



**Seattle  
City Light**

**2020**

INTEGRATED RESOURCE PLAN  
PROGRESS REPORT



## Overview

*Clean energy policies are driving changes in regional supply and demand — and the biggest influences on this 2020 Integrated Resource Plan Progress Report are continued growth in renewable resources as well as energy efficiency, which are fast becoming centric to our energy future. As the costs of utility-scale solar and wind energy become less expensive, existing fossil fuels are being replaced with cleaner energy fuels.*

This is a game changer.

Although recovery of a post-pandemic economy is still to be determined, technology innovations never took a break, and they are moving quickly — unleashing new opportunities for customer choice and participation in designing the future of our industry. Those choices, however, coupled with the rapid evolution in thinking about electrification, requires a similar focus on environmental equity and rate designs that don't leave vulnerable populations behind. In January 2020, Seattle Mayor Jenny Durkan signed an executive order committing the City to expedite Climate Action plans and reiterating the Seattle City Council's August 2019 resolution supporting a Green New Deal for Seattle. City Light's work ahead will focus on eliminating fossil fuels in the service area and improving outcomes for communities that have disproportionately shouldered the weight of environmental injustice.

As Seattle City Light continues to invest in energy efficiency, renewable resources, and grid modernization, it will partner with customers to track loads, demand response opportunities, and distributed energy resources to shift and better spread loads throughout the day. (Demand response is a change in the power consumption of an electric utility customer to better match the demand for power with the supply). Internet technology and advanced metering enable customers to have smarter homes and businesses, with more flexibility to control loads and help the grid adapt to the continued changes over the next few decades. These utility and customer relationship changes must be done without backing off the strong commitment made this past summer to address and reverse the effect of decades of racial and social inequities disproportionately borne by our 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.





City Light is creating a smart and instructive dashboard in its Integrated Resource Plan (IRP) framework with more targeted information to enable consumers to lower overall emissions, reduce environmental impacts, and increase fairness and equity while maintaining affordability. The goal is to create more overall value in personal and city energy use and energy efficiency.

City Light has been a consistent voice for generating electricity with clean renewable resources, promoting energy efficiency with our customers, and reducing the need to build or acquire costly new power generation. Since 2005, City Light has been greenhouse gas neutral — the first electric utility in the nation to achieve that distinction. Seattle’s new homes are among the most energy efficient in the country. Our long-term emphasis on greenhouse gas neutrality has resulted in City Light being as high as 98% carbon free.

The steps to keep City Light as a forerunner in cleaner energy have many components. Determining the kinds of fuels (hydro, wind, solar, etc.) City Light will use to meet its customers’ demands is an ongoing challenge. The path to owning, producing, and purchasing energy is filled with federal, state, and local regulations, some still in the making.

The job of the IRP is a complex one: determining what resources should support our energy use. There are myriad factors that go into completing an IRP and recommending changes to the resource portfolio. Many of them are brand new and more detailed than

ever before: a groundbreaking new Clean Energy Transformation Act with an ongoing rule-making process, and new priorities for transportation electrification and decarbonization. There are newly released and evolving studies about changing weather patterns and their effects on water flows, upon which hydropower operations as well as fish and wildlife depend. Each day brings continuous improvements in wind, solar, thermal, and pumped storage. Batteries that are beyond what was imagined just last year are on the market. Plus, there is increasing regional cooperation in managing power resources, so the region can better share in overall energy efficiency. However, constant market shifts and this unusually fast-breaking recession are bringing new economic realities and making for uncertain timelines. All these factors have come together in the midst of a nine-month pandemic, the impacts of which are still uncertain.

City Light determined that producing a comprehensive resource study for a long-range IRP now would be inconclusive. Therefore, we sought and received permission from the Washington Department of Commerce to change course; recognizing the limited validity of completing and presenting a full IRP now, which would have limited durability and use in the future. Instead, we turned our attention to building a solid analytic foundation for the 2022 IRP, ensuring future resource adequacy with better evaluation of resource choices.

## IRP Legal Requirements

***Washington law (RCW 19.280) requires all electric utilities with over 25,000 customers to develop comprehensive resource plans that identify strategies to meet their customers' electricity needs in the short and long term. Seattle City Light is required to file an Integrated Resource Plan, which is either a Progress Report due every two years or an updated Integrated Resource Plan due every four years. Progress Reports reflect changing conditions and the progress of Integrated Resource Plans, whereas Integrated Resource Plans are comprehensive resource plans that explain the mix of generation and demand-side resources the utility plans to use to meet their customers' electricity needs over the period covered in the plan. Our change in course means that City Light last produced a full Integrated Resource Plan in 2016. We prepared an Integrated Resource Plan Progress Report in 2018. With this exception due to emergent factors in 2020, City Light will next produce a comprehensive Integrated Resource Plan in 2022.***

## 2020 Progress Report: The New Energy Frontier

City Light has entered a New Energy Frontier, where even a pandemic could not stop the many concurrent changes that are affecting how we all will adapt to the changing reliance on renewable energy. Fleets throughout our metropolitan region are rapidly electrifying, residential customers will be asked to use advanced metering systems to strategically plan their energy usage throughout the day, and we are focusing more on providing energy efficiency programs and benefits to disadvantaged communities.

The main priority for our resource planning this past year has been to find a new and better framework for determining which resources are best for City Light's customer-owners. We are committed to making these choices in a more customer-centric manner.

The primary catalyst for the change in course is Washington's Clean Energy Transformation Act (CETA), passed by the legislature in 2019. It is the most significant mandate to-date addressing how we will reduce greenhouse gas emissions while transitioning to renewable energy resources. New regulations enforcing its provisions are being written and are expected to go into effect in 2021. The new rules will change decades of reliance on fossil fuels, replacing them with renewable resources and distributed energy resources. The benefits of energy efficiency allow City Light to offer programs that save energy so that new, more costly resource acquisitions and generation are not necessary. In addition, new tools like demand response and battery storage will fill voids where hydropower and new renewable energy sources cannot.

Today's Progress Report also introduces a new framework incorporating resource adequacy. With the increasing renewable resource markets growing more competitive, City Light can rely on short-term market purchases to fill customer demand, with an overall energy supply that is greenhouse gas neutral and as high as 98% greenhouse gas free – for at least the next five years.

## New Framework

As City Light began our 2020 integrated resource planning efforts, we quickly saw efforts across the region and the energy economy that would reduce greenhouse gas emissions faster than outlined in the 2018 IRP Progress Report. We determined that new resource choices, investments in energy efficiency, renewable generation and demand response would emerge as important resource choices for the future. We made a commitment to stakeholders to expand our evaluation of energy efficiency resources to include the added value and benefits of each option. Additionally, as the new requirements of the CETA were being written, City Light focused on testing reliability



metrics used in the electric utility industry to find a metric well-matched to a flexible hydropower utility like City Light.

The new framework we developed will better answer the question of how much of each energy resource we need to meet demands each year. Previously, potential energy shortages were tracked only in the winter months when peak seasonal loads required large amounts of energy. The new framework provides evidence that summer months need to be tracked, as water supply resources may be stressed if water levels drop. The utility may need to maintain higher-level water for fish runs, recreational needs, and unseasonably long periods of high temperatures, meaning we must find other means to meet demand.

