RESOLUTION NO. 2700

August 12, 2025

A RESOLUTION OF THE COMMISSION OF PUBLIC UTILITY DISTRICT NO. 1 OF BENTON COUNTY, WASHINGTON ESTABLISHING THE DISTRICT'S EIA 2026 – 2035 TEN-YEAR COST-EFFECTIVE RESOURCE CONSERVATION POTENTIAL AND 2026 – 2027 BIENNIAL TARGET

WHEREAS, Washington State Energy Independence Act, RCW 19.285, (Initiative 937) mandates that each qualifying utility pursue all available conservation that is cost-effective, reliable, and feasible; AND

WHEREAS, The District is a qualifying utility under the Act; AND

WHEREAS, The Commission wishes to assert its authority under Title 54 of the Revised Code of Washington in its implementation of the Washington State Energy Independence Act; AND

WHEREAS, Washington Administrative Code (WAC) provisions, adopted by the Department of Commerce, recognize that the individual public utility has the authority to establish the conservation targets that meet the requirements of the State's statute. WAC 194-37-070 (1) states, "Ten-year potential. By January 1st of each even-numbered year, each utility shall identify its achievable cost-effective conservation potential for the upcoming ten years"; AND

WHEREAS, WAC 194-37-070 (2) states, "Biennial target. By January 1st of each even-numbered year, each utility shall establish and make public a biennial conservation target. The utility's biennial target shall be no less than its pro rata share of the ten-year potential identified pursuant to subsection (1) of this section"; AND

WHEREAS, The District completed a Conservation Potential Assessment in June 2025 that identifies the District's achievable cost-effective conservation potential and complies with provisions of WAC 194-37-070; AND

WHEREAS, Due notice was given of a public meeting to be held August 12, 2025 to make public the District's conservation resource potential and biennial conservation target; AND

WHEREAS, Said public meeting was held to gain public comment concerning the conservation potential and targets.

NOW, THEREFORE BE IT RESOLVED by the Commission of Public Utility District No. 1 of Benton County, that the District's 2026 - 2035 ten-year cost-effective conservation resource potential be established at 9.67 aMW and the District's 2026 - 2027 biennial target be established at 1.10 aMW based upon the District's June 2025 Conservation Potential Assessment and in compliance with requirements of the Energy Independence Act.

APPROVED AND ADOPTED by the Commission of Public Utility District No. 1 of Benton County at an open meeting, with notice of such meeting being given as required by law, this 12th day of August 2025.

DocuSigned by:

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Jeff Hall, President

ATTEST:

Signed by:

BDBC6BF293EB4FE...

Mike Massey, Secretary

PREPARED BY EES CONSULTING

Public Utility District No. 1 of Benton County

Conservation Potential Assessment 2026-2045 – Final Report

June 26, 2025

EES Consulting
a GDS Associates Company

Amber Gschwend, Director
amber.gschwend@gdsassociates.com

June 16, 2025

Mr. Chris Johnson
Public Utility District No. 1 of Benton County
P.O. Box 6270
2721 W. 10th Avenue
Kennewick, WA 99336

SUBJECT: Conservation Potential Assessment 2026-2045 –Final Report

Dear Mr. Johnson:

Please find attached the Conservation Potential Assessment for 2026-2045. We appreciate the assistance from District staff in the completion of this study. The conservation potential estimated for the 2026-2027 biennium is 1.10 aMW.

Very truly yours,

Amber Gschwend
Director, EES Consulting

Contents

1 Executive Summary

This report describes the methodology and results of the 2025 Conservation Potential Assessment (CPA) for Public Utility District No. 1 of Benton County (the District). This assessment provides estimates of energy savings by sector for the period 2025 to 2044. The assessment considers a wide range of conservation resources that are reliable, available and cost-effective within the 20-year planning period.

1.1 BACKGROUND

The District provides electricity service to over 58,100 customers located in Benton County, Washington, excluding the City of Richland and Benton Rural Electric Association's service territory. The District's territory covers 939 square miles and includes 1,800 miles of transmission and distribution lines. In addition, the District's service territory includes an estimated 109,000 acres of irrigated agriculture.

Washington's Energy Independence Act (EIA), effective January 1, 2010, requires that utilities with more than 25,000 customers (known as qualifying utilities) pursue all cost-effective conservation resources and meet conservation targets set using a utility-specific conservation potential assessment methodology.

The EIA sets forth specific requirements for setting, pursuing and reporting on conservation targets. The methodology used in this assessment complies with RCW 19.285.040 and WAC 194-37-070 Section 5 parts (a) through (d) and is consistent with the methodology used by the Northwest Power and Conservation Council (Council). This assessment was built on the technical workbooks developed for the Final 2021 Power Plan. Thus, this Conservation Potential Assessment will support the District's compliance with EIA requirements.

The primary model assumptions included the following changes since the previous study:

- Avoided Costs
  - Recent forecast of power market prices prepared by the Council in September 2024[1]
  - Avoided generation capacity value updated with recent wholesale rates
- Updated Customer Characteristics Data
  - Residential home counts and appliance saturations based on the 2022 Residential Building Stock Assessment
  - Commercial floor area based on recent load growth
- Measure Updates
  - Measure savings, costs, and lifetimes were updated based on the latest data available from the Regional Technical Forum for proven and active UES measures.
- Accounting for Recent Achievements
  - Internal programs

[1]Northwest Power and Conservation Council. September 2024 Wholesale Electricity Market Price and Avoided Emissions Rates Forecasts. https://nwcouncil.app.box.com/s/92rzpzc4hv7b2wzj2g1iy6mb8wvwlhyq

- The District's share of market transformation efforts by the Northwest Energy Efficiency Alliance (NEEA)

The first step of this assessment was to carefully define and update the planning assumptions using the new data. The Base Case conditions were defined as the most likely market conditions over the planning horizon, and the conservation potential was estimated based on these assumptions. Additional scenarios were also developed to test a range of conditions.

1.2 RESULTS

Table 1-1 shows the high-level results of this assessment, the cost-effective potential by sector in 2, 4, 10, and 20-year increments. The total 20-year energy efficiency potential is 20.85 aMW. The most important numbers per the EIA are the 10-year potential of 9.67 aMW, and the two-year potential of 1.10 aMW. These numbers are also illustrated in Figure 1-1 below.

