

2025 CONSERVATION POTENTIAL ASSESSMENT

Snohomish County Public Utility District

September 19, 2025

Prepared by:



LIGHTHOUSE ENERGY
— CONSULTING —

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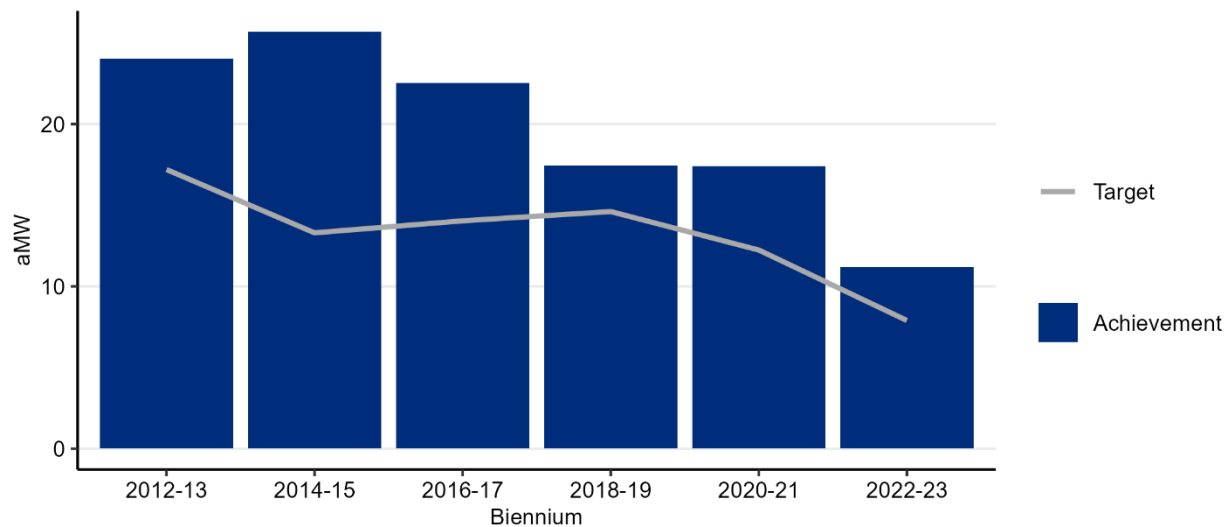
Executive Summary

Overview

This report describes the methodology and results of a conservation potential assessment (CPA) conducted by Lighthouse Energy Consulting (Lighthouse) for Snohomish County Public Utility District (the District). The CPA estimated the achievable technical energy savings potential for the period of 2026 to 2045, the results of which were provided for use in the District’s integrated resource planning (IRP) process, where the cost-effective energy efficiency potential was determined through the District’s optimization modeling. This report describes the results of the full 20-year period, with additional details on the 2- and 10-year periods that are the focus of Washington’s Energy Independence Act (EIA) and the 4-year period covered by the District’s second Clean Energy Implementation Plan (CEIP).

The District is the second largest publicly owned utility in the state of Washington, providing electricity service to over 377,000 customers in Snohomish County and Camano Island. The EIA requires that utilities with more than 25,000 customers identify and acquire all cost-effective energy efficiency resources and meet targets set every two years through a CPA. The District’s history of consistently exceeding these biennial conservation targets is shown in Figure 1.

Figure 1: Historic Targets and Achievements (aMW)



Source: WA EIA Utility Reports

The EIA specifies the requirements for setting conservation targets in RCW 19.285.040 and WAC 194-37-070 Section (5), parts (a) through (d). The methodology used in this assessment complies with these requirements and is consistent with the methodology used by the Northwest Power and Conservation Council (Council) in the 2021 Power Plan. Appendix III details the requirements of the EIA and how this assessment fulfills those requirements. Washington’s Clean Energy Transformation Act (CETA) includes an additional requirement for CPAs; namely, that the assessment of cost-effectiveness make use of specific values for the social cost of carbon. This requirement is addressed through the District’s IRP modeling.

This CPA used much of the 2021 Power Plan materials, with customizations to make the results specific to the District’s service territory and customers. Notable changes in this CPA relative to the District’s previous assessment include the following:

- Energy Efficiency Measures
 - This assessment uses the measures savings, costs, and other characteristics based on the measures included in the 2021 Power Plan, with updates to many measures based on new information from the Regional Technical Forum (RTF) and additional customizations to make the measures specific to the District. Multiple measures were updated across the assessment, generally resulting in decreases in potential.
- Customer Characteristics
 - The District provided updated customer data from its customer database. This resulted in the following changes:
 - Updated saturations of electric heating and electric resistance heating, resulting in an increase in residential potential
 - Higher estimates of commercial loads and floor area
 - Updated industrial forecast, projecting lower industrial growth over the study period
- Program Impacts
 - Incorporation of the District’s recent conservation program achievements to account for what was already accomplished and estimate what may be possible in the near future

Results

Figure 2 and Table 1 show the achievable technical energy efficiency potential by sector over 2-, 4-, 10-, and 20-year periods. Over the 20-year planning period, the District has 196 aMW of achievable technical conservation available, which is approximately 15% of its projected 2045 load. The EIA focuses on the 2- and 10-year potential, which are 11.9 aMW and 102.7 aMW, respectively. In the 4-year period covered by the District’s 2025 CEIP, there are 27 aMW of achievable conservation potential available.

Figure 2: Achievable Technical Potential by Sector (aMW)

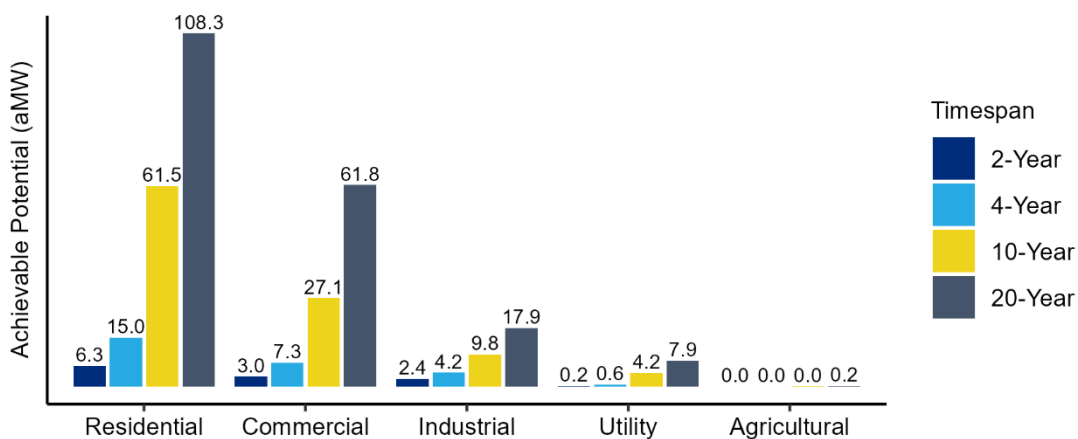


Table 1: Achievable Technical Potential by Sector (aMW)

| Sector | 2-Year | 4-Year | 10-Year | 20-Year |
|--------------|-------------|-------------|--------------|--------------|
| Residential | 6.3 | 15.0 | 61.5 | 108.3 |
| Commercial | 3.0 | 7.3 | 27.1 | 61.8 |
| Industrial | 2.4 | 4.2 | 9.8 | 17.9 |
| Utility | 0.2 | 0.6 | 4.2 | 7.9 |
| Agricultural | 0.0 | 0.0 | 0.0 | 0.2 |
| Total | 11.9 | 27.1 | 102.7 | 196.1 |

Note: In this and all subsequent tables, totals may not match due to rounding.

The residential and commercial sectors are the two largest components of the District’s overall load, and most of the energy efficiency potential comes from these sectors. There is only a small amount of agriculture in the District’s service territory, so the potential in this sector is especially small.

The results above were included as resource options in the District’s IRP modeling process. Figure 3 and Table 2, below, show the cost-effective potential by sector and time period, as selected by the District’s IRP process. There are 7.5 aMW of cost-effective potential over the initial two years. Over the 10-year period of 2026 to 2035, there are 64.3 aMW of cost-effective savings potential. Over the 20-year study period, more than 129 aMW of potential was identified as cost-effective, equivalent to 66% of the identified achievable potential and 10% of the District’s projected 2045 load.

Figure 3: Cost-Effective Potential by Sector (aMW)

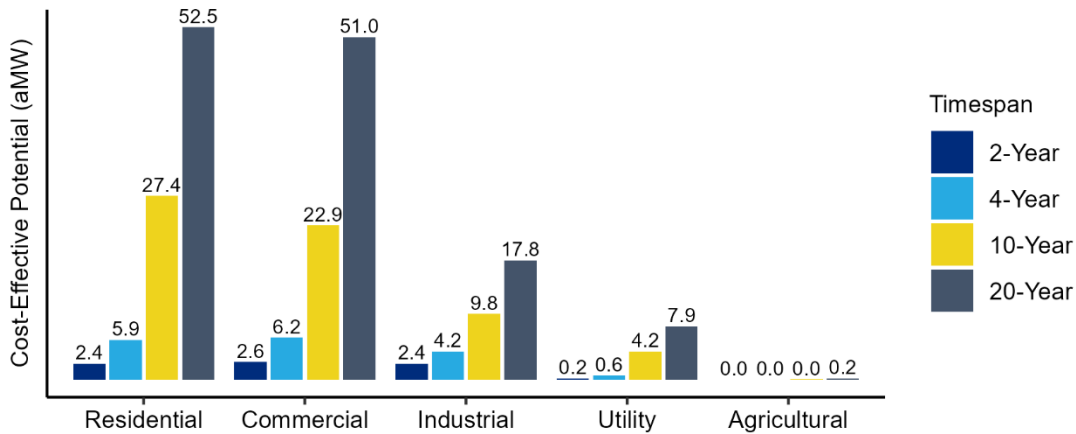


Table 2: Cost-Effective Potential by Sector (aMW)

| Sector | 2-Year | 4-Year | 10-Year | 20-Year |
|--------------|------------|-------------|-------------|--------------|
| Residential | 2.4 | 5.9 | 27.4 | 52.5 |
| Commercial | 2.6 | 6.2 | 22.9 | 51.0 |
| Industrial | 2.4 | 4.2 | 9.8 | 17.8 |
| Utility | 0.2 | 0.6 | 4.2 | 7.9 |
| Agricultural | 0.0 | 0.0 | 0.0 | 0.2 |
| Total | 7.5 | 17.0 | 64.3 | 129.3 |

This assessment does not specify how the energy efficiency potential will be achieved. Possible mechanisms include the District’s own energy efficiency programs, market transformation driven by the Northwest Energy Efficiency Alliance (NEEA), state building codes, and state or federal product standards. Often, the savings associated with a measure will be achieved through several of these mechanisms over the course of its technological maturity. For example, heat pump water heaters started as one of NEEA’s market transformation initiatives. They subsequently became a regular offering in utility programs across the Northwest and have recently become subject to federal product standards taking effect in 2029.

Energy efficiency also contributes to reductions in peak demand. This assessment used hourly load and savings profiles developed by the Council to identify the demand savings from each measure that would occur at the time of the District’s system peak. The energy savings potential identified in this assessment and identified as cost effective through the District’s IRP will result in 209 MW of peak demand savings over the 20-year planning period, as shown in Table 3. This represents approximately 10% of the District’s projected 2045 peak demand and is nearly double the energy savings potential identified above. Energy efficiency savings tend to occur when demand for energy is the greatest, resulting in significant contributions to reductions in peak demand.

Table 3: Peak Demand Savings from Cost-Effective Potential by Sector (MW)

| Sector | 2-Year | 4-Year | 10-Year | 20-Year |
|--------------|-------------|-------------|--------------|--------------|
| Residential | 5.2 | 13.5 | 64.2 | 116.2 |
| Commercial | 3.4 | 8.0 | 28.1 | 61.1 |
| Industrial | 2.8 | 5.1 | 11.8 | 21.4 |
| Utility | 0.2 | 0.8 | 5.2 | 9.9 |
| Agricultural | 0.0 | 0.0 | 0.1 | 0.4 |
| Total | 11.7 | 27.3 | 109.4 | 209.0 |

The estimate of annual cost-effective energy efficiency potential by sector is shown in Figure 4. The potential starts at approximately 3.6 aMW in 2026 and grows to a maximum of 9 aMW in 2035. After that point, the available potential diminishes through the remaining years of the planning period.

Figure 4: Annual Incremental Cost-Effective Energy Efficiency Potential (aMW)

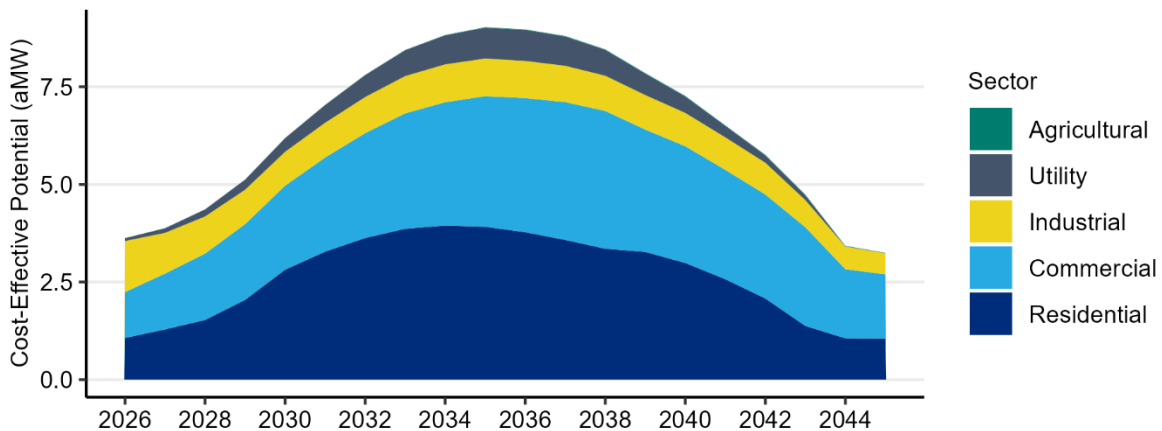
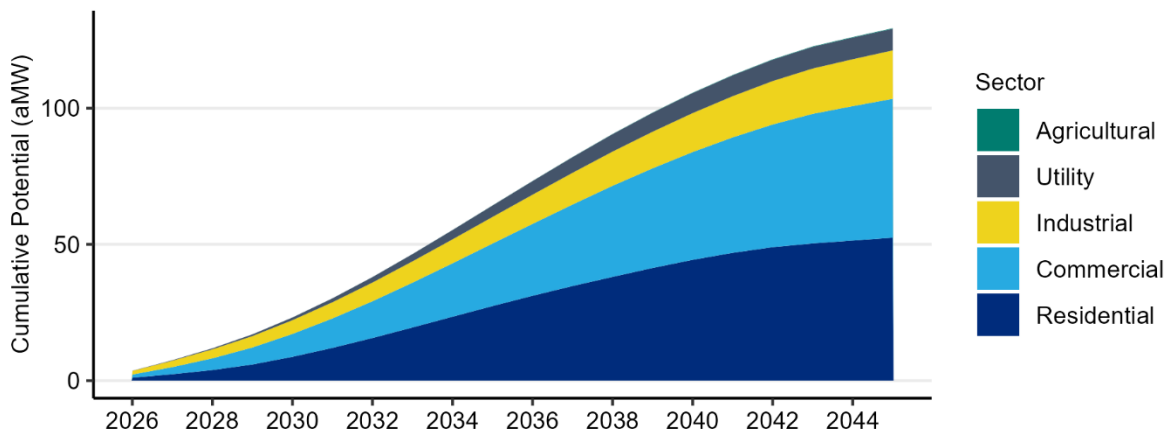


Figure 5 shows how the cost-effective energy efficiency potential grows on a cumulative basis through the study period, totaling more than 129 aMW over the 20-year planning period.

Figure 5: Annual Cumulative Energy Efficiency Potential (aMW)



The year-by-year estimates of energy efficiency potential are based on ramp rates developed by the Council. Ramp rates identify the share of the available potential that is projected to be acquired in each year based on the market and program maturity of each measure. For each measure, Lighthouse applied a ramp rate that would align the near-term potential with the District’s recent program achievements and the savings from NEEA’s market transformation initiatives that were estimated to occur in the District’s service territory. Program achievement data for 2023 and 2024 were provided by District staff and Lighthouse assigned appropriate ramp rates for each measure so that the future acquisition of energy efficiency was aligned with recent program history while ensuring the acquisition of all energy efficiency potential over the 20-year planning period. Since this assessment did not assess the cost-effectiveness, Lighthouse assumed that measures that were identified as cost-effective in the District’s prior IRP would be identified as cost-effective in the current IRP and aligned ramp rates such that the future potential expected to be cost-effective aligned with the District’s recent accomplishments.

Comparison to Previous Assessment

Table 4 shows a comparison of the 2-, 10-, and 20-year achievable technical potential by sector as quantified by the previous 2023 CPA and this 2025 CPA. The 2-year potential declined slightly while there were larger decreases in the 10- and 20-year potential.

Table 4: Comparison of Current and Prior CPA Achievable Potential (aMW)

| Sector | 2-Year Potential | | | 10-Year Potential | | | 20-Year Potential | | |
|--------------|------------------|----------|----------|-------------------|----------|----------|-------------------|----------|----------|
| | 2023 CPA | 2025 CPA | % Change | 2023 CPA | 2025 CPA | % Change | 2023 CPA | 2025 CPA | % Change |
| Residential | 4.8 | 6.3 | 32% | 64.7 | 61.5 | -5% | 131.3 | 108.3 | -17% |
| Commercial | 3.5 | 3.0 | -14% | 27.4 | 27.1 | -1% | 54.6 | 61.8 | 13% |
| Industrial | 3.9 | 2.4 | -39% | 13.9 | 9.8 | -29% | 20.5 | 17.9 | -13% |
| Utility | 0.2 | 0.2 | 10% | 3.8 | 4.2 | 10% | 7.2 | 7.9 | 10% |
| Agricultural | 0.0 | 0.0 | -91% | 0.2 | 0.0 | -80% | 0.3 | 0.2 | -37% |

| | | | | | | | | | |
|--------------|-------------|-------------|------------|--------------|--------------|------------|--------------|--------------|------------|
| Total | 12.4 | 11.9 | -4% | 109.9 | 102.7 | -7% | 213.8 | 196.1 | -8% |
|--------------|-------------|-------------|------------|--------------|--------------|------------|--------------|--------------|------------|

The near-term changes were driven by the District’s recent accomplishments. This is the best indicator of what the District’s programs can accomplish in the early years of the study period. In the mid- to longer term, the differences are due to updated measure assumptions, customer characteristics, and long-term forecasts.

