferries, there will be significant reductions in emissions and pollution.

Resilience for Vulnerable Communities

Environmental justice communities throughout Seattle are at particularly vulnerable to environmental and natural disasters. City Light will target new technology deployments in these areas to increase their resilience to such events.

Building a Visible Energy Future

Customer-owners should be involved and be able to see the results of Seattle's commitment to creating a new energy future. This will be apparent through highly recognizable projects such as the Miller Community Center Microgrid and future DER-based projects.

- **Environmental Stewardship**
 - Decarbonization efforts will be greatly supported by Grid Modernization, as a key part of the plan is to increase the capacity for electrification and customer adoption of renewable DERs. Increases in system efficiency will best match supply and demand, getting the most out of existing renewable generation resources and reducing the need for incremental generation over the long-term.
 - SCL will ensure equitable outcomes for Grid Modernization by prioritizing Environmental Justice Communities for planning and deployments of operational projects and investments in system assets.
- **Operational and Financial Excellence**
 - Grid Modernization projects focus on increasing system reliability, flexibility, and security, all of which are critical to continued operational excellence.
 - By considering alternative methods to traditional investment, SCL should aim to decrease capital expenditures related to the buildout of new infrastructure.
- **Safe and Engaged Employees**
 - Grid Modernization is only possible through cooperation between multiple teams. Coordinating these efforts across departments will help SCL break down siloes.
 - A key aspect of Grid Modernization, increasing operational visibility, will allow the SCL grid to be operated more safely.

Drivers of Grid Modernization

Grid Modernization will allow SCL to meet the needs of its customer-owners and external partners. For example, the TESIP outlines the long-term plans of SCL to incentivize and meet the growing demand for electric vehicle (EV) charging on the distribution network. An updated strategy that prioritizes non-wires solutions will enable SCL to execute the TESIP at the highest value to customer-owners while controlling costs and meeting the timelines of both present and future partners of SCL. Similarly, economics, technology evolution, and changing codes in the region are driving customers to electrify building heating. This is another growing source of load for SCL. Consideration of non-wires solutions and new demand flexibility will provide new tools to allow the Utility to efficiently and cost effectively serve customers.

SCL customer-owners also have changing preferences about how their energy is delivered and what sources of energy they receive. DERs, such as solar power, are becoming increasingly popular among residents in the greater Seattle area. The Grid Modernization Plan will address this change in customer-owner preferences with new interconnection standards for DERs to both formalize and streamline the process for connecting distributed generation sources.

Development of Project Tables

The team is using the EPRI Grid Mod Framework to build a program that can be adapted and scaled as needed as shown in Figure 1. The current projects fall into four categories: planning,

operations, supporting technology, and physical infrastructure. The project selection process drew upon conversations throughout the utility and the Utility Next project portfolio, benchmarking with other utilities, and discussions with industry experts. These projects will allow the Grid Modernization team to support a wide range of groups across the utility.

EPRI GRID MODERNIZATION FRAMEWORK

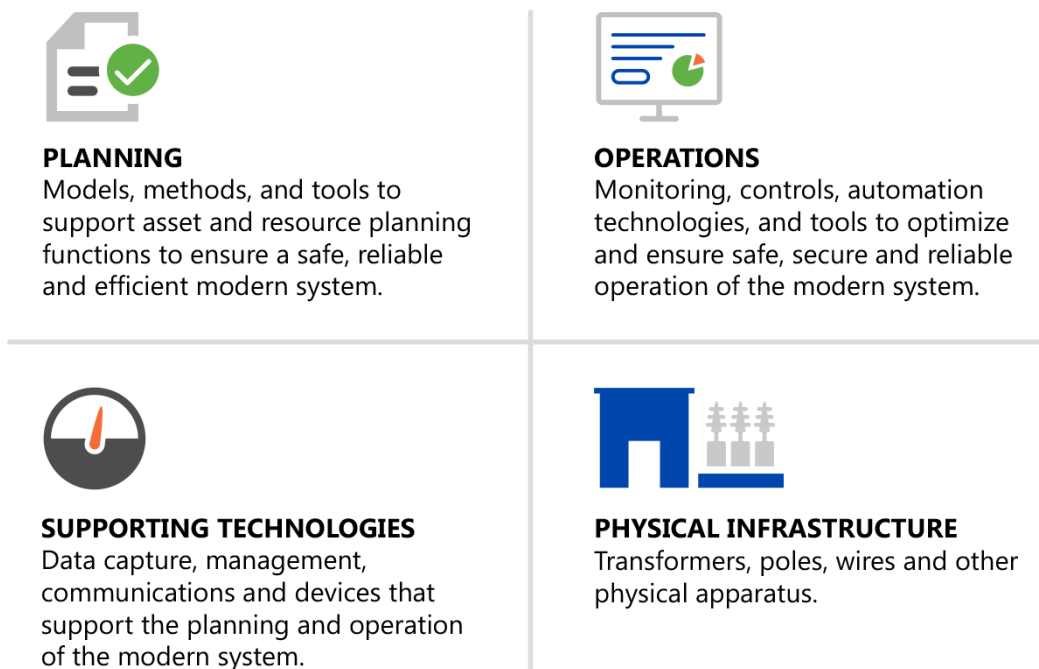


Figure 1: Grid Modernization Project Organization

Existing SCL Grid Modernization Efforts

In the last few years, City Light has been implementing many projects that fall under the “Grid Modernization” umbrella. The utility has updated the billing system and installed advanced metering infrastructure (AMI) meters throughout the service territory. The technical staff has embraced new technology that operates distribution switches either remotely or automatically. The crews have completed the fiber communication Operational Technology (OT) backbone connecting substations, generation plants, and the centralized control facilities. The recently constructed Grid Mod Lab, in the SCL’s TMO building, is a dedicated space for testing new technologies and training personnel in their use. The Outage Management System (OMS) is being upgraded and the Energy Management System (EMS) was reimplemented and now has an upgrade schedule.

City Light has nearly completed the deployment of an AMI network for billing about half a million customers. The Utility is also able to use this network and the Advanced Grid Analytics (AGA) platform to assess the loading of distribution transformers through AGA’s Asset Loading

module. In addition, City Light has been working since 2015 to deploy fault location, isolation, and service restoration (FLISR) distribution automation equipment on the most outage prone feeders at multiple substations. This system significantly reduces the number of customers affected by, and the duration of, power outages. It is critical to a resilient and reliable grid.

In 2019, the Utility began to participate in a regional utility DER planning group with PSE, Snohomish PUD, Tacoma Power, Avista, and Pacific Power to share technical approaches in implementing new technologies. SCL also began to deploy distribution line sensors which will provide a near-real time alert to dispatchers about faults. As a “value added” feature, the communication system being used is the same as the AMI meters. The reimplementation of the OMS, especially relating to system status data, will be crucial to best utilizing this project and others like it.

The Grid Mod Team has developed detailed project tables. Some of the work proposed is an extension of on-going Grid Modernization projects, while others are newer ideas that benefit our customer-owners or have operational value. These are described in a later section of this document. The tables identify the current state, two, five, and ten-year goals for each project, as well as action items required to meet those goals. Risks and required integrations associated with each project are also described. There is a brief description of each project’s value and importance to SCL’s mission. They are sorted by category but are not listed by importance. Prioritization will be reflected in the next update to this plan and will require further discussion and decision-making. Leadership will be providing strategic guidance, and implementation will ultimately depend on what projects are funded and staffed for 2021-2022 and beyond.

Budget: Existing and Future

Other than the existing work done by the Grid Modernization team around distribution automation, the projects listed in this document are currently unbudgeted. Funds for project work over the next two years will come from various SCL CIP and O&M budgets. Later phases of implementation under this Grid Modernization plan will require incremental capital requests and re-prioritizing existing capital funding as City Light modernizes approaches and solves problems in new ways.

Staffing: Existing and Future

The Grid Modernization team at City Light will be involved in every project outlined in this document. However, these projects and the broader Grid Modernization effort requires participation and support from a wide variety of teams within City Light. In many cases, Grid Modernization projects will affect work procedures as City Light approaches traditional problems in new and innovative ways. As such, the Grid Modernization team has made recommendations as to which groups should be involved in each project. See Table 2 for an overview of the projects and lead teams. This report also identifies projects where external consultants may be necessary. For the complete list, see the Grid Mod Project Staffing section.

Lead Team	Projects
AMLP – Asset Management	<ul style="list-style-type: none"> Targeted Lightning Arrestors on OH Transformers
AMLP – GIS	<ul style="list-style-type: none"> Advanced Grid Analytics: Enhanced Connectivity Models
AMI – OPS	<ul style="list-style-type: none"> Landis and Gyr Mesh Communication Network Assessment
CCES	<ul style="list-style-type: none"> Demand Response Pilot
EST – Electrification	<ul style="list-style-type: none"> Managed EV Charging
EST – Grid Mod	<ul style="list-style-type: none"> Continued Grid Modernization Plan Development Distribution Automation (all projects) Line Sensor Deployment OT Field Area Network – Pilot Project PNNL Seattle Waterfront Resiliency Study
EST – Strategic Technology	<ul style="list-style-type: none"> Miller Community Center Microgrid Plan
ETO – Distribution Planning	<ul style="list-style-type: none"> DER Interconnection Studies and Procedures Energy Storage Technology Non-Wires Solutions Analysis
SCL Enterprise Cybersecurity	<ul style="list-style-type: none"> Cybersecurity for Grid Monitoring and Control

Table 2: Grid Mod Staffing Overview

Organizational Change Management Approach

Multiple models have been developed to prepare and support individuals and teams in making organizational changes. Prosci's ADKAR model⁴ is one of the commonly used approaches for this purpose. There are five building blocks of successful change for an individual:

- Awareness of the need for change
- Desire to participate and support in the change
- Knowledge of what to do during and after the change
- Ability to realize or implement the change as required
- Reinforcement to ensure the results of a change continue

⁴ <https://www.prosci.com/resources/articles/why-the-adkar-model-works>

Based on surveys of practitioners, Prosci has assembled seven factors, as shown in Figure 2, that are best practices⁵ for managing change:

1. Mobilize an active and visible primary sponsor
2. Dedicate change management resources
3. Apply a structured change management approach
4. Engage with employees and encourage their participation
5. Communicate frequently and openly
6. Integrate and engage with project management
7. Engage with middle managers



Figure 2: Prosci's Seven Best Practices Factors for Change Management

⁵ <https://www.prosci.com/hubfs/367443/2.downloads/thought-leadership/7-Best-Practices-in-Change-Management-TL.pdf?hsLang=en-ca>

Organizationally, SCL's leadership is actively engaged in sponsoring change management efforts; however, the application is often limited to a few practitioners and is not generally viewed as a key competency of the organization. In the next two years, the Grid Mod Team will identify two or three key factors and incorporate those into the project work. Change management is a key aspect of transformative work such as Grid Modernization. Effectiveness in change management will be key to success. Recommendations will be made to leadership on whether additional resources, efforts, or training are needed.

Conclusion and Next Steps

By completing the 18 projects described in this document, SCL will be able to enable electrification efforts and to advance organizational and technical preparedness for future grid technologies. The SCL Grid Modernization Team is the facilitating organization for the work presented in this and future versions of the plan. The entire utility shares ownership of the work and the goals to implement the vision presented here as depicted in Figure 3. The Electrification and Strategic Technology division will serve as monitors of progress. The team will coordinate and collaborate with the utility's strategic vision and support overall organizational engagement. Ultimately, grid modernization will help ensure that SCL is able to deliver equitable, resilient, reliable, flexible, secure, sustainable, and affordable electricity to our customer-owners for years to come.

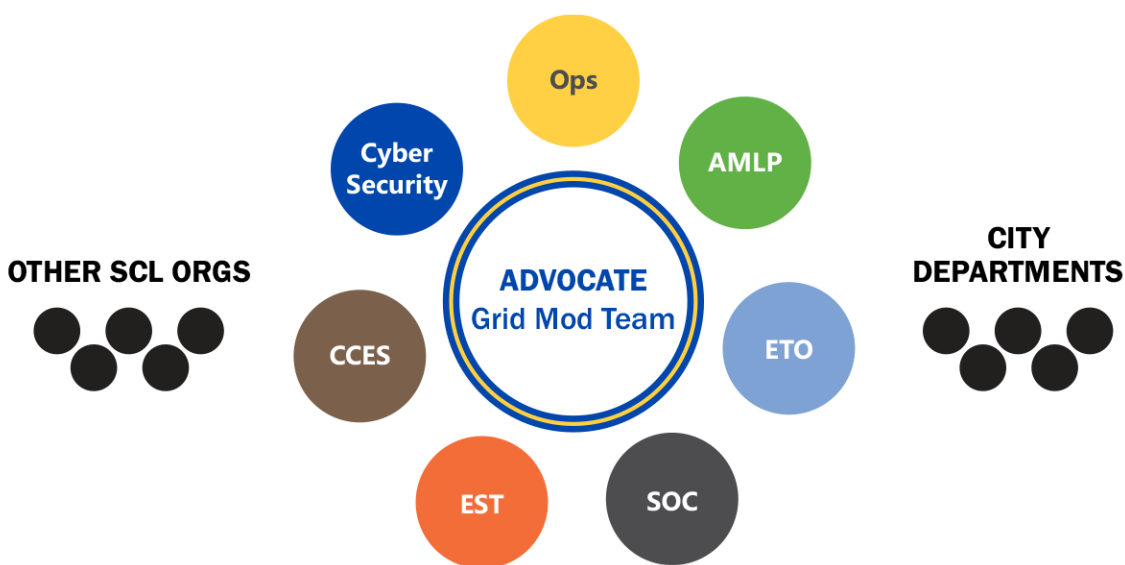
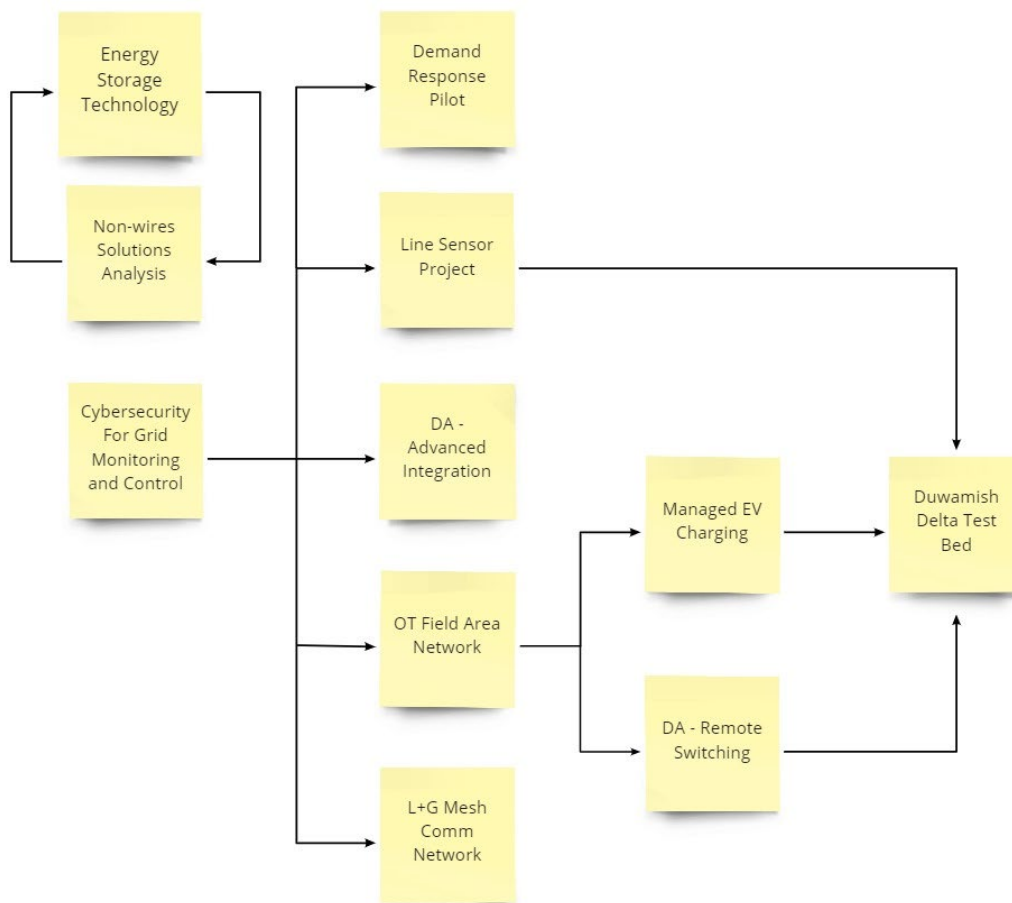


Figure 3: Distributed Project Implementation with Grid Mod Team supporting as strategic lead

Grid Modernization Dependencies

After projects are selected, a timeline incorporating resourcing constraints can be built. Given the optionality of the current plan, a dependency diagram shows interdependence of projects that appear disparate. This section shows the most significant dependencies for projects in this roadmap.