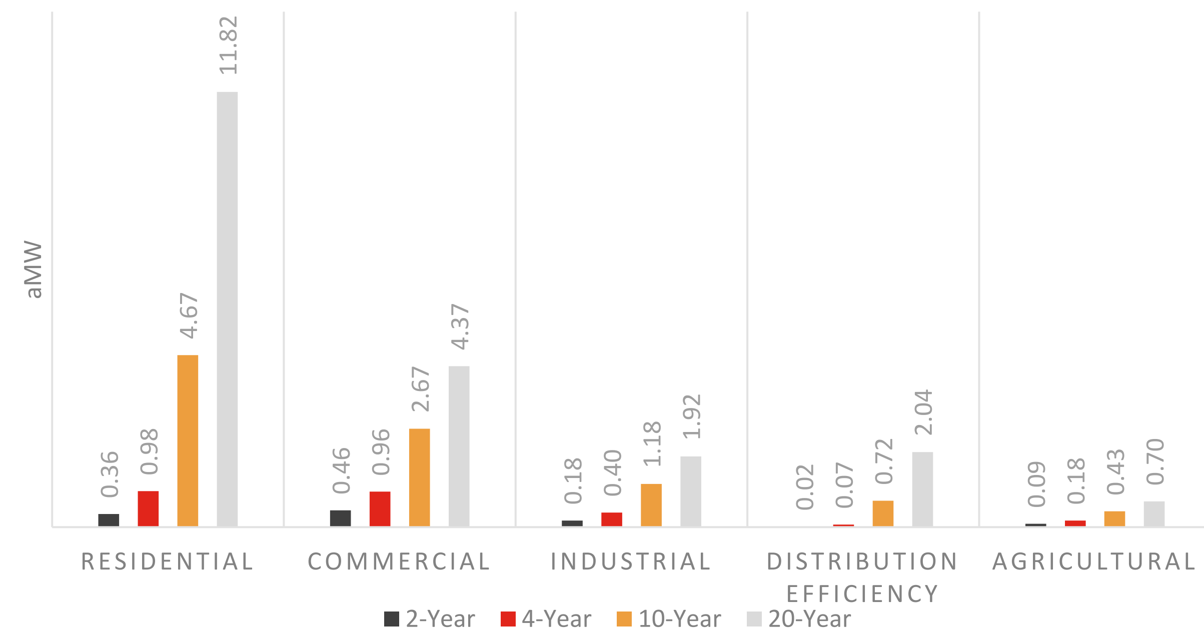
These estimates include energy efficiency achieved through the District's own utility programs and through its share of the NEEA accomplishments. Some of the potential may be achieved through code and standards changes, especially in later years. In some cases, the savings from those changes will be quantified by NEEA.

TABLE 1-1: COST-EFFECTIVE POTENTIAL (aMW)

	2-Year	4-Year	10-Year	20-Year
Residential	0.36	0.98	4.67	11.82
Commercial	0.46	0.96	2.67	4.37
Industrial	0.18	0.40	1.18	1.92
Distribution Efficiency	0.02	0.07	0.72	2.04
Agricultural	0.09	0.18	0.43	0.70
Total	**1.10**	**2.59**	**9.67**	**20.85**

Note: Numbers in this table and others throughout the report may not add to total due to rounding.

FIGURE 1-1: COST-EFFECTIVE ENERGY EFFICIENCY POTENTIAL ESTIMATE



Energy efficiency also has the potential to reduce peak demands. Estimates of peak demand savings are calculated for each measure using the Council's ProCost tool, which uses hourly load profiles developed for the 2021 Power Plan and the District-specific definition of when peak demand occurs. These unit-level estimates are then aggregated across sectors and years in the same way that energy efficiency measure savings potential is calculated. The reductions in peak demand provided by energy efficiency are summarized in Table 1-2 below.

The savings from most energy efficiency measures are concentrated in those periods when energy is being used, and not evenly throughout the day. Thus, the peak demand reduction, measured in MW, is greater than the annual average energy savings. The District's annual peak occurs most frequently in summer evenings, between 4 and 6 PM. In addition to these peak demand savings, demand savings would occur in varying amounts throughout the year.

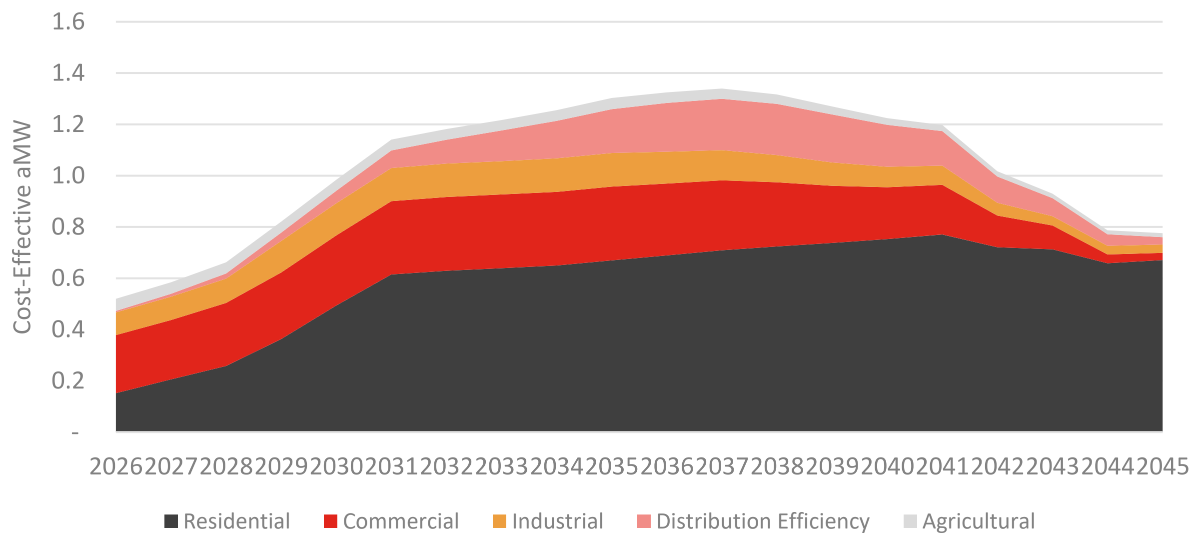
TABLE 1-2: COST-EFFECTIVE DEMAND SAVINGS (MW)

	2-Year	4-Year	10-Year	20-Year
Residential	0.63	1.75	8.65	22.53
Commercial	0.38	0.84	2.44	4.31
Industrial	0.22	0.48	1.42	2.30
Distribution Efficiency	0.02	0.08	0.87	2.46
Agricultural	0.00	0.00	0.00	0.00
Total	**1.25**	**3.16**	**13.38**	**31.62**

The 20-year energy efficiency potential is shown on an annual basis in Figure 1-2. This assessment shows potential starting around 0.48 aMW in 2026 and ramping up to a maximum of 1.3 aMW per year in 2037.

The potential then gradually decreases through the remaining years of the planning period as the retrofit measure opportunities diminish over time.