Table 5 compares the cost-effective energy efficiency potential selected by the District’s IRP across the 2023 and 2025 CPAs. While the District’s IRP model selected higher-cost energy efficiency relative to previous IRPs, selecting energy efficiency with levelized costs up to \$75/MWh, there was less potential available at these cost thresholds, resulting in less cost-effective potential.

Table 5: Comparison of 2023 and 2025 CPA Cost-Effective Potential (aMW)

| Sector | 2-Year Potential | | | 10-Year Potential | | | 20-Year Potential | | |
|--------------|------------------|------------|-------------|-------------------|-------------|-------------|-------------------|-------------|-------------|
| | 2023 CPA | 2025 CPA | % Change | 2023 CPA | 2025 CPA | % Change | 2023 CPA | 2025 CPA | % Change |
| Residential | 3.3 | 2.4 | -29% | 40.0 | 5.9 | -85% | 84.6 | 27.4 | -68% |
| Commercial | 3.1 | 2.6 | -17% | 23.9 | 6.2 | -74% | 47.4 | 22.9 | -52% |
| Industrial | 3.9 | 2.4 | -39% | 13.8 | 4.2 | -70% | 20.4 | 9.8 | -52% |
| Utility | 0.2 | 0.2 | 10% | 3.8 | 0.6 | -83% | 7.2 | 4.2 | -42% |
| Agricultural | 0.0 | 0.0 | -92% | 0.2 | 0.0 | -98% | 0.3 | 0.0 | -86% |
| Total | 10.5 | 7.5 | -29% | 81.8 | 17.0 | -79% | 159.8 | 64.3 | -60% |

Conclusion

This report summarizes the CPA conducted for the District for the 2026 to 2045 timeframe. The CPA identified a smaller amount of achievable technical potential relative to the previous CPA. The achievable technical potential identified in this assessment can reduce the District’s annual energy and peak demand by 15% and 16%, respectively. This potential was evaluated alongside other demand and supply side resources through the District’s IRP process, and the 7.5 aMW that was selected in the 2026-27 biennium is part of a least-cost, least-risk portfolio.

Introduction

Objectives

This report describes the methodology and results of a CPA conducted for the District by Lighthouse. The CPA estimated the achievable technical potential energy savings for the period of 2026 to 2045, the results of which were provided for use in the District's IRP process, where the cost-effective energy efficiency potential will be determined through the District's optimization modeling. This report describes the results of the full 20-year period, with additional detail on the 2- and 10-year periods that are the focus of Washington's EIA as well as the 4-year period covering 2026-2029 that aligns with the District's 2025 CEIP.

This assessment was conducted in a manner consistent with the requirements of Washington's RCW 19.285, and WAC 194-37. As such, this report is part of the documentation of the District's compliance with these requirements. The state of Washington's CETA includes an additional requirement for CPAs to use specific values for the social cost of carbon. This requirement is addressed through the District's IRP modeling process, where the cost-effective potential is determined.

The results of this assessment, combined with the results of the District's IRP modeling, can be used to assist the District in planning its energy efficiency programs by identifying the amount of cost-effective energy savings available in various sectors, end uses, and measures.

Background

Washington State's EIA defines "qualifying utilities" as those with 25,000 customers or more and requires them to achieve all conservation that is cost-effective, reliable, and feasible. Since the District serves more than 377,000 customers, it is required to comply with the EIA. The requirements of the EIA specify that all qualifying utilities complete the following by January 1st of every even numbered year:¹

- Identify the achievable cost-effective conservation potential for the upcoming 10 years using methodologies consistent with the Council's latest power plan.
- Establish a biennial acquisition target for cost-effective conservation that is no lower than the utility's pro rata share for that two-year period of its cost-effective conservation potential for the subsequent 10 years.²

Appendix III further details how this assessment complies with each of the requirements specified by Washington's EIA.

¹ Washington RCW 19.285.040

² In CA No. 2011-03, the State Auditor's Office has defined "pro rata" as "a proportion of an exactly calculable factor" and expects utilities to have analysis and documentation to support their identified targets, which could be more or less than 20% of the 10-year potential.

Study Uncertainties

There are uncertainties inherent in any long-term planning effort. While this assessment makes use of the latest forecasts of customers and loads, it is still subject to remaining uncertainties and limitations. These uncertainties include, but are not limited to:

- Customer Characteristic Data: This assessment used the best available data to reflect the District's customers. In some cases, however, the assessment relied upon data beyond the District's service territory due to limitations of adequate sample sizes. There are uncertainties, therefore, related to the extent that this data is reflective of the District's customer base.
- Measure Data: Measure savings and cost estimates are based on values prepared by the Council and RTF. These estimates will vary across the region due to local climate variations and market conditions. Additionally, some measure inputs such as applicability are based on limited data or professional judgement.
- Utility System Assumptions: Measures in this CPA reflect cost credits based on their ability to free up transmission and distribution system capacity. The actual value of these credits is dependent on local conditions, which vary across the District's service territory.
- Load and Customer Growth Forecasts: This CPA makes use of projections of future customer and load growth over a 20-year period. Any forecast over a similar time period will include a significant level of uncertainty.
- Policy Change: The CPA includes policies currently in effect at the time of its development. Future changes to the policy environment are difficult to predict and could lead to significant changes to loads, cost effectiveness of measures, or other study outcomes.

Due to these uncertainties and the continually changing planning environment, the EIA requires qualifying utilities to update their CPAs every two years to reflect the best available data and latest market conditions.

Report Organization

The remainder of this report is organized into the following sections:

- Methodology
- Customer Characteristics
- Historic Conservation Achievement
- Results
- Scenario Results
- Summary
- References & Appendices

Methodology

This section provides an overview of the methodology used to develop the estimate of achievable technical conservation potential for the District.

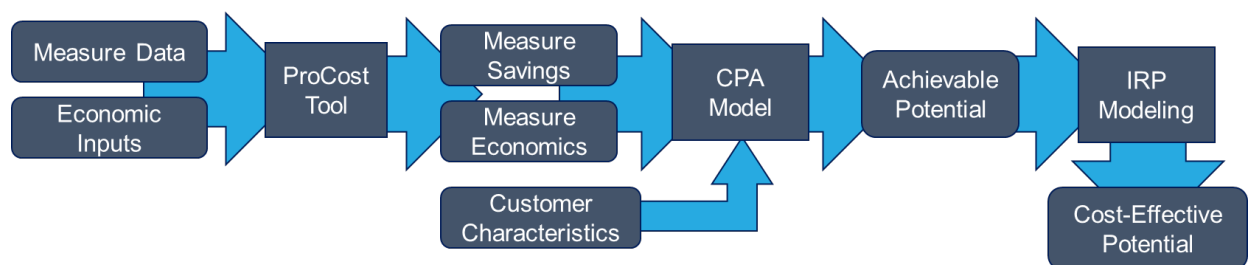
Washington’s requirements for CPAs are spelled out in RCW 19.285.040 and WAC 194-37-070, Section 5 parts (a) through (d). Additional requirements are specified in the rules of Washington’s CETA. The methodology used to produce this assessment, combined with the IRP modeling performed by the District, is consistent with these requirements. The development of this CPA follows much of the methodology used by the Council in developing its regional power plans, including the 2021 Power Plan.

Appendix III provides a detailed breakdown of the requirements of the EIA and how this assessment complies with those requirements.

High-level Methodology

The methodology used for this assessment is illustrated in Figure 6. At a high level, the process combines data on individual energy efficiency measures and economic assumptions using the Council’s ProCost tool. This tool calculates detailed data on the costs and benefits of each measure, which are used to calculate a levelized cost. The measure savings and economics are then combined with customer data in Lighthouse’s CPA model, which quantifies the number of remaining implementation opportunities. The CPA model aggregates the savings associated with each of these opportunities to determine the overall potential. Measures with similar costs and seasonality of their savings are bundled and provided to the District for use in its IRP modeling. The IRP modeling determines the amount of energy efficiency potential that is cost effective through its optimization process, developing a resource portfolio that balances cost and risk.

Figure 6: Conservation Potential Assessment Methodology



Economic Inputs

As stated above, the District’s IRP modeling is used to determine the amount of energy efficiency potential that is cost-effective. However, the CPA relied on some economic assumptions to develop the levelized costs that were provided with the savings potential as inputs to the IRP. Lighthouse coordinated with District staff to determine which economic values would be included in the CPA and those that would be included as part of the IRP analysis. Some values, such as the discount rate, are used in both analyses. Table 6 summarizes the typical costs and benefits of energy efficiency measures and whether they were included in the levelized cost calculated as part of the CPA or considered as part of the IRP.

Table 6: Inclusion of Energy Efficiency Costs and Benefits

| Category | Cost or Benefit | CPA | IRP |
|--------------------------|------------------------------|-----|-----|
| Costs | Measure Capital Costs | ✓ | |
| | Operations & Maintenance | ✓ | |
| | Program Administration | ✓ | |
| | Other Fuel | ✓ | |
| Benefits | Avoided Energy | | ✓ |
| | Non-Energy Impacts | ✓ | |
| | Social Cost of Carbon | | ✓ |
| | Deferred T&D Capacity | ✓ | |
| | Deferred Generation Capacity | | ✓ |
| | NW Power Act Credit | ✓ | |
| | Risk Mitigation | | ✓ |
| Avoided REC Requirements | | ✓ | |

Many of the cost assumptions and some of the benefits that were included in the CPA are specific to each individual measure. However, there are several global assumptions that were applied across all measures. This includes the program administrative cost assumption, deferred transmission and distribution capacity values, and the Northwest Power Act Credit. The sections below discuss these avoided cost assumptions.

Program Administration Costs

In its past power plans, the Council has assumed that program administrative costs are equal to 20% of the cost of each measure. This CPA uses that assumption, which is also consistent with the District’s previous CPA.

Deferred Transmission and Distribution System Costs

Unlike supply-side resources, energy efficiency does not require capacity on transmission and distribution infrastructure. Instead, it frees up capacity by reducing the peak demands on these systems and can help defer future capacity expansions and the associated capital costs.

In the development of the 2021 Power Plan, the Council developed a standard methodology for calculating these values and surveyed Northwest utilities to update the values associated with these cost deferrals. This CPA uses values provided by the District, which use the methodology developed by the Council with District-specific costs. The resulting values are \$8.22 and \$13.96 per kW-year (in 2020 dollars) for transmission and distribution capacity, respectively. These values are applied to the demand savings that are coincident with the timing of the respective system peaks.

Northwest Power Act Credit

The EIA requires that a 10% cost credit be given to energy efficiency measures. This benefit is specified in the Northwest Electric Power Planning and Conservation Act and is included by the Council in their power planning work. Because the treatment of measure benefits is spread across both the CPA and IRP, but all costs are considered in the CPA, the 10% cost credit is applied in the CPA as a 10% reduction to the measure costs.

Other Financial Assumptions

In addition, this assessment makes use of an assumed discount rate to convert future costs and benefits to present values so that values occurring in different years can be compared. This assessment uses a real discount rate of 3%. Energy efficiency's benefits accrue over the lifetime of the measure, so a lower discount rate results in higher present values for benefits occurring in future years.

Assumptions about finance costs are applied to measures as well. The cost of each measure is assumed to be split across various entities, including Bonneville Power Administration (BPA), the District, and end use customers. For each of these entities, additional assumptions are made about whether the measure costs are financed, and if so, the cost of that financing. This assessment uses the finance cost assumptions that were used in the 2021 Power Plan.

Measure Characterization

Measure characterization is the process of defining each individual measure, including the savings at the meter as well as the cost, lifetime, non-energy impacts, and a load or savings shape that defines when the savings occur. The Council's 2021 Power Plan materials are the primary source for this information, although Lighthouse incorporated updated information from the RTF for many measures. Appendix V contains the full list of energy efficiency measures considered the source(s) of information used for each.

Measure savings are typically defined via a "last in" approach. With this methodology, each measure's savings is determined as if it was the last measure installed. For example, savings from home weatherization measures are determined based on the assumption that the home's heating system has already been upgraded. Similarly, the heating system measures are quantified based on the assumption that the home has already been weatherized. This approach is conservative but prevents double counting savings over the long term as homes are likely to install both measures.

Measure savings also consider measure interaction. Interaction occurs when measures in one end use impact the energy use of other end uses. Examples of this include energy efficient lighting and other appliances. The efficiency of these appliances results in less wasted energy released as heat, which impacts the demands on heating and cooling systems.

These measure characteristics, along with the economic assumptions, are used as inputs to the Council's ProCost tool. This tool determines the savings at the generator, factoring in line losses, as well as the demand savings that occur coincident with the District's system peak. The outputs of ProCost are used to calculate a levelized cost that is passed through to the District's IRP modeling.

Customer Characteristics

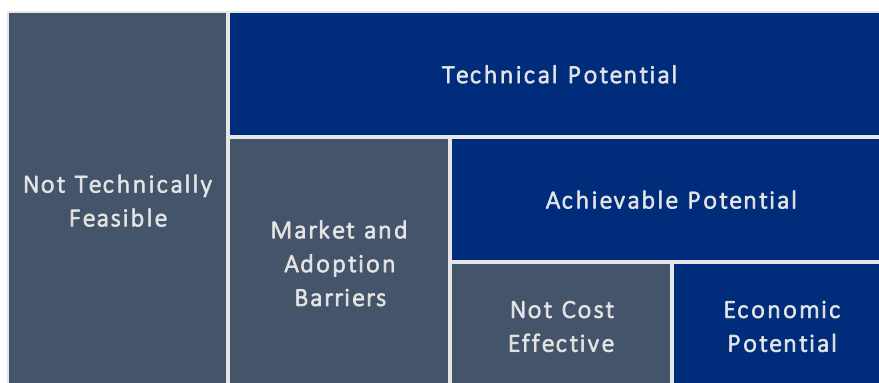
The assessment of customer characteristics is used to determine the number of remaining measure installation opportunities for each measure. This requires identifying the number of opportunities overall as well as the share that has already been completed. The characterization of the District's customer base was completed using data provided by the District, NEEA's commercial and residential building stock assessments, US Census data, and other data. Details for each sector are described subsequently in this report.

This CPA used baseline measure saturation data from the Council’s 2021 Power Plan. This data was developed from NEEA’s stock assessments, market research, and other studies. This data was supplemented with the District’s conservation achievements, where applicable. This achievement is discussed in the next section.

Energy Efficiency Potential

The energy efficiency measure data and customer characteristics are combined in Lighthouse’s CPA model. The model calculated two types of energy efficiency potential: technical and achievable potential. A third category of potential, called economic or cost-effective potential, was determined by the District’s IRP modeling. The three types of potential are depicted in Figure 7 and described further below.

Figure 7: Types of Energy Efficiency Potential



First, technical potential is the theoretical maximum of energy efficiency available, regardless of cost or market constraints. It is determined by multiplying the measure savings by the number of remaining feasible installation opportunities.

The model then applies several filters that incorporate market and adoption barriers to estimate the achievable potential. These filters include assumptions about the maximum potential adoption and the pace of annual achievements. Energy efficiency planners generally assume that not all measure opportunities will be installed; some portion of the technically possible measure opportunities will remain unavailable due to unsurmountable barriers. In the Northwest, energy efficiency planners typically assume that 85% of all measure opportunities can be achieved. This assumption comes from a pilot study conducted in Hood River, Oregon, where home weatherization measures were offered at no cost. The pilot was able to reach over 90% of homes and complete 85% of identified measure opportunities. In the 2021 Power Plan, the Council has taken a more nuanced approach to this assumption. Measures that are likely to be subject to future codes or product standards have higher maximum achievability assumptions. This CPA follows the Council’s new approach.

In addition, ramp rates are used to identify the portion of the available potential that can be acquired each year. The selection of ramp rates incorporates the different levels of program and market maturity as well as the practical constraints of what utility programs can accomplish in a given year.

Finally, economic potential is determined by limiting the achievable potential to those measures that pass an economic screen. The EIA specifies that the cost-effectiveness screen uses the total resource cost (TRC) test. The TRC test considers all costs and benefits, regardless of who pays the

cost or receives the benefit. The costs and benefits included in the TRC test are summarized in Table 6 above.

For this CPA, the economic screening was done by the District's IRP optimization model, which compared the costs of energy efficiency measures with other supply-side resources. Lighthouse provided the District with estimates of hourly achievable technical potential for groups of measures with similar costs and seasonal savings shapes. For each group of measures, a net present value of measure costs was also provided. The District's IRP model then compared different resource portfolios to find the combination of demand and supply side resources that provided the optimal balance of least cost and risk to the District. The energy efficiency resources included in this portfolio are therefore cost-effective.

Customer Characteristics

This section describes the characterization of the District’s customers, which is an essential component of a CPA. It includes defining the makeup and characteristics of each sector, which determines the type and quantity of opportunities to implement energy efficiency measures. Additional information about the local climate and population of the service territory is used to characterize some measures. This information is summarized in Table 7.

Table 7: Service Territory Characteristics

| Heating Zone | Cooling Zone | Total Homes (2024) | Total Population (2024) |
|--------------|--------------|--------------------|-------------------------|
| 1 | 1 | 344,562 | 875,166 |

The number of homes was based on the District’s customer database and represents a slight increase over the prior CPA. The population is based on census data and includes both Snohomish County as well as the District’s service territory on Camano Island.

Residential

Within the residential sector, the key characteristics are the number and type of homes as well as the saturation of end use appliances such as space and water heating equipment. Table 8 summarizes the characteristics that were used for this assessment.