Work With No Grid Modernization Project Dependencies



Figure 4: Grid Modernization Plan Dependencies

Detailed Project Tables

(Two-year goals are highlighted in grey)

SCL's Detailed Capability Development — Planning		
Objective: Focusing the Grid Mod Plan Development		
Prioritization Reason: Modernizing the grid will take a concerted and well thought out effort with a focus on electrification enablement and equity.		
Continuing Grid Mod Planning	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
Technical <ul style="list-style-type: none"> • Distribution Automation project (DA-FLISR) • Line Sensor Pilot • 2021-2022 Grid Mod Plan – Based on EPRI Framework (Planning, Operations, Supporting Technologies, Physical Infrastructure) Policy: <ul style="list-style-type: none"> • Loosely organized federation of projects 	Technical <ul style="list-style-type: none"> • Determine the long-term scope (10 year or longer) of the Grid Mod Roadmap • Define and/or confirm Organizational Grid Mod Objectives • Identify Technical and Organizational Capabilities to achieve each objective • Develop Roadmaps and System Engineering Analysis • Develop and obtain funding for key projects Process <ul style="list-style-type: none"> • Update Grid Mod Plan on regular intervals • Funding for identified projects • Project approach identified and key SCL positions obtained, identified, and filled 	Technical <ul style="list-style-type: none"> • Implemented Grid Mod projects Process <ul style="list-style-type: none"> • Update Grid Mod Plan on regular intervals
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> • Hire and engage with EPRI to build a long-term Grid Mod Roadmap • Perform business case analysis to justify budget and staffing • Implement projects 	<ul style="list-style-type: none"> • Continue to Implement projects 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> • Paradigm shift for many parts of the organization—previously problem and budget driven moving towards objectives and capability driven 	<ul style="list-style-type: none"> • Integration with SCL business processes so the Roadmap can be implemented. 	

SCL's Detailed Capability Development — Planning		
Objective: Update SCL Procedures for New Customer Technologies		
<p>Prioritization Reason: In the recent past, SCL customer-owners are adding more solar and other DERs (Residential and Commercial scale). SCL's interconnection procedures were developed in 2009 and are ready for realignment with the business processes.</p>		
DER Interconnection Studies and Procedures	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Process:</p> <ul style="list-style-type: none"> • Currently processes accommodate customer requests but don't necessarily integrate with the distribution system • Interconnection Procedures from 2009/2012; "solar" only, new technologies not considered. • Multi-step process based on size: <ol style="list-style-type: none"> 1) submit application (size, location, details); 2) pay study fee; 3) study impact (duration varies significantly); 4) study results issued; 5) design, construction, testing 6) contracts & documentation 	<p>Technical:</p> <ul style="list-style-type: none"> • Interconnection Procedures incorporating IEEE 1547-2018 aka "smart" inverters • Standardized use cases, including grid services • Studied feeder-level hosting capacity • Monitoring and control requirements in place to support grid services <p>Policy:</p> <ul style="list-style-type: none"> • Monetize functionality of "smart" inverter-based systems, including grid services <p>Process:</p> <ul style="list-style-type: none"> • Updated screening criteria for DERs • Pilot new processes to validate improvements <p>Tools:</p> <ul style="list-style-type: none"> • Online customer application DER portal 	<p>Process:</p> <ul style="list-style-type: none"> • DER interconnection process to feed into other "planning" processes to capture load forecasting impacts from DER <p>Tools:</p> <ul style="list-style-type: none"> • Automated interconnection process for DER • Implemented DERMS
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> • Establish desired use cases for DERs, including grid services • Establish a value for DER grid services, using a repeatable process • Update the interconnection process and address the inverter settings reqts • Assess and implement any new policies for customer provided grid services. Change to a two-way financial relationship • Improve the technical analysis process for fast-track and screening criteria • Develop an online application portal for DERs with customer self-screening • Develop a policy and plan, addressing monitoring information and control (MIC) for customer owned DERs, and implement plan 	<ul style="list-style-type: none"> • Develop new tool sets to further automate and decrease time for management and technical review of interconnection • Integrate DER interconnection process into greater planning process to feed DER data into load and DER forecasts 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> • Operationally, the primary utility function is to "protect" the grid, balancing the benefits of any given DER against exposing the grid to new risks • Evolving industry standards for DER operation and interconnection • Limited value of DERs for grid services without direct control and communications • Lack of policy relevant to monitoring information and control (MIC) for DER. • SCL staff lacks availability and expertise to implement to implement program • Many internal and external stakeholders with different priorities 	<ul style="list-style-type: none"> • Integrate new SCL DER Interconnection Standards with current work flows • New tool sets work with existing applications • Regulated by WA state, for DER interconnections (WAC 480-108) 	

SCL's Detailed Capability Development — Planning

Objective: Extract Additional Value from AGA Tool

Prioritization Reason: Enhance accuracy of distribution system electrical connectivity model for better planning, engineering and operation.

AGA: Enhanced Electrical Connectivity Model	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<ul style="list-style-type: none"> • SCL has implemented three AGA (Advanced Grid Analytics) modules: <ul style="list-style-type: none"> ○ Asset Loading Module ○ Revenue Protection Module ○ Reliability Planner Module • GIS model accuracy is essential for planning and engineering • GIS electrical model connectivity is a requirement for OMS (reimplementing currently) and ADMS (future) • The most common challenge of ADMS implementation is the GIS model accuracy. • Some planning tools can verify GIS models, but with limitations. 	<ul style="list-style-type: none"> • GIS LRDS upgrade is complete • AGA Model Validation modules improve the electrical connectivity model in GIS (Service Transformer to Substation) and CCB (Meter to Service Transformer) • The detailed GIS model of distribution system will be verified using AGA data verification module. • The electrical connectivity model is ready to integrate with OMS • The GIS loop radial distribution model is valid and ready for ADMS implementation 	<ul style="list-style-type: none"> • GIS network is upgraded • The detailed new GIS model of distribution system will continue to be verified using AGA data verification module. • ADMS successfully build distribution system model using the verified GIS model.
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> • The GIS team uses AGA to validate the electrical model in the LRDS GIS upgrade implementation • Test and verify that AGA modules can be used to improve the electrical connectivity model accuracy • Complete connectivity model validation using AGA • Verify GIS model and AGA data verification module of four to six OH feeders using other engineering tools and field verification. • Evaluate the AGA module performance with those OH feeders • Use the AGA validated data for OMS outage identification • Use those four to six feeders for ADMS concept demo 	<ul style="list-style-type: none"> • The GIS team uses AGA to validate the electrical model in the LRDS GIS data maintenance • Continue to use the AGA validated data for OMS • Use the AGA validated data for ADMS implementation 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> • The GIS upgrade is postponed due to resource adjustment • The AGA performance is unknown. If this project moves forward, suggest to use phase approach and have different contract for each phase depending on previous phase performance. 	<ul style="list-style-type: none"> • Resources and budget to implement the plan • The new upgraded OMS with DA-FLISR and Remote Switching support • The OT centralized cybersecurity system, and OT network landing zone are in place • GIS LRDS Project has been completed 	

SCL's Detailed Capability Development — Planning		
Objective: Provide Innovative Solutions to Customers		
Prioritization Reason: The Port of Seattle is a key infrastructure partner for the City of Seattle. Keeping the Port operational will help Seattle recover after major natural disasters.		
PNNL Seattle Waterfront Resiliency Study	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical</p> <ul style="list-style-type: none"> The waterfront is served from the north and south 26kV distribution system and the downtown network system SCL has many switching points in the 26kV system SCL's network grid has very few outages but is geographically constrained and does not serve large industrial loads Washington State Ferries is in the process of electrifying two routes out of Colman Dock <p>Policy</p> <ul style="list-style-type: none"> City Light is working with Port of Seattle to develop their Clean Energy Strategic Plan to decarbonize their operations 	<p>Technical</p> <ul style="list-style-type: none"> Technical study of networked microgrids with multiple sources of electricity generation 10-Year Action Plan for Resilient Ports <p>Policy:</p> <ul style="list-style-type: none"> Supporting resilient ports for social good Decarbonize transportation, including vehicles and marine vessels Increase clean energy jobs on waterfront <p>Process:</p> <ul style="list-style-type: none"> Identify problems and possible solutions→Study Feasibility→Concept/Pilot projects→Assess→Full Implementation→Training <p>Tools:</p> <ul style="list-style-type: none"> Study using GridLAB-D 	<p>Technical</p> <ul style="list-style-type: none"> Build-out system of microgrids with waterfront partners <p>Policy</p> <ul style="list-style-type: none"> Incentivize renewable generation Explore new ownership and maintenance models for DERs as system assets Encourage/Monetize resilient ports for social good
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Partner with PNNL to complete the networked microgrid study Assess regional social value of resilient ports Train people for clean energy jobs related to renewable energy microgrids 	<ul style="list-style-type: none"> Apply for grants to build microgrids Design the system of microgrids Build microgrids 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Resiliency problem is too hard to solve with limited infrastructure spending Land is difficult to set aside for microgrid equipment or renewable energy resources Operational complexity outweighs benefits 	<ul style="list-style-type: none"> Federal and State grants available Coordinated clean energy plans for the City of Seattle, the Port of Seattle, the NW Seaport Alliance, etc. 	

SCL’s Detailed Capability Development — Planning

Objective: Offer New Technologies to Environmental Justice Communities

Prioritization Reason: The City of Seattle is committed to decarbonization and equity and this program advances both goals.

Duwamish Delta Test Bed Project	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical</p> <ul style="list-style-type: none"> Served by multiple substations—Customer-owners in neighborhoods around the Duwamish River served by portions of SCL South Substation, Delridge Substation, and Duwamish Substation Vulnerable to natural disasters such as earthquakes, liquefaction, etc. Aging infrastructure in some areas <p>Policy:</p> <ul style="list-style-type: none"> SCL has no special policies related to the electrical system in this area SCL assesses projects using a Race and Social Equity Toolkit <p>Process:</p> <ul style="list-style-type: none"> SCL has no special technical or business processes related to the electrical system in this area <p>Tools:</p> <ul style="list-style-type: none"> SCL using standards analysis and engineering tools in this area 	<p>Technical</p> <ul style="list-style-type: none"> Upgrade Duwamish feeder breakers with SCADA Identify targeted electrification projects, concentrating on transportation electrification. Work with the TE Program Manager and considering personal vehicles, fleets, buses, trucks, dredging, etc. Explore feasibility of NWS to facilitate increased electrification for some projects Pilot projects implemented (line sensors, remote switching, etc.) Demand Response Pilot in the Duwamish Valley SCL-PNNL Study for waterfront networked microgrids SCL-PNNL H2@Scale DOE Study Project <p>Policy:</p> <ul style="list-style-type: none"> Prioritize grid improvements in Envir. Justice communities by Establishing Grid Mod Test Bed Thru electrification, support City of Seattle decarbonization goals and improve air quality Local jobs to implement the pilot projects <p>Tools:</p> <ul style="list-style-type: none"> Advanced Planning to incorporate NWS in SCL infrastructure decisions Partnerships for workforce development 	<p>Technical, Policy, Process, and Tools</p> <ul style="list-style-type: none"> Develop longer-term goals in the near-term after further exploration

Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State
<ul style="list-style-type: none"> Focus portion of TE SIP towards the Duwamish Delta/Duwamish Valley Community and Stakeholder outreach to establish a SCL Grid Mod test bed for equitable outcomes for customer-owners Scope and implement Duwamish Delta pilot projects (including line sensors, remote switching, Demand Response, etc.) Support PNNL studies with technical staff and data Obtain wider COS support for this approach 	<ul style="list-style-type: none"> Develop longer-term TE and Grid Mod goals in the near-term after further exploration Continue new technology test bed to offer solutions in an Environmental Justice community

Considerations and Risks to Achieving the Future State	Dependencies and Integrations
<ul style="list-style-type: none"> Staff resources—focused pilot-area program manager and technical staff Limited focus of TE Program Manager Budget for new pilot projects 	<ul style="list-style-type: none"> Continued access to On-Call Consultant Roster Collaboration with City of Seattle departments and neighborhood organizations and advocates PNNL and DOE resources

SCL's Detailed Capability Development — Planning		
Objective: Explore New Approaches to Solve Traditional Problems		
Prioritization Reason: SCL requires, based on regulations and technical necessity, screening and evaluation criteria for non-wires solutions (NWS) during the planning process.		
Develop Non-Wires Solutions Design and Application Guidelines	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical:</p> <ul style="list-style-type: none"> Customers are increasingly deploying DERs and District Energy Systems that could be considered NWS SCL staff are learning about the benefits of NWS to facilitate new large loads Feeder utilization is based on annual peak loading (winter and summer) – not hourly (8760) or 576 cases <p>Process:</p> <ul style="list-style-type: none"> NWS are not considered as alternatives to traditional investments SCL has no formal processes to value, screen, or evaluate NWS Many of City Light's largest customers are developing long-term electrification plans that could create significantly and costly demands for the deployment of traditional T&D solutions. 	<p>Technical:</p> <ul style="list-style-type: none"> SCL has developed NWS screening criteria and incorporates NWS into the planning process Feeder utilization limits and forecasts based on 576 or 8760 analysis New NWS analysis tools on-boarded <p>Policy:</p> <ul style="list-style-type: none"> NWS are considered as alternatives to traditional investments Probabilistic forecasts for DERs included in the Integrated Resource Plan Programs are in place to fairly compensate customers for NWS projects where applicable (on-site DERs, demand response, etc.) <p>Process:</p> <ul style="list-style-type: none"> SCL has a defined process and proper evaluation criteria for NWS option projects 	<p>Technical:</p> <ul style="list-style-type: none"> NWS screening and evaluation criteria have been updated to reflect recent trends and lessons learned during previous NWS projects SCL has evaluated available tools to automate processes where possible
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Do a "Best Practice" analysis of other utilities and existing frameworks for NWS screening and evaluation Develop NWS screening criteria, application guidelines, engineering standards and specifications for projects Pilot the developed tools and skills into upcoming projects (e.g. ferry and bus electrification) Formalize processes in SCL distribution planning around NWS Select proper tools for NWS analysis to be done 	<ul style="list-style-type: none"> Continue to evaluate available tools in the market that would automate or make easier NWS analysis Compile lessons learned on the deployment of NWS for future projects Update NWS screening and evaluation criteria to capture new market trends and widen criteria to include more projects 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> SCL lack the internal resources and/or technical skillset to develop NWS screening criteria internally/independently Tools currently available may not allow planners to properly evaluate NWS Additional distribution planners may need to be hired Common understanding of NWS technologies required (PV, batteries, demand response, TOD rates, managed EV charging, etc.) 	<ul style="list-style-type: none"> NWS processes should integrate effectively with distribution planning processes SCL must abide by RCW 19.280.100 Distributed Energy Resource Planning, including NWS Collaboration required across SCL groups for NWS analysis (e.g. EST, ESE, Distribution Planning) Customer interest and engagement may be required 	

SCL's Detailed Capability Development — Planning		
Objective: Assess Batteries as Solutions to many Grid and Customer Issues		
Prioritization Reason: Energy storage is an integral part of NWS. An understanding of its usefulness & effectiveness is required for advanced planning purposes.		
Energy Storage Technology	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical:</p> <ul style="list-style-type: none"> SCL has relatively high voltage (26.4 kV) and short feeders, which tend to minimize grid support issues. Current voltage control equipment includes load tap changers and capacitor banks in substations; few devices are located on feeders. There are a few small customer-owned battery energy storage systems (BESS) City Light is deploying storage at the Miller Community Center Microgrid Storage is being considered to help manage Washington State Ferry electrification <p>Policy:</p> <ul style="list-style-type: none"> Market value of storage is still evolving. Power quality issues are addressed in response to customer complaints. <p>Process:</p> <ul style="list-style-type: none"> ESEs, planners, & distribution engineers work mainly with traditional methods of serving customer-owners. They do not have the time or tools to analyze alternative solutions. 	<p>Technical:</p> <ul style="list-style-type: none"> Energy storage technology is employed on the distribution system, where appropriate, to solve a variety of problems. Typical uses include power quality issues, feeder capacity upgrades, load smoothing, resiliency, etc. <p>Policy:</p> <ul style="list-style-type: none"> Planning for electrification has a long term, strategic focus Non-wires Solutions (NWS) such as energy storage are considered a standard method of addressing problems on the grid <p>Process:</p> <ul style="list-style-type: none"> Engineers & planners develop the skills needed to analyze situations where NWS should be considered as an alternative to traditional energy delivery methods. SCL adopts a standardized methodology for benefit-cost analysis for all distributed energy resources. SCL develops expertise and ownership of maintenance for City owned storage systems 	<p>Policy:</p> <ul style="list-style-type: none"> SCL develops a strategic plan for electrification that considers all viable methods of delivering power to customers. Storage is fully valued by analytical methods. <p>Process:</p> <ul style="list-style-type: none"> NWS becomes a standard tool used by engineers & planners to address technical or financial limitations encountered with traditional methods. SCL manages storage for the benefit of the distribution and transmission grids.
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Incorporate knowledge about NWS into planning. Additional training for technical personnel about considerations for the uses and limitations of various storage technologies and about analysis of storage options for grid benefits. Develop and implement a standardized benefit-cost analysis for use with DERs 	<ul style="list-style-type: none"> Develop a strategic approach that considers long-term customer load projections. Develop communications and software that enable storage management by dispatchers. 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Energy storage is a broad and evolving field. Full understanding requires covering a lot of technical material. SCL technical personnel have limited time available to learn new technology. Strategic development requires support from top level management. It may also entail reorganization. Analytical tools & methods must be unique to SCL. This development requires time & effort. Management of storage on the distribution grid for the benefit of the transmission grid requires very careful and detailed planning studies to protect the distribution system. 	<ul style="list-style-type: none"> Pilot projects should involve SCL engineers & technicians in order to develop in-house understanding of the technologies and how to maintain these systems. Storage management depends on development of a suitable communications system. New technologies may require additional and/or revised safety procedures. 	