## **New Directions to Cleaner Seattle Power Mixes**

The 2020 IRP Progress Report shows City Light's power supply is built on a robust hydropower portfolio that will meet our power supply needs for several years to come. City Light's existing short- and long-term plans include new investments in energy conservation while continuing to evaluate investments in new renewable energy.

But resource adequacy priorities are changing. Summer emerges as the primary season to watch for the possibility of needing new resource adequacy investments. A proposed new Northwest Power Pool Resource Adequacy Program has the promise of helping the region create a more transparent, dependable, affordable, and clean generating mix.

We identified another new tracking need: gauging how City Light's hydropower resources would respond to adding variable renewable energy resources to the mix across all hours. We also developed more metrics to help determine if advising customers to change their own energy patterns can save energy and costs. Most customers now have advanced meters, which will allow them to track their energy use.

With solar and wind growing as a significant share of the power supply, Seattle must start planning for greater uncertainty in wholesale market supply conditions throughout the year, due to the variability in production of hydro, solar, and wind. New studies also will help produce more in-depth water resource and operations information, identifying the hours when City Light might change hydropower operations to better meet local and regional goals of reducing greenhouse gas emissions.

Perhaps the largest addition to this 2020 Progress Report is a new scientific standard on how City Light gauges hydro resource adequacy so that we can better prepare for when hydro runs low, as in the late summer. Both wind and solar energy supplies are more available in the summer months. The research and testing of our metrics referred to as the "new framework" have spurred changes in when, how much, and how often we chart hydro supply and energy needs. Ongoing energy complexity meets new technology to deliver both a pathway to conserving more water when it runs low in late summer and meeting new energy need with contracts for solar and wind, which are more abundant in summer.

As City Light forges ahead in creating our 2022 IRP, we will align information from our 2022 Conservation Potential Assessment, new Transportation Electrification Strategic Investment Plan, and other electrification work to inform Seattle's future power mix.

## Premises for the 2022 Integrated Resource Plan

**Conservation investments continue to outpace growth in customers' use of power.** Conservation investment remains the first and best resource choice as the most environmentally responsible way to meet growing energy demands, resource adequacy, and 100% carbon-free regulations. It also provides a low-cost way to meet the Washington Energy Independence Act requirements.

**City Light expects to add new clean fuels (wind and sun) to our power mix, starting with customer programs.** New alternative renewable energy investments through customer-centric programs and utility choices reduce City Light's market reliance and help City Light customers achieve their goals to reduce their carbon footprint.

**Cost should not be the only consideration when picking an alternative energy resource.** The IRP framework shows comparing resources on cost alone will not lead to the most value. A higher-cost energy efficiency resource path that provides reductions in power use at the right time must be considered for all its merits. The IRP analysis shows that increasing spending on energy efficiency could provide additional value by reducing City Light's Bonneville Power Administration (BPA) purchases now.

**New power supply costs are declining, but caution should be taken, as adding too much new renewable power generation too soon could add costs to customer bills.** Most new utility-scale clean power supply, customer solar generation, energy efficiency, and demand reduction options continue to decrease in price. Use of these products has increased due to tax incentives, rigorous energy efficiency codes and standards, net metering policy, and renewable

portfolio standards. This has created a viable market for these new technologies and has led to faster installation. However, what works today may not endure through the life of the project, which is usually about 30 years due to the speed of technology change. Lower-cost customer demand response options and energy storage options such as batteries could be on the horizon. Future IRPs are likely to see expanded use of these technologies because they can provide important targeted reductions in power use.

**Transmission and distribution investments will be needed to support 100% greenhouse gas-free power and electrification.** Regional and local cooperation will be important to deliver increasing amounts of renewable power supplies. City Light's analysis projects possible limitations in delivering that power without changes in transmission policy or new investments. Going forward, regional and local discussions about alternatives to new electric power lines, which power lines are necessary to build, and how to pay for investments will be as important as evaluating power supply options.

**Past IRPs concluded BPA preference power meets City Light goals — that has not changed.** Going forward, the Progress Report continues to rely on the BPA contract beyond 2028 to keep City Light's power supply dependable. BPA provides over 40% of City Light's power supply, and a future contract is expected to provide clean energy to meet demand during the winter and provide supplemental summer power when we have the highest energy needs. The analysis also shows that City Light is steadily reducing our BPA purchases and saving money now because of our investments in conservation. Our future use of BPA will be influenced by our load growth, BPA's available power supply and viability of reliable alternatives. City Light expects to engage BPA during the lead up to the new regional cooperation contract to ensure availability of products and contract structure that support the emerging needs of our utility, and the region as a whole.

**Work continues to mitigate the impacts of climate change.** Through policies supporting energy conservation, renewable energy, and greenhouse gas neutrality as well as rigorous building codes,





the City of Seattle and City Light have been leaders. City Light is well-prepared to address the new greenhouse gas neutral and greenhouse gas free mandates of the CETA. The 2020 IRP analysis finds City Light today is close to a 100% greenhouse gas-free standard with 91% to 99% carbon-free energy. Additional renewable energy and City Light's newly adopted Transportation Electrification Strategic Investment Plan will further support carbon neutrality and advance City Light's ability to meet Seattle's Green New Deal objectives.

**Customer-centric energy efficiency programs have been the go-to resource for the last decade, keeping electricity demand stable even with the region's economic growth.** The New Energy Frontier and innovative technology are opening new opportunities for customers to help reduce the need for utility-scale investment and keep costs down. The utility's challenge is to teach our customers about their own energy consumption and how to help us reduce greenhouse gas emissions. We look forward to the day when customers know this information just like they know the cost of a latte or a tank of gas.

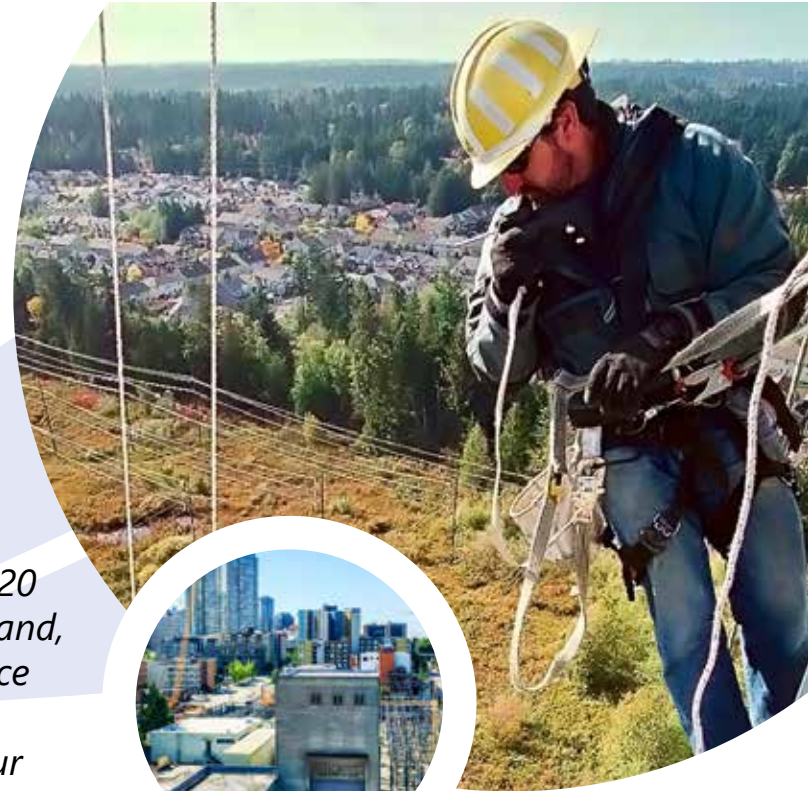
## Key Definitions

**Resource Adequacy** refers to having sufficient resources, generation, energy efficiency, storage, and demand-side resources to serve loads across a wide range of conditions.