Table 8: Residential Home Characteristics

| | Single Family | Low Rise Multifamily | High Rise Multifamily | Manufactured |
|-----------------------------|---------------|----------------------|-----------------------|--------------|
| Share of Homes | 76% | 11% | 8% | 5% |
| HVAC Equipment | | | | |
| Electric Forced Air Furnace | 17% | 7% | 7% | 76% |
| Air Source Heat Pump | 6% | 0% | 0% | 8% |
| Ductless Heat Pump | 3% | 0% | 0% | 2% |
| Electric Zonal/Baseboard | 23% | 81% | 81% | 9% |
| Central Air Conditioning | 17% | 2% | 0% | 18% |
| Room Air Conditioning | 31% | 31% | 15% | 21% |
| Other Appliances | | | | |
| Electric Water Heater | 36% | 90% | 100% | 95% |
| Refrigerator | 117% | 99% | 100% | 104% |
| Freezer | 53% | 6% | 4% | 51% |
| Clothes Washer | 96% | 35% | 40% | 98% |
| Electric Clothes Dryer | 81% | 34% | 40% | 85% |
| Dishwasher | 100% | 68% | 47% | 85% |
| Electric Oven | 61% | 71% | 74% | 96% |
| Desktop | 59% | 21% | 19% | 31% |
| Laptop | 111% | 75% | 70% | 66% |
| Monitor | 110% | 50% | 52% | 34% |

In Table 8, numbers greater than 100% imply an average of more than one appliance per home. For example, the single family refrigerator saturation of 117% means that single family homes average approximately 1.2 refrigerators per home.

For this assessment, Lighthouse used an updated database of customer information to identify the type of home and primary heating system. Additional characteristics were based on data from the American Community Survey and NEEA’s 2022 Residential Building Stock Assessment (RBSA). The updated data sources resulted in a slightly higher prevalence of electric heating, which increases the amount of heating-related energy efficiency savings available.

This assessment assumed an average customer growth rate of 1.23%, based on the District’s long-term forecast of residential customers. An additional demolition rate, based on assumptions for Washington State from the Council’s 2021 Power Plan, was also used. The demolition rate quantifies the number of existing homes that are converted to new homes through demolition or major renovations, where building codes for new homes apply.

Commercial

In the commercial sector, the building floor area is the primary variable in determining the number of conservation opportunities, as many of the commercial measures are quantified based on the applicable amount of floor area. To estimate the commercial floor area in the District’s service territory, Lighthouse used the same District-provided database of customer information that was used for the residential sector. For the commercial sector, the database included energy consumption and building categorizations for each account. After mapping these categorizations to the building types used in this CPA, Lighthouse converted the loads to floor area using energy use intensity (EUI) values quantified in NEEA’s 2019 Commercial Building Stock Assessment (CBSA).

Table 9 summarizes the resulting floor area estimates for each of the 18 commercial building segments. The total commercial floor area was estimated to be approximately 171 million square feet, a 13% increase over the baseline floor area used in the 2023 CPA.

Table 9: Commercial Floor Area by Segment

| Building Type | 2024 Floor Area (square feet) |
|----------------------|------------------------------------------|
| Large Office | 25,484,844 |
| Medium Office | 9,203,618 |
| Small Office | 5,755,114 |
| Extra Large Retail | 6,265,818 |
| Large Retail | 1,579,084 |
| Medium Retail | 10,174,492 |
| Small Retail | 4,318,722 |
| School (K-12) | 20,633,251 |
| University | 1,535,547 |
| Warehouse | 6,523,363 |
| Supermarket | 3,278,727 |
| Mini Mart | 1,106,153 |
| Restaurant | 3,202,900 |
| Lodging | 2,575,015 |
| Hospital | 2,543,449 |
| Residential Care | 2,202,808 |
| Assembly | 9,261,367 |
| Other Commercial | 55,100,440 |

| | |
|--------------|--------------------|
| Total | 170,744,715 |
|--------------|--------------------|

Lighthouse applied a growth rate of 1.19% to the commercial sector, which is the District’s expected future growth in commercial loads.

Industrial

The methodology used to estimate potential in the industrial sector is different from the residential and commercial sectors. Instead of building a bottom-up estimate of the savings associated with individual measures, potential in the industrial sector is quantified using a top-down approach that uses the annual energy consumption within individual industrial segments, which is then further disaggregated into end uses. Savings for individual measures are calculated by applying an assumed savings percentage to the applicable end use consumption within each industrial segment.

To quantify the industrial segment loads, Lighthouse again used database of customer loads provided by the District and mapped the District’s categorizations to the industrial segments used in this CPA. The resulting industrial consumption totaled 963,771 MWh, as summarized in Table 10. This represents an 11% increase over the 2023 CPA.

The District projects that industrial loads will grow at a rate of 0.62%, a slower growth rate than was assumed in the 2023 CPA.

Table 10: Industrial Sector Sales by Segment

| Segment | 2024 Sales (MWh) |
|--------------------------------|-------------------------|
| Water Supply | 6,117 |
| Sewage Treatment | 73,914 |
| Frozen Food | 6,420 |
| Other Food | 32,268 |
| Wood - Lumber | 9,618 |
| Wood - Other | 51,930 |
| Chemical Manufacturing | 87,524 |
| Cement/Concrete Products | 20,706 |
| Primary Metal Manufacturing | 33,207 |
| Fabricated Metal Manufacturing | 12,942 |
| Semiconductor Manufacturing | 26,409 |
| Transportation Equipment | 535,293 |
| Misc. Manufacturing | 48,986 |
| Refrigerated Warehouse | 2,692 |
| Indoor Agriculture | 15,745 |
| Total | 963,771 |

Agricultural

The agricultural sector was characterized using data provided by the US Department of Agriculture’s Census of Agriculture, which is conducted every five years. This assessment used data from the recently released 2022 Census of Agriculture. The District’s 2023 CPA used the 2017 version of this Census, which was the most recent version available at the time. The key inputs for this sector are summarized in Table 11 below. The number of farms has not changed but the updated data shows there no longer being any irrigated acreage in the District’s service area and a small increase in the share of statewide dairy production.

Table 11: Agricultural Sector Inputs

| Characteristic | Count | 2017 Census Data Point |
|-----------------------|--------------|-------------------------------------|
| Number of Farms | 1,645 | Total number of farms |
| Irrigated Acres | 0.0% | Share of statewide irrigated land |
| Dairy Production | 5.3% | Share of statewide dairy production |

Overall, the agricultural sector load represents a very small portion of the District’s customer base.

Distribution System Efficiency

The 2021 Power Plan used a new approach for quantifying the potential energy savings in measures that improve the efficiency of utility distribution systems. The Council’s new approach estimated savings potential based on estimates of the number of distribution substations and feeders for each utility, as well as the 2018 sales within each sector as reported to the US Energy Information Administration. Table 12 summarizes the assumptions used for this sector.

Table 12: Utility Distribution System Efficiency Assumptions

| Characteristic | Count |
|------------------------------------|--------------|
| Distribution Substations | 71 |
| Residential/Commercial Substations | 65 |
| Urban Feeders | 128 |
| Rural Feeders | 55 |
| 2018 Residential Sales (MWh) | 3,566,730 |
| 2018 Commercial Sales (MWh) | 2,386,767 |
| 2018 Industrial/Other Sales (MWh) | 528,243 |

Recent Conservation Achievement

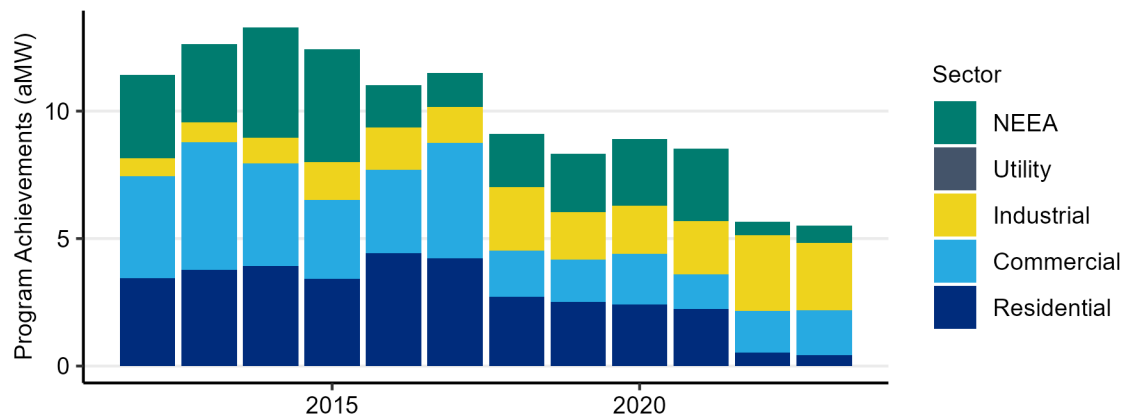
The District has a long history of energy efficiency achievement and, according to the RTF’s Regional Conservation Progress Report, has achieved annual savings equal to 0.8% of its retail sales on average over the 2016-2023 timeframe.

The District currently offers programs for its residential, commercial, industrial, and agricultural customers. In addition to these programs, the District receives credit for the market transformation initiatives of NEEA that accrue within its service territory. NEEA’s work has helped to bring energy efficient emerging technologies, like ductless heat pumps and heat pump water heaters, to the Northwest.

Overall

Figure 8 summarizes the District’s 2012-2023 conservation achievement by sector as well as the savings attributed to NEEA, as reported under Washington’s EIA. Note that the District achieved additional residential savings in 2022 and 2023 that were not reported to the Department of Commerce.

Figure 8: Past Conservation Achievements by Sector (aMW)



Source: WA EIA Utility Reports

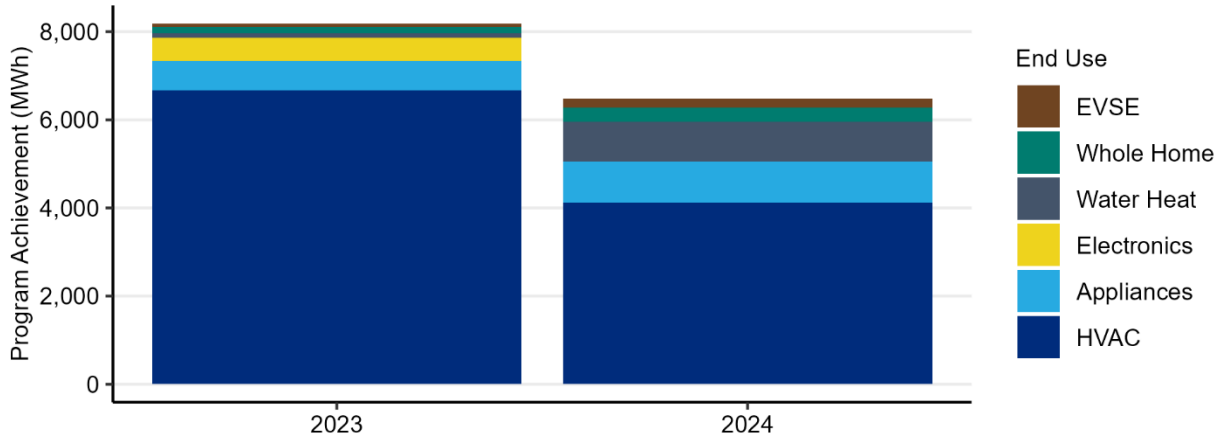
The average savings over this 12-year period average nearly 10 aMW per year. Most of the historical savings are from the District’s residential and commercial sectors. Savings from NEEA’s market transformation initiatives are also primarily in the residential sector. Savings from NEEA decreased in 2022 when the baselines that it uses to quantify its market transformation efforts were reset to align with the 2021 Power Plan. A similar adjustment happened in 2016.

The District provided detailed program achievement data for 2023 and 2024. The sections below summarize these recent achievements.

Residential

The recent residential program achievements by end use are shown in Figure 9. In total, residential savings add to 1.7 aMW over the two years. The HVAC end use is the largest end use, at 73% of the total. This end use includes both weatherization measures as well as heating system equipment. After HVAC, the largest sources of savings include appliances (10%) and water heat (7%).

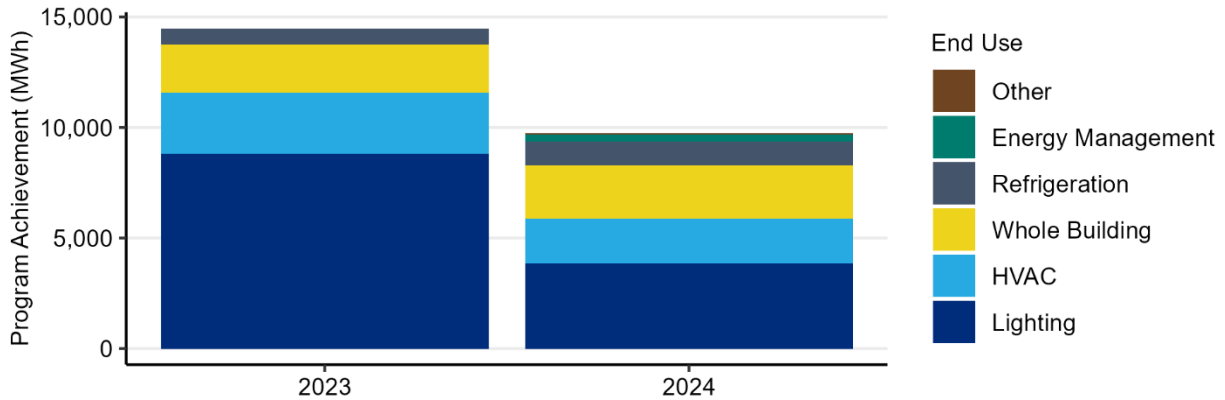
Figure 9: Recent Residential Program Achievements by End Use (MWh)



Commercial

Most of the District’s commercial savings are in the lighting and HVAC end uses, as shown in Figure 10. There is also large amount of savings in the Whole Building end use, achieved through the District’s early design assistance provided to new buildings. Smaller amounts of savings come from projects in the refrigeration, energy management, and other end uses. In total, commercial savings were 2.8 aMW over the two-year period.

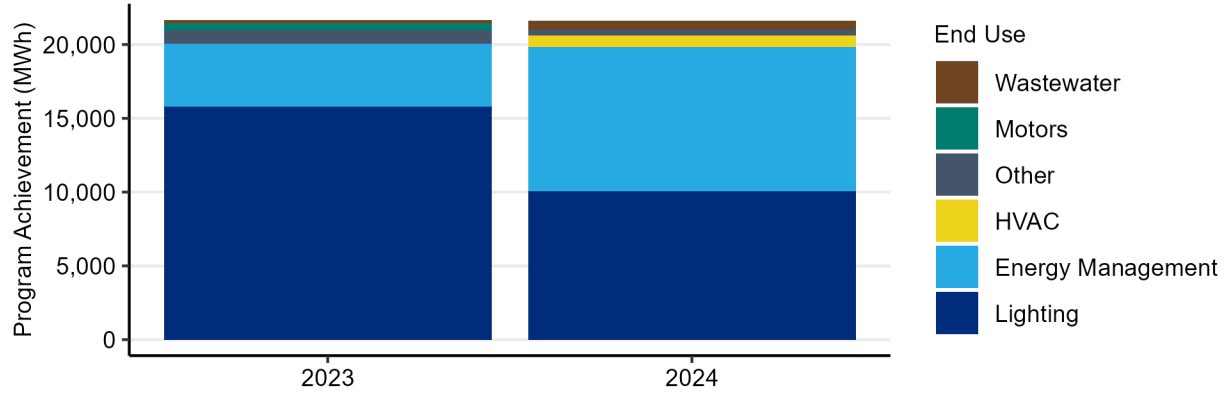
Figure 10: Recent Commercial Program Achievements by End Use



Industrial

In the industrial sector, lighting, and strategic energy management (SEM) measures have been the largest source of savings in recent years. After these end uses, smaller amounts of savings were achieved through HVAC, motors, wastewater specific measures, and other end uses. The industrial savings total nearly 5 aMW over the last two years.

Figure 11: Recent Industrial Program Achievements by End Use



The District has not reported any savings in the agricultural or utility sectors over the past two years.

Achievable Potential Results

This section discusses the results of the 2025 CPA. It begins with a discussion of the high-level achievable technical conservation potential and then covers additional detail on the achievable potential within the individual sectors and end uses.

Achievable Conservation Potential

The achievable technical conservation potential is the amount of energy efficiency that can be saved without considering the cost-effectiveness of measures. It considers market barriers and the practical limits of acquiring energy savings by efficiency programs.

Figure 12 shows the supply curve of achievable potential over the 20-year study period. A supply curve depicts the cumulative potential against the levelized cost of energy savings, with the measures sorted in order of ascending cost. No economic screening is applied. Levelized costs are used to make the costs comparable between measures with different lifetimes as well as with supply-side resources considered in the District's IRP. The costs include credits for deferred transmission and distribution system costs, avoided periodic replacements, and non-energy impacts to make them comparable with other resources. With these credits, some of the lowest cost measures have a net levelized cost that is negative, meaning the credits exceed the measure costs.