SCL's Detailed Capability Development — Operations		
Objective: Minimize Customer Outages		
Prioritization Reason: One of the most effective technologies to improve system reliability and customer satisfaction. Also, improve operational efficiency, situation awareness, reduce carbon footprint, and enhance safety.		
DA-FLISR Expansion	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<ul style="list-style-type: none"> Seven DA feeders are in service. Working on five feeders out of University substation and four feeders out of Creston substation Using automated switches to improve efficiency and reduce sustained outages which are caused by faults on main lines. 	<ul style="list-style-type: none"> Implement the planned additional FLISR schemes on multiple feeders at multiple substations Fully integrated with the OMS Integrated with the centralized OT Cybersecurity system Implement additional cutting-edge technologies to further improve system reliability, improve power quality, reduce momentary outages, and reduce operational cost. 	<ul style="list-style-type: none"> Expand the implementation to 20% total overhead feeders Further implement cutting-edge technologies to further improve system reliability, improve power quality, reduce momentary outages, and reduce operational cost. Leading in implementing new technologies to improve customer satisfaction, system reliability, power quality, and work efficiency. Integrated with potential ADMS
Action Items: Current State → 5-Yr Future State		Action Items: 5-Yr Future State → 10-Yr Future State
<ul style="list-style-type: none"> Develop the needed staff resources for the program. Continue to implement the expansion of DA-FLISR Integrate DA with OMS Build DA cybersecurity monitoring system and integrate it to the centralized OT cybersecurity system 		<ul style="list-style-type: none"> Evaluate the performance of the new pilot projects using new FMS (Feeder Management System) Implement the proved successful technologies from pilot projects to the main program Continue to expand the implementation, averaging two feeders per year. Develop and implement the integration plan with future ADMS
Considerations and Risks to Achieving the Future State		Dependencies and Integrations
<ul style="list-style-type: none"> The primary risks are lacking of funding and dedicated resources Higher priority projects in later years of the project may take away some resources and funding. Many internal and external stakeholders with different priorities Routine maintenance required. 		<ul style="list-style-type: none"> Resources and budget to implement the plan Integrate with current EMS, PI historian, updated OMS and future ADMS

SCL's Detailed Capability Development — Operations		
Objective: Improve Operational Efficiency		
Prioritization Reason: Improve system reliability, operational efficiency, situation awareness, reduce carbon footprint, and enhance safety.		
DA-Remote Switching	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<ul style="list-style-type: none"> SCL distribution switches are manual operation, except for DA-FLISR feeders Manual switching is taking significantly longer time to restore outages, is more expensive, and is less safe No situation awareness in real-time Manual switching increase carbon footprint due to more windshield time 	<ul style="list-style-type: none"> Two pilot systems in two different areas are in service. Each system will include two feeders with two normal-closed switches and one normal-open switches The new systems are integrated with SCADA/EMS Integrated with potential NWS projects Integrated with potential TE projects Integrated PI historian Integrated with DA-FLISR Developed plan for system-wide implementation 	<ul style="list-style-type: none"> A dedicated team is formed to implement the project in large scale Expand the implementation up to 50% of total overhead feeders depending on the budget and staffing resources Improve system reliability, enhance customer satisfaction, improve safety, and reduce carbon footprint. The larger size of the project, the more impact it will have Integrated with potential ADMS Support future TE, NWS projects Expand the system capabilities in some areas to become DA-FLISR to further improve system reliability
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Develop the needed staff resources for the program. Study potential TE and NWS potential areas, distribution system performance, outage and switching history, other distribution projects to select pilot feeders that can provide optimal benefits Test required communications in a lab and in the field for different environments Integrate with EMS/SCADA and PI historian Integrate with OMS, DA-FLISR, etc. Integrate with potential TE and NWS projects Evaluate the pilot projects Study distribution system performance, outage and switching history, planned TE, NWS and other distribution projects to develop short-term and long-term plan for expanded system. 	<ul style="list-style-type: none"> Form a dedicated team including various engineers, dispatcher, EMS specialists, technicians, line crews with support from the E-team Develop construction, material, practice standards relating to project's material and construction Develop construction priority schedule Design, install and commission the large-scale implement project 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> The primary risks are lack of funding and dedicated staffing resources Higher priority projects in later years of the project may take away some resources and funding. Many internal and external stakeholders with different priorities 	<ul style="list-style-type: none"> Must have an expanded cyber-secure communication network ready for this project as described in the "OT-Field Area Network project" Need new cybersecurity monitoring system Resources and budget to implement the plan Integrate with current EMS, PI historian, OMS, DA-FLISR and future ADMS 	

SCL's Detailed Capability Development — Operations		
Objective: Improving the Integration and Cybersecurity of the DA System		
Prioritization Reason: Enhance cybersecurity, improve system reliability and operational efficiency of the DA systems.		
DA-Advanced Integration	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<ul style="list-style-type: none"> Current DA systems integrated with SCADA/EMS and PI historian. The integration with OMS is essential but has not been implemented due to limitation of the existing OMS (2009) version. Lack of OMS-DA integration reduces dispatchers' efficiency, leads to confusion, and inaccurate outage reports and reliability indices New OMS upgrade is being planned (2021+) Enterprise OT cybersecurity monitoring system is being developed (DA needs its cybersecurity monitoring system.) Lack of effective tool to collect and analyze outage events data, to proactively diagnose and troubleshoot DA device conditions to optimize the system performance 	<ul style="list-style-type: none"> New DA cybersecurity monitoring system is designed, and built for DA-FLISR The cybersecurity system will be integrated with the OT centralized cybersecurity system New upgraded OMS is implemented DA-FLISR is integrated with new upgraded OMS The new Feeder Management System (FMS) is designed and implemented. FMS is integrated with cybersecurity monitoring system, with OT network landing zone and remote access. 	<ul style="list-style-type: none"> The new DA-remote switching system is integrated to the DA cybersecurity monitoring system. The new DA-remote switching system is integrated to OMS FMS will integrate with the DA-remote switching system The new integration will also cover for the expanded/large scale DA-FLISR and remote switching systems
Action Items: Current State → 5-Yr Future State		Action Items: 5-Yr Future State → 10-Yr Future State
<ul style="list-style-type: none"> Develop the needed staff resources for design, implementation and manage the new systems Confirm OMS upgrade (2021+) requirements support DA-FLISR Set up and test OMS and DA-FLISR integration in a lab environment Test and implement OMS and DA-FLISR integration Design and test cybersecurity system for DA-FLISR in the Grid Mod Lab Implement the new cybersecurity system and test with DA-FLISR system Integrate the new cybersecurity system with the OT centralized cybersecurity system Design and test FMS in the Grid Mod Lab Design, implement, and test FMS with Shoreline DA feeders (original pilot) Integrate all DA feeders to FMS, OMS, and cybersecurity 		<ul style="list-style-type: none"> Set up and test OMS and DA-remote switching integration in a lab environment Test and implement OMS and DA-remote switching integration Design and test the DA cybersecurity system for DA-remote switching in the Grid Mod lab Test the DA cybersecurity system with the new DA-remote switching system Design, implement, and test FMS with the pilot remote switching system Integrate all future DA-FLISR, remote switching with OMS, DA cybersecurity monitoring system, and FMS
Considerations and Risks to Achieving the Future State		Dependencies and Integrations
<ul style="list-style-type: none"> The primary risks are lack of funding and dedicated staffing resources System integration is typically challenging and may take more time and effort than initially forecast The OMS and cybersecurity system will be upgraded periodically and this may cause delay in the subsequent integration 		<ul style="list-style-type: none"> Resources and budget to implement the plan The new upgraded OMS support DA The OT centralized cybersecurity system, and OT network landing zone are in place.

SCL's Detailed Capability Development — Operations		
Objective: Enable Connections to Distributed Equipment		
Prioritization Reason: The project will expand SCL capabilities and functionalities to improve system resiliency, reliability, responsiveness, and adaptation, to speed up decarbonization, to enhance safety, to improve operational efficiency, to increase life expectancy of assets, and to optimize energy delivery and customer service options		
OT Field Area Network	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<ul style="list-style-type: none"> SCL AMI project is utilizing radio mesh network which is less expensive than an SCL owned Field Area Network, but it is also less reliable, secure, high latency, narrow bandwidth. It is not currently used for critical control applications. The communication for DA-FLISR is fiber optics, which is reliable, secure, fast speed, broad bandwidth, yet, is more capital intensive, and takes longer to implement. Identified the need for reliable, secure communication to meet the needs of new field technologies. Those new projects include but are not limited to Managed TE, DER, NWS, DA-FLISR, remote switching, line sensor, etc. 	<ul style="list-style-type: none"> Two pilot systems in two different areas are implemented and evaluated—criteria: Environmental Justice Communities, hilly-treed areas, etc. The pilot communication will serve one or two new grid mod projects: remote switching, line sensor managed TE, DER, Connected Grid Building, or NWS The new systems are integrated with SCADA/EMS/ADMS Developed plan for large scale implementation 	<ul style="list-style-type: none"> A dedicated team is formed to implement the project in large scale Expand the implementation up to 50% of SCL service area depending on the budget and staffing resources The new communication will serve as standard communication for new distribution field projects such as managed TE, DER, NWS, DA-FLISR, remote switching, line sensor, etc. and reduce their cost, reduce design and implementation durations and increase their chance of success
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Develop the needed staff resources for the program. Develop the high-level communication system network design Develop new communication devices specs and purchase new devices Test the new communication in the lab Study and selected two different testing areas to test the communication performance with different environments. Design, install and commission the pilot projects Evaluate the pilot projects Develop the plan for possible large-scale implementation Obtain budget for large-scale implementation project 	<ul style="list-style-type: none"> Form a dedicated team including various engineers, technicians, line crews with support from the E-team Develop construction, material, practice standards relating to project's material and construction Develop construction priority schedule Design, install and commission the large-scale implement project Develop communication network guidelines including common communication protocols for new distribution field projects such as but not limited to managed TE, DER, NWS, DA-FLISR, remote switching, line sensor, energy delivery optimization, advanced distribution system protection. 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> The intention is to supplement and possibly replace the AMI mesh network with a more robust and capable OT FAN The primary risks are lack of funding and dedicated staffing resources Higher priority projects in later years of the project may take away some resources and funding Many internal and external stakeholders with different priorities. Communication technologies have short lifecycles and current best technologies can be outdated quickly 	<ul style="list-style-type: none"> Resources and budget to implement the plan Integrate with backbone communication, and DA-FLISR communication networks. Evaluate possible shared City infrastructure. 	

SCL's Detailed Capability Development — Operations		
Objective: Implement and Analyze Demand Side Management		
Priority consideration: Demand response is an emerging technology which City Light can use for a variety of grid services, e.g. load shifting		
Demand Response Pilot	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical:</p> <ul style="list-style-type: none"> SCL currently has not implemented demand response or customer-controlled loads Initial pilot scoping and valuation work was conducted with a focus on industrial customers Demand Response Potential has been assessed as part of City Light's Conservation Potential Assessment Integrated Resource Plan updates forthcoming in early 2021 will inform long-term value of demand response resources Interest has been expressed in a residential and small-commercial focused pilot with impacts in the Duwamish Valley. 	<p>Technical:</p> <ul style="list-style-type: none"> Conduct pilot project (2021-2022). Define grid value and peak-shaving needs now and in the future Grid interactive water heaters and possibly smart thermostats for residential customers and/or small commercial Assess pilot results and potential long-term value Review relevant case studies at other utilities, including behavioral DR <p>Policy:</p> <ul style="list-style-type: none"> Consider demand response programs for load shifting and other grid services. <p>Process:</p> <ul style="list-style-type: none"> Develop & pilot various DR programs. Engineers & planners develop the skills needed to analyze situations where DR should be considered for grid benefits. SCL adopts a standardized methodology for benefit-cost analysis for demand response resources. 	<p>Technical:</p> <ul style="list-style-type: none"> SCL has installed a Distributed Energy Resources Management System (DERMS) for wide-scale implementation of DR control. Participating customer resources and customer sectors expand. <p>Policy:</p> <ul style="list-style-type: none"> SCL is engaged in regional DR programs at MW scale. SCL actively seeks grid benefits from DR. <p>Process:</p> <ul style="list-style-type: none"> DR becomes a standard tool used by marketers, planners, & engineers to produce financial and grid benefits for SCL's customer-owners.
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Determine specific objectives of DR pilot. Involve participating groups in this process. Plan & execute pilot; assess results. Share results with interested parties at SCL. Review case studies covering technology for incorporating small-commercial winter peaking DR and assess the value of this targeted sector. 	<ul style="list-style-type: none"> SCL builds on pilot programs for various types of DR. Successful pilot programs are then rolled out at scale. SCL pursues opportunities for DR in the energy markets. 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Some DR techniques, e.g. EV charging, have not been shown to be cost effective (not enough participants). Therefore, it is important to consider the experience of other utilities when designing a DR program. Cybersecurity & data security are significant challenges to DR control design. DR is a broad and evolving field. Full understanding requires covering a lot of technical material. SCL technical personnel have limited time available to learn new technology. Equity needs to be carefully considered in program roll-out. 	<ul style="list-style-type: none"> Pilot projects should involve SCL engineers & technicians in order to develop in-house understanding of the technologies and how to maintain these systems. The most effective DR requires a suitable communications system. Current candidates include cellular modems, AMI networks, FM radio broadcast, and customer Wi-Fi connections. DR at scale requires DERMS. New technologies may require additional and/or revised safety & operating procedures. 	

SCL's Detailed Capability Development — Operations		
Objective: Assist Customers with Optimized Charging for the Grid		
Prioritization Reason: SCL is committed to helping customer-owners lower their carbon footprints. Creating a managed EV charging program could ultimately allow more EVs to exist on the SCL distribution system while minimizing additional required capacity buildout.		
Managed EV Charging	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical</p> <ul style="list-style-type: none"> EV Fast Chargers are currently being piloted with time-of-use rates A residential lease-to-own model program has provided 35 residents with 240V chargers. SCL is collaborating with King County Metro to electrify transit buses A UW Capstone Project, supervised by EST's Strategic Tech team, is studying managed charging of UW fleet vehicles <p>Policy</p> <ul style="list-style-type: none"> Seattle City Council has approved the SCL Transportation Electrification Strategic Investment Plan (TESIP) 	<p>Technical</p> <ul style="list-style-type: none"> SCL has studied benefits of managed EV charging Pilot project for managed charging of fleet medium and heavy-duty EVs (V1G) to avoid overloading on feeder laterals SCL has identified load profiles for EVs SCL has analyzed the effect of passive charge management (TOD pilot) <p>Process</p> <ul style="list-style-type: none"> A residential rate pilot has been reviewed and is in place if financially tenable Engagement with SCL customer-owners related to TESIP goals on managed charging 	<p>Technical</p> <ul style="list-style-type: none"> A V2G pilot for medium and heavy-duty EVs has been put in place assuming SCL has willing fleet-operating stakeholders, exploring customer and/or SCL benefits Developed standards for managed EV charging <p>Process</p> <ul style="list-style-type: none"> Based on pilot success and the adoption of EVs in SCL territory, SCL has or is in the process of adopting a V2G program Developed rates for multiple managed EV charging options
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Study benefits and challenges of managed EV charging Complete an analysis on the effects of passive charge management (e.g. TOD rates) Complete a detailed map of expected EV growth Areas of concern due to EV fleets on the SCL network must be identified A proper incentive structure for customer-owners in the V1G pilot should be drafted for a pilot project Assess customer interest in managed charging options. Analyze the EV load profiles using the specially installed EV meters, AMI meters/load disaggregation software or EPRI data 	<ul style="list-style-type: none"> Study V2G managed charging benefits and technical and operational challenges Market V2G technology should be monitored until the industry becomes mature enough for SCL to pursue a pilot project Note areas/times of day that are of particular worry which V2G technology might alleviate problems Fleet-owning customers should be engaged with to determine interest in a V2G pilot 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Cybersecurity analysis will be needed for SCL actively managed charging Customer privacy concerns if data is collected on charging behavior Equity goals should be considered with any new EV charging projects V2G technology voids the current warranties of electric vehicles SCL will need to assess distribution protection impacts of EV managed charging 	<ul style="list-style-type: none"> Customer interest in V1G or V2G pilot projects is vital to project success Communications infrastructure would be required to communicate to EV chargers Additional buildout of EV charging infrastructure Installing EV chargers with capabilities to meet the needs of the grid An ADMS or DERMS would be required to give control of V2G fleets to dispatchers and give insight to dispatchers 	

SCL's Detailed Capability Development — Operations		
Objective: Increase Situational Awareness for Dispatchers		
Prioritization Reason: The existing overhead fault current indicators are nearing end-of-life on the SCL distribution system. Replacing these sensors with smart line sensors would increase dispatcher capabilities and reduce customer outage times.		
Line Sensor Deployment	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
Technical <ul style="list-style-type: none"> Distribution fault current indicators (FCIs) exist on the system but do not communicate to SOC and are reaching end-of-life Underground FCIs are being deployed (without communication) A pilot project using AMI-enabled line sensors from L+G has been completed 	Technical <ul style="list-style-type: none"> Smart line sensor deployment on the distribution system which communicate to dispatchers at SOC when a fault is sensed A study has been done to measure the effects of the line sensors on standard outage measurements (CAIDI) Full-scale deployment of line sensors 	Technical <ul style="list-style-type: none"> Monitoring of trends in FCI/line sensor technology Process Completed integration into a DMS or ADMS
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Determine the preferred communications network for this project Final selection of vendor products – line sensors and other related deployed equipment Deploy line sensors on small scale (~100) and report on performance Assign personnel to manage and monitor the sensors Create a plan to integrate line sensor data into future DMS or ADMS systems that SCL will deploy Deploy line sensors on a system-wide scale Report on the effects of the line sensors on standard outage measurements (CAIDI) 	<ul style="list-style-type: none"> Continue to monitor line sensor functionality, and make changes to the project if necessary Replace line sensors as necessary if they fail, or begin a new project to find a replacement product Integrate line sensor monitoring into the SCL DMS/ADMS 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Smart sensor information that is communicated back to SOC may raise cybersecurity concerns Staff to monitor the health of the line sensor system and flag devices or areas of concern would be required for a large-scale deployment 	<ul style="list-style-type: none"> Integration of FCI/line sensor data into a DMS or ADMS is critical to their long-term usability by dispatchers Communications infrastructure is required to support devices and a new SCL-owned communication network might be required 	

SCL's Detailed Capability Development — Supporting Technologies

Objective: Extract Additional Value from Installed Equipment

Prioritization Reason: The L+G communications for AMI is an existing asset that SCL has committed to long-term for billing. Planning and operations projects that utilize the L+G mesh network will extract additional value.