**Resource Needs** translate local, state, and federal regulations into defined minimum or maximum thresholds for having a certain type and amount of resources to meet demand or a portion of demand.

**Resource Choices** refers to the kinds of programs and fuels chosen to meet demand, like energy efficiency (conservation), alternative energy like wind and solar, renewable energy, fossil fuels, storage and battery capacity, hydro and others.

**Demand Response** is a change in the power consumption of an electric utility customer to better match the demand for power with the supply.



## Planning A Cleaner Energy Future

*As part of the IRP process, City Light identifies supply needs for the next 20 years based on the ability of existing supply to meet future forecast demand, regulatory requirements, and uncertainty in supply and demand. Resource choices must correspond to City Light's goals of reliability, affordability, and environmentally responsible service. We must forecast and define our resource adequacy — having sufficient resources to serve loads across a wide range of conditions — and clean energy needs.*

The selection of future portfolios meets requirements such as City Light's current standards for greenhouse gas neutrality, Initiative 937 mandates (Washington State Energy Independence Act) and the Washington State Clean Energy Transformation Act (SB5116) requirements. The following table highlights the legislative goals of these major policies enacted to combat climate change. In all cases there are alternative compliance mechanisms to prevent intolerable cost increases. These mechanisms include provisions for no load growth and capping costs at a percentage of all capital and operating expenditures we must make to provide service to our customers (revenue requirement).

*"Resource choices must correspond to City Light's goals of reliability, affordability and environmentally responsible service."*







### **Clean Energy Transformation Act (2019)**

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- All cost-effective and feasible conservation
- 2026 — No coal
- 2030 — 100% greenhouse gas neutral; at least 80% renewable and non-emitting resources
- 2045 — 100% greenhouse gas free with renewable and non-emitting resources

### **Energy Independence Act "I-937" (2006)**

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- All cost-effective conservation
- 2020 — 15% renewable generation (excludes hydro)

### **Seattle City Light Carbon Neutrality (2000)**

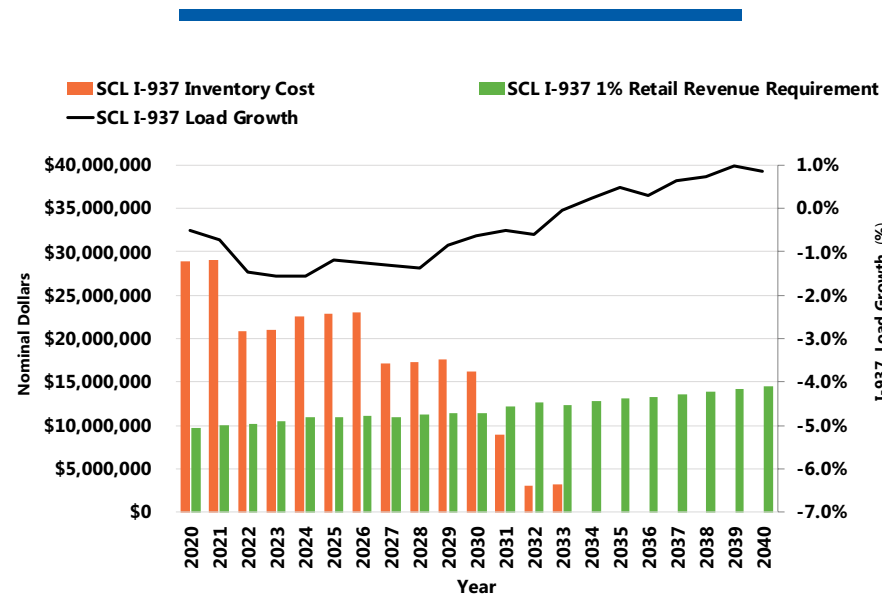
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- Greenhouse gas neutral
- Load growth met with cost-effective conservation and new renewable energy

## I-937 Energy Independence Act 2006

In 2006, Washington voters approved Initiative 937 (I-937), which requires major utilities to invest in all cost-effective energy efficiency measures and sets targets for adding Northwest renewable energy as a percentage of load. Eligible renewable resources include water, wind, solar energy, geothermal energy, landfill gas, wave, ocean or tidal power, gas for sewage treatment plants, bio-diesel fuel, and biomass energy. In 2020, the target increased to 15% of load. This target does not increase beyond the current level.

The law also includes provisions to keep costs affordable for utilities. Today, City Light can comply under the “no load growth” option. This option is available when a utility’s weather-adjusted load average did not increase over the previous three years. In choosing this compliance option, City Light is required to demonstrate that we invested at least one percent of our total annual retail revenue requirement that year on eligible renewable resources.



City Light’s Progress Report finds that our continued investment in the current conservation path from the 2020 Conservation Potential Assessment delays load growth until 2033. With our current inventory of eligible renewable resources, we do not project adding renewable resources for I-937 compliance until 2031. In the chart below, the black line represents the measurement of load growth. In 2030, the black line shows that City Light will be measuring half a percentage of load decline. The 2030 orange bar shows that City Light’s eligible renewable resource expenditures are over \$15 million. The 2030 green bar shows the one percent of revenue requirement threshold is just over \$10 million dollars. This indicates City Light’s one-year cost for renewable resources is about 1.5%, exceeding the 1% threshold for costs.

## Clean Energy Transformation Act 2019

The Clean Energy Transformation Act (CETA) provides electric utilities in Washington a clear mandate to phase out greenhouse gas emissions. CETA requires utilities eliminate the use of coal-fired resources after Dec. 31, 2025. Additionally, all electricity sold to customers must be greenhouse gas neutral starting Jan. 1, 2030, and greenhouse gas free by 2045. To be greenhouse gas neutral, a utility must supply at least 80% of its load with a combination of renewable and non-emitting resources. Utilities may use alternative compliance options during the greenhouse gas neutral period for no more than 20% of load.

CETA establishes that a utility must incorporate a social cost of greenhouse gases in making resource decisions. CETA sets a minimum cost that a utility must use from a technical study published in August 2016 by the Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. A utility is allowed to use a higher cost if it can establish a reasonable basis for doing so. City Light will use the social cost of greenhouse gases when evaluating conservation programs, developing IRPs, and evaluating mid- to long-term resource options during resource acquisition.

The social cost of greenhouse gases represents the monetized damages associated with an incremental increase in carbon emissions in a given year. This cost is expected to increase over time as future emissions are expected to produce larger, incremental damages in response to climate change. The table below shows the costs being used.