FIGURE 1-2: ANNUAL COST-EFFECTIVE ENERGY EFFICIENCY POTENTIAL ESTIMATE



As Figure 1-2 shows, about 57% of the 20-year potential is in the residential sector. The largest contributing measure categories for residential applications include water heating and HVAC. Measures with notable potential in this end use include:

- Smart Thermostat
- Faucet Aerators
- Heat Pump Water Heaters
- Ductless Heat Pump
- Refrigerators and Clothes Dryers

The second largest share of conservation is available in the District's commercial sector. The 20-year potential in the commercial sector is lower compared with the potential estimated in the 2023 CPA. The District has also achieved significant savings in lighting measures and HVAC in recent years, leaving limited remaining savings. Savings in the commercial sector are spread across numerous end uses, but the primary areas for opportunity include the following:

- Energy Management
- Residential-Sized and Commercial-Sized Heat Pump Water Heaters
- Heat Recovery Ventilation
- Chillers and AC
- Commercial Lighting
- Grocery Refrigeration

This study identified similar levels of industrial potential compared with the 2023 study. The primary difference is in accounting for the industrial program achievement for 2023-2024 and changes in measure cost-effectiveness.

1.3 COMPARISON TO PREVIOUS ASSESSMENT

Table 1-3 shows a comparison of the 2-, 10-, and 20-year Base Case conservation potential by customer sector for this assessment and the results of the District's 2025 CPA. The increase in distribution efficiency potential is due to the increase in cost-effectiveness for the applicable measures.

TABLE 1-3: COMPARISON OF 2023 CPA AND 2025 CPA COST-EFFECTIVE POTENTIAL

	2-Year			10-Year			20-Year		
	2023	2025	% Change	2023	2025	% Change	2023	2025	% Change
Residential	0.37	0.36	-2%	3.67	4.67	27%	7.57	11.82	56%
Commercial	0.48	0.46	-6%	3.17	2.67	-16%	6.19	4.37	-29%
Industrial	0.17	0.18	3%	0.98	1.18	20%	1.51	1.92	28%
Distribution Efficiency	0.00	0.02	516%	0.12	0.72	515%	0.33	2.04	515%
Agricultural	0.09	0.09	1%	0.43	0.43	1%	0.69	0.70	1%
Total	**1.11**	**1.10**	**-1%**	**8.36**	**9.67**	**16%**	**16.28**	**20.85**	**28%**

*Note that the 2023 columns refer to the CPA completed in 2023 for the time period of 2024 through 2043. The 2025 assessment is for the timeframe: 2026 through 2045.

The change in conservation potential estimated since the 2025 study is the result of several changes to the input assumptions, including measure data and avoided cost assumptions. Additionally, measure updates were made, and ramp rates were adjusted to account for program success and current economic outlook. These are discussed below, and a detailed analysis is provided in the Results section of this study.

1.3.1 Measure Data

Measure data was updated to include the Final 2021 Power Plan supply curve data plus measure updates from the RTF for proven and active measures as of February 2025.

1.3.2 Avoided Cost

This study updated the avoided cost of conservation assumptions as shown in Table 1-4.

TABLE 1-4: AVOIDED COST UPDATES, 20-YEAR LEVELIZED IN $2025

	2023 Base Case	2025 Base Case	Source of Update
Energy	2023 NWPCC April 2023 Baseline Forecast[2] $8.15/MWh	NWPCC September 2024 Base High Demand $19.62/MWh[3]	NWPCC Forecast Update
Social Cost of Carbon, $/short ton	WAC 194-40-100 $35.24/MWh	WAC 194-40-100 $48.30/MWh	Updated Study Period
Avoided Cost of RPS Compliance	Included in Social Cost of Carbon		
Distribution System Credit, $/kW-yr	$8.53	$11.91	9th Plan Updates
Transmission System Credit, $/kW-yr	$3.83	$4.85	9th Plan Updates
Deferred Generation Capacity Credit, $/kW-yr	$108	$140	Updated BPA Demand Rates
Total Avoided Cost[1]			*% Difference*
Energy Value, $/MWh	$43.40	$67.92	57%
Demand Value, $/kW-year	$120.36	$156.76	30%

1. For illustration purposes only. Excludes the 10% Power Act Credit.

Based on the above assumptions, energy and capacity values for energy efficiency have increased by 57% and 30% respectively since the 2023 study.

1.3.3 Customer Characteristics

Growth in usage and number of customers since the 2023 study was accounted for in the base year assumptions. Additionally, appliance saturation data was updated based on NEEA's 2022 Residential Building Stock Assessment. The updates generally increased electric appliance saturation assumptions including heat pumps and heat pump water heating. While non-residential loads are estimated to have zero to little growth, the residential sector is anticipated to continue to grow. Growth in the number of homes provides the basis for the higher savings potential over the study period.

1.4 TARGETS AND ACHIEVEMENT

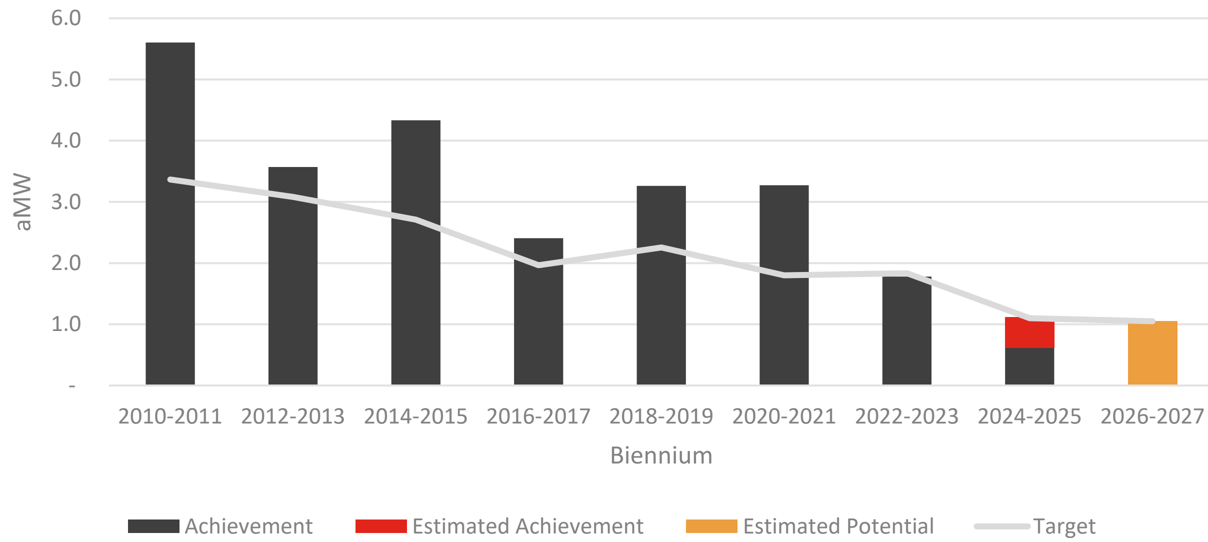
Figure 1-3 compares the District's historic achievement with its targets. The estimated potential for 2026 and 2027 is based on the Base Case scenario presented in this report and represents approximately a 1% reduction over the 2024-25 biennium. The slight decrease is the net impact of factors reducing savings