L+G Mesh Communication Network Assessment	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical:</p> <ul style="list-style-type: none"> SCL has nearly completed the AMI meter project for billing. AGA modules are used by planning, engineering, and new services groups at SCL. <p>Policy:</p> <ul style="list-style-type: none"> SCL has a contract with L+G through 2031 (Signed in 2016 for 15 years) <p>Process:</p> <ul style="list-style-type: none"> The mesh network is owned and managed by L+G (until 2031) 	<p>Technical:</p> <ul style="list-style-type: none"> Utilization of the L+G network for operations, for example, distribution system – monitoring only Understanding the cybersecurity and performance capabilities (bandwidth, latency, etc.) of this network <p>Process:</p> <ul style="list-style-type: none"> Secure lower cost, grid edge communications system Assess the future of the L+G network (SCL operation/ownership or L+G management or upgrade) 	<p>Policy</p> <ul style="list-style-type: none"> Final evaluation of the L+G network (SCL operation/ownership or L+G management or upgrade) as approaching 2031 <p>Technical</p> <ul style="list-style-type: none"> Defined and implemented project for any changes to the AMI Comm network
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Assess possible additional uses for the comm network (non-L+G equipment) to maximize the value of the asset Evaluation of new L+G offerings and services available using the L+G mesh network Evaluate the Cybersecurity assessment for operations projects Plan operational projects for the next five years based on the results to date Determine if SCL ownership of the L+G network is feasible after the contract end 	<ul style="list-style-type: none"> Finalize a plan with internal stakeholders on the future of the L+G mesh communication network Define and implement comm network changes/upgrades 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Investing in the L+G network through various projects locks SCL into L+G offerings for the future L+G Infrastructure will likely be near or at end-of-life by 2031 There is little in-house technical knowledge of the L+G network at City Light Operational projects may present cybersecurity risks 	<ul style="list-style-type: none"> If the L+G network is used for operations purposes, L+G solutions should be linked to SCL technologies (OMS, ADMS) 	

SCL's Detailed Capability Development — Supporting Technologies

Objective: Keep the Grid Secure

Prioritization Reason: Cybersecurity of grid connected components is critical for the operation of a secure modern grid.

Cybersecurity for Grid Mod Monitoring & Control	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Process:</p> <ul style="list-style-type: none"> Lack of cybersecurity analysis or understanding is sometimes cited as a reason for not undertaking new technology projects Customer owned grid connected equipment is not monitored or controlled and SCL cybersecurity is not addressed because there is no communication 	<p>Technical:</p> <ul style="list-style-type: none"> Standardized security (both cyber & physical) analysis is applied Grid Mod Projects Security reports are automatically generated for review and/or action. <p>Policy:</p> <ul style="list-style-type: none"> Cybersecurity standards always apply All communication between SCL and its customer's equipment is secured and monitored. Every Grid Mod Project integrates cyber protections along with traditional design and analysis <p>Process:</p> <ul style="list-style-type: none"> Cybersecurity is built into the customer connection process. <p>Tools:</p> <ul style="list-style-type: none"> Various available security techniques and applications. 	<p>Policy:</p> <ul style="list-style-type: none"> Updated standardized cybersecurity policy <p>Process:</p> <ul style="list-style-type: none"> Asset management of all cyber devices owned by SCL, including on grid edge devices Connected DER are continuously monitored for cybersecurity issues. <p>Tools:</p> <ul style="list-style-type: none"> One or more standardized communication systems designed for DER communication are available for most projects.
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Establish and use standardized cybersecurity review process and standard practices for Grid Mod Projects Implement security management tools to automatically monitor connections and generate event files and reports. Establish body of work for SCL employees to support cybersecurity. 	<ul style="list-style-type: none"> Assess standardized cybersecurity policy Implement asset management for all cyber devices. All engineers and technicians are trained to configure cyber protection in OT assets. Establish standardized communication methods for DER. 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> Most employees do not consider cybersecurity an integral part of their job duties—this new function needs to be integrated into all disciplines. Cybersecurity technologies are continuously evolving; there are no industry standards. Communication networks and associated cyber requirements for DER have not been standardized; there are many competing technologies. Difficulty verifying DER settings after interconnection without communication and hence realizing the actual grid value. Lack of cyber policy relevant to monitoring, information, and control (MIC) 	<ul style="list-style-type: none"> Many internal and external stakeholders with different priorities. Cybersecurity is a specialty field and should be supported at the project level by dedicated technical staff. 	

SCL's Detailed Capability Development — Physical Infrastructure

Objective: Obtain Additional Learnings from Innovative Installation

Prioritization Reason: SCL will be responsible for the operation and maintenance of the Miller Community Center Microgrid for the life of the system. This project offers opportunities for both internal and external workforce development.

Miller Community Center Microgrid Plan	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical:</p> <ul style="list-style-type: none"> The Miller Microgrid has broken ground and will likely be operating in Q1 2021 The University of Washington (UW) will be writing a report after analyzing data from use case data tests Washington State Clean Energy Fund 2 (CEF2) grant Data and operations are not currently integrated into the SCL EMS (Physical security is monitored by SCL) Microgrid O&M is SCL responsibility 	<ul style="list-style-type: none"> SCL has trained internal and external personnel to operate and maintain microgrid, PV, and battery systems SCL collects data from the PV+Storage Miller Microgrid and assesses value streams Investigate settings for smart inverter systems The Miller Community Center will continue to function as a place of haven in case of a larger power outage City Light will define and implement through this project the cybersecurity needs of utility owned equipment on a customer site 	<ul style="list-style-type: none"> The community center will continue to function as a place of haven Integration of data and operations into an ADMS system
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Testing of use cases for data collection in support of the UW team working on the analytics report Assess the Miller Microgrid on-going value streams Determine the in-house skills required to operate and maintain this microgrid system with a focus on battery systems Conduct personnel training on new technology with the Lighting Design Lab Develop findings/insights from implementing and operating the Miller Microgrid that can inform potential future microgrid design, development, and installation. 	<ul style="list-style-type: none"> Integrate monitoring, control, and data collection with an ADMS and redesign of microgrid controls to allow remote operation and ADMS integration 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> SCL Operations and Maintenance (O&M) work for the Miller Community Center Microgrid will be done for the near future by an outside consultant SCL crews have not been trained to operate or maintain a microgrid or associated equipment Dispatchers, crews, and SFD should conduct emergency operations training around the microgrid ADMS implementations are often costly and complicated 	<ul style="list-style-type: none"> SCL needs to have available staff for new technology training Long-term integration of data and operations will require an ADMS 	

SCL's Detailed Capability Development — Physical Infrastructure

Objective: Reduce Repeat Customer Outages

Prioritization Reason: Improve the reliability for customer-owners in areas where lightning strikes often occur and reduce operational costs.

Targeted Lightning Arresters on OH Transformers	Goals	
Current State (2021)	Future State (5 years)	Future State (10 years)
<p>Technical:</p> <ul style="list-style-type: none"> SCL's distribution system averages 113 overhead transformer failures caused by lightning strikes every year. Lightning strikes often occur repeatedly in the same areas. <p>Policy:</p> <ul style="list-style-type: none"> Lightning arresters are not installed on overhead transformers, except for "back-lot" locations that are difficult to access. Failed transformers are replaced in-kind regardless of the cause of failure. Lightning arresters are always installed on terminal poles to protect underground cables. <p>Process:</p> <ul style="list-style-type: none"> SCL stocks approximately 500 replacement transformers in various voltage configurations. 	<p>Technical:</p> <ul style="list-style-type: none"> Studied the effectiveness of OH distr. transformer lightning arresters and related economic benefits. Common types of overhead transformers in the most lightning-prone areas of SCL's system are equipped with arresters. Cost of conversion is minimized by purchase of factory-installed arresters. <p>Policy:</p> <ul style="list-style-type: none"> Established process after review of engineering study, which could include proactively adding lightning protection to installed transformers or adding arresters to all new and lightning damaged transformers. Updated OH distribution transformer lightning arrester policy based upon economic justification <p>Process:</p> <ul style="list-style-type: none"> Purchase common types of spare transformers that are factory-equipped with lightning arresters and used to replace lightning-damaged transformers. 	<p>Technical:</p> <ul style="list-style-type: none"> Value based approach to lightning arresters on overhead transformers <p>Policy:</p> <ul style="list-style-type: none"> All new and replaced overhead transformers are equipped with lightning arresters. <p>Process:</p> <ul style="list-style-type: none"> All transformers are ordered with factory-installed lightning arresters. SCL will no longer need to stock two separate transformer configurations, one with and one without a lightning arrester.
Action Items: Current State → 5-Yr Future State	Action Items: 5-Yr Future State → 10-Yr Future State	
<ul style="list-style-type: none"> Conduct an engineering study on the effectiveness of OH distribution transformer lightning arresters and related economic benefits. Study to evaluate proposal to install arresters on replacement transformers when the original unit failed because of lightning Select an appropriate arrester class that will minimize arrester failure Choose the common size(s) and configurations of transformers to be protected Modify storm response and maintenance policy to ensure that this practice is incorporated into response by line crews Review previous lightning arrester installation policy and study cost benefit of standard installation of lightning arresters Stock a recommended quantity of transformers with factory-installed arresters for low cost and rapid response time 	<ul style="list-style-type: none"> Study the effectiveness of applying lightning arresters to overhead transformers. Continue to replace non-arrester-equipped transformers when they fail in service. 	
Considerations and Risks to Achieving the Future State	Dependencies and Integrations	
<ul style="list-style-type: none"> SCL lacks the in-house capability to perform the value analysis for the limited use of lightning arresters on overhead transformers. SCL must staff the study with a project manager and a subject matter expert. The lightning arresters may not offer enough protection to justify the cost. The arresters themselves may have too high a failure rate to justify their use. On-going management of two variations of the same type of transformer. 	<ul style="list-style-type: none"> The ability of lightning arresters to protect the transformer as well as the downstream customer wiring. The failure rate of various types of lightning arresters. The economic value of this type of transformer protection. The cost and logistics of keeping both arrester-equipped and non-arrester-equipped transformers in stock. 	

Grid Mod Project Staffing

This section provides an initial staffing plan for the Grid Mod Plan projects, including leads, participants, consultants, and stakeholders.

Project	Project Manager/Coordinator	Participating SCL Teams	Other Interested SCL Teams	External Partners/Consultants
DER Interconnection Studies and Procedures	ETO- Distribution Planning	CCES-Solar Team EST-GridMod	ETO-Distribution Engr ETO-Network Engr	
AGA: Enhanced Electrical Connectivity Model	AMLPG-GIS	ETO-Planning Ops-AMI UTD-PMO ETO-Distribution Engr	EST-GridMod SOC-Dispatchers	Vendor (L+G)
PNNL Seattle Waterfront Resiliency Study	EST-GridMod	EST-StrategicTech ETO-Distribution Planning		PNNL Port of Seattle Northwest Seaport Alliance
Duwamish Delta Test Bed Project	EST-GridMod	EST-StrategicTech ETO-Planning	ETO-Distribution Engr SOC-Dispatchers	COS Partners Duwamish Valley Stakeholders PNNL
Non-Wires Solutions Analysis	ETO- Distribution Planning	EST-GridMod EST-StrategicTech ETO-Distribution Engr ESE CCES	SOC-Dispatchers SOC-Operators SCL Enterprise Cybersecurity Ops	Vendors and Consultants
Energy Storage Technology	ETO-Distribution Planning	EST-GridMod EST-StrategicTech ETO-Distribution Engr ESE	SOC-Dispatchers SOC-Operators SCL Enterprise Cybersecurity Ops	Vendors and Consultants
Continuing Grid Mod Plan Development	EST-GridMod	ETO-Planning EST-StrategicTech	SOC-Operators Many others	Partner (EPRI)
DA-FLISR Expansion	EST-GridMod	SOC-Dispatchers ETO-PSA, Engr, Planning, Comm Ops-Comm Techs Ops-Line Crews	SCL Enterprise Cybersecurity SOC-Operators Ops-Relay Techs	Vendor (S&C)

Project	Project Manager/Coordinator	Participating SCL Teams	Other Interested SCL Teams	External Partners/Consultants
DA-Remote Switching	EST-GridMod	SOC-Dispatchers ETO-PSA, Engr, Planning, Comm Ops-Comm Techs Ops-Line Crews Ops-Relay Techs	SCL Enterprise Cybersecurity SOC-Operators	Vendor (S&C)
DA-Advanced Integration	EST-GridMod	SCL Enterprise Cybersecurity UTD-PMO Ops-Comm Techs ETO-PSA SOC-Dispatchers	Ops-Relay Techs	Vendors
OT Field Area Network – Pilot Project	EST-GridMod	Ops-Comm Techs Ops-Line Crews ETO-Distribution Engr SCL Enterprise Cybersecurity	ETO-PSA SOC-Dispatchers ETO-Comm	Vendor Comm Consultants
Demand Response Pilot	CCES	EST-GridMod CCES-Account Execs ETO-Planning ETO-PSA	Ops-Comm Techs SOC-Dispatchers	Vendor BPA
Managed EV Charging	EST-Electrification	CCES ETO-Distribution Engr ETO-Planning AMLPE-ESE	SOC SCL Enterprise Cybersecurity EST-GridMod Ops-Comm Techs	Vendors Sys Protection Consultant
Line Sensor Deployment	EST-GridMod	SOC-Dispatchers SCL Enterprise Cybersecurity PSAutomation	Ops-Distribution Engr Ops-Overhead Line Crews	L+G SMEs
Landis and Gyr Mesh Communication Network Assessment	AMI Ops	EST-GridMod SCL Enterprise Cybersecurity PSAutomation	Ops-Comm Techs ETO-Comm Engr	L+G SMEs

Project	Project Manager/Coordinator	Participating SCL Teams	Other Interested SCL Teams	External Partners/Consultants
Cybersecurity for Grid Mod Monitoring & Control	SCL Enterprise Cybersecurity	EST-GridMod ETO Ops-Comm Techs	SOC	Customer-owners with DERs Vendors and Consultants
Miller Community Center Microgrid Plan	EST-StrategicTech	LDL Ops-Stations PSAutomation	ETO-Distribution Engr SOC Ops-Overhead Line Crews EST-GridMod	Training Consultants SFD O&M Contractor
Targeted Lightning Arresters on OH Transformers	AML-Asset Management	ETO-Distribution Engr Ops-Overhead Line Crews Ops-Warehouse	Standards Engr SOC EST-GridMod	Lightning Engr Consultant

Appendix: Glossary

Advanced Distribution Management System (ADMS): The software platform that supports the full suite of distribution management and optimization. An ADMS includes functions that automate outage restoration and optimize the performance of the distribution grid. ADMS functions being developed for electric utilities include fault location, isolation and restoration; volt/volt-ampere reactive optimization; conservation through voltage reduction; peak demand management; and support for microgrids and electric vehicles.⁶

Distributed Energy Resources (DER): "A source or sink of power that is located on the distribution system, any subsystem thereof, or behind a customer meter. These resources may include, but are not limited to, electric storage resources, distributed generation, thermal storage, and electric vehicles and their supply equipment."⁷

Distributed Energy Resources Management System (DERMS): A software platform that is used to organize the operation of the aggregated DER within a power grid.⁸

Enterprise Technology Roadmap: An [enterprise] "technology roadmap is a visual document that communicates the plan for technology initiatives" at an enterprise-wide level of an organization. This roadmap typically outlines when, why, and what technology solutions will be implemented to help the organization move forward while avoiding costly mistakes.⁹

Fault Location Isolation and Service Restoration (FLISR): Distribution automation system which detects and responds to faults in order to minimize the number of customers affected by a distribution system outage.