Year	Social Cost of Greenhouse Gases <i>(in 2019 dollars per metric ton of carbon dioxide)</i>
2020	\$75
2025	\$83
2030	\$89
2035	\$95
2040	\$102
2045	\$108
2050	\$115

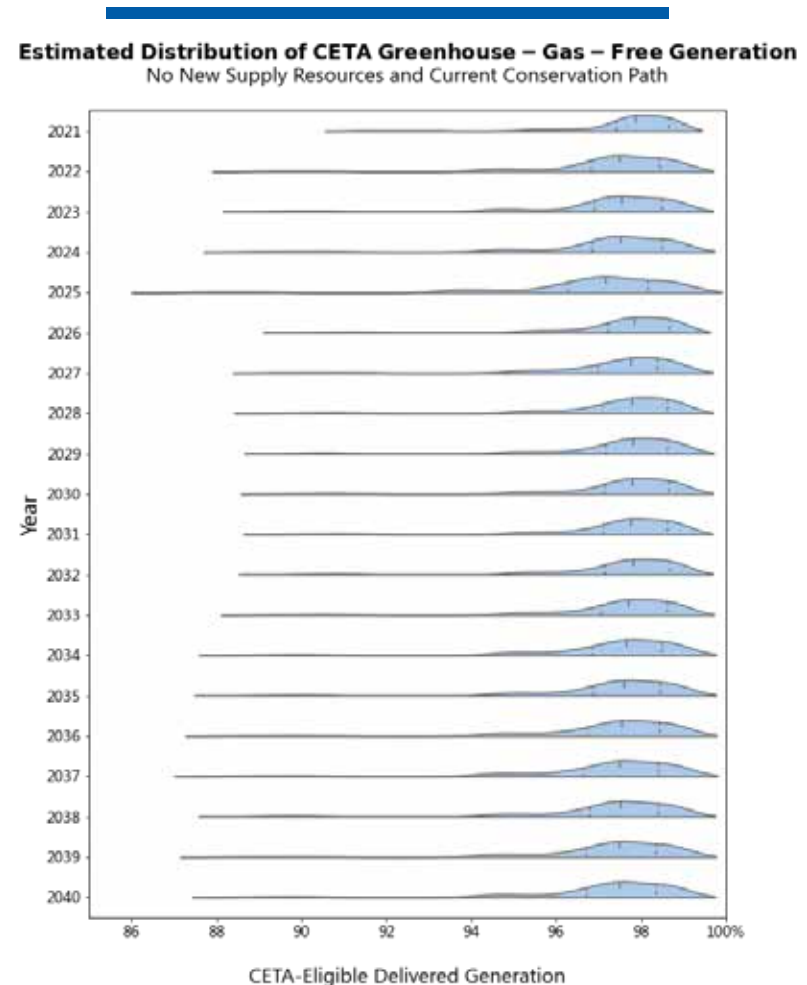
For CETA, emissions fall into two categories: known sources and unknown sources. City Light's sources of emissions are unknown; they come from wholesale market transactions where the delivered power source is not always identified.

In our IRP analysis, City Light has implemented CETA rules by adding the social cost of greenhouse gases as a penalty to market purchases in months that City Light has a deficit. Additionally, City Light assumes that 3% of its BPA power deliveries are from unspecified market purchases, which is consistent with a recent historical average.

To calculate the penalty, City Light uses the CETA default emission rate for unspecified electricity, which is 0.437 metric tons of carbon dioxide equivalent per megawatt hour. City Light assumes this rate is constant through all future years studied.

City Light conducted a review of our existing supply portfolio and current 2020 Conservation Potential Assessment plans. Even without new resources, we find City Light can achieve 91% to 99% greenhouse gas neutrality across the anticipated range of hydro and temperature conditions we expect to experience.

The next chart shows the projected distribution of our greenhouse gas-free generation as a percentage of customer load. To better understand the chart, focus in on 2025, which has the largest tails. On the right tail of the distribution, the chart shows that under some conditions, City Light can be close to 100% greenhouse gas free. On the left tail, the chart shows that there is a condition, although unlikely, of coming in at 86% greenhouse gas free. The height of the blue shaded area indicates the frequency of the distribution. In 2025, under most conditions, City Light expects to be between 96% to 98% greenhouse gas free.





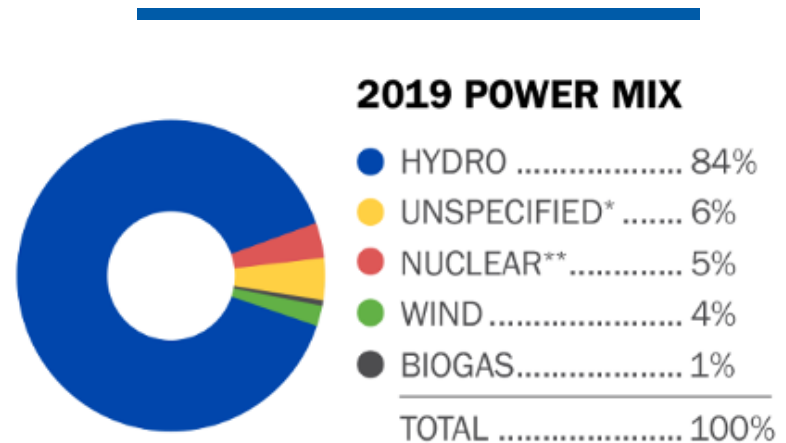


## Our Existing Resources

The cornerstone of City Light’s energy is hydropower: a clean, renewable resource that has always been the region’s most reliable, affordable, and climate-friendly power source. City Light prioritizes environmentally responsible hydropower operations. Our power mix starts with our Skagit and Boundary hydropower projects on the Skagit and Pend Oreille Rivers, which in 2019 provided 40% of the power customers use today. The remainder comes from long-term contracts with the BPA and from other renewable sources. Purchases from the wholesale market fill the gaps when City Light’s and BPA’s water levels are low.

Since 2005, City Light has been greenhouse gas neutral, demonstrating commitment to mitigation of carbon emissions. If short-term energy needs require purchase from the wholesale

markets, there may be fossil fuel resources like natural gas or coal in the purchase. To be true to our commitment, City Light purchases emission offsets, which are reductions in emissions in one place that can be used to compensate for emissions elsewhere. Offsets are usually denominated in metric tons of reduced emissions or megawatt hours of renewable energy.



*\*City Light does not have coal or natural gas resources in its power supply portfolio. It does make market purchases to balance or match its loads and resources. These purchases, along with market purchases made by Bonneville Power Administration (BPA), may incidentally include coal or natural gas resources, which are assigned to the utility. Any emissions associated with unspecified market purchases are offset through our greenhouse gas (GHG) neutrality policy.*

*\*\*This fuel represents a portion of the power purchased from BPA.*

## Determining Load

Energy efficiency programs encourage customers to use power more efficiently and allow the utility to defer the acquisition of expensive new resources, including those that negatively affect the environment. Integral to developing the IRP, energy efficiency programs will help City Light maintain our status as a greenhouse gas neutral utility, support the City's environmental and climate change policy goals, and meet the requirements of I-937.

For example, the average City Light residential customer today uses less than 8,000 kilowatt hours of electricity per year, compared to over 10,000 kilowatt hours per year in 2000.

The 2019 retail load forecast (most recent available for the IRP) is expected to decline from 1,026 aMW (average megawatts) in 2020 to 999 aMW in 2040, or by about 0.1% per year over the next 20 years, after accounting for the impacts of energy efficiency programs and a softening Seattle economy with slower growth in future commercial square footage. There is, however, slight growth after the first 10 years, as energy efficiency tapers off and transportation electrification ramps up. City Light worked with King County Metro and the Washington State Ferries to reflect their electrification plans in this forecast.