Figure 12: 20-Year Supply Curve

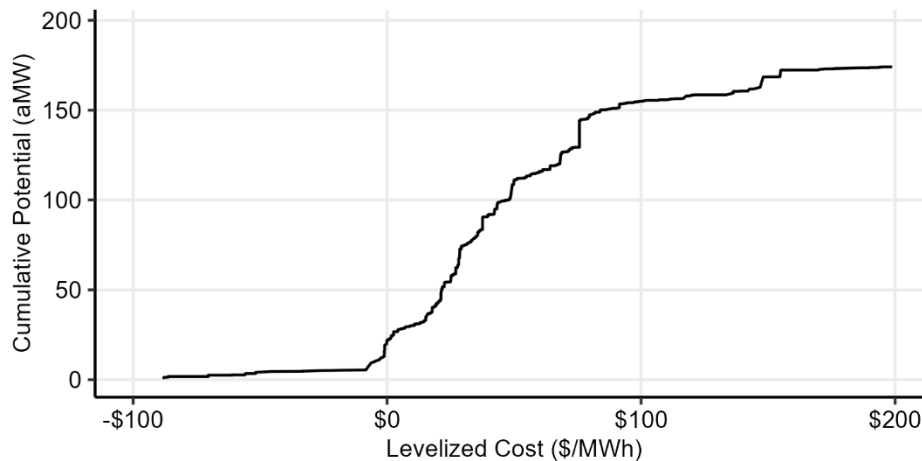
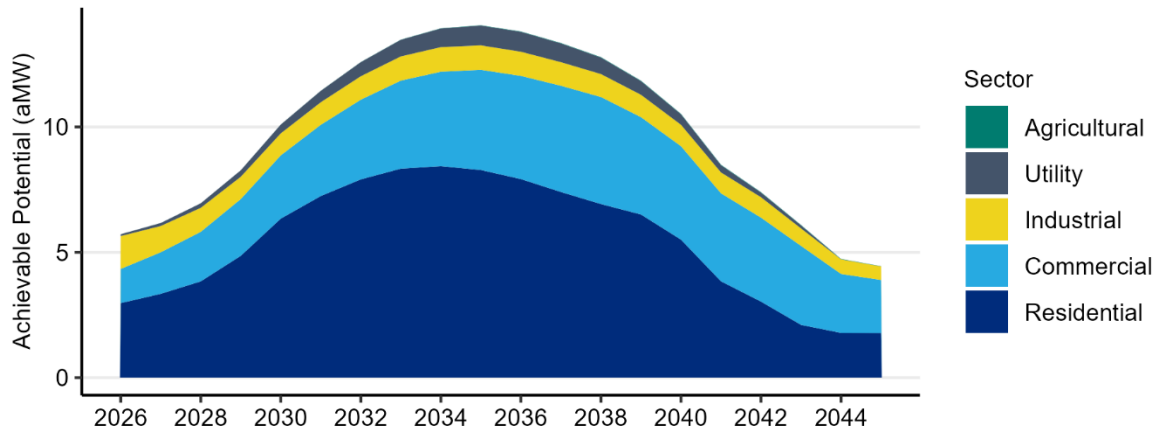


Figure 12 shows that approximately 20 aMW of potential are available at a cost at or below \$0/MWh. Approximately 100 aMW of achievable potential are available for costs below \$50/MWh. After approximately \$90/MWh, further increases in potential come at an increasing cost. In total, there are nearly 196 aMW of achievable technical potential available in the District's service territory over the 20-year study period, but only potential below \$200/MWh is shown.

Sector Summary

Figure 13 shows the achievable potential by sector on an annual basis. Most of the potential is in the District's residential sector, with less available in the commercial, industrial, utility, and agricultural sectors.

Figure 13: Annual Achievable Potential by Sector



Lighthouse used the ramp rates from the 2021 Power Plan to establish reasonable rates of acquisition for all measures and sectors. Lighthouse made modifications to the ramp rates applied to individual measures in order to align the near-term potential with recent and expected savings in each sector. Appendix VI has more detail on the alignment of ramp rates with program expectations.

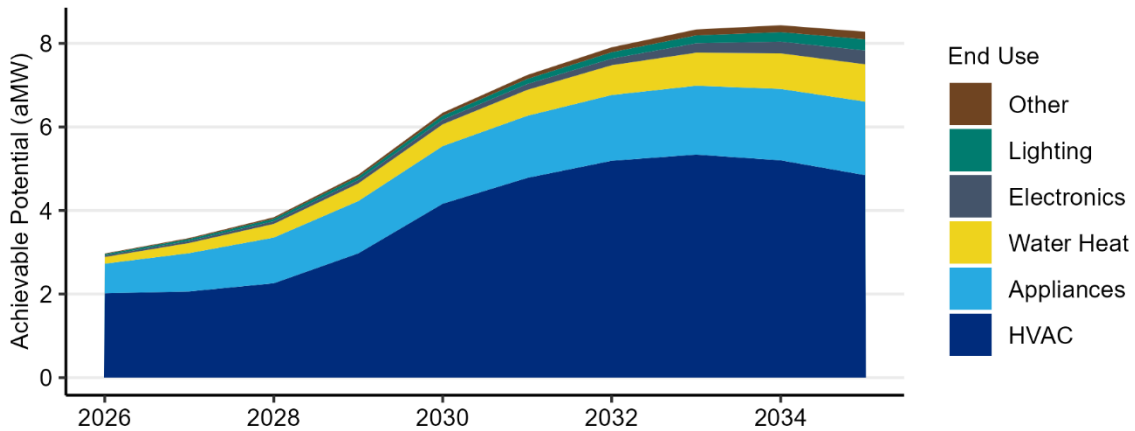
The sections below describe the achievable potential within each sector.

Residential

Relative to the 2023 CPA, the achievable technical potential in the residential sector has increased in the near term while decreasing in the long term. Near-term potential is aligned with recent program achievements, while the long-term potential is based on the overall supply. Decreasing in the long-term potential were driven by a variety of factors, including slower growth in new homes, incorporation of the District’s recent program achievements, and a variety of measure assumption updates.

Figure 14 shows the achievable technical potential by end use for the first 10 years of the study period. HVAC measures (including weatherization) make up 63% of potential in the sector, followed by appliances (22%), water heating (9%), electronics (2%), lighting (2%), and other end uses (1%). In Figure 14, the other end use category includes measures in the cooking, electric vehicle supply equipment, motors, and whole home end uses.

Figure 14: Annual Residential Potential by End Use



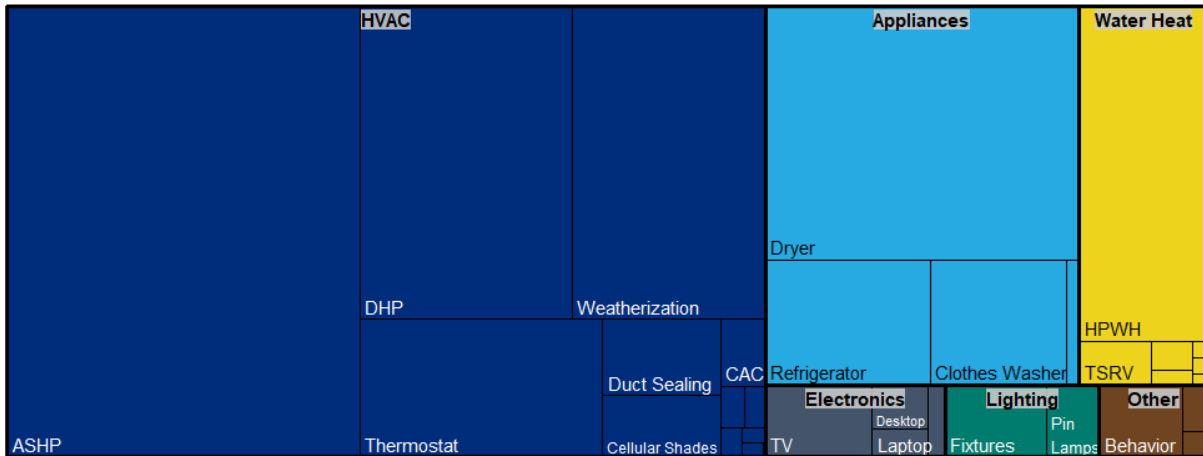
The potential grows during the initial years of the study as the expected market share of efficient equipment increases along with increases in the rate of the acquisition of retrofit measures, like attic insulation, which can be achieved at any time. By 2033, the rate of savings achievement begins to level off as the market shares of efficient equipment reach maximum values and the remaining available retrofit measures begin to diminish.

Note that some residential measures, such as smart thermostats and heat pump water heaters can provide benefits as both energy efficiency and demand response resources. Demand response benefits were not included in this CPA. The decision to use them as demand response resources was treated as an incremental decision and included in the District’s Demand Response Potential Assessment, although energy efficiency programs can help build a stock of flexible equipment that could be called upon in the future through demand response programs.

Figure 15 shows how the 10-year potential breaks down into end uses and measure categories. The area of each block represents the share of the total 10-year residential potential. Air source heat pumps (ASHP), ductless heat pumps (DHP), smart thermostats, and weatherization make up most of the potential in the HVAC end use, while heat pump dryers are the primary source of potential in the appliances end use. In the water heating end use, heat pump water heaters (HPWH) are the key measures.

Beginning in 2029, HPWH are subject to a federal standard that will require HPWH for many common tank sizes. Since this standard is not incorporated into the District’s load forecast, Lighthouse kept the savings potential for these measures after 2029 so that the savings from this standard can be accounted for in the IRP.

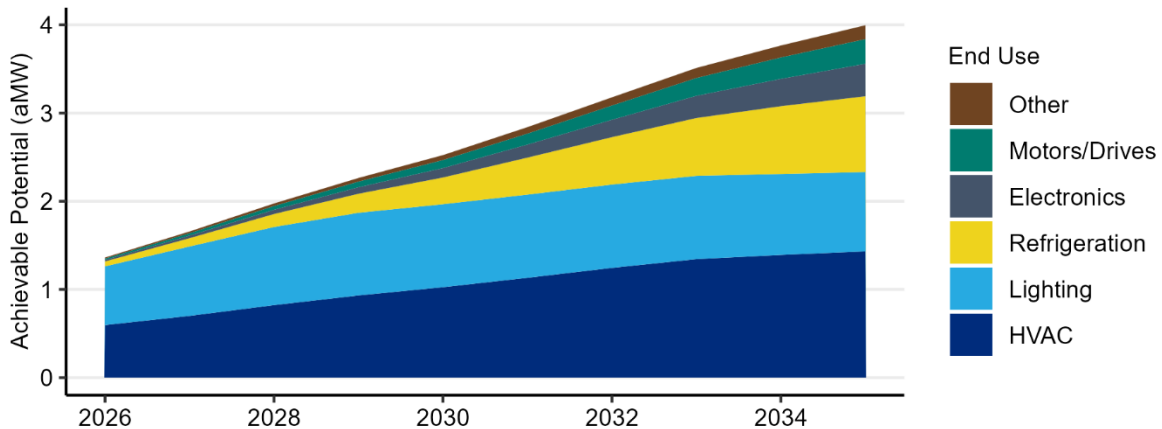
Figure 15: Residential Potential by End Use and Measure Category



Commercial

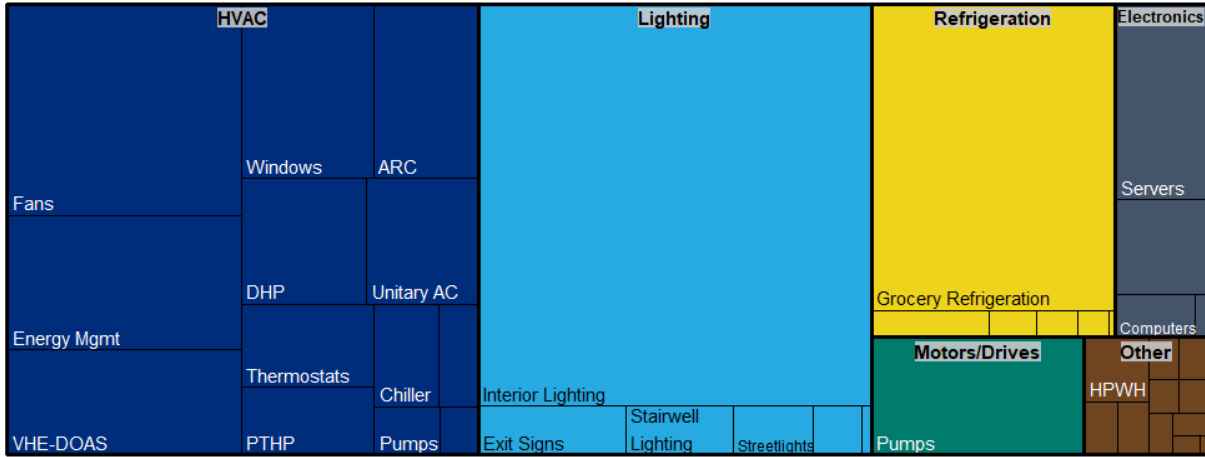
In the commercial sector, HVAC and lighting measures are the end uses with the highest potential. These two end uses comprise 39% and 33% of the 10-year potential, respectively. The lighting end use includes measures applicable to both interior and exterior lighting. The savings potential in the lighting end use is subject to a state law banning mercury in lighting beginning in 2029. In effect, this will raise the baseline for lighting programs to LED products. Similar to the discussion of HPWH in the residential sector, the savings potential for commercial lighting was not adjusted so these future savings be accounted for in the IRP. In Figure 16, the other end use category includes measures in the compressed air, food preparation, process loads, and water heating end uses.

Figure 16: Annual Commercial Potential by End Use



Key end uses and measure categories within the commercial sector are shown in Figure 17. The area of each block is proportional to its share of the 10-year commercial potential. The commercial sector includes a variety of building types with different end uses. This is apparent in the range of measures included in Figure 17.

Figure 17: Commercial Potential by End Use and Measure Category

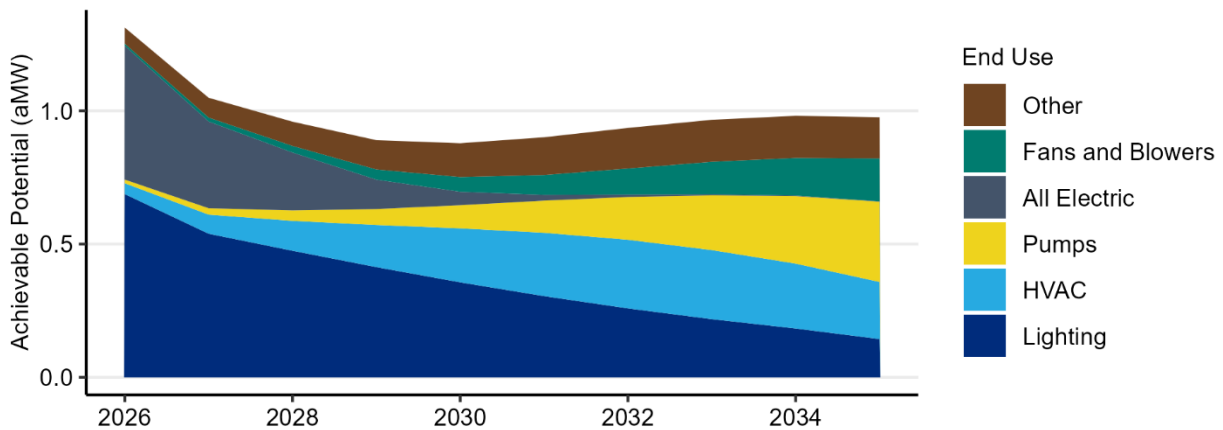


Industrial

The annual industrial sector potential is shown in Figure 18. Lighting is the largest area of potential, comprising 36% of the 10-year potential. After lighting, the key end uses include HVAC (18%), pumps (13%), all electric (13%), and fans and blowers (7%). The all electric end use category includes measures applicable to all end uses, such as strategic energy management programs and measures applicable to the water and wastewater segments. The potential in these categories decreases over time due to the District’s past successes and limited remaining available potential. The other category in Figure 18 includes a variety of end uses, including refrigeration, material handling and processing, motors, and several other smaller end uses.

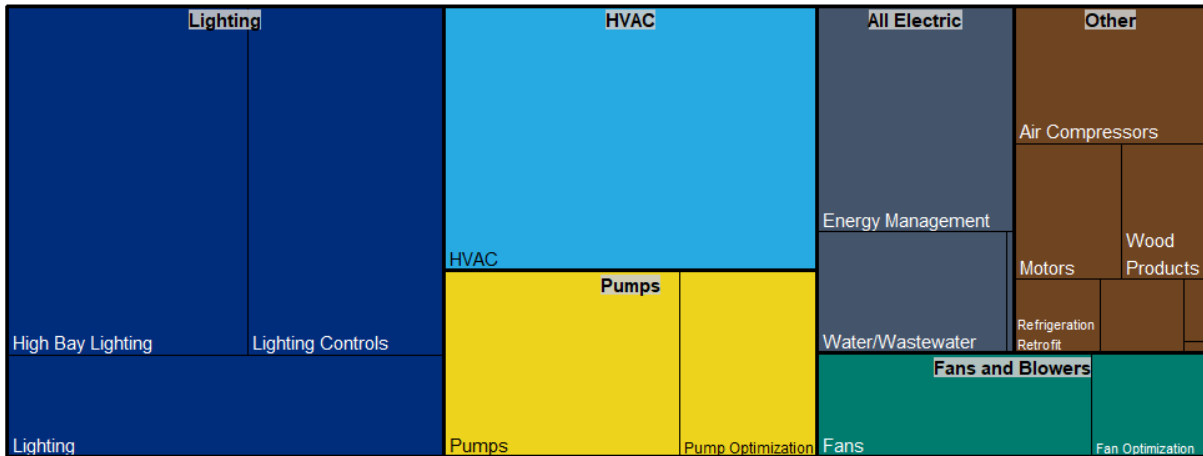
While the estimate of industrial loads at the beginning of the study period is higher for the 2025 CPA, over the long term the 2025 CPA has a 13% lower forecast. This, combined with accounting for the District’s recent programmatic achievements, has reduced the 20-year achievable technical potential by 15%, falling from 21 aMW to 18 aMW.

Figure 18: Annual Industrial Potential by End Use



The breakdown of 10-year industrial potential into end uses and measure categories is shown in Figure 19.

Figure 19: Industrial Potential by End Use and Measure Category

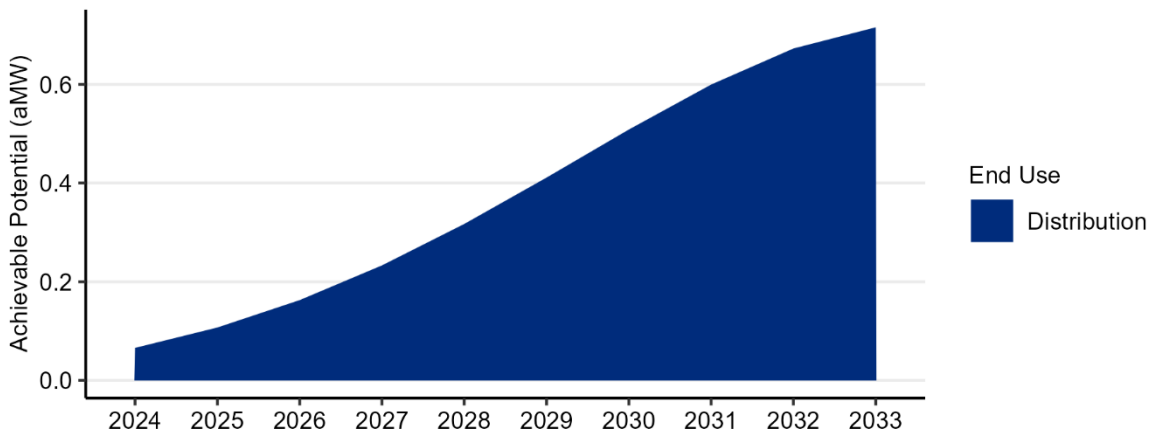


Utility Distribution System

The measures in the distribution efficiency sector involve the regulation of voltage to improve the efficiency of utility distribution systems. This analysis includes the measures characterized in the 2021 Power Plan, which use increasing sophisticated control systems.