Grid Architecture: "... is a discipline with roots in system architecture, network theory, control engineering, and software architecture, all of which we apply to the electric power grid. An architectural description is a structural representation of a system that helps people think about the overall shape of the system, its attributes, and how the parts interact."¹⁰

Operational Technology: "... is hardware and software that detects or causes a change, through the direct monitoring and/or control of industrial equipment, assets, processes and events."¹¹ The term has become established to demonstrate the technological and functional differences between traditional IT systems and Industrial Control Systems environment, the so-called "IT in the non-carpeted areas"

⁶ <https://www.gartner.com/en/information-technology/glossary/advanced-distribution-management-systems-adms>

⁷ <https://www.ferc.gov/CalendarFiles/20180215112833-der-report.pdf>

⁸ <https://www.next->

[kraftwerke.com/knowledge/derms#:~:text=A%20distributed%20energy%20resources%20management,distributed%20energy%20resources%20\(DER\)](https://www.next-kraftwerke.com/knowledge/derms#:~:text=A%20distributed%20energy%20resources%20management,distributed%20energy%20resources%20(DER))

⁹ <https://www.aha.io/roadmapping/guide/product-roadmap/what-is-a-technology-or-it-roadmap>

¹⁰ <https://www.pnnl.gov/grid-architecture>

¹¹ <https://www.gartner.com/en/information-technology/glossary/operational-technology-ot>

2022-2026 Strategic Plan Financial Forecast

EXECUTIVE SUMMARY

This document details the financial assumptions behind the 3.5% average rate path established by the 2022-2026 Strategic Plan (the "Plan"). The proposed rate path provides the revenue required to deliver on City Light's Strategic goals outlined in the Plan.

Average rates are derived by dividing the revenue requirement by retail sales. On average the revenue requirement is increasing by a little over \$30M (3.3%) and retail sales are decreasing by 0.3%.

RATE INCREASE SUMMARY

	2021	2022	2023	2024	2025	2026	Avg
Revenue Requirement	919.3	955.6	989.0	1,026.2	1,050.2	1,079.1	
Annual Increase		3.9%	3.5%	3.8%	2.3%	2.8%	3.3%
Retail Sales GWh	8,637	8,633	8,607	8,600	8,542	8,520	
Annual Change		-0.1%	-0.3%	-0.1%	-0.7%	-0.3%	-0.3%
Average Rate, ¢/kWh	10.65	11.07	11.49	11.93	12.29	12.67	
Annual Increase	3.0%	3.9%	3.8%	3.8%	3.0%	3.0%	3.5%

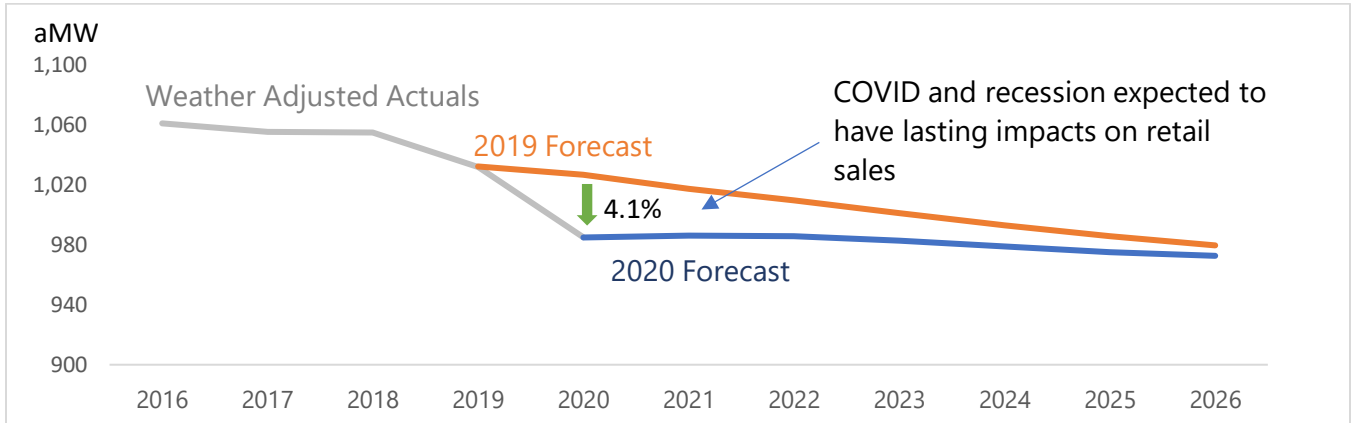
Below is a table of bill impacts assuming each customer receives the annual rate increase noted above and maintains a consistent level of consumption. These impacts are examples only and will change after the retail rate design process is completed for each year. Customers who decrease their consumption through energy efficiency measures will experience smaller bill impacts.

CUSTOMER BILL IMPACT EXAMPLES

	Monthly Bill	Monthly Increase					
	2021	2022	2023	2024	2025	2026	AVG
Residential-typical (634 kWh/mo.)	\$76.77	\$3.00	\$3.04	\$3.18	\$2.61	\$2.68	\$2.90
UDP Residential-typical (60% Discount)	\$30.71	\$1.20	\$1.22	\$1.27	\$1.04	\$1.07	\$1.16
Small Commercial-Car Wash	\$465	\$18	\$18	\$19	\$16	\$16	\$18
Medium Commercial-Retail Store	\$7,436	\$290	\$294	\$308	\$252	\$259	\$281
Large Industrial-Stone	\$23,550	\$920	\$933	\$977	\$800	\$821	\$890
Large Commercial-Hospital	\$94,607	\$3,695	\$3,747	\$3,923	\$3,212	\$3,298	\$3,575
Large Commercial-Education	\$1,990,939	\$77,754	\$78,851	\$82,561	\$67,594	\$69,399	\$75,232

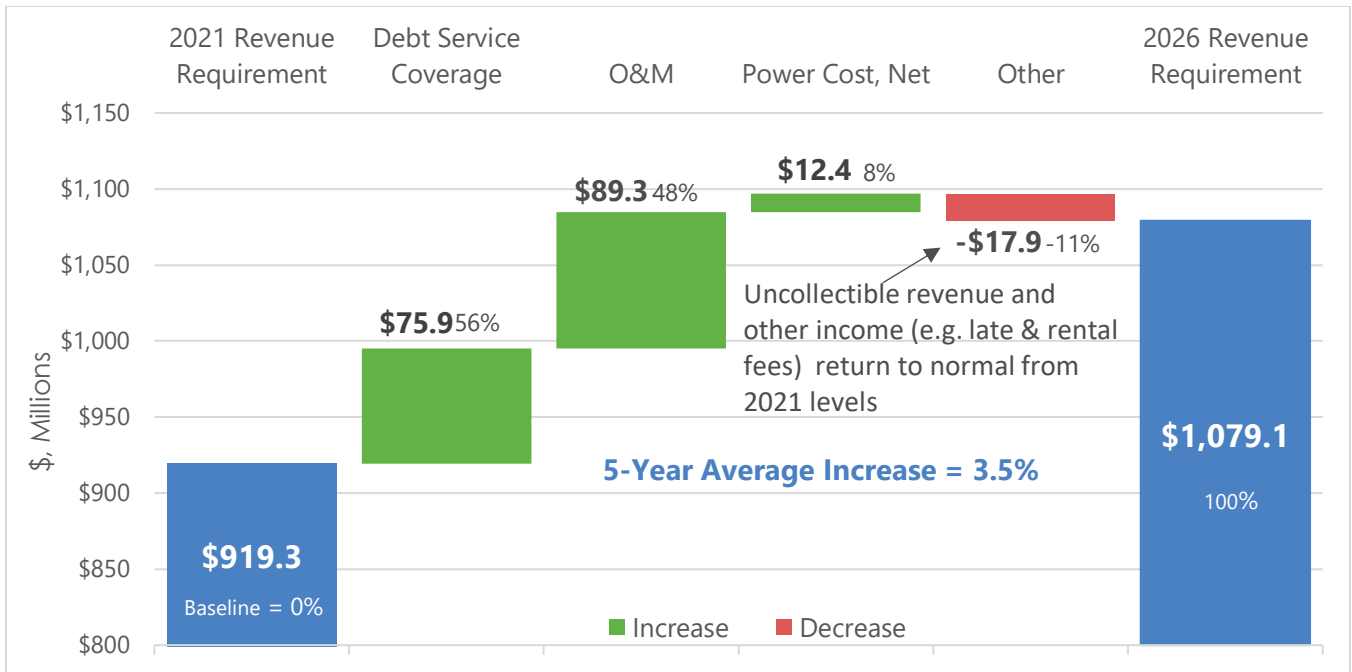
The COVID pandemic and associated recession significantly reduced City Light’s retail sales to commercial customers in 2020, and this was only partially offset by increased residential sales. The recovery is expected to last several years and, as a result, City Light’s retail sales are expected to be relatively flat through 2026.

RETAIL SALES FORECAST

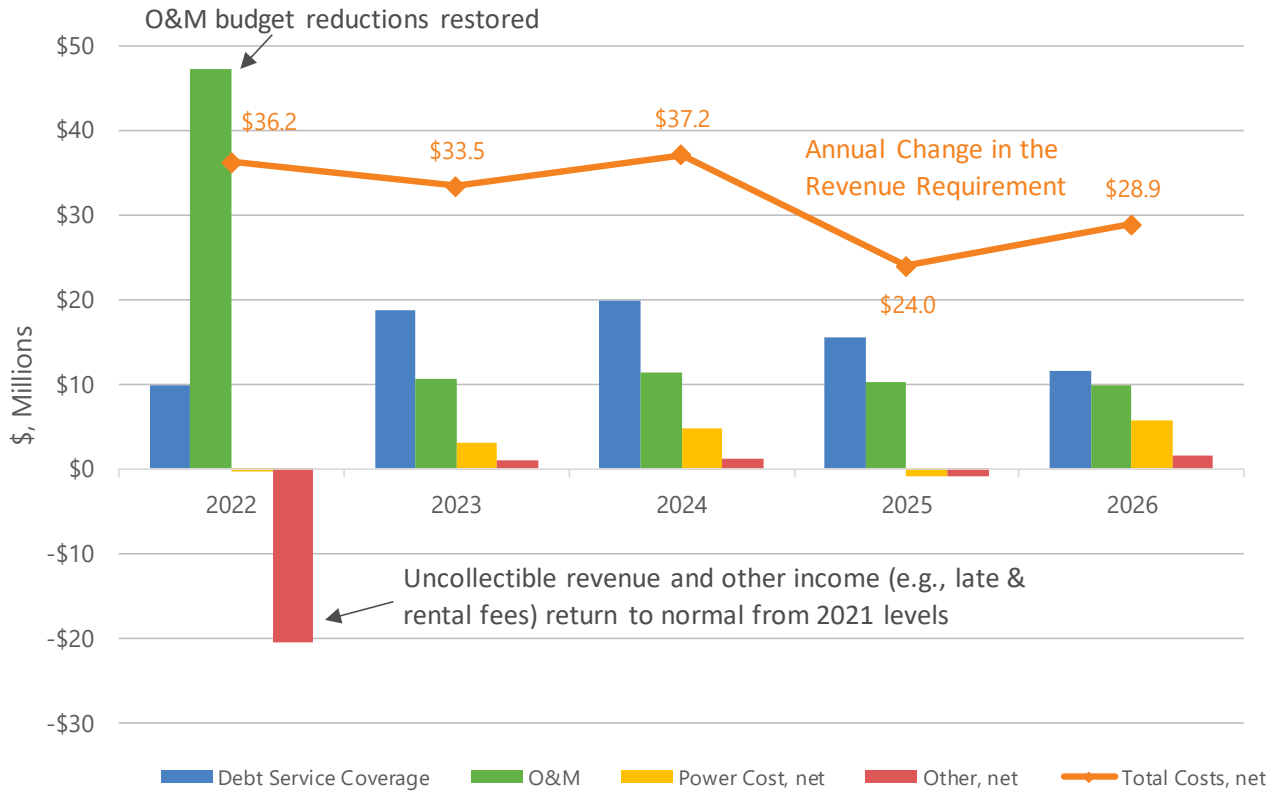


The below charts and table summarize City Light’s revenue requirements for 2022-2026

REVENUE REQUIREMENT DRIVERS CUMMULATIVE 2022-2026



RETAIL REVENUE REQUIREMENT ANNUAL GROWTH DRIVERS 2022-2026



RETAIL REVENUE REQUIREMENT SUMMARY

\$, Millions	2022	2023	2024	2025	2026
Revenue Requirement	955.6	989.0	1,026.2	1,050.2	1,079.1
Debt Service Coverage					
Debt Service	234.5	244.4	256.6	254.1	256.8
Additional Coverage*	188.0	196.4	204.1	222.2	231.1
Operations & Maintenance (O&M)					
Baseline 2022 O&M	339.0	339.0	339.0	339.0	339.0
Inflation and REC Growth* *	-	10.6	22.0	32.2	42.1
Net Power Costs					
Power and Wheeling Contracts	234.5	237.7	242.3	241.2	246.7
Net Wholesale Revenue (NWR)	(40.0)	(40.0)	(40.0)	(40.0)	(40.0)
Power Related Revenues, Net	(17.1)	(17.1)	(17.0)	(16.8)	(16.5)
Other					
Taxes, Payments and Uncollectibles	56.1	57.9	59.9	61.4	64.0
Miscellaneous Revenue	(39.4)	(39.8)	(40.8)	(43.2)	(44.2)
*Debt Service Coverage	1.80	1.80	1.80	1.87	1.90

** Inflation on existing O&M and incremental renewable energy credit (REC) investments to meet I-937 requirements. Additional detail included in the O&M section.

Drivers of 2022-2026 Revenue Requirements and Rates

1. Debt Service and Debt Service Coverage

- Funds historic and future capital investments
- Increases on average \$15 million per year
- \$1.7 billion 2022-2026 net capital requirements (\$338 million per year)
 - 43% expected to be funded with operating cash

2. Operating and Maintenance (O&M)

- 2022 O&M - \$30 million 2021 budget reductions restored plus inflation
- Cost increase of around \$11 million per year during 2022-2026
- Inflation around 3% per year
- Sets overall spending target
 - City Light will continue to make resource and organizational adjustments to deliver on strategic initiatives and core services

3. Net Power Cost

- In total, net power costs are expected to remain relatively stable
 - Around 1% growth per year on average
- Bonneville Power Costs are the largest single component at over \$200 million
 - Expected to increase a little over 2% per year
 - Actual 2022 BPA costs are currently expected to come in below the planning values used in this forecast, and any savings will be passed along to City Light customers¹

4. Other Revenues/Costs²

- Not a large driver, expected to remain stable over planning period
- Uncollectible revenue expected to return to typical levels in 2022
 - At higher levels in 2020 and 2021 due to pandemic and recession

¹ Based on BPA's preliminary 2022-2023 rate proposal and purchase volumes. Any cost differences will be passed through to City Light Customers with the BPA passthrough mechanism. BPA is expected to announce a final rate decision in July 2021.

² Other Costs include state taxes, franchise payments and uncollectible revenue, which tend to grow in proportion to retail revenue. Miscellaneous revenue comes from a variety of fees and service charges, as well as from interest earnings; only minor growth in these revenues is anticipated.

INTRODUCTION

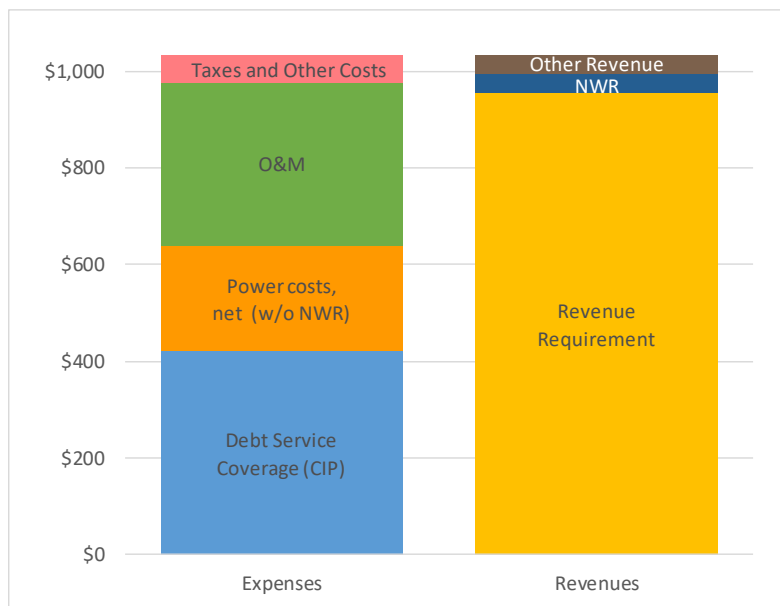
The 2022-2026 Strategic Plan builds on the 2019-2024 Strategic Plan Update (also called the 2018 Strategic Plan), extends the horizon an additional two years to 2026 and shortens the Plan horizon to five years. The 2021-2026 Strategic Plan was postponed while the Utility focused on COVID-19 related issues. The 3.6% rate increase that was originally anticipated for January 1, 2021 was canceled to help mitigate the economic impacts of COVID-19 on ratepayers. However, on March 29, 2021 Seattle City Council approved a 3% rate increase effective April 1, 2021, along with the removal of the current 3.0% RSA surcharge.³ The net result is no impact on expected customer bills for the remainder of 2021. At the same time, Seattle City Council approved an across-the-board 3.9% rate increase for all rate classes, effective Jan 1, 2022, which is reflected in this plan.