***City Light is completing a new load forecast that will be part of the 2022 IRP. We have the difficult task of identifying how load will change and for how long as a result of the pandemic-induced recession. City Light's annual 2020 retail load is expected to end the year 4% lower than forecasted in 2019.***

Load and energy efficiency programs impact City Light's BPA power contract deliveries. As load declines, City Light receives less BPA power. The ability to add energy efficiency creates a choice for City Light that gives us some control over how much BPA power we receive. It is a complex but important relationship. As electrification grows, City Light's customers will use more of our existing surplus energy. Demand side choices of energy efficiency (and potential

demand response) will allow City Light to get the highest and best use of our energy supply and the wholesale market.

## Resource Adequacy

Resource Adequacy (RA) refers to having sufficient resources, generation, energy efficiency, storage, and demand-side resources to serve loads across a wide range of conditions. City Light reviews a wide range of water and demand conditions to determine whether it has sufficient resources. In our 2018 IRP, City Light conducted an RA Assessment using an established winter-focused metric, and determined we had no need for new supply resource additions to meet resource adequacy for 20 years.

In gearing up for the New Energy Frontier, City Light is transforming our future to accommodate increases in solar and wind energy. We have updated our RA research to track all hours of the year for stressed circumstances that might prompt resource additions.

City Light's new RA study adopted a "Loss of Load Event" (LOLEV) resource adequacy metric, which measures the frequency of deficit events. City Light selected this metric because it better evaluates energy limitations that City Light could experience and identifies the value of resources such as battery storage and demand response.

City Light defines the duration and magnitude of a deficit event as greater than four hours and more than 200 megawatts (MW) per hour once a day, respectively. This means that deficit events of less than four hours and 200 MW per hour, or up to 800 megawatt hours once a day, can be easily covered by City Light's hydropower flexibility and are not considered an event. City Light also established a LOLEV standard of RA that means events cannot occur more than two times every 10 years for the months January, July, August, and December in order to stay within our portfolio resource adequacy. This standard yields the same RA needs as the previous winter metric but introduces summer RA needs. City Light's research and analysis identified these four critical months for setting RA targets based on

the concurrence of risks for City Light and the region that should be monitored into the future.

For its regional assessment, City Light relies upon the Northwest Power and Conservation Council (NW Council). NW Council’s most recent study (October 2019) and our own analysis show concurrent regional and City Light RA risks occur in December, January, and August. The most likely changes to risk are for calendar year 2024 or later. The regional analysis also describes capacity shortfalls or shorter duration events whereas City Light’s risks occur when the region still has available energy surplus. City Light’s hydropower flexibility and capacity surpluses can leverage regional energy surpluses to fill voids. Additionally, anticipated new regional energy resources can reduce energy shortage risks when fossil fuel plants close. City Light decided to add July and August for its study because of the variability of water levels we can experience during July and the dry and restricted operating conditions we have in August. Additionally, climate change can exacerbate the severity of low water conditions in the summer; this will be well-monitored along with all months.

City Light also reviewed to what extent wholesale market reliance could be used as a backup in these critical months. City Light’s analysis studied multiple years and determined that for the long-

term, market reliance of about 200 MW is appropriate for short-term market purchases. However, we concluded that any projected energy shortages can be covered by City Light’s hydro flexibility and our mid-term and short-term purchases following our wholesale hedging practices before 2026. City Light will continue to monitor regional markets for energy shortfalls that could lead City Light to change its LOLEV standards or market reliance levels.

City Light translates this RA information into a target amount of energy we need each month to meet the energy standard. With these guidelines and our new models, the utility stays ahead of its worst case scenarios by tracking where and when there may be shortages, so we are prepared for stressful conditions.

The following table shows the targets City Light’s analysis established for near-term and long-term RA, assuming our existing conservation path from the 2020 Conservation Potential Assessment. In 2021, City Light will update this study with a new demand forecast and evaluate its market reliance in preparation for the next Conservation Potential Assessment. City Light will also continue to monitor regional market conditions.

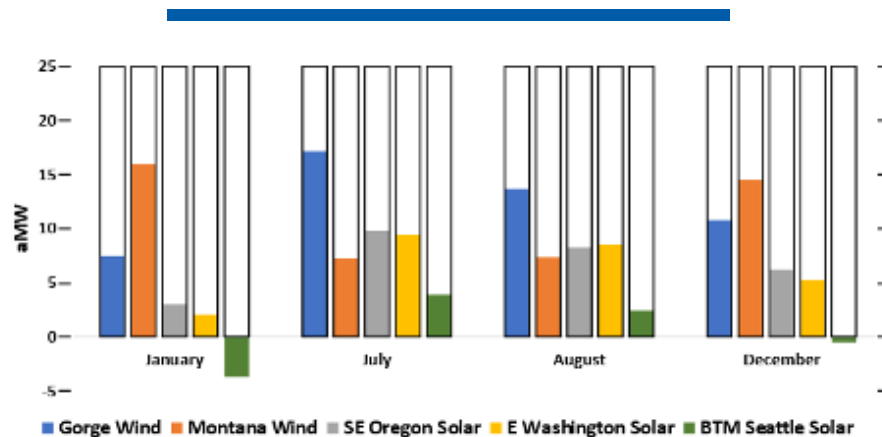
<b>Resource Adequacy Energy Need</b> <i>(Average Megawatts)</i>	<b>2022</b>	<b>2024</b>	<b>2026</b>	<b>2030</b>	<b>2034</b>	<b>2038</b>	<b>2040</b>
<b>December</b>	27	38	13	20	5	3	10
<b>January</b>	-	-	-	-	-	-	-
<b>July</b>	156	134	137	146	159	165	177
<b>August</b>	39	25	113	122	147	146	161



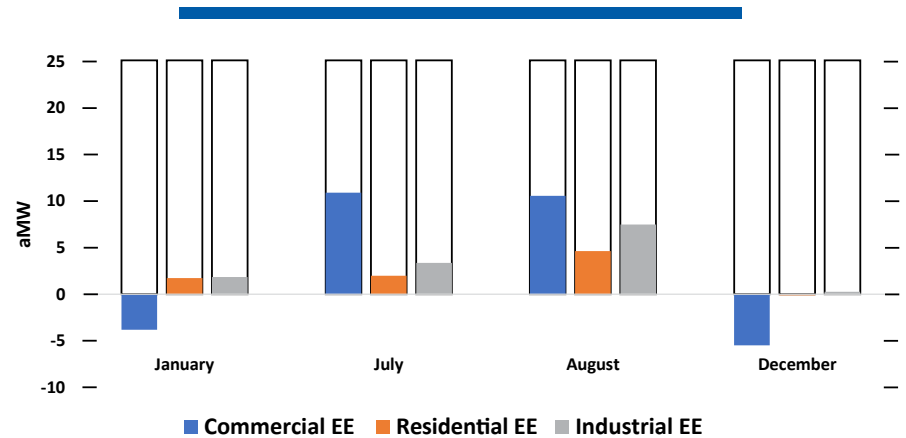
## Resource Choices

City Light's new approach matches new resource choices to both the region's and our own RA deficits across the different months. The analysis targets resource choices that complement City Light's existing resource mix and changing demand. It better informs about the capability of City Light's hydro fleet to respond to variability in generation from wind and solar resources, and to changes in demand from weather. Monthly RA targets allow City Light to select resources based on their contributions to the most critical time periods.