The annual distribution system potential is shown in Figure 20. Based on conversations with the District, CVR has already been implemented at 67 of 96 of the District’s substations. At the remaining substations, the District is considering Demand Voltage Reduction instead. The 2021 Power Plan included three levels of CVR, the third of which is only possible with advanced metering infrastructure (AMI). The 2023 CPA included the second, advanced tier of CVR. In the 2025 CPA, Lighthouse also included the third tier now that the District is nearing completion of its AMI implementation. However, Lighthouse limited the potential of these tiers to the substations where CVR has already been implemented. The remaining substations were included in the estimate of potential for DVR in the District’s 2025 Demand Response Potential Assessment. The net change of these competing adjustments is a small increase in the 20-year potential. Lighthouse assumed the District is already implementing the first measure, line drop compensation. The remaining measures used advanced controls to further regulate voltage.

Figure 20: Annual Distribution System Potential

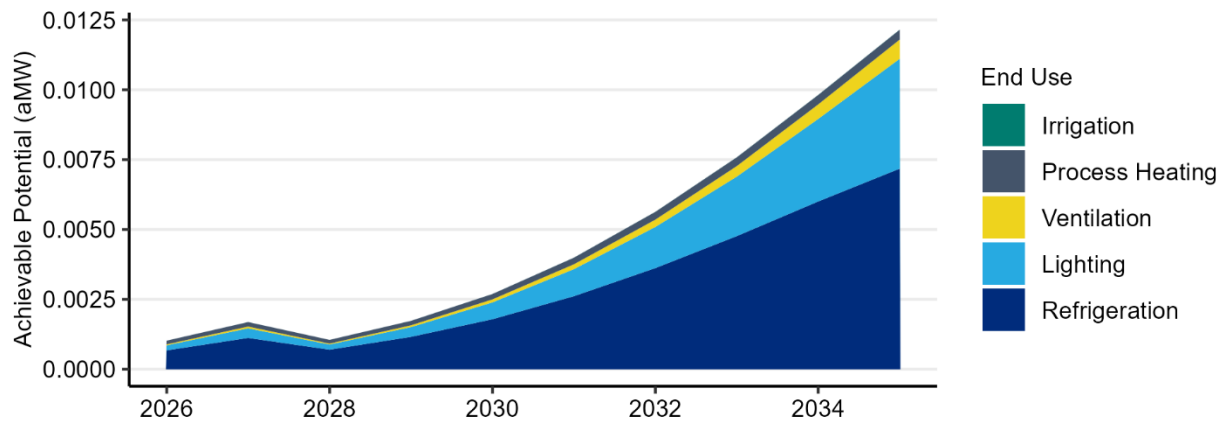


Agricultural

The potential in the agricultural sector is driven by the irrigated acreage, number of pumps, annual dairy production, and number of farms in the District’s service territory. Since dairy farms are the primary agricultural activity in the District’s service territory, the primary sources of savings are related to those operations. The overall level of agricultural activity and potential is still small, especially relative to other sectors. Note, the scale used in Figure 21 has changed significantly from what was used in other figures above.

Lighthouse updated the potential estimate with the newly available 2022 Census of Agriculture. The survey showed lower amounts of irrigation and a slightly higher amount of dairy production. The overall result was a 37% decrease in potential, with the total potential falling from 0.33 aMW to 0.21 aMW.

Figure 21: Annual Agricultural Potential by End Use

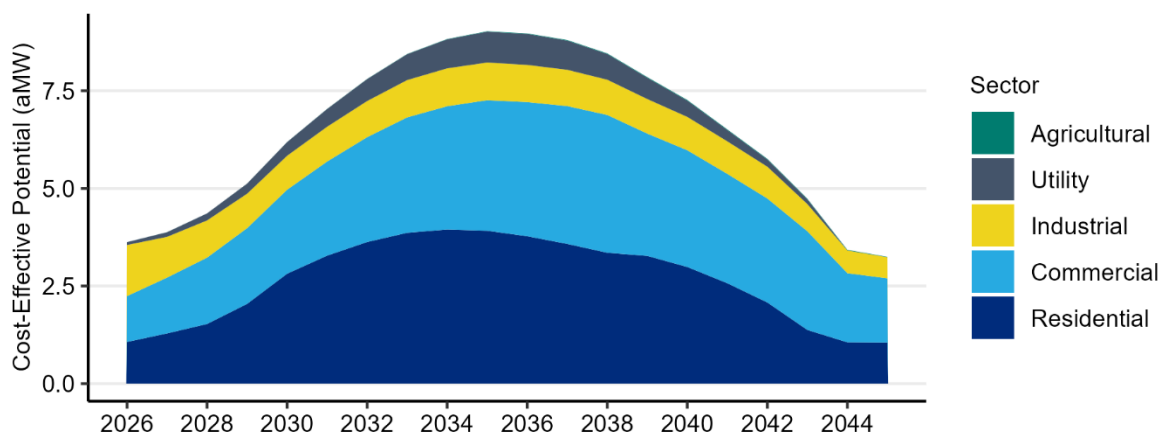


Cost-Effective Potential Results

This section discusses the cost-effective potential, the subset of the achievable technical potential identified as cost-effective through the District’s IRP.

Figure 22 shows the annual cost-effective potential by sector. Most of the District’s potential is in the residential and commercial sectors. While the annual potential for the residential, commercial, and industrial sectors begins in roughly equal amounts, the potential in the residential and commercial sectors grows, while the industrial potential tapers slowly over time. As with the achievable potential, the cost-effective potential in the utility and agricultural sectors is more limited.

Figure 22: Annual Cost-Effective Potential by Sector (aMW)



The sections below discuss the cost-effective potential within each sector in greater detail.

Residential

Figure 23 shows the annual residential cost-effective potential by end use over the initial 10 years of the study period. The three areas with the largest amounts of potential include the HVAC, water heating, and appliances end uses. The potential within these three end uses grows over the initial years of the study period, but the HVAC potential begins to decline in the later years due to limited amounts of remaining potential.

Figure 23: Annual Residential Cost-Effective Potential by End Use

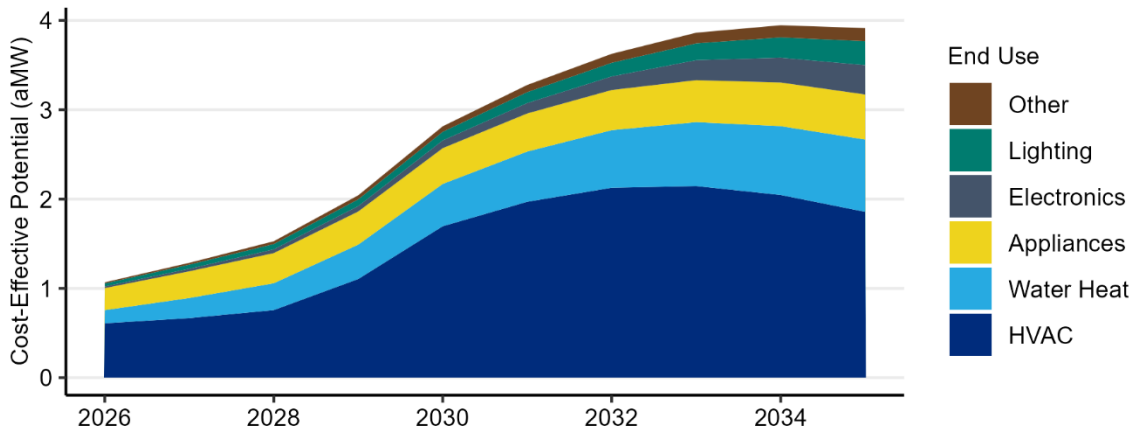
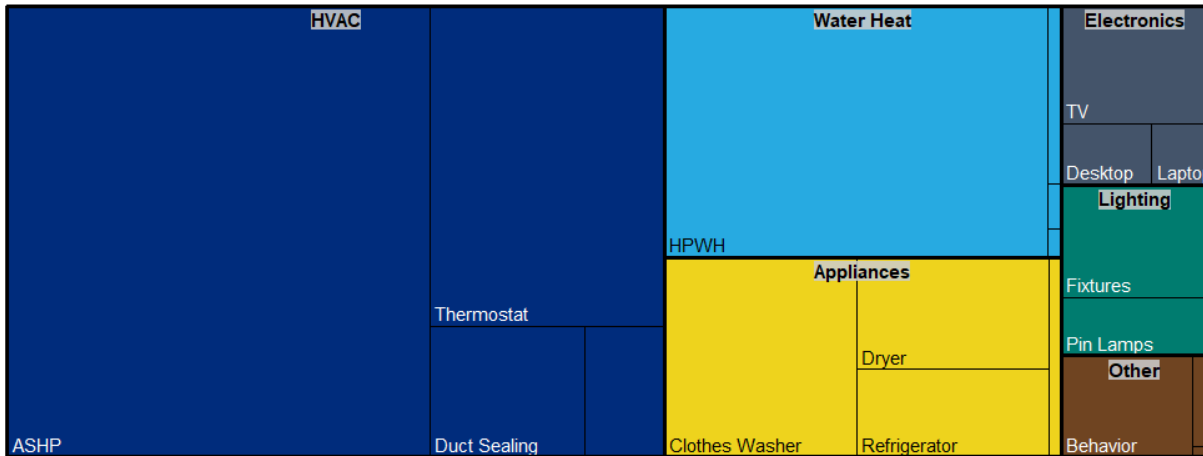


Figure 24 shows the distribution of the 10-year cost-effective potential within the residential sector. In the HVAC end use, air source heat pumps (ASHP), smart thermostats, and duct sealing are the key measures. The cost of ASHPs includes incentives from the Inflation Reduction Act, improving the cost-effectiveness of these measures, especially in low-income homes where the incentives are higher. In the water heating end use, heat pump water heaters (HPWH) are the primary measure. Within the appliances end use, efficient washers and dryers, including heat pump dryers, make up a large share of the potential.

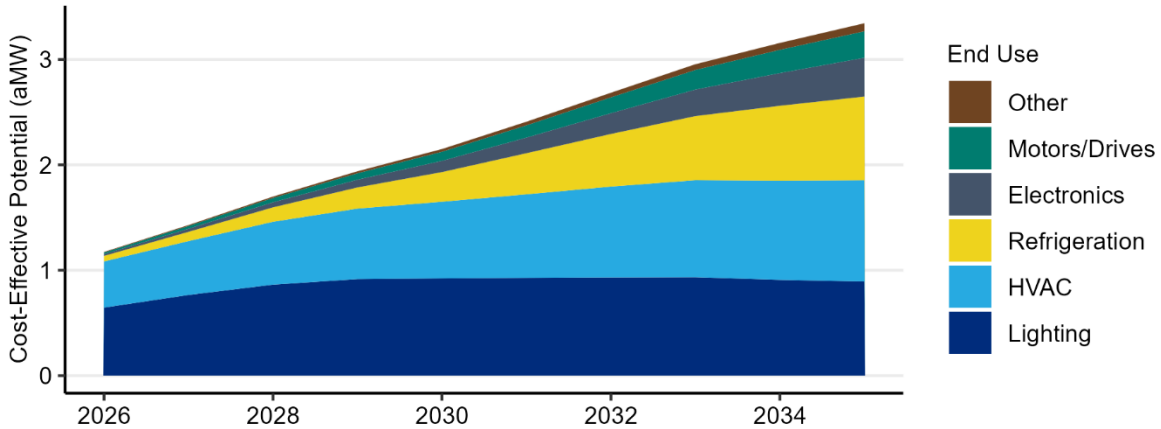
Figure 24: Residential Cost-Effective Potential by End Use and Measure Category



Commercial

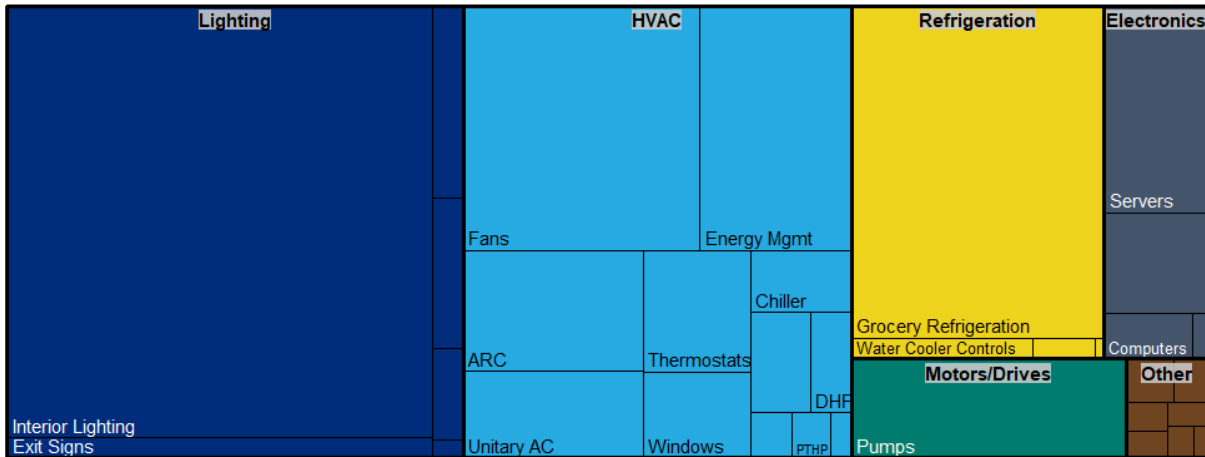
The annual cost-effective potential for the commercial sector is shown in Figure 25. In the near term, most of the potential is in lighting and HVAC measures, but this diminishes over time while the savings available in the refrigeration and other smaller end uses grow.

Figure 25: Annual Commercial Cost-Effective Potential by End Use



The distribution of the 10-year cost-effective potential for the commercial sector is shown in Figure 26. Like the achievable potential described earlier, most of the lighting potential is in interior lighting measures while the HVAC is spread across a variety of system types and measures.

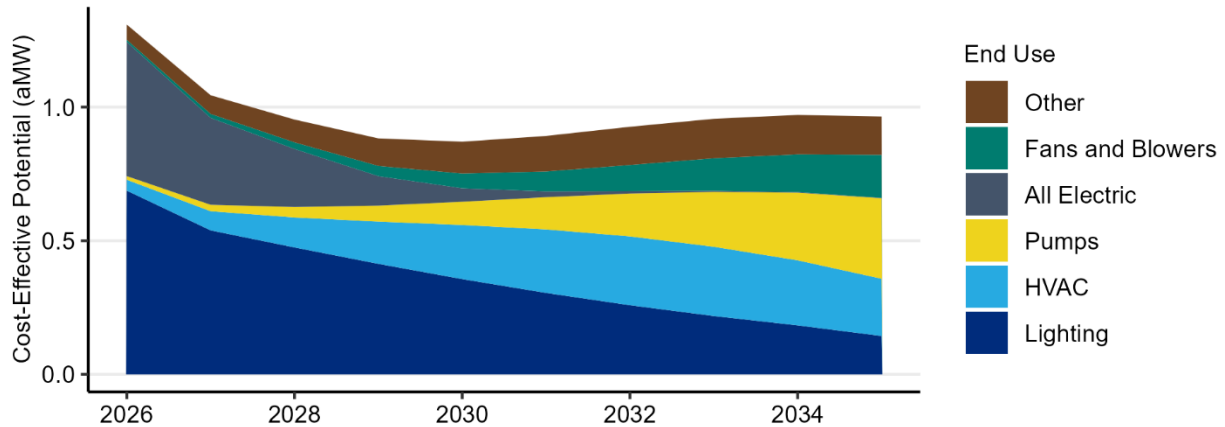
Figure 26: Commercial Cost-Effective Potential by End Use and Measure Category



Industrial

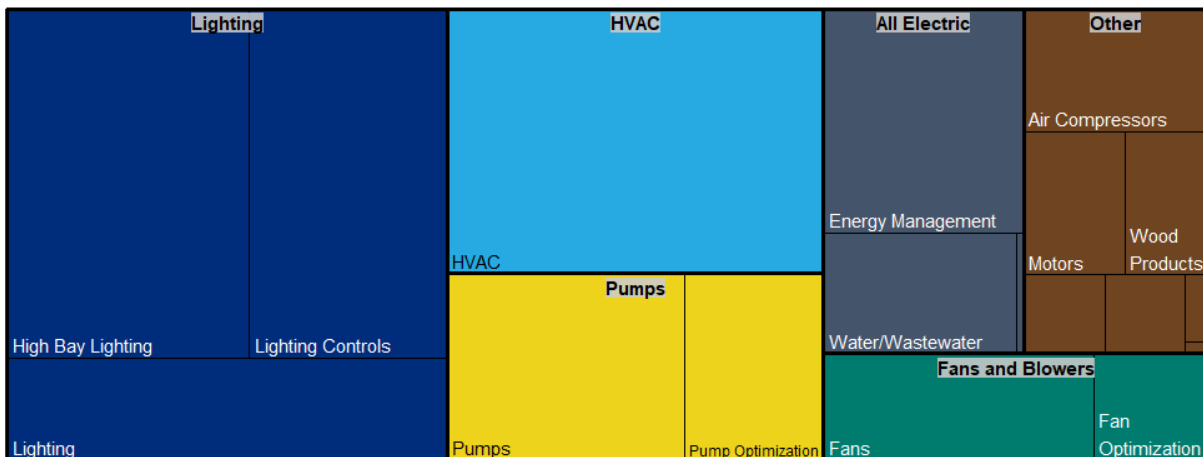
Figure 27 shows the annual cost-effective potential for the industrial sector. The lighting potential declines over the 10-year period shown below, reflecting past program achievements and limited remaining potential. The all electric category also declines quickly, again reflecting past achievements and limited remaining potential from programs like Strategic Energy Management. Predicting potential in the industrial sector is notoriously hard to do, however, and new opportunities often emerge as industrial facilities change operations and products over time. Achievements in these areas could be replaced with achievements in the HVAC, pumps, and fans and blowers end uses, which were assigned slower ramp rates due to limited recent program activity.