[2] Northwest Power and Conservation Council. April 7, 2023 Wholesale Electricity Market Price and Avoided Emissions Rates Forecasts. https://nwcouncil.app.box.com/s/3b5rky1s5onfpqdqtqvqtzrlkwwo8y4m/file/1185194585607

[3] Northwest Power and Conservation Council. September 2024 Wholesale Electricity Market Price and Avoided Emissions Rates Forecasts. https://nwcouncil.app.box.com/s/92rzpzc4hv7b2wzj2g1iy6mb8wvwlhyq

potential compared with the 2023 assessment including: reduced measure savings, increased measure costs, achievements (both tracked by the District and evidenced by the RBSA). Factors that have offset the reduced savings potential include the following: higher avoided cost resulting in a higher number of cost-effective measures; adjustments to ramp rates that increased earlier period savings. The figure below also shows that the District has consistently met its biennial energy efficiency targets, and that the potential estimates presented in this report are achievable through the District's various programs and the District's share of NEEA savings.

FIGURE 1-3: HISTORICAL ENERGY EFFICIENCY ACHIEVEMENT AND TARGETS



1.5 CONCLUSION

This report summarizes the CPA conducted for the District for the 2026 to 2045 timeframe. Many components of the CPA are updated from previous CPA models including items such as energy market price forecast, code and standard changes, recent conservation achievements, revised savings values and ramp rates for RTF and Council measures, and multiple scenario analyses.

The near-term results of this assessment are consistent with the 2023 assessment.

2 Introduction

2.1 OBJECTIVES

The objective of this report is to describe the results of the Benton Public Utility District (the District) 2025 Electric Conservation Potential Assessment (CPA). This assessment provides estimates of energy savings by sector for the period 2026 to 2045, with the primary focus on the initial 10 years. This analysis has been conducted in a manner consistent with requirements set forth in RCW 19.285 (EIA) and 194-37 WAC (EIA implementation) and Washington Clean Energy Transformation Act (CETA) and is part of the District's compliance documentation. The results and guidance presented in this report will also assist the District in strategic planning for its conservation programs. Finally, the resulting conservation supply curves can be used in the District's Integrated Resource Plan (IRP).

The conservation measures used in this analysis are based on the measures that were included in the Council's 2021 Power Plan with updates from the RTF for active and proven UES measures. The assessment considered a wide range of conservation resources that are reliable, available, and cost effective within the 20-year planning period.

2.2 ELECTRIC UTILITY RESOURCE PLAN REQUIREMENTS

According to Chapter RCW 19.280, utilities with at least 25,000 retail customers are required to develop IRPs by September 2008 and biennially thereafter. The legislation mandates that these resource plans include assessments of commercially available conservation and efficiency measures. This CPA is designed to assist in meeting these requirements for conservation analysis. The results of this CPA may be used in the next Resource Plan due to the state by September 2025. More background information is provided below.

2.3 ENERGY INDEPENDENCE ACT

Chapter RCW 19.285, the Energy Independence Act, requires that, "each qualifying utility pursue all available conservation that is cost-effective, reliable and feasible." The timeline for requirements of the Energy Independence Act is detailed below:

- By January 1, 2010 – Identify achievable cost-effective conservation potential through 2019 using methodologies consistent with the Pacific Northwest Power and Conservation Council's (Council) latest power planning document.
- Beginning January 2010, each utility shall establish a biennial acquisition target for cost-effective conservation that is no lower than the utility's pro rata shares for the two-year period of the cost-effective conservation potential for the subsequent ten years.
- On or before June 1, 2012, each utility shall submit an annual conservation report to the department (the Department of Commerce or its successor). The report shall document the utility's progress in meeting the targets established in RCW 19.285.040.
- Beginning on January 1, 2014, cost-effective conservation achieved by a qualifying utility in excess of its biennial acquisition target may be used to help meet the immediately subsequent two biennial acquisition targets, such that no more than twenty percent of any biennial target may be met with excess conservation savings.

- Beginning January 1, 2014, a qualifying utility may use conservation savings in excess of its biennial target from a single large facility to meet up to an additional five percent of the immediately subsequent two biennial acquisition targets.[4]

This report summarizes the preliminary results of a comprehensive CPA conducted following the requirements of the EIA and additions made by the passage of CETA. A checklist of how this analysis meets EIA requirements is included in Appendix C.

2.4 OTHER LEGISLATIVE CONSIDERATIONS

Washington state enacted several laws that impact conservation planning. Washington HB 1444 enacts efficiency standards for a variety of appliances. Washington also enacted a clean energy law, SB 5116. CETA (2019) requires the use of specific values for avoided greenhouse gas emissions. This study follows the CETA requirements to value energy efficiency savings at the prescribed value established by the Department of Ecology. Finally, CETA requires that all sales of electricity be greenhouse gas neutral by 2030 and greenhouse gas free by 2045. This provision has been incorporated into the assumptions of this CPA. Specifically, this impacts the avoided cost of conservation, as described in Appendix D.

2.5 STUDY UNCERTAINTIES

The savings estimates presented in this study are subject to the uncertainties associated with the input data. This study utilized the best available data at the time of its development; however, the results of future studies will change as the planning environment evolves. Specific areas of uncertainty include the following:

- Customer Characteristic Data – Residential and commercial building data and appliance saturations are in many cases based on regional studies and surveys. There are uncertainties related to the extent that the District's service area is similar to that of the region, or that the regional survey data represents the population.
- Measure Data – In particular, savings and cost estimates (when comparing to current market conditions), as prepared by the Council and RTF, will vary across the region. In some cases, measure applicability or other attributes have been estimated by the Council or the RTF based on professional judgment or specific market research.
- Market Price Forecasts – Market prices (and forecasts) are continually changing. The market price forecasts for electricity and natural gas utilized in this analysis represent a snapshot in time. Given a different snapshot in time, the results of the analysis would vary. However, different avoided cost scenarios are included in the analysis to consider the sensitivity of the results to fluctuating market prices over the study period. In this study, the Council's High-Demand mid-gas price forecast (September 2024) was used to model the Base scenario while the High Gas forecast was used to model a high scenario.