These next two charts show how each type of resource contributes relative to a measure of the maximum amount of output the resource can produce. As an example, the first blue bar shows that for Gorge Wind, the reliable contribution to RA is about 8 aMW of energy for every 25 MW of capacity. The green bar for "Behind the Meter Solar" produces what may be viewed as an unexpected result. It shows negative impacts in January and December because solar resources installed by customers (i.e., "behind the meter") have the same impact as energy efficiency by reducing City Light's load. Load reductions decrease the amount of BPA power that City Light receives. In the winter, the reduction in BPA is greater than the decrease in load.



The next chart shows how City Light's conservation programs contribute to RA. The blue bar, representing commercial energy efficiency, shows that it adds 10 aMW for every 25 aMW increase in energy efficiency in July.



Resources also gain additional benefits for being able to supply energy in periods when wholesale market prices are higher and helping City Light shape our hydro to market conditions. This year with new RA modeling and the addition of summer months changing resource needs, the IRP moves into a phase of evaluating whether our past resource choices will continue to prevail or if new options are in order.

For the 2020 IRP, City Light opted to focus on resource choices that were examined in the 2018 IRP to test the new framework. Some differences included the additions of behind-the-meter commercial solar, expanded review of energy efficiency, and the omission of natural gas-fueled power plants.



### The resource choices studied are:

- 360 different energy efficiency combinations
- 360 different BPA purchase levels to correspond with the desired energy efficiency path
- Southeastern OR Solar
- Eastern WA Solar
- Gorge Wind
- Montana Wind
- Commercial Customer Behind the Meter Solar
- Wholesale Market Reliance

**No fossil fuel resources, such as natural gas simple-cycle plants, “peakers,” or combined cycle plants, were considered.** We acknowledge that market reliance is a source of greenhouse gases for City Light. This CETA-required assessment compares the value of renewable resources to market reliance and its impact to the environment.

Other resource choices that may increase reliability and lower cost are demand response (customers respond to a request by the utility to reduce their demand), and customer-owned and utility-scale storage resources (e.g., batteries, pumped storage hydro, and compressed air storage).

As the scale of wind and solar energy generation surpasses fossil generation, hydro flexibility may not be sufficient to take care of all deficit hours, and new storage may be the best current option to fill

in that gap. City Light’s 2022 IRP will focus on these technologies to add more resource adequacy at lower cost. Other renewable energy technologies that may play a role are geothermal, landfill gas, and biomass energy, if higher-cost resources are needed.

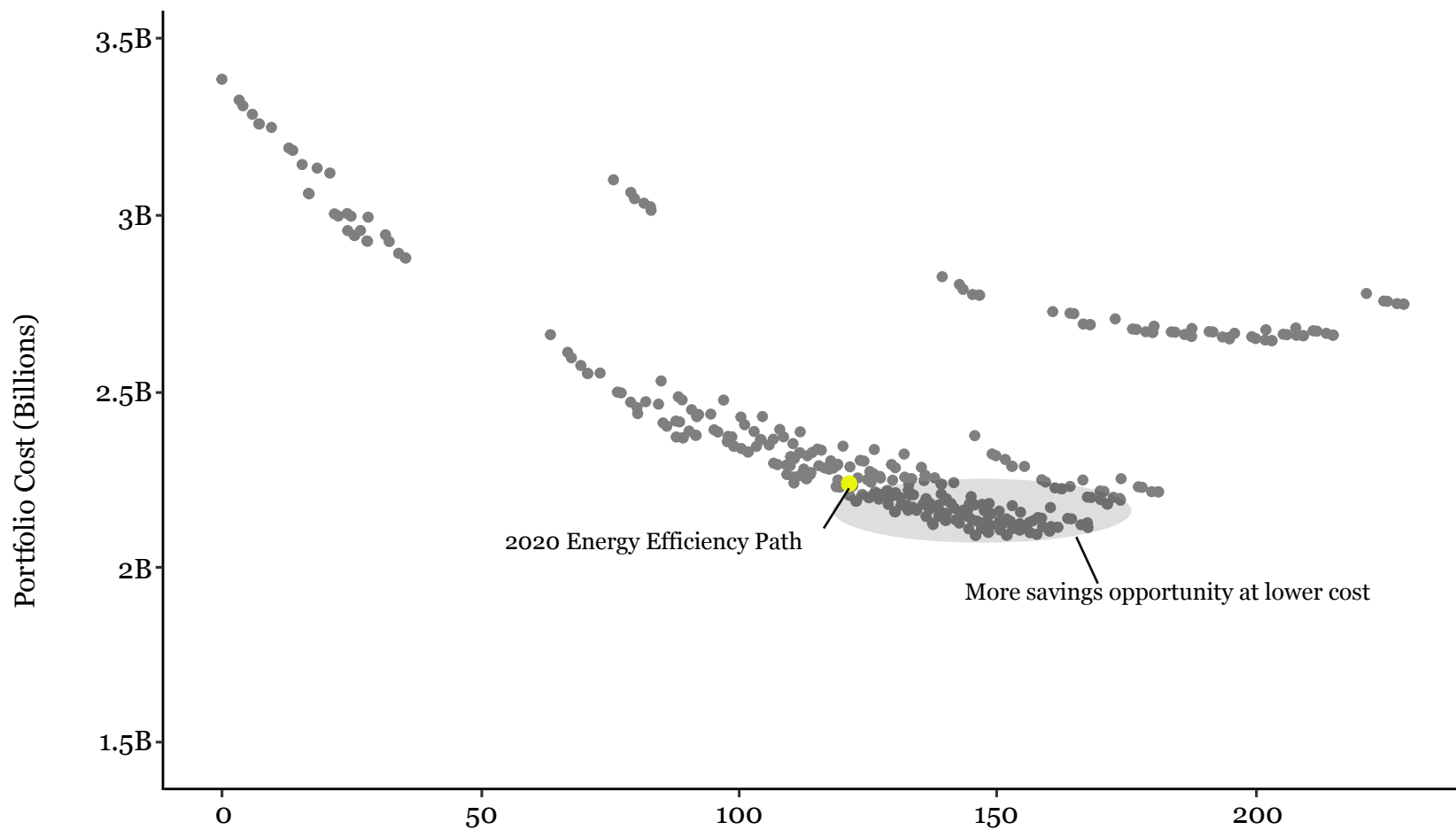
## Resource Choices through the New Framework

- The new framework shows increased and more targeted energy efficiency could be beneficial.
- Solar is becoming an appealing resource for City Light but has potential drawbacks like lack of resource diversity due to the significant solar growth that is happening across the West.
- Gorge Wind is like solar because it provides more energy in the summer. With a different generation pattern than solar, it is anticipated to have even more value as solar power becomes saturated in the West.
- Montana Wind is more expensive than Gorge Wind and solar. It appears to be one of the most promising wind supply resources if resource needs increase in the winter from a large growth in electric vehicles and heating loads. However, delivering Montana Wind may prove challenging without regional investment in new transmission capacities.