This document details the assumptions that determine the average retail rate path for the years 2022-2026. Average retail rates are not actual billed rates but are the ratio of the revenue requirement to retail sales and represent the average impact to customer bills, assuming their consumption is constant.

$$\text{average rate} \left(\frac{\$}{kwh} \right) = \frac{\text{revenue requirement} (\$)}{\text{retail sales} (kwh)}$$

The revenue requirement is the amount of retail revenue that must be collected to balance revenues with expenses, given current effective financial policies. The chart below illustrates how the revenue requirement is sized to meet expenses.

REVENUES AND EXPENSES (2022 FORECAST, \$MILLIONS)



³ A 1.5% RSA surcharge was implemented August 2016 and an additional 1.5% surcharge (3% total) was implemented November 2019. The RSA returned above its \$100 million target in Q1 2021 and the surcharges were set to roll off in Q2.

Following is a short description of each primary component of the revenue requirement. These are discussed in detail in the following sections of this document.

Debt Service Coverage

- The cost of debt-funded capital investments (including deferred expenses such as programmatic conservation and superfund remediation) as recovered over time.
- Per policy, debt service coverage is set at or above 1.8 times the annual debt service obligation.
- The additional funds in debt service coverage above those needed to pay principal and interest obligations cash-fund a portion of the current year capital requirements, so they are not all debt financed.
- In efforts to mitigate the amount of future debt issued, the targeted debt coverage was increased in 2025 and 2026 to 1.87 and 1.90, respectively.

O&M

- Includes cash-related expenses for all O&M costs excluding taxes, purchased power and wheeling (purchased transmission).
- All non-capitalized labor costs are included in this category.
- Includes inflation assumptions, additional program funding requirements, as well as mitigating cost reductions.

Power, Net

- Purchased power costs and wheeling costs, net of power revenues.
- Includes revenues from surplus power sales net of purchases, also called net wholesale revenue.
- Does not include costs of operating owned generation (e.g. Skagit, Boundary hydro projects), these are part of O&M.

Other

- Includes tax payments, franchise payments and uncollectible revenue, net of miscellaneous revenues.

This document concludes with a short discussion of the retail sales forecast, which is the denominator in the average rate formula.

DEBT SERVICE COVERAGE (CIP, DEFERRED O&M AND BONDS)

Debt service coverage represents the cost of capital spending, as recovered over time. Net capital requirements are comprised of the capital improvement program (CIP) plus expenses deferred (such as programmatic conservation and superfund remediation), less capital contributions, which are payments from outside sources that offset capital expenses.

$$\text{Net Capital Requirements} = \text{CIP} + \text{Deferred O\&M} - \text{Capital Contributions}$$

Net capital requirements are not a direct component of the revenue requirement but determine the amount of debt (bonds) that must be issued. The principal payments on outstanding debt and associated interest expense make up debt service.

City Light’s debt service coverage policy (established by Resolution 31187) calls for setting rates to yield sufficient revenue net of expenses to cover annual debt service obligations by at least 1.8 times. Since the additional amount required for debt service coverage is not an actual expense, these funds are typically allocated to City taxes⁴ and current year capital expenditures, which reduces the size of future bonds.

The capital expenditures forecast is based on the 2021-2026 CIP Plan that was adopted in 2020 for the 2021 budget process. It differs from the CIP Plan (budget) in that the timing of spending is adjusted to reflect projected cash outflows, and amounts are reduced by a 10% assumed under-expenditure. Capital expenditures also includes deferred O&M, which is treated like CIP.

CAPITAL EXPENDITURES FORECAST

\$ Millions	2022	2023	2024	2025	2026
2021-2026 Adopted CIP	337.1	356.4	343.9	340.5	339.2
Deferred O&M	34.7	34.5	36.3	37.1	39.2
Total Capital Expenditures	371.8	390.9	380.1	377.7	378.4

The next table summarizes capital requirements and funding sources. Capital contributions include third-party funding for capital expenses such as service connections and reimbursements for certain transportation projects. They are included in the forecast as a credit to total capital requirements. Capital funding from operations reflects cash drawdowns and may represent net operating proceeds from the current or previous year(s). Bond issuances totaling about \$1.0 billion to support 2022-2026 capital requirements will bring total outstanding debt to almost \$3.0 billion by 2026.

Per financial policy, the six-year CIP should be funded with at least 40% operating cash. Cash funding over the five year period is projecting to be around 43%, with years 2022-2024 coming in slightly under the 40% target and years 2025-2026 exceeding the target, primarily from increasing the targeted debt service coverage.

⁴ Taxes paid to the City of Seattle are considered junior lien to debt service. They are not included in the taxes category when calculating the revenue requirement.

CAPITAL REQUIREMENTS AND FUNDING

\$, Millions	2022	2023	2024	2025	2026
Capital Requirements, net					
CIP	337.1	356.4	343.9	340.5	339.2
Programmatic Conservation	29.6	29.9	30.2	30.5	30.8
Deferred O&M	5.1	4.7	6.1	6.7	8.4
Capital Contributions	(43.9)	(41.1)	(40.3)	(41.0)	(44.7)
Total	327.9	349.7	339.9	336.7	333.7
Capital Funding					
Operations	128.2	133.1	133.1	155.8	170.8
Bond Proceeds	199.8	216.7	206.7	180.9	163.0
Total	327.9	349.7	339.9	336.7	333.7
Total Debt Outstanding	2,702	2,791	2,876	2,936	2,996

Capital requirements determine the size of future bond sales and resulting debt service. The bond size shown below is slightly higher than bond proceeds shown above to account for issue costs and required deposits into the bond reserve fund. Debt service assumptions for bonds issued in 2022 and later assume a 30-year term at a 5.0% interest rate. The existing debt service schedule has sizable decreases in 2025 and 2026 that provide City Light leadership with an opportunity to increase the debt service coverage target in 2025 and 2026 while mitigating the rate impacts to customers.

BOND SALES AND DEBT SERVICE, \$MILLIONS

	Bond Size	2022	2023	2024	2025	2026
Existing ¹		223.0	219.5	217.2	200.9	191.4
2021 (Aug) ²	200	11.5	11.5	11.5	11.5	11.5
2022 (Aug) ³	206		13.4	13.4	13.4	13.4
2023 (Aug) ³	223			14.5	14.5	14.5
2024 (Aug) ³	213				13.8	13.9
2025 (Aug) ³	187					12.1
2026 (Aug) ²	169					
Total		234.5	244.4	256.6	254.1	256.8
Debt Service Coverage (1.8x)		422.0	439.9	461.8	457.5	462.3

¹As of December 2020, ²Fixed Rate Issue (30 year / 4.0%), ³Fixed Rate Issue (30 year / 5.0%)

OPERATING AND MAINTENANCE (O&M)

Operating and maintenance expenses (O&M) are the costs associated with day-to-day operations. O&M is a large and diverse category of costs that includes functions such as power production; distribution and transmission system operation and maintenance; customer services such as billing and meter reading; and administrative support. This forecast defines O&M as excluding purchased power, wheeling and taxes, which are included in separate categories.

The basis for the 2022-2026 O&M forecast is the 2022 Endorsed O&M budget,⁵ which is then inflated by expense type. The 2022 O&M budget restores the \$30 million of one-time reductions taken in 2021. The average annual inflation rate applied to O&M is around 3.0% and represents the increased cost of providing the same level of services as in 2022. The table below lists the inflation assumption for each O&M cost category.

BUDGET O&M INFLATION BY CATEGORY

\$, millions	2022	2023	2024	2025	2026
Labor ³	148.6	153.9	158.9	164.1	169.5
Labor Benefits ²	67.3	69.3	71.3	73.2	75.3
Non-Labor ¹	86.3	88.5	90.6	92.6	94.7
Transfers to City ³	70.6	73.1	75.5	78.0	80.6
Operating Supplies ^{1,5}	11.9	12.2	12.5	12.8	13.1
Overhead Credits ^{3,6}	(47.5)	(49.2)	(50.8)	(52.5)	(54.2)
Total Inflated Budget	337.2	347.8	358.0	368.2	378.9
¹ CPI Growth ⁴		2.5%	2.3%	2.2%	2.3%
² CPI Growth + 0.5%		3.0%	2.8%	2.7%	2.8%
³ CPI Growth + 1.0%		3.5%	3.3%	3.2%	3.3%
Avg Growth All O&M		3.1%	2.9%	2.9%	2.9%
⁴ City of Seattle Budget Office January 2021 CPI-W Forecast for King and Snohomish Counties					
⁵ Includes IT equipment and software; fuel costs; and inventory material for distribution and generation systems.					
⁶ Overhead expenses associated with the Capital Improvement Program (CIP) are removed from the O&M budget and included as capital expenditures.					

There are numerous adjustments made to the 2022 O&M budget to make it consistent with financial reporting and policies. The following table details these changes. It shows the relationship between the inflated O&M budget and the O&M forecast.

⁵ In 2020 Seattle City Council only adopted a 2021 budget and did not endorse a 2022 budget as they typically do with a biannual budget. This 2022 O&M budget reflects the budget that was submitted to and endorsed in 2020 by the City's Budget Office.

O&M ADJUSTMENTS DETAIL

\$, millions	2022	2023	2024	2025	2026
Inflated 2022 Budget	337.2	347.8	358.0	368.2	378.9
<i>adjustments</i>					
REC Expense ¹	12.2	12.2	13.5	13.6	13.6
Intertie Expense ¹	1.1	1.1	1.1	1.2	1.2
PNCA Payment ¹	1.9	1.9	1.9	1.9	1.9
Solar Tax Credit ²	1.6	1.6	1.6	1.6	0.8
Engineering OH (excl from budget)	(5.0)	(5.1)	(5.1)	(5.2)	(5.2)
Under Expenditure ³	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
Total O&M	339.0	349.6	361.0	371.2	381.1
2022 O&M Baseline	339.0	339.0	339.0	339.0	339.0
Inflation and REC growth	-	10.6	22.0	32.2	42.1
Total O&M	339.0	349.6	361.0	371.2	381.1

¹Items that are budgeted as purchased power budget but recognized as O&M in financial statements

- Renewable Energy Credits (RECs) required to meet regulatory requirements, 2022 reflects the purchase of Stateline RECs under a new, REC-only contract.
- Maintenance costs associated with ownership of the 3rd AC intertie.
- Payments for the Pacific Northwest Coordination Agreement (PNCA) related to the compensation for the benefits of upstream storage at the Boundary project.

²Passthrough of the production tax credit, offset as a credit to state taxes

³Remove \$10 million per year to reflect an assumption of budget under-expenditure.

POWER COSTS, NET

This category includes all costs and revenue associated with the purchase and sale of electricity, wheeling (purchased transmission) and associated ancillary power management services.

City Light's power portfolio is a relative constant. Except for expiration of the Stateline contract in 2022 and the Grand Coulee contracts in 2024 through 2026, no major contract changes and no new resources are currently expected in this plan. However, City Light's power portfolio is a dynamic process, and new resource acquisitions could be pursued before 2026 based on many factors including power market outlooks, reliability studies and customer programs. Below is a table outlining long-term power and wheeling costs.

LONG-TERM POWER AND WHEELING CONTRACTS

\$, Millions	2022	2023	2024	2025	2026
BPA Power ¹	160.4	163.5	164.5	167.6	169.2
Priest Rapids ²	1.5	1.4	1.3	1.2	1.1
Grand Coulee ³	7.6	7.8	7.5	1.7	1.5
Lucky Peak ⁴	9.1	9.3	9.5	9.8	10.0
Stateline ⁵	1.7	0.0	0.0	0.0	0.0
Columbia Ridge ⁶	6.4	6.5	6.7	6.8	6.9
King County West Point ⁶	2.4	2.4	2.5	2.6	2.6
High Ross ⁷	0.4	0.4	0.4	0.4	0.5
BPA Wheeling ⁸	44.0	45.2	48.7	50.0	53.8
Other Wheeling ⁹	1.0	1.0	1.0	1.0	1.0
Total LT Power & Wheeling	234.5	237.7	242.3	241.2	246.7

¹Assumes BPA bills remain at same level in 2022 as in 2021 and increase 1.3% per year on average during 2023-2026. BPA rates updated October 1st of odd-numbered years.

²Priest Rapids costs are expected to decline because City Light's share of the project will shrink as Grant County PUD's load grows.

³Reflects City Light's apportioned allotment of production O&M costs, growing with inflation. Some contracts start expiring in 2024 and all will expire by 2026.

⁴Reflects production O&M cost growing with inflation.

⁵The Stateline contract expires at the end of 2021 with the last payment in 2022. City Light has already contracted to receive RECs from the Stateline Project starting in 2022 (which are included in O&M) but will not continue to purchase the power.

⁶Cost inflates per contract terms.

⁷Expenses for the High Ross contract reflect a small level of O&M costs. City Light stopped making capital payments in 2020.

⁸Assumes BPA costs stay at current levels and increase 5% per year on average during 2023-2026.

⁹Forecast assumes Lucky Peak transmission costs are transferred to a third party as part of a renewed exchange agreement through 2026.

City Light's largest contract is with the Bonneville Power Administration (BPA). For planning purposes, the 2022 BPA costs are assumed to continue at 2021 levels. After BPA announces its final rates for fiscal years 2022-2023, any differences between 2022 actual costs and the costs based on the 2022 assumptions below will be passed-through or credited to City Light customers via the BPA pass-through mechanism (SMC 21.49.081). A credit to City Light retail rates is currently anticipated based on BPA's preliminary rate proposal and City Light's declining purchase volume due to its lower retail load. BPA power and wheeling bills are assumed to increase around 2.2% per year during 2023-2026, with the rate changes effective in October of odd years.

BPA DETAIL

\$ Millions	2022	2023	2024	2025	2026
Wheeling	44.0	45.2	48.7	50.0	53.8
Block	204.4	208.7	213.2	217.6	223.0
Total BPA Costs	160.4	163.5	164.5	167.6	169.2
Annual Change		2.1%	2.2%	2.1%	2.5%

Power revenues are comprised of Net Wholesale Revenue, other miscellaneous power revenues, and long-term power sale obligations. The following table details these assumptions.

POWER REVENUES, NET DETAIL

Power Revenue, Net (\$ in millions)	2022	2023	2024	2025	2026
Net Wholesale Revenue ¹	40.0	40.0	40.0	40.0	40.0
Power Contracts					
Article 49 to PO County	2.7	2.8	2.8	2.9	2.9
Priest Rapids	1.6	1.6	1.5	1.4	1.1
BPA Credit for South Fork Tolt	2.9	2.9	2.8	2.8	2.7
BPA Residential Exchange Credit	-	-	-	-	-
Power Marketing Net ²	7.8	7.8	7.8	7.8	7.8
Transmission Sales ³	2.0	2.0	2.0	2.0	2.0
Total Power Related Revenues, net	17.1	17.1	17.0	16.8	16.5
Total Power Revenue, Net	57.1	57.1	57.0	56.8	56.5

¹ Net Wholesale Revenue (NWR) is the revenue from selling surplus energy on the wholesale market, net of purchases for load balancing. The NWR value is a round number set by policy and influenced by the current outlook of NWR based on expected prices and normal hydro conditions. Any differences between actual and planned NWR are buffered through the Rate Stabilization Account.

²Power marketing revenues (net of purchases) are earned from sales of ancillary services associated with generation and transmission assets, such as reserve capacity sales. Assumes Lucky Peak exchange premiums of \$2M per year through 2026.

³Assumes \$1M of revenue from the resale of BPA point-to-point transmission and \$1M from the resale of 3rd AC transmission capacity.

OTHER COSTS AND MISCELLANEOUS REVENUES

This "other" category is made up of costs and revenues such as taxes, interest income and fees for retail services.

OTHER COSTS (TAXES, PAYMENTS AND UNCOLLECTIBLES) DETAIL

\$, Millions	2022	2023	2024	2025	2026
State Taxes ¹	41.3	42.6	44.1	45.2	47.3
Franchise Payments and Other Taxes ²	7.5	7.8	8.1	8.3	8.5
Uncollectible Revenues ³	7.2	7.5	7.7	7.9	8.1
Total Other Costs	56.1	57.9	59.9	61.4	64.0

¹ State taxes are 3.8734% of retail revenues, plus some other revenues and contributions. Not included are City taxes, which are 6% of total taxable revenues but do not directly impact the revenue requirement because they are junior to debt service. They are treated as a "below the line" expenditure and are deducted from the additional 0.8x debt service coverage, reducing the amount of current year operating proceeds going to capital requirements.