[4] The EIA requires that the savings must be cost effective and achieved within a single biennial period at a facility whose average annual load before conservation exceeded 5 aMW. In addition, the law requires that no more than 25% of a biennial target may be met with excess conservation savings, inclusive of provisions listed in this section.

- Utility System Assumptions – Credits have been included in this analysis to account for the avoided costs of transmission and distribution system expansion. Though potential transmission and distribution system cost savings are dependent on local conditions, the Council considers these credits to be representative estimates of these avoided costs. A value for generation capacity was also included but may change as the Northwest Resource Adequacy market continues to evolve.
- Discount Rate – The Council develops a real discount rate as well as a finance rate for each power plan. The finance rate is based on the relative share of the cost of conservation and the cost of capital for the various program sponsors. The Council has estimated these figures using the most current available information. This study reflects the current borrowing market although changes in borrowing rates will likely vary over the study period.
- Forecasted Load and Customer Growth – The CPA bases the 20-year potential estimates on forecasted loads and customer growth provided by the utility. These forecasts includes a level of uncertainty including economic growth, inflation, and electrification.
- Load Shape Data – The Council provides conservation load shapes for evaluating the timing of energy savings. In practice, load shapes will vary by utility based on weather, customer types, and other factors. This assessment uses the hourly load shapes used in the 2021 Plan to estimate peak demand savings over the planning period, based on shaped energy savings. These shapes are averages across several regions and utility service area profiles may differ.
- Frozen Efficiency – Consistent with the Council's methodology, the measure baseline efficiency levels and end-using devices do not change over the planning period. In addition, it is assumed that once an energy efficiency measure is installed, it will remain in place over the remainder of the study period.
- Economic Conditions – economic conditions impact all the variables in the study. The economy directly influences pricing data; however, it also impacts the ability for utilities and consumers to pay for energy efficiency upgrades.

Due to these uncertainties and the changing environment, under the EIA, qualifying utilities must update their CPAs every two years to reflect the best available information.

2.5.1 Economic Impacts

Economic conditions can have significant influence on energy efficiency achievability and economic feasibility. Recently, with COVID-19, we saw sustained supply chain shortages that impacted the technical feasibility of utilities in meeting conservation goals. Additionally, the COVID-19 recession impacted consumer's ability to pay electric bills placing larger than normal arears on utilities. Many utilities experienced a period of lower operating reserves due to this reduced revenue collection. The financial strain on utilities had lasting impacts on program offerings. The high inflation in the electric industry since 2022 resulted in electric retail rate increases and additional utility low income assistance programs. Power cost increases often coincide with supply chain and inflationary pressures for energy efficiency goods and services, however, there is a time lag and uncertainty in outlook that impacts near-term decision making.

At the time of this report, significant tariffs have been introduced in the world economy introducing uncertainty in both cost and availability of energy efficiency products. Additionally, the U.S. reported the first quarter of negative growth since the pandemic. These impacts cannot be modeled with certainty. Measure costs have not been updated to reflect upward pricing pressures predicted. An attempt at adjusting ramp rates to reflect pricing and product availability has been made. However, there is a large potential for realized savings to be significantly different from what is predicted today based on the market uncertainty. The District plans to continue investing in energy efficiency resources and has focused its efforts to support low-income energy efficiency programs. These programs are costly compared with standard energy efficiency rebate/incentive programs. As such, it is expected that the rate of adoption is slower so that rate impacts can be mitigated to all consumers.

2.6 REPORT ORGANIZATION

The main report is organized with the following main sections:

- Methodology – CPA methodology along with some of the overarching assumptions
- Recent Conservation Achievement – the District's recent achievements and current energy efficiency programs
- Customer Characteristics – Housing and commercial building data for updating the baseline conditions
- Results – Energy Savings and Costs – Primary base case results
- Scenario Results – Results of all scenarios
- Summary
- References & Appendices

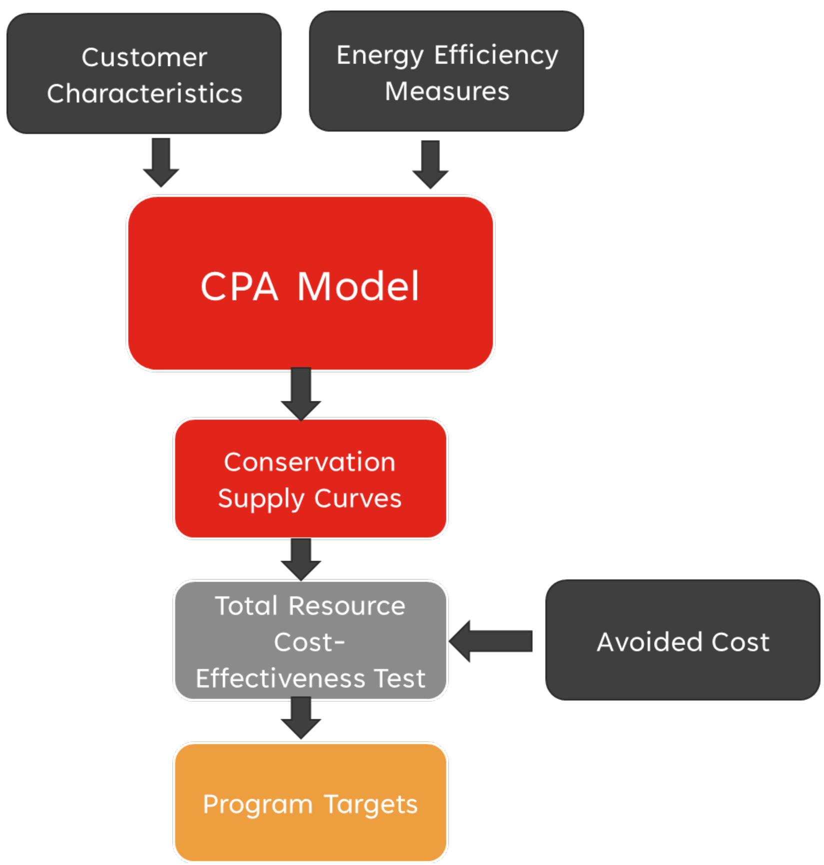
3 CPA Methodology

This study is a comprehensive assessment of the energy efficiency potential in the District's service area. The methodology complies with RCW 19.285.040 and WAC 194-37-070 Section 5 parts (a) through (d) and is consistent with the methodology used by the Northwest Power and Conservation Council (Council) in developing the Seventh Power Plan. This section provides a broad overview of the methodology used to develop the District's conservation potential target. Specific assumptions and methodology as they pertain to compliance with the EIA and CETA are provided in the Appendix C of this report.