The following chart shows the results of the analysis of 360 conservation paths. The gray shaded area identifies combinations of conservation programs (other paths) that are different from the approved 2020 Conservation Potential Assessment and result in lower cost for City Light with more savings. The 2020 approved path

is indicated by the yellow dot. City Light will review and update these findings when we conduct our 2022 Conservation Potential Assessment. City Light will also include a Demand Response Potential and Customer-Installed Solar Potential assessment, the former of which is now explicitly required by CETA.

### Total Portfolio: Net Present Value Cost vs 2040 Energy Efficiency Achievement







# Action Plans

*The utility is already making plans for the next year, next two years and next 10 years to meet federal and state regulations. Our plans include forward-thinking transportation electrification strategies, time-of-day pricing to improve energy efficiency, and more commercial customer energy efficiency through updating older buildings.*

City Light will be evaluating both new demand response programs and new large customer renewable energy tariff offerings to complement programs for residential and commercial solar as well as adding more community outreach/proposed partnerships for new and existing energy services and plans. For our existing resources, City Light’s efforts include steps for relicensing the Skagit River Hydroelectric Project, BPA engagement for a post-2028 contract, and leadership in efforts to develop organized regional market concepts and collaborate on regional resource adequacy.

City Light’s intends to determine what roadblocks exist and what options need more research. All City Light performance objectives call for buy-in from both internal and external stakeholders and the public to conduct transparent evaluation of the alternatives, including those that result in more equitable outcomes for customers at reasonable costs and risks.

*The cornerstone of City Light’s energy – 85% of the power mix in 2019 -- is hydropower: a clean, renewable resource that has always been the region’s most reliable, affordable and climate friendly resource.*





## Next Steps: Building the 2022 Integrated Resource Plan

Today, the forecasts show that City Light's energy supply benefits from continued investment in customer energy efficiency programs, which enable our hydropower dams to support more alternative energy sources. We forecast that our energy supply is as high as 98% greenhouse gas free with long-standing and intensive focus on energy efficiency programs and procuring long-term energy supply from only clean and renewable sources.

City Light's work begins with gathering inputs, stakeholder and public engagement, ensuring alignment with plans for clean energy services, and more study, research, and analysis.

### The steps include:

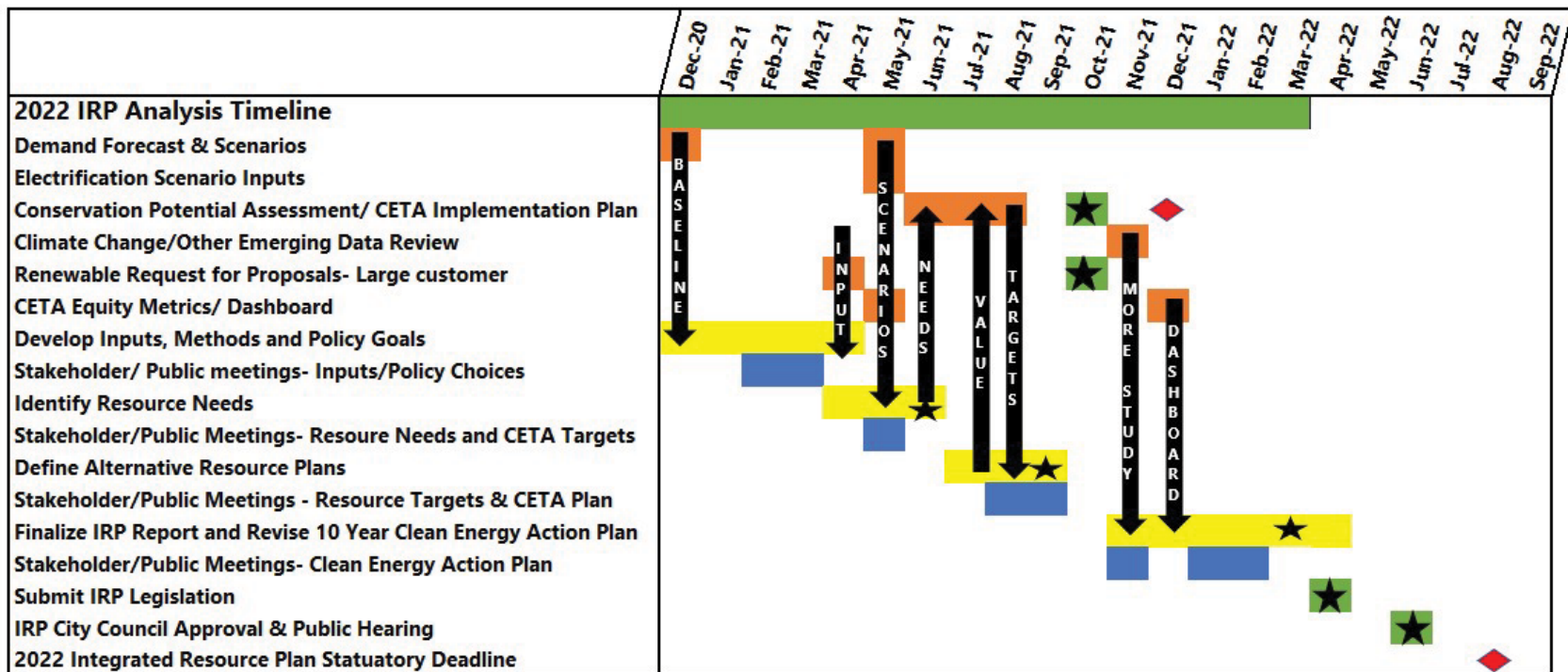
1. An updated demand forecast that reflects trends from the pandemic and City Light's Transportation Electrification Strategic Investment Plan.
2. Refinements to City Light's framework following the first complete and adopted set of CETA rules.
3. More insight into current renewable resource costs and delivery possibilities as City Light completes its first Renewable Resources Request for Proposals that will support a large customer renewable energy program.

4. Continued engagement with stakeholders and the public to gather input along the way.
5. Final review of new NW Council and Northwest Power Pool Resource Adequacy data to update our RA market reliance study in the second quarter of 2021.
6. Refined Conservation and Demand Response Potential Assessments focused on what City Light can do to target demand-side resources to be even more complementary with our hydro resources.
7. New research into how customer-owned generation, demand response, and storage resources fit into the plan.

## 2022 IRP Work Plan

Integrated Resource Plans are ambitious undertakings that must lock in inputs early while at the same time support and align with other consequential activities. The work is to develop a resource strategy that aligns with City Light’s new Transportation Electrification Strategic Investment Plan and the 2022 Conservation and Demand Response Potential Assessment, and that considers the potential for building electrification – all while exploring options for other distributed resources such as battery storage and additional “behind the meter” solar. The work will prioritize identifying racial, social, and economic equity metrics. City Light will evaluate new climate change research but may be limited in the range of information that we can include in time for producing a 2022 IRP.

The following chart shows a high-level timeline with connection points between interrelated processes, important milestones and statutory deadlines, including required City Council engagement and desired stakeholder and public engagement. Stakeholder and public input will inform and improve City Light’s recommendations. City Light endeavors to build an ambitious, customer-centric plan that brings affordability and better outcomes for those in our communities who have shouldered the weight of climate change.