² Payments associated with franchise contracts with the cities of Burien, Lake Forest Park, SeaTac, Shoreline, and Tukwila. Franchise payments range from 4% to 6% of total retail revenue in each franchise territory. City Light also pays Lake Forest Park a 2% public utility tax that is passed through to customers in that jurisdiction as an addition to their rates. Other taxes are miscellaneous taxes (e.g., B&O tax) to other jurisdictions where the utility has operations.

³ Uncollectible revenue is assumed to be 0.75% of retail revenues.

MISCELLANEOUS REVENUE SOURCES DETAIL

\$, Millions	2022	2023	2024	2025	2026
Non-Base Rate Retail Revenue ¹	5.0	5.2	5.3	5.5	5.6
Other Revenue ²	23.6	24.3	25.0	27.3	28.0
Suburban Undergrounding ³	4.1	4.1	4.1	4.1	4.1
Property Sales ⁴	1.2	1.2	1.3	1.3	1.3
Interest Income ⁵	6.8	6.8	6.9	6.9	7.0
Operating Fees & Grants	0.4	0.0	0.0	0.0	0.0
Net RSA Transfers ⁶	(1.8)	(1.8)	(1.8)	(1.9)	(1.9)
Total Other Revenue Sources	39.4	39.8	40.8	43.2	44.2

¹ Non-base rate retail revenue includes revenues from retail customers for services or programs that are not dictated by the revenue requirement. Examples include elective green power programs, distribution capacity charges and power factor charges.

² Other revenue includes a broad range of income sources, such as late payment fees, payments for damages to property, transmission tower attachments, distribution pole attachments and account change fees.

³ Suburban undergrounding revenues are collected from customers in certain suburban cities for the repayment of discretionary municipal undergrounding of parts of their distribution system.

⁴ Property sales based on historical averages. No large sales are assumed in this forecast.

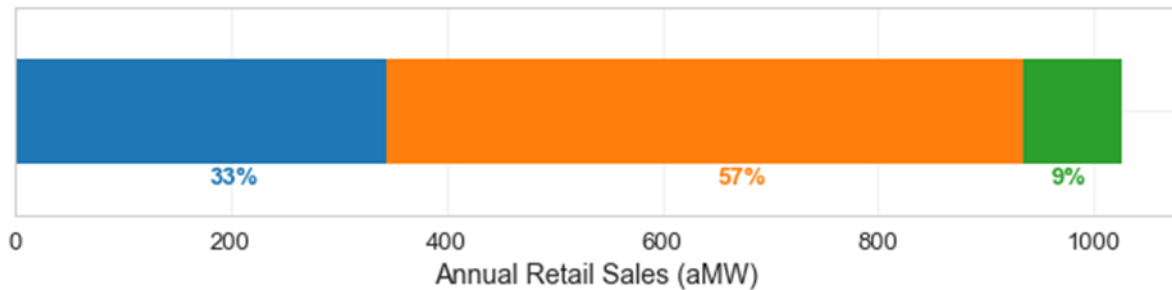
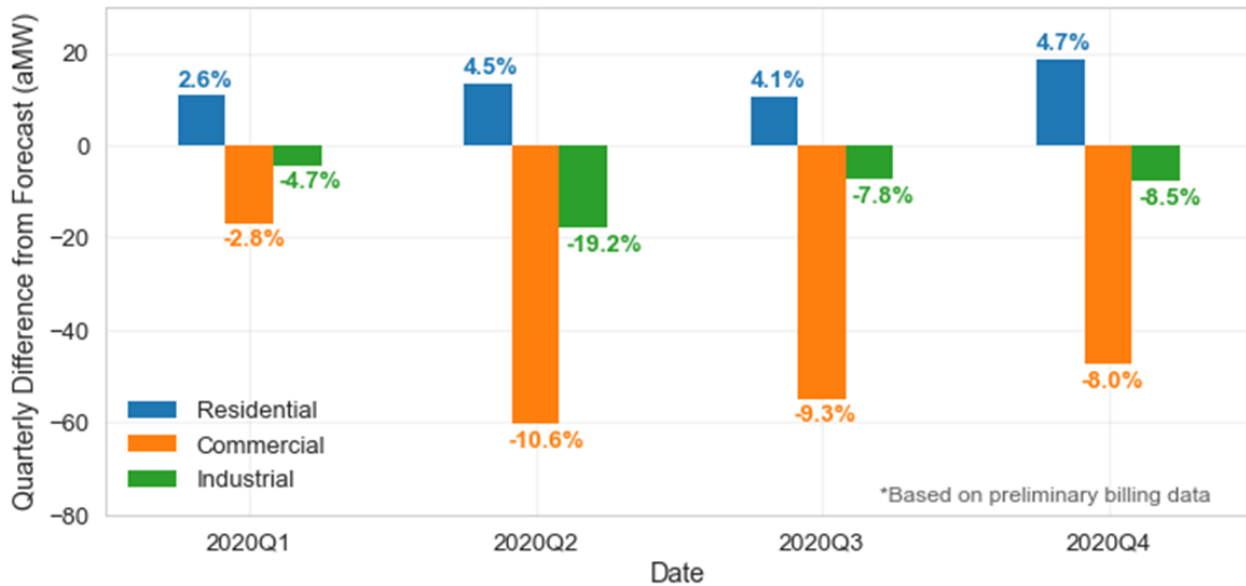
⁵ Interest income assumes City Cash Pool cash holdings accrue interest at an annual rate of 1.5%.

⁶ RSA transfers are the deposit into the RSA net of any RSA surcharge revenue. They primarily reflect interest earned by the RSA.

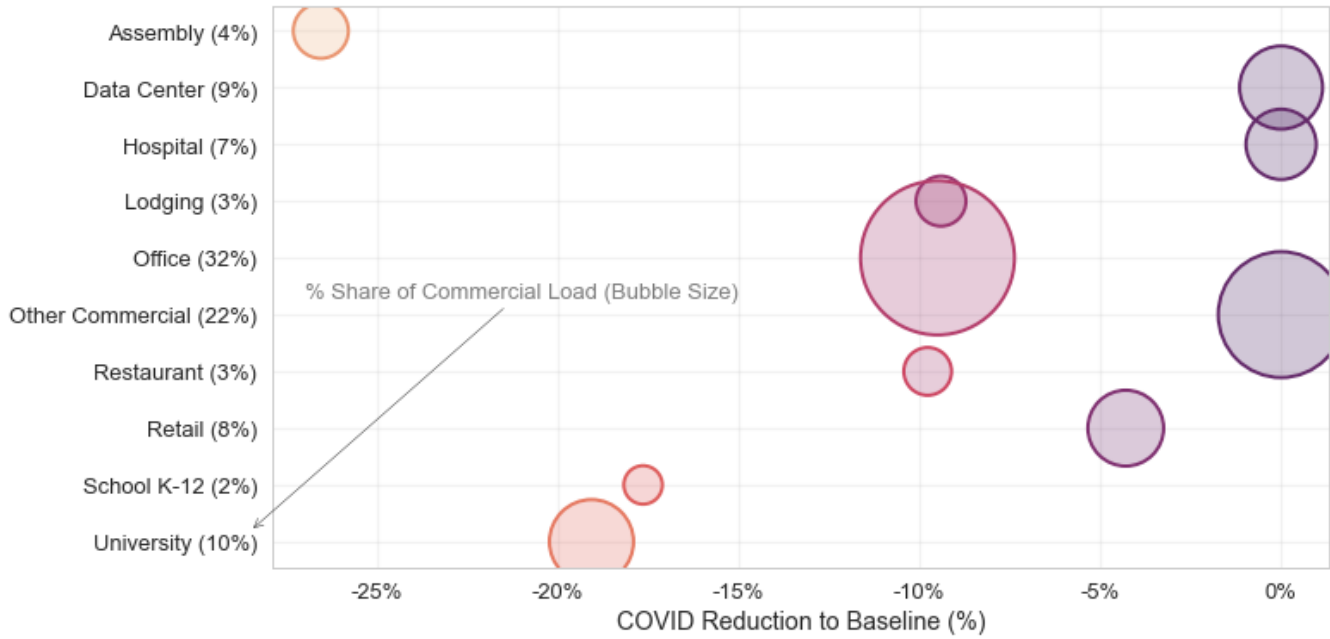
RETAIL SALES

The forecast of retail sales is based on City Light’s 2020 official load forecast, which assumes a gradual recovery from the COVID-driven load reduction in 2020. Non-residential retail sales were significantly reduced in 2020 due to the pandemic-related recession and public health measures. This was partially offset by increased residential sales due to customers spending more time in their homes. Places where large amounts of people gather (concert venues, theaters, places of worship, etc..) had the most reduction while segments like hospitals and data centers had minimal change. Office space, which makes up approximately one third of commercial load was reduced by roughly 10%.

COVID Impacts on Retail Sales



COVID Impacts by Commercial Segment



The current forecast projects most of this lost load will gradually return over the next few years. Energy efficiency investments by both the Utility and customers are expected to continue to reduce sales. However, gradually bringing back most of the lost load during the pandemic will offset some of the impacts of energy efficiency, resulting in a flatter load outlook compared to previous forecasts. The current forecast projects retail sales to decline 0.3% per year on average.

RETAIL SALES FORECAST

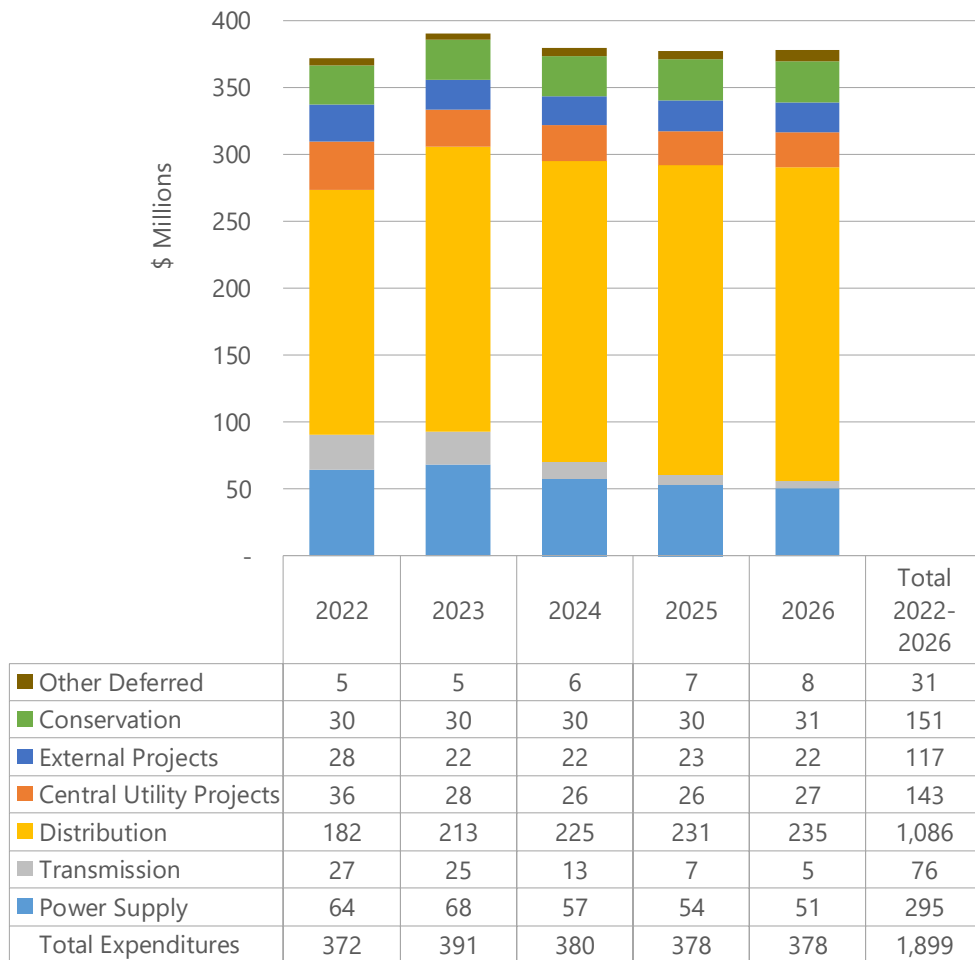
	2022	2023	2024	2025	2026
GWh					
Residential	3,008	2,973	2,956	2,933	2,928
Small and Medium	3,363	3,372	3,380	3,361	3,350
Large and High Demand	2,262	2,262	2,264	2,249	2,241
Total	8,633	8,607	8,600	8,542	8,520
Annual change					
Residential	-1.4%	-1.2%	-0.6%	-0.8%	-0.1%
Small and Medium	0.6%	0.3%	0.2%	-0.6%	-0.3%
Large and High Demand	0.9%	0.0%	0.1%	-0.7%	-0.4%
Total	-0.1%	-0.3%	-0.1%	-0.7%	-0.3%

APPENDIX A: CAPITAL REQUIREMENTS DETAIL

CIP

The following bar chart is a graphical depiction of the forecasted capital expenditures from the 2021-2026 adopted CIP. The forecasted capital requirements are anticipated to be lower than recent history. The capital requirements between 2016-2020 averaged \$410 million annually, which includes 2020 with lower than usual capital expenditures due to the impacts of COVID.

CAPITAL REQUIREMENTS FORECAST: BASED ON 2021-2026 ADOPTED CIP



Key infrastructure projects planned during 2022-2026 include the following:

- The underground and overhead equipment replacements, which include replacing older distribution equipment that is nearing the end of its useful life, is overloaded or no longer has available parts.
- The overhead equipment replacement project also includes the accelerated wood pole replacement program.

- Other key projects include the overhead and underground electric power service connections for Medium General Service and various protection, mitigation and enhancement activities that will fulfill the requirements for the 2013 FERC license and settlement agreement at Boundary.

MAJOR CIP PROJECTS 2022-2026 SPENDING, \$MILLIONS

Included in 2021-2026 Adopted CIP Budget

8353: Underground Equipment Replacements	209.2
8351: Overhead Equipment Replacements	199.2
8366: Medium Overhead and Underground Services	93.7
6987: Boundary - Licensing Mitigation	83.2
9969: Software Replacement Strategy (Distribution)	57.6
7125: Denny Substation Transmission Lines	55.2
8363: Network Additions and Services: Broad Street Substation	53.2
9239: Transportation Electrification	51.8
8404: Denny Substation - Network	50.7

Draft Topic Outline for Panel Comments on 2022-2026 SCL Strategic Plan

1. Statement regarding Panel's overall support for the plan
2. Comments on the current context in which the Plan is submitted
 - a. What is different now from 3 years ago? What is the same?
 - b. Notable successes/challenges since last plan?
 - c. What are the major issues for SCL now, in the Panel's view, and why?
3. Comments on financial condition of the Utility/proposed 2022-2026 rate path
4. Comments on the 5 Strategic Priorities, how the Utility will measure success for each, and the associated PIAs.
 - a. Improve the Customer Experience
 - b. Create our Energy Future
 - c. Develop Workforce and Organizational Agility
 - d. Ensure Financial Health and Affordability
 - e. We Power Seattle
5. Other topics of interest to the Panel relevant to City Light that the Panel wishes to bring to the Mayor's/Council's attention

2022-2026 City Light Strategic Plan

City Light Review Panel Comment Letter

The City Light Review Panel was created by City Ordinance in 2010. One of the responsibilities of the Review Panel outlined in that legislation is to *“review and assess City Light’s strategic plan and provide an opinion on the merits of the plan and future revision to it to the Mayor and Council.”* Ordinance 124740, adopted in 2015 amending Ordinance 123256 which originally created the Panel, also states in part:

The Council continues to expect the Panel to provide the Mayor and the Council with analyses and recommendations on significant elements of the strategic plan including, but not limited to, financial policies, cost allocation, rate design, operational efficiency, and to submit its recommends to Mayor and the Council or, if a collective recommendation cannot be reached, a recommendation indicating the majority and minority positions and the rationales for those positions.

(Ordinance 124740 ,Section 1.)

With each submittal to the Mayor of a Strategic Plan update or new strategic plan, the Panel has submitted a lengthy letter commenting on the Plan. If the Mayor makes changes to the Plan before sending it to Council, the Panel has had the opportunity to opine on those changes.

The general process that the Panel has used in the past to develop its comments letters is as follows:

- The Panel facilitator (Karen) provides a simple topic outline to the Panel for review. (see below). The outline is basically “food for thought”; the Panel can add or subtract topics.
- The Panel has an opportunity (or two) to go through the outline and offer comments and ideas about what they would like to say in the letter.
- Karen then drafts a letter based on that input. She shares it with the Panel Chair and Vice Chair for advance review that the draft is basically on track.
- The draft is then reviewed by the Panel as a whole and refined until it is finalized.
- In the event there are points on which the Panel does not reach consensus, minority opinions can be acknowledged in the letter.