3.1 BASIC MODELING METHODOLOGY

The basic methodology used for this assessment is illustrated in Figure 3-1. A key factor is the kilowatt hours saved annually from the installation of an individual energy efficiency measure. The savings from each measure is multiplied by the total number of measures that could be installed over the life of the program. Savings from each individual measure are then aggregated to produce the total potential.

FIGURE 3-1: CONSERVATION POTENTIAL ASSESSMENT PROCESS



3.2 CUSTOMER CHARACTERISTIC DATA

Assessment of customer characteristics includes estimating both the number of locations where a measure could be feasibly installed as well as the share—or saturation—of measures that have already been installed. For this analysis, the characterization of the District's baseline was determined using data provided by the District, NEEA's commercial and residential building stock assessments, and census data. Details of data sources and assumptions are described for each sector later in the report.

This assessment primarily sourced baseline measure saturation data from the Council's 2021 Plan measure workbooks. The Council's data was developed from NEEA's Building Stock Assessments, studies, market research and other sources. This data was updated with NEEA's 2022 Residential Building Stock Assessment and the District's historical conservation achievement data, where applicable. The District's historical achievement is discussed in detail in the next section.

3.3 ENERGY EFFICIENCY MEASURE DATA

The characterization of efficiency measures includes measure savings, costs, and lifetime. Other features, such as measure load shape, operation and maintenance costs, and non-energy benefits are also important for measure definition. The Council's 2021 Power Plan is the primary source for conservation measure data. Some of these measures were updated based on RTF measures that have been updated since the 2021 Plan. These updates are limited to proven and active measures.

The measure data include adjustments from raw savings data for several factors. The effects of space-heating interaction, for example, are included for all lighting and appliance measures, where appropriate. For example, if an electrically-heated house is retrofitted with efficient lighting, the heat that was originally provided by the inefficient lighting will have to be made up by the electric heating system. These interaction factors are included in measure savings data to produce net energy savings. Other financial-related data needed for defining measure costs and benefits include: discount rate, line losses, and deferred capacity-expansion benefits.

A list of measures by end-use is included in Appendix F.

3.4 TYPES OF POTENTIAL

Once the customer characteristics and energy efficiency measures are fully described, energy efficiency potential can be quantified. Three types of potential are used in this study: technical, achievable, and economic or cost-effective potential. Technical potential is the theoretical maximum efficiency available in the service territory if cost and market barriers are not considered. Market barriers and other consumer acceptance constraints reduce the total potential savings of an energy efficient measure. When these factors are applied, the remaining potential is called the achievable potential. Economic potential is a subset of the achievable potential that has been screened for cost effectiveness through a benefit-cost test. Figure 3-2 illustrates the four types of potential followed by more detailed explanations.

FIGURE 3-2: TYPES OF ENERGY EFFICIENCY POTENTIAL[5]

Technical – Technical potential is the amount of energy efficiency potential that is available, regardless of cost or other technological or market constraints, such as customer willingness to adopt a given measure. It represents the theoretical maximum amount of energy efficiency that is possible in a utility's service territory absent these constraints.

Estimating the technical potential begins with determining the value for energy efficiency measure savings. Additionally, the number of applicable units must be estimated. Applicable units are the units across a service territory where the measure could feasibly be installed. This includes accounting for units that may have already been installed. The value is highly dependent on the measure and the housing stock. For example, a heat pump measure may only be applicable to single family homes with electric space heating equipment. A saturation factor accounts for measures that have already been completed.

In addition, technical potential considers the interaction and stacking effects of measures. For example, interaction occurs when a home installs energy efficient lighting and the demands on the heating system rise due to a reduction in heat emitted by the lights. If a home installs both insulation and a high-efficiency heat pump, the total savings of these stacked measures is less than if each measure were installed individually because the demands on the heating system are lower in a well-insulated home. Interaction is addressed by accounting for impacts on other energy uses. Stacked measures within the same end use are often addressed by considering the savings of each measure as if it were installed after other measures that impact the same end use.

The total technical potential is often significantly more than the amount of achievable and economic potential. The difference between technical potential and achievable potential is a result of the number

[5] Reproduced from U.S. Environmental Protection Agency. *Guide to Resource Planning with Energy Efficiency.* Figure 2-1, November 2007.

of measures assumed to be affected by market barriers. Economic potential is further limited due to the number of measures in the achievable potential that are not cost-effective.

Achievable Technical – Achievable technical potential, also referred to as achievable potential, is the amount of potential that can be achieved with a given set of market conditions. It takes into account many of the realistic barriers to adopting energy efficiency measures. These barriers include market availability of technology, consumer acceptance, non-measure costs, and the practical limitations of ramping up a program over time. The level of achievable potential can increase or decrease depending on the given incentive level of the measure. In the Seventh Power Plan, the Council assumed that 85% of technical potential can be achieved over the 20-year study period. This is a consequence of a pilot program offered in Hood River, Oregon where home weatherization measures were offered at no cost. The pilot was able to reach over 90% of homes. These assumptions were updated based on a measure-by-measure analysis of maximum achievability rates as finalized in the 2021 Power Plan. The Council also uses a variety of ramp rates to estimate the rate of achievement over time. This CPA follows the Council's methodology, including both the achievability and ramp rate methodologies.

Economic – Economic potential is the amount of potential that passes an economic benefit-cost test. In Washington State, EIA requirements stipulate that the total resource cost test (TRC) be used to determine economic potential. The TRC evaluates all costs and benefits of the measure regardless of who pays the cost or receives the benefit. Costs and benefits include the following: capital cost, O&M cost over the life of the measure, disposal costs, program administration costs, environmental benefits, distribution and transmission benefits, energy savings benefits, economic effects, and non-energy savings benefits. Non-energy costs and benefits can be difficult to enumerate, yet non-energy costs are quantified where feasible and realistic. Examples of non-quantifiable benefits might include: added comfort and reduced road noise from better insulation or increased real estate value from new windows. A quantifiable non-energy benefit might include reduced detergent costs or reduced water and sewer charges from energy efficient clothes washers.

For this potential assessment, the Council's ProCost model was used to determine cost effectiveness for each energy efficiency measure. The ProCost model values measure energy savings by time of day using conservation load shapes (by end-use) and segmented energy prices. The version of ProCost used in the 2025 CPA evaluates measure savings on an hourly basis but ultimately values the energy savings during two segments covering high and low load hour time periods.

3.5 AVOIDED COST

Each component of the avoided cost of energy efficiency measure savings is described below. Additional information regarding the avoided cost forecast is included in Appendix D.