Figure 27: Annual Industrial Cost-Effective Potential by End Use



The distribution of savings potential across the end uses and measure categories in the industrial sector is shown below, in Figure 28. Lighting savings potential in the industrial sector is spread across high bay lighting, lighting controls, and other lighting applications. The remaining potential is spread across the HVAC, pumps, all electric, and fans and blowers end uses.

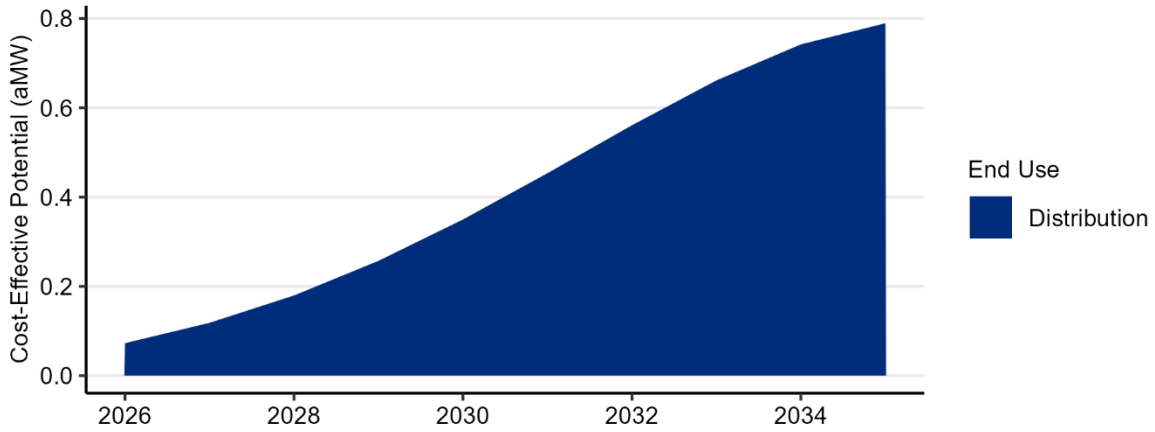
Figure 28: Industrial Cost-Effective Potential by End Use and Measure Category



Utility Distribution System

In the utility distribution system, all of the achievable technical potential identified in this CPA was selected by the District’s IRP. The District is already implementing this in their system, the potential identified in this CPA includes a more advanced implementation that is available through the District’s implementation of advanced metering infrastructure (AMI).

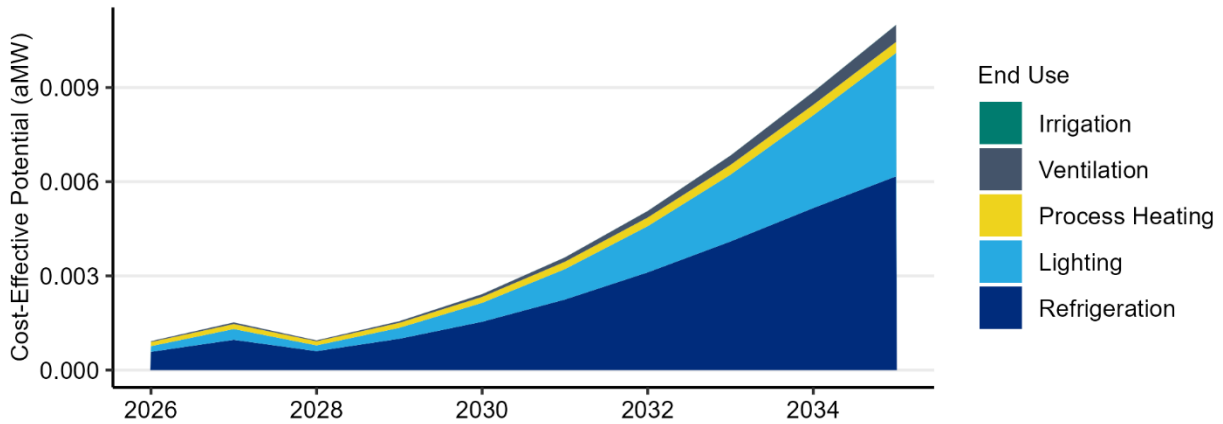
Figure 29: Annual Utility Distribution System Cost-Effective Potential by End Use



Agricultural

The annual cost-effective potential in the agricultural sector is shown in Figure 30. Most of the cost-effective potential is associated with dairy refrigeration and lighting measures.

Figure 30: Annual Agricultural Cost-Effective Potential by End Use



Savings Shape

This section details the methodology and results of the hourly savings estimates developed by Lighthouse for use in the District’s IRP.

Methodology

Each of the measures included in this CPA have one or more savings components. Efficient heat pumps, for example, can provide both heating and cooling savings, each of which are quantified as separate savings components. While most measures have just a single savings component, numerous measures have more than one. Water-saving measures often have two distinct savings components: the reduction of water heating loads in homes and the reduced loads at wastewater treatment plants through the reduction of wastewater influent. In Lighthouse’s CPA model, each measure savings component is assigned a load profile and a ratio reflecting the share of the total measure savings associated with that savings component. These ratios, combined with the hourly load profiles, were applied to the annual potential results, enabling the calculation of hourly savings.

The load shapes used in this analysis are the ones developed by the Council for the 2021 Power Plan. Measures were also grouped into bins with similar leveled costs and two seasonality groupings. A “winter” group applied to measures with predominantly heating-season savings. The rest of the measures were placed into an “annual” group. These measures have savings profiles that are consistent throughout the year or, in a few cases, summer-oriented savings.

Results

Figure 31 shows the cumulative monthly savings for each seasonality group and cost bin. The annual group of measures provides fairly consistent savings throughout the months of the year, while the winter measure savings are heavily correlated with seasonal heating demands. The largest group of savings is the lowest-cost annual savings bin, shown in dark blue on the left, which has roughly 60,000 MWh of savings potential in each month by the end of the study period. A large portion of the winter-focused savings are also in the lowest cost category.

Figure 31: Monthly Savings Shape of 20-Year Potential

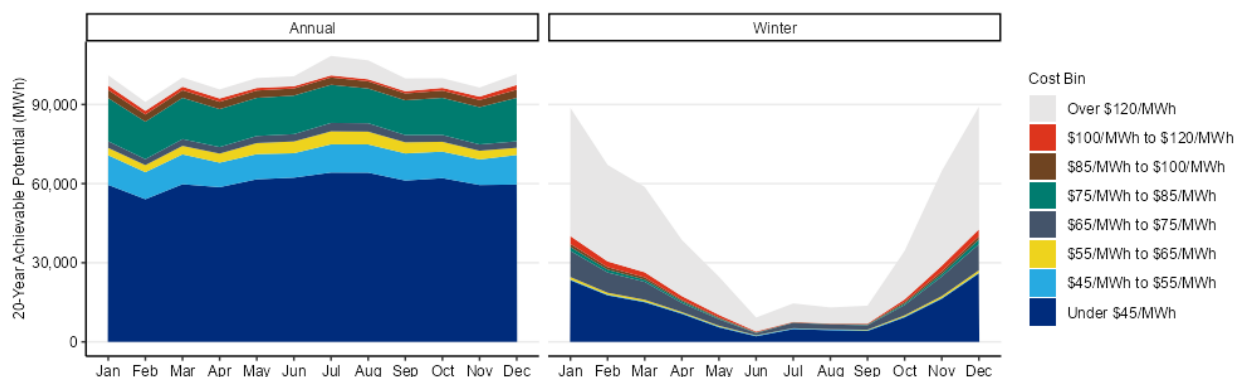
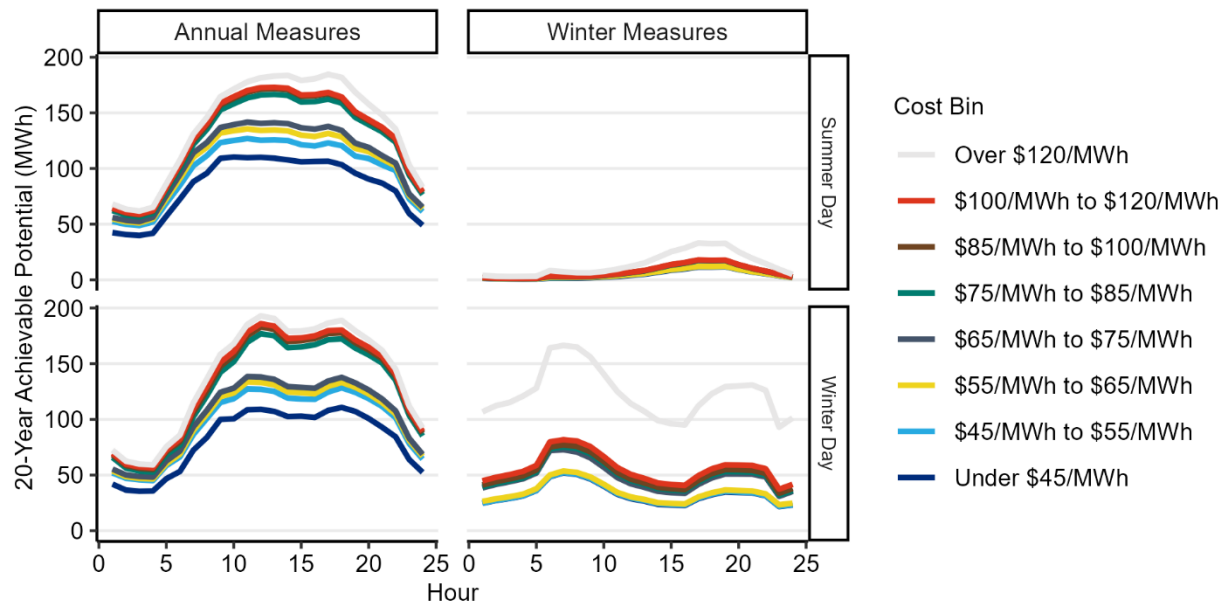


Figure 32 shows the hourly results for a winter and summer day by seasonality and cost bin groupings. The lines are stacked, showing the incremental potential that is available as you move up across the cost bins.

As would be expected, the winter measures contribute little savings on a summer day. On a winter day, the contribution of both measure categories towards the District’s morning and evening peaks is apparent by the humps at the beginning and end of each day. The hourly contributions of measures in the annual measure group are fairly consistent across seasons, although the shapes reflect the typical seasonal shapes of energy demand, with summer demand peaking in the afternoon and winter demand typically following a morning and evening peak pattern.

Figure 32: Hourly Results by Measure Seasonality



Summary

This report summarized the results of the 2025 CPA conducted for the District. The assessment provided estimates of the achievable technical energy savings potential for the 20-year period beginning in 2026, with detail on the first two and ten years per the requirements of Washington State’s EIA. The assessment considered a wide range of measures that are reliable and available during the study period.

Compared to the District’s 2023 CPA, the potential has decreased. While aligning the near-term potential with the District’s recent achievements resulted in an increase in near-term residential potential, there were decreases in potential driven by updated forecasts, measure updates, and adjustments to account for the District’s recent achievements.

Compliance with State Requirements

The methodology used to estimate the cost-effective energy efficiency potential described in this report is consistent with the methodology used by the Council in determining the potential and cost-effectiveness of conservation resources in the 2021 Power Plan. Appendix III provides a list of Washington’s EIA requirements and a description of how each was implemented. In addition to using a methodology consistent with the Council’s 2021 Power Plan, the assessment used assumptions from the 2021 Power Plan where utility-specific inputs were not used. Utility-specific inputs covering customer characteristics, previous conservation achievements, and some economic inputs were used. The assessment included the measures considered in the 2021 Power Plan materials, updated with new information from the RTF made available since its publication.

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Appendix I: Acronyms

| | |
|------|--------------------------------------------|
| aMW | Average Megawatt |
| BPA | Bonneville Power Administration |
| CETA | Clean Energy Transformation Act |
| CPA | Conservation Potential Assessment |
| EIA | Energy Independence Act |
| EUI | Energy Use Intensity |
| HPWH | Heat Pump Water Heater |
| HVAC | Heating, Ventilation, and Air Conditioning |
| IRP | Integrated Resource Plan |
| kW | kilowatt |
| kWh | kilowatt-hour |
| LED | Light-Emitting Diode |
| MW | Megawatt |
| MWh | Megawatt-hour |
| NEEA | Northwest Energy Efficiency Alliance |
| O&M | Operations and Maintenance |
| RPS | Renewable Portfolio Standard |
| RTF | Regional Technical Forum |
| SEM | Strategic Energy Management |
| TRC | Total Resource Cost |

Appendix II: Glossary

| | |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Achievable Technical Potential</i> | Conservation potential that includes considerations of market barriers and programmatic constraints but not cost effectiveness. This is a subset of technical potential. |
| <i>Average Megawatt (aMW)</i> | An average hourly usage of electricity, measured in megawatts, across the hours of a day, month, or year |
| <i>Avoided Cost</i> | The costs avoided through the acquisition of energy efficiency |
| <i>Cost Effective</i> | A measure is described as cost effective when the present value of its benefits exceeds the present value of its costs |
| <i>Economic Potential</i> | Conservation potential that passes a cost-effectiveness test. This is a subset of achievable potential. Per the EIA, a Total Resource Cost (TRC) test is used. |
| <i>Levelized Cost</i> | A measure of costs when they are spread over the life of the measure, similar to a car payment. Levelized costs enable the comparison of resources with different useful lifetimes. |
| <i>Megawatt (MW)</i> | A unity of demand equal to 1,000 kilowatts (kW) |
| <i>Renewable Portfolio Standard</i> | A requirement that a certain percentage of a utility's portfolio come from renewable resources. In 2020, Washington utilities with more than 25,000 customers are required to source 15% of their energy from renewable resources |
| <i>Technical Potential</i> | The set of possible conservation savings that includes all possible measures, regardless of market or cost barriers |
| <i>Total Resource Cost (TRC) Test</i> | A test for cost-effectiveness that considers all costs and benefits, regardless of who they accrue to. A measure passes this test if the present value of all benefits exceeds the present value of all costs. The TRC test is required by Washington's Energy Independence act and is the predominant cost effectiveness test used throughout the Northwest and US. |

Appendix III: Compliance with State Requirements

This Appendix details the specific requirements for Conservation Potential Assessments listed in WAC 194-37-080. The table below lists the specific section and corresponding requirement along with a description of how the requirement is implemented in the model and where the implementation can be found.

Table 13: CPA Compliance

| WAC 194-37-080 Section | Requirement | Implementation |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (5)(a) | Technical potential. Determine the amount of conservation that is technically feasible, considering measures and the number of these measures that could physically be installed or implemented, without regard to achievability or cost. | The model calculates technical potential by multiplying the quantity of stock (number of homes, building floor area, industrial load) by the number of measures that could be installed per each unit of stock. The model further constrains the potential by the share of measures that have already been completed. See calculations in the “Units” tabs within each of the sector model files. |
| (5)(b) | Achievable technical potential. Determine the amount of the conservation technical potential that is available within the planning period, considering barriers to market penetration and the rate at which savings could be acquired. | The model applies maximum achievability factors based on the Council’s 2021 Power Plan assumptions and ramp rates to identify how the potential can be acquired over the study period. See calculations in the “Units” tabs within each of the sector model files. The complete set of the ramp rates used is on the “Ramp Rates” tab. |
| (5)(c) | Economic achievable potential. Establish the economic achievable potential, which is the conservation potential that is cost-effective, reliable, and feasible, by comparing the total resource cost of conservation measures to the cost of other resources available to meet expected demand for electricity and capacity. | The District uses its IRP optimization model to determine what measures are cost effective by comparing the costs and benefits of conservation measures against other resources. See the District’s IRP documentation for further details. |
| (5)(d) | Total resource cost. In determining economic achievable potential as provided in (c) of this subsection, perform a life-cycle cost analysis of measures or programs to determine the net levelized cost, as described in this subsection: | A life-cycle cost analysis was performed using the Council’s ProCost tool and additional calculations added by Lighthouse. Lighthouse configured ProCost to use District-specific inputs and used the outputs to develop a levelized cost that included all costs and benefits not included in the District’s IRP analysis. The levelized cost was calculated in |

| WAC 194-37-080 Section | Requirement | Implementation |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>a manner consistent with other resources included in the IRP.</p> <p>The measure files within each sector contain the ProCost results. These results are then rolled up into the ProCost Measure Results file, which is linked to each sector model file.</p> |
| (5)(d)(i) | Conduct a total resource cost analysis that assesses all costs and all benefits of conservation measures regardless of who pays the costs or receives the benefits; | <p>The costs considered in the levelized cost include measure capital costs, O&M costs, periodic replacement costs, and any non-energy costs. Benefits included avoided T&D capacity costs, non-energy benefits, O&M savings, periodic replacement costs. Avoided energy costs, generation capacity value, and any risk premium are factored into the District’s IRP modelling.</p> <p>Measure costs and benefits can be found in the individual measure files as well as the “ProCost Measure Results” file.</p> |
| (5)(d)(ii) | Include the incremental savings and incremental costs of measures and replacement measures where resources or measures have different measure lifetimes; | <p>Assumed savings, cost, and measure lifetimes are based on 2021 Power Plan and subsequent RTF updates, where applicable.</p> <p>Measure costs and benefits can be found in the individual measure files as well as the “ProCost Measure Results” files.</p> |
| (5)(d)(iii) | Calculate the value of the energy saved based on when it is saved. In performing this calculation, use time differentiated avoided costs to conduct the analysis that determines the financial value of energy saved through conservation | <p>Lighthouse used the load shapes developed for the 2021 Power Plan to provide the District with hourly potential estimates for use in its IRP modelling. T&D capacity credits were included in the levelized cost calculations, based on each measure’s contribution to reducing peak demands.</p> <p>“MC and Loadshape” files contain the library of load shapes. Individual measure files contain the load profile assignments.</p> |
| (5)(d)(iv) | Include the increase or decrease in annual or periodic operations and maintenance costs due to conservation measures | <p>Measure analyses include changes to O&M costs as well as periodic replacement costs, where applicable.</p> <p>Measure assumptions can be found in the individual measure files.</p> |