Looking ahead, based on the calendar presented by Leigh Barreca, the Panel will have three meetings (in addition to March 25) to develop the Panel letter to accompany the 2022-2026 plan:

- **March 25:** Discuss RP letter process.
- **April 14:** Review and discuss draft plan including appendices; Begin RP letter
- **April 29:** See final SP & appendices, with design elements.; Continue RP letter
- **May 12:** Finalize letter for inclusion in submittal package to Mayor

A topic outline for the letter, based on the Panel's outlined role in Ordinance, and prior letters, could look as follows:

Draft Topic Outline for Panel Comments on 2022-2026 SCL Strategic Plan

1. Statement regarding Panel's overall support for the plan
2. Comments on the current context in which the Plan is submitted
 - a. What is different now from 3 years ago? What is the same?
 - b. Notable successes/challenges since last plan?
 - c. What are the major issues for SCL now, in the Panel's view, and why?
3. Comments on financial condition of the Utility/proposed 2022-2026 rate path
4. Comments on the 5 Strategic Priorities, how the Utility will measure success for each, and the associated PIAs.
 - a. Improve the Customer Experience
 - b. Create our Energy Future
 - c. Develop Workforce and Organizational Agility
 - d. Ensure Financial Health and Affordability
 - e. We Power Seattle
5. Other topics of interest to the Panel relevant to City Light that the Panel wishes to bring to the Mayor's/Council's attention

It would be helpful to get the Panel's general thoughts on this draft topic outline at the March 25 meeting.

Seattle City Light Review Panel

c/o K. Wingers, Seattle City Light
P.O. Box 32023 Seattle, WA 98124-4023
CLRP@seattle.gov

May 7, 2018

Sent via email and hand delivery

Honorable Jenny A. Durkan
Mayor, The City of Seattle
600 4th Ave, Seattle, WA
7th Floor
Seattle, WA 98104

RE: Review Panel Recommendations on 2019-2024 City Light Strategic Plan

Dear Mayor Durkan:

We are pleased to submit to you our recommendations with respect to the proposed City Light Strategic Plan for 2019-2024 (the "2019 Plan"). We support the priorities and initiatives in the 2019 Plan, but for the reasons laid out below, we do not endorse the accompanying rate path. Our primary concern with the current draft of the Plan is the projected revenue requirement and implications for electricity rate increases over the next six years.

As a Panel, we are ringing the alarm bell: it is time for the City to place much more focus on controlling the Utility's costs going forward. Continual rate increases that significantly outpace the rate of inflation are threatening our diverse economy. The projected rate of growth in the City Light's operating and capital costs – and thus, electricity rates – is not sustainable, particularly now that we have confirmed what was only suspected in 2016: City Light has entered a new reality of declining retail demand that is projected to continue for the foreseeable future. Major effort is required to reduce the trajectory of growth in operating and capital costs at City Light, and this should be a high priority for the City's leaders and the Utility on behalf of a diverse, equitable future that benefits everyone.

The Planning Process

This is a new strategic plan. The original 2013-2018 strategic plan ("Original Plan") was adopted in 2012, and updated every two years (the "2014 Update", and "2016 Update", collectively referred to as the "Updates"), on a rolling six-year basis. The Review Panel, with evolving membership, has been in place since 2010 to advise the Utility, Mayor and Council on development of the strategic plan and other issues. Since June of 2016, we have met 24 times, for three hours per meeting, considering the issues in this new 2019 Plan. While we are not a Panel of experts, our members represent a wide range of customers served by City Light—from

low income households, to working families, to industrial customers, to energy efficiency advocates, to cities receiving franchise services from City Light.

Customer Outreach

In addition to engaging with the Panel, the Utility has completed an impressive outreach effort to customers as part of the strategic planning process. Feedback garnered from this outreach was positive, and noted four themes with respect to what customers want from City Light: reliability, affordability, rate predictability and support for clean energy. However, it should be noted this input was secured before the rate path was developed.

Success since Adoption of the 2013-2018 Strategic Plan

City Light has had important successes in many areas as a result of adoption of the Original Plan. It is important to mention these, because we strongly support continuation of the current strategic planning process. Since 2012:

- There has been solid progress on the vast majority of over 30 initiatives in the Original Plan—the focus of which was on upgrading and modernizing aging infrastructure. Two initiatives warranting particular mention are implementation of the outage management system and completion of the Climate Adaptation Plan.
- Enrollment in the Utility Discount Program has increased dramatically (while this shifts costs to other customers, it is important progress in terms of social equity—current enrollment is estimated at 30-50% of total eligible households).
- The Utility has maintained the rate path to which it committed for the first two years of the Original Plan and the first two years of both Updates.
- Financial savings targets have been met.
- A new retail power sales forecast methodology has been developed, and the 2019 Plan incorporates a forecast based on this updated methodology.

The strategic planning process continues to serve its fundamental goal of syncing operations and capital planning to the Utility's budgets and rates, promoting policy-driven budget decisions.

Current Challenges

The context in which the Utility finds itself has evolved significantly since 2012. The most significant change is the arrival of something other utilities around the county have been experiencing for some time: *declining retail demand for power*. We first noted concern that this might be a long-term situation in 2014, and again in 2016—when we supported the need for a new forecast methodology.¹ That new forecast (which we received in January 2018, fairly late in

¹ The new forecast methodology was developed based on recommendations from an independent third party review of the prior methodology. With input from a technical team from across the Utility, the new

the planning process) confirms that indeed, we can expect average annual growth rate in *retail electricity sales to decline by an estimated -0.4% per year over the next 20 years*. This decline is the net result after considering economic growth (increasing demand) and increasing energy efficiency (reducing demand). And in fact, City Light has collected approximately \$118 million less in retail revenue than projected in the last five years due to lower retail demand than forecast – necessitating the issuance of approximately \$100 million in additional debt to support approved expenditures.

How can retail demand for electricity be declining as Seattle’s economy is booming? In part, it is due to the success of the Utility’s (and others’) energy efficiency efforts. The forecast estimates 2.0% to 2.5% annual reductions in retail demand due to efficiency – in appliances, building design and construction codes and standards, and utility incentive programs.

Residential consumption is projected to continue to decline as more of the population lives in multifamily housing. However, much of the cost effective programmatic energy efficiency has been harvested from the residential sector. The Utility is now increasing its energy efficiency focus on commercial customers. Very slow growth in demand is forecast from the commercial sector. Industrial power demand is forecast to decline slowly over the next 20 years, due to both a decline in employment from this sector (-0.2%/year) and new efficiencies.

The biggest cost driver for the Utility continues to be its *very large capital investment program*—which has been necessary in order to upgrade infrastructure. Debt service on capital spending and debt service coverage accounts for 48% of expected growth in revenue requirements over the next 6 years. The Utility’s debt service plus debt service coverage will account for \$402.5 million in rate revenues in 2019 (43% of the 2019 estimated total revenue requirement), growing to an expected \$508 million in 2024 (45% of the 2024 estimated total revenue requirement). See the bar chart at **Attachment 1** for a depiction of the historical growth in City Light’s debt service.

It is important to strengthen the condition of City Light infrastructure. At this point, however, we need more focus on controlling future capital costs. We note three challenges with respect to capital expenditure budgets:

- Major cost overruns have been experienced on some large projects—the Denny Substation and the new customer billing system – for various reasons.
 - The Denny Substation project had an early engineering cost of \$89 million, which grew to \$173 million within two years as urban design requests were added to the project, and a street vacation was necessitated by those changes. The project

methodology incorporates more refined assumptions regarding conservation potential, changes in consumer use patterns, and has a more robust weather normalization model. City Light staff expect the new methodology will decrease—but not eliminate—uncertainty in retail sales forecasts.

was ultimately constructed for \$209.5 million. These costs do not include a second transmission line to the substation (\$66 million) or the build-out of the substation network (\$65.7 million).

- The customer billing system experienced a 60% cost increase, from \$68 million to \$110 million.
- City Light is required to expend substantial funds to move its infrastructure due to many transportation projects (City, WSDOT and Sound Transit). For example, the cost of utility relocations required by the Alaskan Way Viaduct and Seawall projects is estimated at \$82.4 million in ratepayer dollars in the 2018-2024 period.
- Maintaining the rate path commitment in the strategic plan required deferring several capital projects, creating some concern about a future bow wave of capital spending.

Changes in energy markets pose new risks for City Light that could cause significant disruption in power demand. Third-party actors are seeking to compete in the same market space as the Utility. Wholesale power demand remains weak. The price of renewable energy and energy storage technology is declining, making them a more attractive alternative to traditional centralized electricity generation. Cyber-security risks are becoming more sophisticated. These changes must be addressed aggressively to ensure that City Light remains resilient.

Within the Utility itself, we see other challenges:

- There have been significant changes in leadership in recent years, and these are ongoing.
- Declines in *wholesale revenue* have required a 1.5% surcharge on customer bills since August 2016 in order to replenish the Rate Stabilization Account.

Fortunately, there are a few opportunities on the horizon to *increase revenue*, both of which would be addressed by initiatives proposed in the new 2019 Plan:

- Evolution of market opportunities to buy and sell interruptible power (“Western Energy Imbalance Market”).
- Slow, but increasing adoption of electric vehicles (Utility funds are being used to promote growth in this area).

2019-2024 Strategic Plan

- **Plan Priorities**

The core priorities in the strategic plan have evolved since 2012, and it is important to note why this has happened. The Original Plan priorities—concepts which remain relevant and important — were:

- a. Improve customer experience and rate predictability
- b. Increase workforce performance and safety practices
- c. Enhance organizational performance
- d. Continue conservation and environmental stewardship leadership

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Given the Panel's concern about the continuing level of rate increases, we have asked that "affordability" be specifically identified as a new priority, rather than be subsumed under customer service. Because "affordability" means different things to different people, we want to clarify that our focus on affordability arises out of our concern about the fact that City Light's rates continue to increase faster than inflation.

On the positive side, in the last six years the Utility has made tremendous strides in workforce safety and improving its infrastructure: these priorities are now merged under the priority of "Continuing City Light's Core Business." The 2019 Plan priorities, which we support, are:

- a. Customer Service
- b. Affordability
- c. Clean Energy, and
- d. Continuing Progress on City Light's Core Business

We note that with the new billing system and impending implementation of automated metering infrastructure, customer service has and will continue to be an important priority. The City-wide emphasis on race and social justice has been embraced by City Light, to its credit. Customer service for all customers—be they large industrial customers, or Utility Discount Program Clients—needs to be a continued focus for City Light.

- **Baseline Expenditures**

As noted, we have an overall concern about rate of growth in baseline expenditures. We do not think this is sustainable in an environment where demand is declining. This challenge is exacerbated by the current rate structure. This is the primary concern we believe that the Utility, with the necessary support from the Mayor and Council, must address in the next few years.

- **Seven Initiatives**

The Panel supports the initiatives in the 2019 Plan. We commend the Utility for reducing the number and cost of proposed initiatives as compared to the Original Plan. Importantly, none of the new initiatives require additional revenue—they will be funded by shifting emphasis within existing budgets. That said, some components of these initiatives that appear to be discretionary spending without a revenue return or savings, could be reduced. We think it is now necessary to examine these and other cost saving opportunities. We also note that savings are projected from several of the new initiatives, but those savings are not built into the rate path.

- **Rate Path**

The Panel believes that the *immediate and direct focus of the City leadership and City Light leadership should be on controlling the Utility's costs.* This is necessary if we are to avoid a future

of spiraling rate increases. *We need to see more focus on addressing this foundational change in City Light's economics.*

The growth in the Utility's costs since 2012 is illustrated in **Attachment 2**. While City Light has commendably met its revenue requirements in each of the first two years of the Original Plan and two subsequent Updates, each strategic plan Update—and the new 2019 Plan—has resulted in actual rates higher than were earlier estimated. Cost increases have been front-loaded into each plan and update, as they are again in the 2019 Plan. Lower cost increases projected for the out-years have not materialized.

In the next year or two, the biggest rate challenge is to address the decline in retail demand that is confirmed by the new forecast methodology. The 2019 Plan's proposed revenue requirements in 2019 and 2020 are lower than they would otherwise have been, thanks to substantial effort by the Utility to find ways to smooth the rate path, including removing some large capital projects from the capital improvement program assumptions.²

New approaches to rate design can mitigate rate pressure, and must be considered. We emphasize the importance of the initiative in the Plan to explore new rate design alternatives. Rate design is a separate issue from the growth in the underlying revenue requirement: *both need to be addressed.*

We support the priorities and initiatives in the Plan, *but at this time the Panel does not endorse the proposed rate path.* The reasons for this vary between individual Panel members, but the core concerns we have are:

- The rate increases are high, as noted, well higher than inflation, and we are concerned that there needs to be more urgency to address this;
- We do not see a plan in place for addressing the growth in the Utility's level of debt;
- We do not feel there has been sufficient transparency with respect to the Utility's costs and revenues;
- We received the updated demand forecast and the first draft of the financial forecast late in the process, and there is additional data we would like to investigate with respect to the Utility's underlying costs and revenues.

Panel Members David Allen, Sara Patton and Nina Sidneva have significant concerns about the rate path, but stop short of agreeing with the Panel's decision to not endorse the rate path.

We look forward to working with City Light to further study all of these issues.

² The first draft rate path presented to us by City Light staff, in January 2018, estimated annual increases in the six year revenue requirement/rate path as shown below, by year:

2019	2020	2021	2022	2023	2024
8.5%	3.5%	4.0%	3.1%	4.3%	4.1%

- **Other Action Items for Consideration**

Our core concern with the Plan relates to the proposed rate path. We offer below some other actions that we believe would be constructive steps for the Utility to pursue. Some of these will require additional funds or redeployment of staff.

- Step up the focus on the changing electric utility industry, particularly the risks posed by third-party actors that pose risks of substantial sudden drops in demand for electricity or other services currently provided by City Light. If City Light is to be resilient in the face of growing uncertainty, it must deploy additional staff time to plan how best to guard against—or take advantage of—these changes. We recommend the Utility be requested to submit a plan for its response to these issues to the Panel within the next year or two at most, for our consideration and comment, and subsequent transmittal to the Mayor and Council.
- Undertake a holistic benchmarking effort. This has not been done since 2011, although we commend the Utility for its ongoing targeted, programmatic benchmarking work.
- The current Rate Stabilization surcharge could be eliminated and the anticipated 2019 rates reduced by 2% or more if, as we have recommended, the Utility is allowed to proceed to sell its surplus property at 8th and Roy.
- Examine options or efficiencies to reduce the increasing cost of central services that City Light is required to utilize.
- Reconsider the scope and scale of discretionary programs that are adding to the Utility's costs. As noted, we think it is important to examine whether these provide some options for cost savings.
- Continue to incorporate financial savings targets in the 2019 Plan. With considerable effort the Utility has met all its prior financial savings targets included in the Original Plan and Updates.
- As we suggested in 2016, it would be helpful to create and track a metric that shows how actual customer bills are impacted versus the projected revenue requirement: consumer conservation action can mean that actual bills rise less than the revenue requirement.

Conclusion

The Panel supports the 2019 Plan, with the exception of the proposed rate path, and we continue to strongly support the strategic planning process. The process provides an important longer-term strategic focus on the choices before City Light.

City Light has had many successes since the strategic planning process was launched in 2010. Utility leaders have appropriately focused on stewardship and maintenance of the Utility's infrastructure and employee safety in recent years, and that focus has paid off. City Light has been carbon neutral since 2005: we are participating in a global transition away from carbon

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that City leaders, the Utility, and its customers can be proud of. Looking forward, we anticipate green power renewable energy and the electrification of transportation will play a growing part in our electric future.

We commend City Light staff, as well a Council and Budget Office staff supporting the Panel, for their responsiveness to our questions and their frank engagement with us on the challenges facing the Utility. Their expertise and work on our behalf is deeply appreciated.

We would welcome the opportunity to speak with you about the recommendations in our letter.

Sincerely,

Members of the City Light Review Panel



Gail Labanara, Panel Chair
Panel Position 9:
Suburban Franchise
Representative



Patrick Jablonski, Panel Vice Chair
Panel Position 6:
Industrial Customer



Nina Sidneva
Panel Position 1:
Economist



Cal Shirley
Panel Position 2:
Financial Analyst



Sara Patton
Panel Position 3:
Non-Profit Energy
Efficiency Advocate



Thomas Buchanan
Panel Position 4:
Residential Customer



David Allen
Panel Position 5:
Commercial Customer



Leon Garnett
Panel Position 7:
Low-Income
Communities Advocate



John Putz
Panel Position 8:
At-Large Customer

cc: City Councilmembers
Deputy Mayor David Moseley
James Baggs, Interim CEO, Seattle City Light

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May 7, 2018

Attachment 1: Seattle City Light Long Term Debt, 2012 - 2024



Attachment 2: City Light Rate Revenue Requirement* Increase Over Previous Year

<i>Strategic Plan Estimate</i>	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
2012 Projected 4.7% avg.	4.4%	5.6%	4.1%	4.8%	5.3%	3.9%						
2014 Projected 4.4% avg.			4.2%	4.9%	5.0%	3.9%	3.6%	4.9%				
2016 Projected 4.3% avg.					5.6%	5.6%	5.0%	3.6%	3.1%	2.5%		
2018 Projected 5.07% avg.							6.5%	6.5%	4.8%	4.2%	4.3%	4.1%
Actual 5.05% avg.	4.4%	5.6%	4.2%	4.9%	5.6%	5.6%						

*Excludes Rate Stabilization Account surcharges and Bonneville Power Administration Pass Through to customers.