3.5.1 Energy

The avoided cost of energy is the cost that is avoided through the acquisition of energy efficiency in lieu of other resources. Avoided costs are used to value energy savings benefits when conducting cost effectiveness tests and are included in the numerator in a benefit-cost test. The avoided costs typically include energy-based values ($/MWh) and values associated with the demand savings ($/kW) provided by energy efficiency. These energy benefits are often based on the cost of a generating resource, a forecast of market prices, or the avoided resource identified in the IRP process. This study relied on the

Council's September 2024 market price forecast for Mid-Columbia. The High-Demand Mid-Gas price forecast is used to define the Base scenario.

3.5.2 Social Cost of Carbon

The social cost of carbon is a cost that society incurs when fossil fuels are burned to generate electricity as shown in Table 3-1. Both the EIA rules and CETA requires that CPAs include the social cost of carbon when evaluating cost effectiveness using the total resource cost test (TRC). CETA further specifies the social cost of carbon values to be used in conservation and demand response studies.

TABLE 3-1: SOCIAL COST OF CARBON VALUES[6]

Year in Which Emissions Occur or Are Avoided	Social Cost of Carbon Dioxide $2018/Metric Ton	Social Cost of Carbon Dioxide $2025/Short Ton[1]
2025	$81	$100
2030	$87	$108
2035	$93	$115
2040	$100	$124
2045	$106	$131

1. ProCost model inputs for $/CO2 are in short tons. In the modeling, 2025 dollars are converted to $2016 to be consistent with the 2021 Power Plan measure data.

According to WAC 194-40-110, values may be adjusted for any taxes, fees or costs incurred by utilities to meet portfolio mandates.[7] For example, the social cost of carbon is the full value of carbon emissions which includes the cost to utilities and ratepayers associated with moving to non-emitting resources. Rather than adjust the social cost of carbon for the cost of RECs or renewable energy, the values for RECS and renewable energy are excluded from the analysis to avoid double counting.

The emissions intensity of the marginal resource (market) is used to determine the $/MWh value for the social cost of carbon. Ecology states that unspecified resources should be given a carbon intensity value of 0.437 metric tons of CO_2e/MWh of electricity (0.874 lbs/kWh).[8] This is an average annual value applied to in all months in the conservation potential model.[9] The resulting levelized cost of carbon is $48.30/MWh over the 20-year study.

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[6] WAC 194-40-100. Available at :https://apps.leg.wa.gov/wAc/default.aspx?cite=194-40-100&pdf=true.

[7] WAC 194-40-110 (b).

[8] WAC 173-444-040 (4).

[9] For reference, the Seventh Power Plan evaluated 0.95 lbs/kWh and 0 lbs/kWh. Typically, the emissions intensity would be higher in months outside of spring run-off (June-July). The seasonal nature of carbon intensity is not modeled due to the prescriptive annual value established by Ecology in WAC 173-444-040.

3.5.3 Renewable Portfolio Standard Cost

Renewable energy purchases need to meet both RPS and CETA and can be avoided through conservation. Utilities may meet Washington RPS through either bundled energy purchases such as purchasing the output of a wind resource where the non-energy attributes remain with the output, or they may purchase unbundled RECs. As stated above, the value of avoided renewable energy credit purchases resulting from energy efficiency is accounted for within the social cost of carbon construct. The social cost of carbon already considers the cost of moving from an emitting resource to a non-emitting resource. Therefore, it is not necessary to include an additional value for renewable energy purchases prior to 2045 when all energy must be non-emitting or renewable.

Beginning in 2045, the social cost of carbon may no longer be an appropriate adder in resource planning. However, prior to 2045 utilities may still use offsets to meet CETA requirements. Since the study period of this evaluation ends prior to 2045, the avoided social cost of carbon is included in each year. For future studies that extend to 2045 and beyond, it would be appropriate to include renewable energy or non-emitting resource costs as the avoided cost of energy rather than market plus the social cost of carbon.

3.5.4 Transmission and Distribution System

The EIA requires that deferred capacity expansion benefits for transmission and distribution systems be included in the assessment of cost effectiveness. To account for the value of deferred transmission and distribution system expansion, a distribution system credit value of $11.91/kW-year and a transmission system credit of $4.85/kW-year were applied to peak savings from conservation measures, at the time of the regional transmission and the District’s local distribution system peaks (adjusted to $2025). These values were developed by Council staff in preparation for 9th Power Plan.[10]

3.5.5 Generation Capacity

The District is a load following customer of BPA. As a load following customer, the District’s avoided cost of capacity is built into BPA’s preference rates. BPA BP-26 Initial Proposal demand rates[11] are escalated 3% each rate period (every two years). Over the 20-year analysis period, the resulting cost of avoided capacity is $140/kW-year (2025$) in levelized terms.

A generation capacity value of $160/kW-year is modeled for the high scenario. This price represents the marginal cost of capacity valued at new construction of a 4-hour battery.

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[10] Northwest Power and Conservation Council. CRAC Meeting February 21, 2025. Available at: https://nwcouncil.app.box.com/s/4e7sowhwsbu95msj5w76bsd15dqgz3mk

[11] BP-26 Rate Proceeding. November 2024. BP-26-E-BPA-10 Available online: https://www.bpa.gov/-/media/Aep/rates-tariff/bp-26/BP26EBPA10-Initial-Proposal-Power-Rate-Schedules-1115.pdf

3.5.6 Risk

With the generation capacity value explicitly defined, the Council's analysis found that a risk credit did not need to be defined as part of its cost-effectiveness test. In this CPA, risk was modeled by varying the base case input assumptions. In doing so, this CPA addresses the uncertainty of the inputs and looks at the sensitivity of the results. The avoided cost components that were varied included the energy prices and generation capacity value. Through the variance of these components, implied risk credits of up to $10.03/MWh and $8/kW-year were included in the avoided cost. Additional information regarding the avoided cost forecast and risk mitigation credit values is included in Appendix D.

3.5.7 Power Planning Act Credit

Finally, a 10% benefit was added to the avoided cost as required by the Pacific Northwest Electric Power Planning and Conservation Act.

3.6 DISCOUNT AND FINANCE RATE

The Council develops a real discount rate for each of its Power Plans. In preparation for the 2021 Power Plan, the Council proposed using a discount rate of 3.7%.[12] This discount rate was used in this CPA. The discount rate is used to convert future costs and benefits into present values. The present values are then used to compare net benefits across measures that realize costs and benefits at different times and over different useful lives.