**Legend**

- Process to Align with IRP ■
- 2022 IRP Activity ■
- Stakeholder/ Public Meeting ■
- City Council Activity ■
- Milestone ★
- State Statutory Deadline ◆



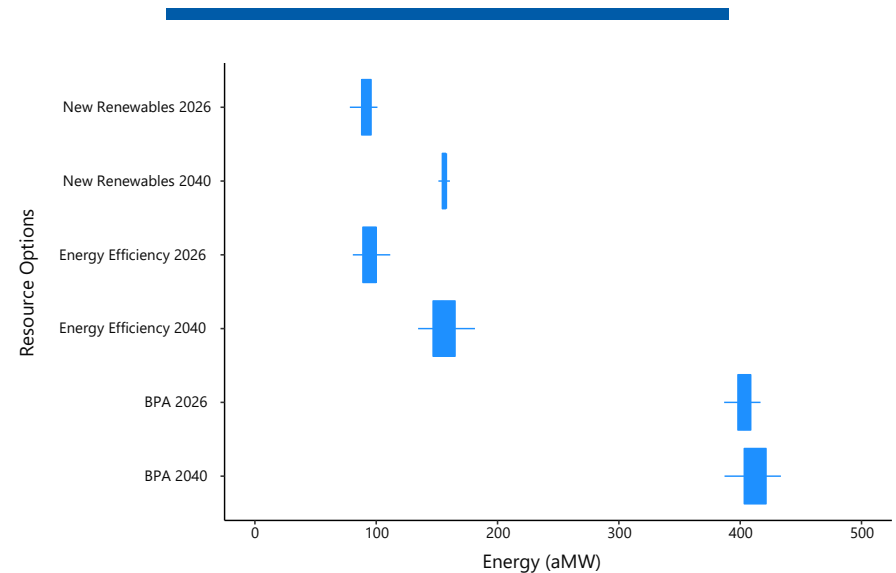


## The 4-Year and 10-Year Long Range Plans

In accordance with the CETA, City Light will prepare two new plans. By Jan. 1, 2022, City Light will complete its first four-year Clean Energy Compliance Plan, required by CETA, to explain the steps City Light is taking between 2022 and 2026 to comply with CETA. Additionally, as part of the 2022 IRP, City Light will prepare a 10-year Clean Energy Action Plan. The Clean Energy Action Plan will benefit from new research as part of CETA to be better able to stress equitable access to clean energy and the benefits provided by same. It will examine supply and demand, and articulate choices City Light must make to ensure environmentally responsible, reliable, and affordable energy paths. These plans will have the benefit of a thorough and open approach to new ideas, technological innovations, regional cooperation, and the best minds of the region. They will expand on the foundations of the 2020 Progress Report and test plans.

City Light’s Progress Report identifies a potential resource adequacy need that could be filled with the addition of more renewable energy and energy efficiency and fewer BPA resources. Therefore, the 2022 IRP will study this potential need and determine what solutions can address it, if needed. The chart below shows that by 2026, approximately 100 aMW of additional renewable energy would fill a resource adequacy void. Aligning new research in 2021, about

the impacts of COVID, electrification potential, and Regional RA studies will help us determine whether these long-term resources are required for RA. City Light will also include demand response and battery storage options to see how these options can increase reliability and potentially lower costs.





## City Light's other action plans to support the advancement of safe, reliable, affordable, and environmentally responsible energy services include:

### Existing Resources and Enhancing Market Practices

- Ensure a well-functioning wholesale market that can enforce the provisions and rules of CETA with continued engagement in the Carbon Markets Workgroup in 2021. (two-year action).
- Sponsor and complete a proposed design for a Resource Adequacy Program with Northwest Power Pool members, increasing electric system reliability and affordability by pooling supply and demand to assist during stressed conditions.
- Relicense the Skagit River Hydroelectric Project by April 2025 and the South Fork Tolt Hydroelectric Project by 2027.
- Advocate for the US delegation to negotiate a new Columbia River Treaty seeking a fair distribution of benefits from treaty storage and operations.
- Collaborate in 2021 with the public power community and BPA on a post-2028 BPA contract, with a proposed final contract in late 2025 for a new contract starting Oct. 1, 2028.

### Equitable Distribution of Energy and Non-Energy Benefits

- Prepare and review the City of Seattle's Racial Equity Toolkit with internal and external stakeholders. Use the toolkit to inform measures of social equity in the IRP process.
- Build a new team to identify impacted populations and develop metrics to track the distribution of the benefits of CETA.
- Launch a new public engagement campaign prioritizing impacted communities.

### Resource Acquisition

- Implement a demand response program pilot, and update City Light's large commercial solar tariff by 2022.
- Early in 2021, conduct a Request for Proposals process for renewable energy to support a large customer renewable

energy program that would deliver new renewable energy to those customers in 2024.

- Develop a tariff and rate for the new large customer renewable energy program.
- Investigate future BPA product options.

### Modeling and Analysis

- Update and refine modeling of clean energy policies in City Light's electric power price forecast.
- Include transportation and building electrification scenarios being developed by a separate City-wide electrification study process.
- Coordinate consistent inputs for evaluation of demand side resource potential at the distribution system level.
- Endeavor to include climate change sensitivity in the 2022 IRP with a plan to fully examine climate change in the 2024 IRP.

### 10-Year Clean Energy Action Plan/CETA compliance/ I-937 Compliance

- Complete, before Jan. 1, 2022, a conservation and demand response potential assessment that provides targets for I-937 and the CETA compliance.
- Identify resource adequacy metrics and targets.
- Identify the use of social cost of greenhouse gas in the analysis.
- Develop metrics to understand impacts on vulnerable communities.
- Include how City Light will ensure coal is not included in our portfolio.
- Include how City Light plans to meet 2030 to 2045 greenhouse gas neutrality.
- Identify any transmission limitations preventing an affordable CETA compliance.



## Partnering in Public Engagement

City Light will be tasked with building its 10-year plan toward a greenhouse gas-free future, which will include valuable public input, Stakeholder Advisory Committee discussions, use of technology to make public engagement more convenient, and simpler information on how we can all access cleaner energy options and prepare for the future in (hopefully) a pandemic-free environment.

Plans call for the public to help contribute to a cleaner environment, not just in helping City Light make resource choices but making energy benefits more equitable for all.

In working with the Mayor and City Council, City Light wants to invite innovative new partnerships to help inspire our customers to become more active in creating a clean energy future. We want to support them in our mutual goals for a more sustainable and socially equitable future. By arming the public with basic information about City Light's existing supply and the types of resource choices ahead, everyone can be a conduit to a shared understanding and an active player toward a better quality of life.

**When you talk with people about our energy future, these are the kinds of questions that will help us start the greater conversation:**

- Are you considering changes in the fuels you use? Why?
- Where do you go for information about your energy use today?
- What information will help you understand more about your own energy use?
- Are you taking steps to be resilient to power outages?
- How do you feel you are being impacted by climate change?
- Have you been impacted by service interruptions in the past year? How did they disrupt your life?
- What suggestions do you have for City Light to help low-income and vulnerable customers?
- Do you want to be part of planning for our future energy supply?
- What can we do to get you to be involved?

Our energy future will directly influence everyone's lives. Help us get ready.

Ask them to join the efforts by emailing us at [SCL.IRP@seattle.gov](mailto:SCL.IRP@seattle.gov)



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

**CUSTOMERS FIRST • ENVIRONMENTAL STEWARDSHIP • EQUITABLE COMMUNITY CONNECTIONS •  
OPERATIONAL AND FINANCIAL EXCELLENCE • SAFE AND ENGAGED EMPLOYEES**



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