| WAC 194-37-080 Section | Requirement | Implementation |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (5)(d)(v) | Include avoided energy costs equal to a forecast of regional market prices, which represents the cost of the next increment of available and reliable power supply available to the utility for the life of the energy efficiency measures to which it is compared | <p>The District incorporates regional market price forecasts as part of its IRP modelling.</p> <p>See the District’s IRP documentation for further details.</p> |
| (5)(d)(vi) | Include deferred capacity expansion benefits for transmission and distribution systems | <p>Deferred transmission and distribution system benefits are based on the values developed by the District, using the methodology developed by the Council for the 2021 Power Plan. These include a transmission capacity benefit of \$8.22/kW-year and a distribution capacity benefit of \$13.96/kW-year (2024\$).</p> <p>These values can be found on the “ProData” tab of the ProCost file, cells C50 and C54.</p> |
| (5)(d)(vii) | Include deferred generation benefits consistent with the contribution to system peak capacity of the conservation measure | <p>Deferred generation capacity expansion deferral benefits are modelled through the District’s IRP analysis. Hourly savings data developed as a part of this CPA enabled the District’s IRP to evaluate the contribution of each measure bundle with respect to the District’s needs for energy and capacity throughout the year.</p> <p>See the District’s IRP documentation for further details.</p> |
| (5)(d)(viii) | Include the social cost of carbon emissions from avoided non-conservation resources | <p>The District’s IRP modelling factors in carbon costs per the requirements of Washington’s EIA and CETA.</p> <p>See the District’s IRP documentation for further details.</p> |
| (5)(d)(ix) | Include a risk mitigation credit to reflect the additional value of conservation, not otherwise accounted for in other inputs, in reducing risk associated with costs of avoided non-conservation resources | <p>The District’s IRP addresses risk through probabilistic modelling.</p> <p>See the District’s IRP documentation for further details.</p> |
| (5)(d)(x) | Include all non-energy impacts that a resource or measure may provide that can be quantified and monetized | <p>All quantifiable non-energy benefits were included where appropriate, based on values from the Council’s 2021 Power Plan materials and updates from the RTF.</p> |

| WAC 194-37-080 Section | Requirement | Implementation |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (5)(d)(xi) | Include an estimate of program administrative costs | <p>Measure assumptions can be found in the individual measure files.</p> <p>This assessment uses the Council’s assumption of administrative costs equal to 20% of measure capital costs.</p> <p>Program admin costs can be found in the “ProData” tab of the ProCost file, cell C29.</p> |
| (5)(d)(xii) | Include the cost of financing measures using the capital costs of the entity that is expected to pay for the measure | <p>This assessment utilizes the financing cost assumptions from the 2021 Power Plan materials, including the sector-specific cost shares and cost of capital assumptions.</p> <p>Financing assumptions can be found in the ProData tab of the ProCost batch runner files, cells C37:F46.</p> |
| (5)(d)(xiii) | Discount future costs and benefits at a discount rate equal to the discount rate used by the utility in evaluating non-conservation resources | <p>This assessment uses a real discount rate of 3% to determine the present value of all costs and benefits. The District IRP assumed a nominal discount rate of 5% and an inflation rate that varied depending upon the type of goods considered. An inflation rate of 2% is assumed for the CPA, consistent with the level of inflation often assumed for consumer goods.</p> <p>The discount rate used in this analysis can be found in the ProCost file, on cell C27 of the ProData tab.</p> |
| (5)(d)(xiv) | Include a ten percent bonus for the energy and capacity benefits of conservation measures as defined in 16 U.S.C. § 839a of the Pacific Northwest Electric Power Planning and Conservation Act | <p>Lighthouse applied the 10% credit as a deduction to measure costs, since all benefits are not evaluated within the CPA.</p> <p>The 10% credit used in the measure analyses can be found in the customized levelized cost calculation within the “ProCost Measure Results” file, in column DF of the “Measure Database” tab.</p> |

Appendix IV: Measure List

This appendix provides a list of the measures that were included in this assessment and the data sources that were used for any measure characteristics. The assessment used all measures from the 2021 Power Plan that were applicable to the District. Lighthouse customized these measures to make them specific to the District's service territory and updated many with new information available from the Regional Technical Forum. The RTF continually updates estimates of measure savings and cost. This assessment used the most up to date information available when the CPA was developed.

This list is high-level and does not reflect the thousands of variations for each individual measure. Instead, it summarizes measures by category. Many measures include variations specific to different home or building types, efficiency level, or other characterization. For example, attic insulation measures are differentiated by home type (e.g., single family, multifamily, manufactured home), heating system (e.g., heat pump or furnace), baseline insulation level (e.g., R0, R11, etc.) and maximum insulation possible (e.g., R22, R30, R38, R49). This differentiation allows for savings and cost estimates to be more precise.

The measure list is grouped by sector and end use. Note that all measures may not be applicable to an individual utility service territory based on the characteristics of individual utilities and their customer sectors.

Table 14: Residential End Uses and Measures

| End Use | Measure Category | Data Source(s) |
|-----------------|-------------------------------|-----------------------|
| Appliances | Air Cleaner | 2021 Power Plan, RTF |
| | Clothes Washer | 2021 Power Plan, RTF |
| | Clothes Dryer | 2021 Power Plan, RTF |
| | Freezer | 2021 Power Plan, RTF |
| | Refrigerator | 2021 Power Plan, RTF |
| Cooking | Electric Oven | 2021 Power Plan |
| | Microwave | 2021 Power Plan |
| Electronics | Advanced Power Strips | 2021 Power Plan, RTF |
| | Desktop | 2021 Power Plan |
| | Laptop | 2021 Power Plan |
| | Monitor | 2021 Power Plan |
| | TV | 2021 Power Plan |
| EVSE | EVSE | 2021 Power Plan |
| HVAC | Air Source Heat Pump | 2021 Power Plan, RTF |
| | Central Air Conditioner | 2021 Power Plan, RTF |
| | Cellular Shades | 2021 Power Plan |
| | Circulator | 2021 Power Plan |
| | Circulator Controls | 2021 Power Plan |
| | Ductless Heat Pump | 2021 Power Plan, RTF |
| | Duct Sealing | 2021 Power Plan, RTF |
| | Ground Source Heat Pump | 2021 Power Plan |
| | Heat Recovery Ventilator | 2021 Power Plan |
| | Room Air Conditioner | 2021 Power Plan |
| | Smart Thermostats | 2021 Power Plan, RTF |
| | Weatherization | 2021 Power Plan, RTF |
| Whole House Fan | 2021 Power Plan | |
| Lighting | Fixtures | 2021 Power Plan, RTF |
| | Lamps | 2021 Power Plan, RTF |
| | Pin Lamps | 2021 Power Plan, RTF |
| Motors | Well Pump | 2021 Power Plan |
| Water Heat | Aerators | 2021 Power Plan, RTF |
| | Circulator | 2021 Power Plan |
| | Circulator Controls | 2021 Power Plan |
| | Dishwasher | 2021 Power Plan |
| | Gravity Film Heat Exchanger | 2021 Power Plan |
| | Heat Pump Water Heater | 2021 Power Plan, RTF |
| | Pipe Insulation | 2021 Power Plan |
| | Showerhead | 2021 Power Plan |
| | Thermostatic Restrictor Valve | 2021 Power Plan, RTF |
| Whole Home | Behavior | 2021 Power Plan |

Table 15: Commercial End Uses and Measures

| End Use | Measure Category | Data Source(s) |
|------------------|--------------------------------------------------------|-----------------------|
| Compressed Air | Air Compressor | 2021 Power Plan |
| Electronics | Computers | 2021 Power Plan |
| | Power Supplies | 2021 Power Plan |
| | Smart Power Strips | 2021 Power Plan, RTF |
| | Servers | 2021 Power Plan |
| Food Preparation | Combination Ovens | 2021 Power Plan, RTF |
| | Convection Ovens | 2021 Power Plan, RTF |
| | Fryers | 2021 Power Plan, RTF |
| | Griddle | 2021 Power Plan, RTF |
| | Hot Food Holding Cabinet | 2021 Power Plan, RTF |
| | Overwrapper | 2021 Power Plan, RTF |
| | Steamer | 2021 Power Plan, RTF |
| HVAC | Advanced Rooftop Controller | 2021 Power Plan, RTF |
| | Chiller | 2021 Power Plan |
| | Circulation Pumps | 2021 Power Plan, RTF |
| | Ductless Heat Pump | 2021 Power Plan, DHP |
| | Energy Management | 2021 Power Plan |
| | Fans | 2021 Power Plan |
| | Heat Pumps | 2021 Power Plan |
| | Package Terminal Heat Pumps | 2021 Power Plan, RTF |
| | Pumps | 2021 Power Plan, RTF |
| | Smart Thermostats | 2021 Power Plan |
| | Unitary Air Conditioners | 2021 Power Plan |
| | Very High Efficiency Dedicated Outside Air System | 2021 Power Plan |
| | Variable Refrigerant Flow Dedicated Outside Air System | 2021 Power Plan |
| Windows | 2021 Power Plan, RTF | |
| Lighting | Exit Signs | 2021 Power Plan |
| | Exterior Lighting | 2021 Power Plan |
| | Garage Lighting | 2021 Power Plan |
| | Interior Lighting | 2021 Power Plan |
| | Stairwell Lighting | 2021 Power Plan |
| | Streetlights | 2021 Power Plan |
| Motors & Drives | Pumps | 2021 Power Plan, RTF |
| Process Loads | Elevators | 2021 Power Plan |
| | Engine Block Heater | 2021 Power Plan, RTF |
| Refrigeration | Freezer | 2021 Power Plan |
| | Grocery Refrigeration | 2021 Power Plan, RTF |
| | Ice Maker | 2021 Power Plan, RTF |
| | Refrigerator | 2021 Power Plan, RTF |
| | Vending Machine | 2021 Power Plan, RTF |
| | Water Cooler Controls | 2021 Power Plan |
| Water Heating | Commercial Clothes Washer | 2021 Power Plan, RTF |
| | Heat Pump Water Heater | 2021 Power Plan, RTF |
| | Pre-Rinse Spray Valve | 2021 Power Plan, RTF |
| | Pumps | 2021 Power Plan, RTF |
| | Showerheads | 2021 Power Plan |

Table 16: Industrial End Uses and Measures

| End Use | Measure Category | Data Source(s) |
|---------------------|---------------------------------|-----------------------|
| All Electric | Energy Management | 2021 Power Plan |
| | Forklift Charger | 2021 Power Plan |
| | Water/Wastewater | 2021 Power Plan |
| Compressed Air | Air Compressor | 2021 Power Plan |
| | Air Compressors | 2021 Power Plan |
| | Compressed Air Demand Reduction | 2021 Power Plan |
| Fans and Blowers | Fan Optimization | 2021 Power Plan |
| | Fans | 2021 Power Plan, RTF |
| HVAC | HVAC | 2021 Power Plan |
| Lighting | High Bay Lighting | 2021 Power Plan |
| | Lighting | 2021 Power Plan |
| | Lighting Controls | 2021 Power Plan |
| Low Temp Refer | Motors | 2021 Power Plan |
| | Refrigeration Retrofit | 2021 Power Plan |
| Material Handling | Motors | 2021 Power Plan |
| | Paper | 2021 Power Plan |
| | Wood Products | 2021 Power Plan |
| Material Processing | Hi-Tech | 2021 Power Plan |
| | Motors | 2021 Power Plan |
| | Paper | 2021 Power Plan |
| | Pulp | 2021 Power Plan |
| | Wood Products | 2021 Power Plan |
| Med Temp Refer | Food Storage | 2021 Power Plan |
| | Motors | 2021 Power Plan |
| | Refrigeration Retrofit | 2021 Power Plan |
| Melting and Casting | Metals | 2021 Power Plan |
| Other | Pulp | 2021 Power Plan |
| Other Motors | Motors | 2021 Power Plan |
| Pollution Control | Motors | 2021 Power Plan |
| Pumps | Pulp | 2021 Power Plan |
| | Pump Optimization | 2021 Power Plan |
| | Pumps | 2021 Power Plan, RTF |

Table 17: Utility Distribution End Uses and Measures

| End Use | Measure Category | Data Source |
|----------------|----------------------------------------------------|--------------------|
| Distribution | Line Drop Control with no Voltage/VAR Optimization | 2021 Power Plan |
| | Line Drop Control with Voltage Optimization & AMI | 2021 Power Plan |

Table 18: Agricultural End Uses and Measures

| End Use | Measure Category | Data Source |
|-----------------|--------------------------|----------------------|
| Irrigation | Irrigation Hardware | 2021 Power Plan, RTF |
| | Motor Rewind | 2021 Power Plan, RTF |
| | Pumps | 2021 Power Plan, RTF |
| | Variable Rate Irrigation | 2021 Power Plan |
| Lighting | Dairy Lighting | 2021 Power Plan |
| | Exterior Lights | 2021 Power Plan |
| Process Heating | Block Heater | 2021 Power Plan, RTF |
| | Stock Tanks | 2021 Power Plan, RTF |
| Refrigeration | Dairy Refrigeration | 2021 Power Plan |
| Ventilation | Fans | 2021 Power Plan |

Appendix V: Achievable Technical Potential by End Use

The following tables detail the achievable technical energy efficiency potential by sector and end use.

Table 19: Residential Achievable Technical Potential by End Use (aMW)

| End Use | 2-Year | 4-Year | 10-Year | 20-Year |
|--------------|------------|-------------|-------------|--------------|
| Appliances | 1.6 | 4.0 | 13.5 | 25.5 |
| Cooking | 0.0 | 0.0 | 0.2 | 1.2 |
| Electronics | 0.1 | 0.2 | 1.5 | 4.1 |
| EVSE | 0.0 | 0.0 | 0.0 | 0.0 |
| HVAC | 4.1 | 9.3 | 38.8 | 58.5 |
| Lighting | 0.1 | 0.2 | 1.3 | 5.2 |
| Motors | 0.0 | 0.0 | 0.0 | 0.0 |
| Water Heat | 0.4 | 1.2 | 5.5 | 12.7 |
| Whole Home | 0.0 | 0.1 | 0.7 | 1.3 |
| Total | 6.3 | 15.0 | 61.5 | 108.3 |

Table 20: Commercial Potential by End Use (aMW)

| End Use | 2-Year | 4-Year | 10-Year | 20-Year |
|------------------|------------|------------|-------------|-------------|
| Compressed Air | 0.0 | 0.0 | 0.1 | 0.4 |
| Electronics | 0.0 | 0.2 | 1.6 | 3.3 |
| Food Preparation | 0.0 | 0.0 | 0.3 | 0.6 |
| HVAC | 1.3 | 3.0 | 10.6 | 24.0 |
| Lighting | 1.5 | 3.3 | 8.9 | 16.2 |
| Motors/Drives | 0.0 | 0.1 | 1.3 | 4.1 |
| Process Loads | 0.0 | 0.0 | 0.0 | 0.1 |
| Refrigeration | 0.2 | 0.5 | 4.1 | 11.4 |
| Water Heat | 0.0 | 0.0 | 0.3 | 1.7 |
| Total | 3.0 | 7.3 | 27.1 | 61.8 |

Table 21: Industrial Potential by End Use (aMW)

| End Use | 2-Year | 4-Year | 10-Year | 20-Year |
|------------------------|------------|------------|------------|-------------|
| All Electric | 0.8 | 1.2 | 1.2 | 1.2 |
| Compressed Air | 0.0 | 0.1 | 0.6 | 1.2 |
| Fans and Blowers | 0.0 | 0.1 | 0.7 | 2.5 |
| HVAC | 0.1 | 0.4 | 1.8 | 2.4 |
| Lighting | 1.2 | 2.1 | 3.6 | 4.1 |
| Low Temp Refrigeration | 0.0 | 0.1 | 0.1 | 0.2 |
| Material Handling | 0.0 | 0.1 | 0.3 | 0.5 |
| Material Processing | 0.0 | 0.0 | 0.2 | 0.5 |
| Med Temp Refrigeration | 0.0 | 0.0 | 0.0 | 0.1 |
| Melting and Casting | 0.0 | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 |
| Other Motors | 0.0 | 0.0 | 0.0 | 0.0 |
| Pollution Control | 0.0 | 0.0 | 0.0 | 0.0 |
| Pumps | 0.0 | 0.1 | 1.3 | 5.1 |
| Total | 2.4 | 4.2 | 9.8 | 17.9 |

Table 22: Utility Distribution Efficiency by End Use (aMW)

| End Use | 2-Year | 4-Year | 10-Year | 20-Year |
|--------------------|------------|------------|------------|------------|
| LDC with no VVO | 0.0 | 0.0 | 0.0 | 0.0 |
| LDC with VVO & AMI | 0.2 | 0.6 | 4.2 | 7.9 |
| Total | 0.2 | 0.6 | 4.2 | 7.9 |

Table 23: Agricultural Potential by End Use (aMW)

| End Use | 2-Year | 4-Year | 10-Year | 20-Year |
|-----------------|------------|------------|------------|------------|
| Irrigation | 0.0 | 0.0 | 0.0 | 0.0 |
| Lighting | 0.0 | 0.0 | 0.0 | 0.1 |
| Process Heating | 0.0 | 0.0 | 0.0 | 0.0 |
| Refrigeration | 0.0 | 0.0 | 0.0 | 0.1 |
| Ventilation | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 0.0 | 0.0 | 0.0 | 0.2 |

Appendix VI: Ramp Rate Alignment Documentation

This appendix documents the application of ramp rates in the District’s 2025 CPA. Ramp rates are a series of annual values that approximate the share of available technical potential that is achievable in a given year. For example, all unweatherized homes in the District’s service territory could theoretically be weatherized in a single year. However, program budgets, available contractors, and other dynamics make this unrealistic. Only a percentage of the homes are weatherized in a single year. For equipment measures like clothes washers, upgrading to more efficient equipment is only available when the equipment reaches the end of its life and needs to be replaced. For these measures, the ramp rates reflect the share of equipment turning over in a given year that is upgraded to more efficient equipment.

The ramp rates used in this study are based on those used in the 2021 Power Plan but were updated to reflect the time period of this study. Lighthouse assigned ramp rates that align the near-term potential quantified in the CPA with the recent achievements of the District’s energy efficiency programs. This ensures that the near-term potential is feasible and achievable for the District’s programs, given that energy efficiency programs take time to ramp up and are subject to local and dynamic market conditions. Since the energy efficiency potential quantified through the CPA will be included as a resource in the District’s Integrated Resource Plan (IRP), ensuring that projections of savings potential are achievable helps ensure that the IRP’s resource strategy is realistic.

Ramp Rate Alignment Process

The District provided program achievement data for 2023-24, which Lighthouse summarized by sector and end use. In addition, Lighthouse also summarized residential program achievements by high-level measure categories.

Additionally, the District also receives credit for savings from market transformation that the Northwest Energy Efficiency Alliance (NEEA) estimates has occurred in the District’s service territory. Lighthouse allocated these savings to sectors, end uses, and measure categories based on recent reporting of NEEA’s regional savings.

Lighthouse compared the recent savings from the District’s programs and NEEA’s market transformation initiatives with the energy efficiency potential identified in the 2025 CPA. Because the District’s Integrated Resources Plan (IRP) is used to determine the subset of the achievable potential that is cost-effective, Lighthouse compared the District’s recent program achievements to the potential that was found to be cost-effective in the District’s prior IRP.

Lighthouse started with the ramp rates that were assigned to each measure in the 2021 Power Plan and compared the resulting approximated cost-effective potential in the first years of the assessment with the District’s recent programmatic achievements. Lighthouse then made changes to the ramp rate assignments for each measure to accelerate or decelerate the pace of savings acquisition to align with recent programmatic achievements. In areas where there were no recent program achievements, Lighthouse typically assigned a slower ramp rate, if one was not already assigned, to account for the fact that a program may need to start from scratch and build momentum over several years.

The following tables show how the District’s recent and forecasted achievements compare to the future savings potential after Lighthouse adjusted the ramp rates to align with programmatic achievements. Color scaling has been applied to highlight the larger values. Discussion follows each table with additional detail.

Residential

Table 24 shows how residential potential was aligned with recent achievements by measure category. Note that ramp rate choices are discrete and may not provide exact alignment. The overall goal is to achieve a general alignment across end uses and measures.

Table 24: Alignment of Residential Program History and Potential by Measure Category (MWh)

| | | Program History | | Estimated CPA Cost-Effective Potential | | | |
|--------------|-----------------------|-----------------|---------------|----------------------------------------|---------------|---------------|---------------|
| End Use | Category | 2023 | 2024 | 2026 | 2027 | 2028 | 2029 |
| Appliances | Clothes Washer | 1,420 | 1,817 | 1,062 | 1,287 | 1,452 | 1,594 |
| Appliances | Dryer | 756 | 1,070 | 573 | 875 | 1,239 | 1,684 |
| Appliances | Freezer | - | - | 8 | 16 | 27 | 43 |
| Appliances | Refrigerator | 632 | 822 | 609 | 834 | 1,042 | 1,229 |
| Cooking | Microwave | - | - | 5 | 10 | 17 | 27 |
| Cooking | Oven | - | - | 1 | 1 | 2 | 3 |
| Electronics | Advanced Power Strips | 531 | 4 | - | - | - | - |
| Electronics | Desktop | 87 | 113 | 93 | 126 | 157 | 187 |
| Electronics | Laptop | - | - | 9 | 18 | 31 | 51 |
| Electronics | TV | - | - | 56 | 106 | 182 | 289 |
| EVSE | EVSE | 78 | 209 | - | - | - | - |
| HVAC | ASHP | 1,753 | 1,669 | 1,045 | 1,700 | 2,573 | 3,675 |
| HVAC | Circulator | - | - | 2 | 4 | 8 | 12 |
| HVAC | Circulator Controls | - | - | 0 | 0 | 1 | 1 |
| HVAC | DHP | 1,185 | 1,255 | - | - | - | - |
| HVAC | Duct Sealing | 63 | 41 | 145 | 238 | 363 | 521 |
| HVAC | Room AC | 4 | 6 | - | - | - | - |
| HVAC | Thermostat | 2,474 | 1,374 | 738 | 1,343 | 2,088 | 2,929 |
| HVAC | Weatherization | 3,139 | 2,315 | 1,282 | 1,036 | 936 | 849 |
| Lighting | Fixtures | - | - | 298 | 401 | 518 | 664 |
| Water Heat | Circulator | - | - | 1 | 2 | 4 | 7 |
| Water Heat | Circulator Controls | - | - | 2 | 4 | 7 | 11 |
| Water Heat | HPWH | 1,001 | 2,087 | 1,272 | 1,937 | 2,580 | 3,293 |
| Water Heat | Pipe Insulation | 7 | - | - | - | - | - |
| Water Heat | TSRV | - | - | 16 | 27 | 43 | 63 |
| Whole Home | Behavior | - | - | 104 | 169 | 255 | 364 |
| Total | | 13,129 | 12,782 | 7,322 | 10,136 | 13,523 | 17,496 |

Note: For clarity, measure categories with no program achievements and no cost-effective potential have been removed. In addition, note that some measures have savings values that are small and cannot be shown at this

level of resolution. These values show as 0 in this and following tables while a true zero value is shown as a dash.

The following sections discuss the alignment within each residential end use.

Appliances & Cooking

In these end uses, both NEEA's market transformation work and the District's programs contribute savings. Depending on the measure, ramp rates were adjusted up and down. The ramp rate for clothes washers and electric resistance dryers was accelerated, while the ramp rate for heat pump dryers was slowed.

Electronics

In this category, the District has achieved some recent savings through advanced power strips, but the Regional Technical Forum has recently deactivated the measure due to a lack of data. Additional potential is available through TVs and computer equipment. Lighthouse slowed the ramp rate for laptop and desktop computers since there is no current program or NEEA initiative that would address this category of measures.

HVAC

In the HVAC end use, certain applications of air-source heat pumps (ASHP) were estimated to be cost effective, after accounting for the tax credits and incentives provided for heat pumps through the federal Inflation Reduction Act. The potential in this category was slowed to align with recent program activity. No ductless heat pump (DHP) measures were estimated to be cost-effective.

The potential with duct sealing measures was given slower ramp rates as the recent program activity in this category has been limited. The potential with smart thermostats was also slowed slightly. Weatherization measures were accelerated but there is limited cost-effective potential remaining.

Lighting

The lighting end use is now subject to Washington state standards that took effect in 2020 covering many screw-in lamps. The potential that remains is in fixtures with integrated LEDs and less common bulb types. There is not currently a program to incentivize LED fixtures, so these measures were assigned slower ramp rates.

Water Heat

The program history and future potential in the water heating end use consists mostly of savings from heat pump water heaters. The potential for heat pump water heaters was found to be at a reasonable level with the default 2021 Power Plan rates.

Washington State has standards for showerheads and aerators, so there is no longer potential in these measure categories. Lighthouse applied slower ramp rates to the potential for circulator pumps and controls, which results in limited early potential for these measures, which were new to the 2021 Power Plan. Lighthouse applied a slower ramp rate for thermostatic restrictor valves as this is another area with no current programs.

Table 25 below summarizes the residential measure category results in Table 24 by end use. The limited HVAC measure potential that is estimated to be cost-effective limits the alignment at the end use and overall levels.

Table 25: Alignment of Residential Program History and Potential by End Use (MWh)

| End Use | Program History | | Estimated CPA Cost-Effective Potential | | | |
|--------------|-----------------|---------------|----------------------------------------|---------------|---------------|---------------|
| | 2023 | 2024 | 2026 | 2027 | 2028 | 2029 |
| Appliances | 2,807 | 3,709 | 2,252 | 3,012 | 3,760 | 4,550 |
| Cooking | - | - | 6 | 11 | 19 | 30 |
| Electronics | 618 | 117 | 158 | 250 | 369 | 528 |
| EVSE | 78 | 209 | - | - | - | - |
| HVAC | 8,618 | 6,659 | 3,213 | 4,322 | 5,969 | 7,986 |
| Lighting | - | - | 298 | 401 | 518 | 664 |
| Motors | - | - | - | - | - | - |
| Water Heat | 1,008 | 2,087 | 1,291 | 1,971 | 2,633 | 3,374 |
| Whole Home | - | - | 104 | 169 | 255 | 364 |
| NEEA | - | - | <i>n/a</i> | <i>n/a</i> | <i>n/a</i> | <i>n/a</i> |
| Total | 13,129 | 12,782 | 7,322 | 10,136 | 13,523 | 17,496 |

Commercial

In the commercial sector, most of the potential is in the lighting end use, which was given some of the fastest ramp rates available in the 2021 Power Plan. Lighthouse assigned slightly slower ramp rates to some lighting measures to better align the potential with recent program history. While Table 26 shows some increases in potential in the early years, the potential begins declining in subsequent years (not shown in the table), reflecting limited savings remaining in this end use.

Lighthouse used the 2021 Plan-assigned ramp rates for most measures in the HVAC end use but slowed the potential for fan measures.

In the other end uses, Lighthouse left the ramp rates at the 2021 Power Plan assignments or assigned slower ramp rates in order to match recent program totals more closely. These end uses have smaller amounts of potential and limited recent program activity.

Table 26 below shows the alignment of program history and potential in the commercial sector.

Table 26: Alignment of Commercial Program History and Potential by End Use (MWh)

| End Use | Program History | | Estimated Cost-Effective Potential | | | |
|------------------|-----------------|---------------|------------------------------------|---------------|---------------|---------------|
| | 2023 | 2024 | 2026 | 2027 | 2028 | 2029 |
| Compressed Air | - | - | 6 | 11 | 20 | 32 |
| Electronics | 225 | 292 | 148 | 261 | 425 | 650 |
| Food Preparation | 83 | 108 | 36 | 53 | 74 | 98 |
| HVAC | 5,145 | 5,094 | 3,565 | 4,345 | 5,292 | 6,247 |
| Lighting | 8,868 | 3,897 | 5,807 | 6,869 | 7,740 | 8,193 |
| Motors/Drives | 196 | 255 | 139 | 237 | 376 | 563 |
| Process Loads | 6 | 8 | - | - | - | - |
| Refrigeration | 731 | 1,083 | 468 | 783 | 1,220 | 1,787 |
| Water Heat | 3 | - | 17 | 35 | 59 | 95 |
| Total | 15,258 | 10,738 | 10,187 | 12,595 | 15,205 | 17,664 |

Industrial

Savings in the industrial sector are often irregular and uneven, subject to the projects that are completed in a given year. management end uses. Most of the near-term potential is in lighting and energy management end uses and ramp rates in these areas were accelerated but limited potential remains after accounting for recent programmatic achievements.

There are smaller amounts of potential in the other end uses and Lighthouse generally applied the 2021 Power Plan ramp rates or slightly slower versions to these categories to match the recent program achievement amounts. The declining overall amounts of future potential show that there may be limited remaining future potential in this sector in some end uses.

Table 27 shows the alignment of industrial potential and recent program history by end use.

Table 27: Alignment of Industrial Program History and Potential by End Use (MWh)

| End Use | Program History | | Estimated Cost-Effective Potential | | | |
|-------------------|-----------------|---------------|------------------------------------|--------------|--------------|--------------|
| | 2023 | 2024 | 2026 | 2027 | 2028 | 2029 |
| Energy Management | 4,524 | 10,417 | 4,396 | 2,849 | 1,902 | 966 |
| Compressed Air | 304 | 55 | 130 | 189 | 267 | 364 |
| Fans and Blowers | - | - | 72 | 130 | 217 | 335 |
| HVAC | - | 765 | 357 | 628 | 983 | 1,385 |
| Lighting | 15,783 | 10,044 | 6,022 | 4,719 | 4,160 | 3,622 |
| Motors | 493 | - | 4 | 5 | 6 | 8 |
| Refrigeration | 451 | - | 161 | 166 | 171 | 162 |
| Process | 126 | - | 202 | 246 | 295 | 360 |
| Pumps | - | 354 | 121 | 211 | 343 | 524 |
| Other | - | - | 3 | 5 | 7 | 9 |
| Total | 21,681 | 21,635 | 11,467 | 9,149 | 8,353 | 7,735 |

Agricultural

The amount of potential is very limited in the District’s agricultural sector, as there is limited agricultural activity in the service territory. There is no recent program achievement in these categories as it is not currently an area of focus for the District’s programs.

Table 28: Alignment of Agricultural Program History and Potential by End Use (MWh)

| End Use | Program History | | Estimated Cost-Effective Potential | | | |
|-----------------|-----------------|------|------------------------------------|-----------|----------|-----------|
| | 2023 | 2024 | 2026 | 2027 | 2028 | 2029 |
| Irrigation | - | - | 0 | 0 | 0 | 0 |
| Lighting | - | - | 2 | 3 | 2 | 3 |
| Process Heating | - | - | 1 | 1 | 1 | 1 |
| Refrigeration | - | - | 6 | 10 | 6 | 10 |
| Ventilation | - | - | 0 | 0 | 0 | 0 |
| Total | - | - | 9 | 15 | 9 | 15 |

Utility Distribution System

Based on conversations with the District, CVR has been implemented at 67 of 96 of the District’s substations. At the remaining substations, the District is considering Demand Voltage Reduction instead. The 2021 Power Plan included three levels of CVR, the third of which is only possible with AMI. The 2023 CPA included the second, advanced tier of CVR. In the 2025 CPA, Lighthouse also included the third tier now that the District is nearing completion of its AMI implementation. However, Lighthouse limited the potential of these tiers to the substations where CVR has already been implemented. The remaining substations were included in the estimate of potential for DVR in the District’s 2025 Demand Response Potential Assessment. Lighthouse applied a slow ramp rate to the conservation potential.

Table 29: Alignment of Utility Distribution System Program History and Potential by End use (MWh)

| End Use | Program History | | Achievable Potential | | | |
|---------------------|-----------------|------|----------------------|-------|-------|-------|
| | 2023 | 2024 | 2026 | 2027 | 2028 | 2029 |
| Distribution System | - | - | 637 | 1,036 | 1,573 | 2,253 |

Appendix VII: Cost-Effective Potential by End Use

The following tables detail the cost-effective energy efficiency potential by sector and end use, as determined by this CPA and the District’s IRP process.

Table 30: Residential Cost-Effective Potential by End Use (aMW)

| End Use | 2-Year | 10-Year | 20-Year | 22-Year |
|--------------|------------|------------|-------------|-------------|
| Appliances | 0.5 | 1.3 | 4.0 | 7.8 |
| Cooking | 0.0 | 0.0 | 0.1 | 0.5 |
| Electronics | 0.0 | 0.1 | 1.3 | 3.9 |
| EVSE | 0.0 | 0.0 | 0.0 | 0.0 |
| HVAC | 1.3 | 3.1 | 15.0 | 22.3 |
| Lighting | 0.1 | 0.2 | 1.3 | 5.2 |
| Motors | 0.0 | 0.0 | 0.0 | 0.0 |
| Water Heat | 0.4 | 1.1 | 5.0 | 11.6 |
| Whole Home | 0.0 | 0.1 | 0.7 | 1.2 |
| Total | 2.4 | 5.9 | 27.4 | 52.5 |

Table 31: Commercial Cost-Effective Potential by End Use (aMW)

| End Use | 2-Year | 10-Year | 20-Year | 22-Year |
|------------------|------------|------------|-------------|-------------|
| Compressed Air | 0.0 | 0.0 | 0.1 | 0.4 |
| Electronics | 0.0 | 0.2 | 1.6 | 3.3 |
| Food Preparation | 0.0 | 0.0 | 0.2 | 0.4 |
| HVAC | 0.9 | 2.2 | 7.4 | 16.4 |
| Lighting | 1.4 | 3.2 | 8.7 | 16.0 |
| Motors/Drives | 0.0 | 0.1 | 1.2 | 3.6 |
| Process Loads | 0.0 | 0.0 | 0.0 | 0.0 |
| Refrigeration | 0.1 | 0.5 | 3.8 | 10.4 |
| Water Heat | 0.0 | 0.0 | 0.1 | 0.5 |
| Total | 2.6 | 6.2 | 22.9 | 51.0 |

Table 32: Industrial Cost-Effective Potential by End Use (aMW)

| End Use | 2-Year | 10-Year | 20-Year | 22-Year |
|------------------------|------------|------------|------------|-------------|
| All Electric | 0.8 | 1.2 | 1.2 | 1.2 |
| Compressed Air | 0.0 | 0.1 | 0.5 | 1.1 |
| Fans and Blowers | 0.0 | 0.1 | 0.7 | 2.5 |
| HVAC | 0.1 | 0.4 | 1.8 | 2.4 |
| Lighting | 1.2 | 2.1 | 3.6 | 4.1 |
| Low Temp Refrigeration | 0.0 | 0.1 | 0.1 | 0.2 |
| Material Handling | 0.0 | 0.1 | 0.3 | 0.5 |
| Material Processing | 0.0 | 0.0 | 0.2 | 0.5 |
| Med Temp Refrigeration | 0.0 | 0.0 | 0.0 | 0.1 |
| Melting and Casting | 0.0 | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 |
| Other Motors | 0.0 | 0.0 | 0.0 | 0.0 |
| Pollution Control | 0.0 | 0.0 | 0.0 | 0.0 |
| Pumps | 0.0 | 0.1 | 1.3 | 5.1 |
| Total | 2.4 | 4.2 | 9.8 | 17.8 |

Table 33: Utility Distribution System Cost-Effective Potential by End Use (aMW)

| End Use | 2-Year | 10-Year | 20-Year | 22-Year |
|--------------------|------------|------------|------------|------------|
| LDC with no VVO | 0.0 | 0.0 | 0.0 | 0.0 |
| LDC with VVO & AMI | 0.2 | 0.6 | 4.2 | 7.9 |
| Total | 0.2 | 0.6 | 4.2 | 7.9 |

Table 34: Agricultural Cost-Effective Potential by End Use (aMW)

| End Use | 2-Year | 10-Year | 20-Year | 22-Year |
|-----------------|------------|------------|------------|------------|
| Irrigation | 0.0 | 0.0 | 0.0 | 0.0 |
| Lighting | 0.0 | 0.0 | 0.0 | 0.1 |
| Process Heating | 0.0 | 0.0 | 0.0 | 0.0 |
| Refrigeration | 0.0 | 0.0 | 0.0 | 0.1 |
| Ventilation | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 0.0 | 0.0 | 0.0 | 0.2 |