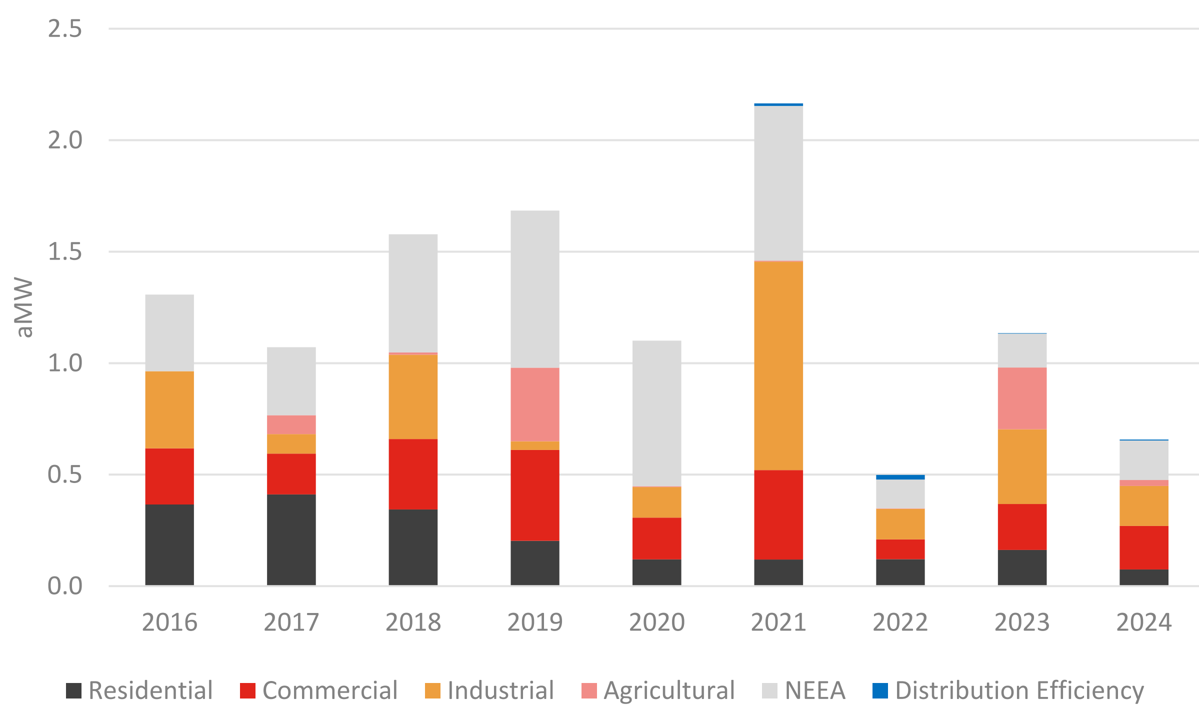
[12] Discount rate per Conservation Resources Advisory Committee (CRAC) meeting. February 21, 2025
https://nwcouncil.app.box.com/s/4e7sowhwsbu95msj5w76bsd15dqgz3mk

4 Recent Conservation Achievement

The District has pursued conservation and energy efficiency resources for many years. Currently, the utility offers a variety of programs for residential, commercial, industrial and agricultural customers. These include residential weatherization, Energy Star® appliance rebates, new construction programs for commercial customers, and energy-efficiency audits. In addition to utility programs, the District receives credit for market-transformation activities that are accomplished by the Northwest Energy Efficiency Alliance (NEEA) in its service territory.

Figure 4-1 shows the distribution of conservation among the District's customer sectors and through Northwest Energy Efficiency Alliance (NEEA) efforts over the past five years. NEEA's work helps bring energy efficient emerging technologies, like ductless heat pumps and heat pump water heaters to the Northwest markets. Note that District savings achievement for 2020 was lower than historical achievements primarily due to the COVID-19 pandemic. Economic factors and risk for COVID-19 transmission both likely contributed to fewer measures being implemented in the District's service area. More detail for these savings is provided below for each sector.

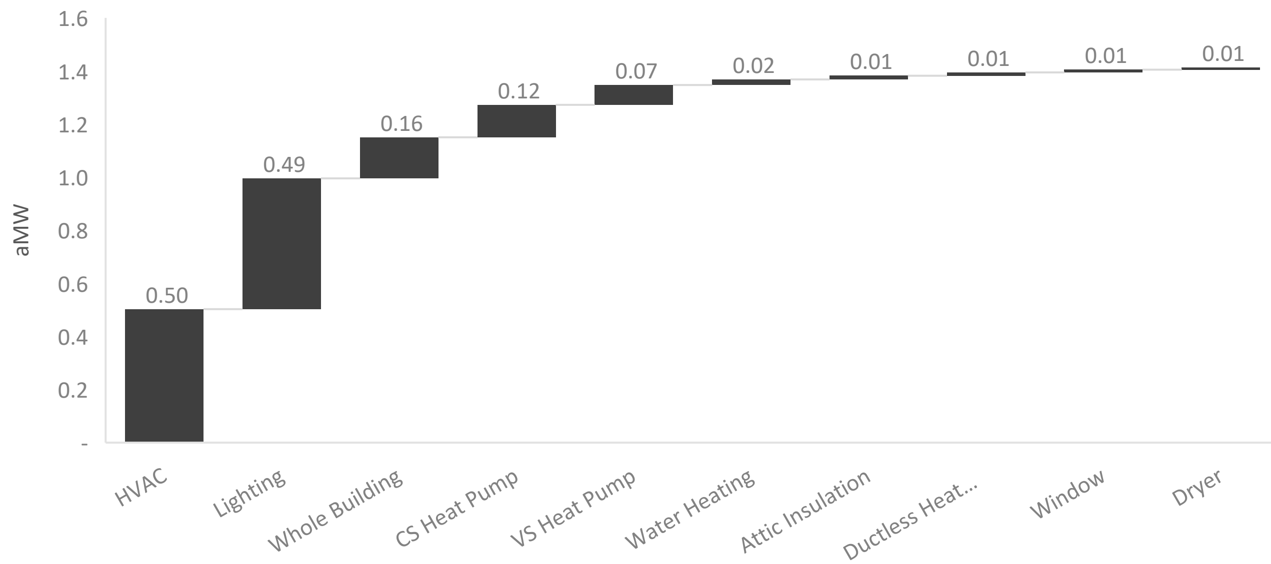
FIGURE 4-1: RECENT CONSERVATION HISTORY BY SECTOR



4.1 RESIDENTIAL

Figure 4-2 shows historic conservation achievement by end use in the residential sector. Savings from HVAC and lighting measures account for most of the savings. Note that in the figure below, HVAC includes weatherization measures.

FIGURE 4-2: 2017-2025 RESIDENTIAL SAVINGS ACHIEVEMENT



4.2 COMMERCIAL & INDUSTRIAL

Historic achievement in the commercial and industrial sectors is primarily due to lighting, Strategic Energy Management, and custom HVAC projects. Figures 4-3 and 4-4 show the breakdown of commercial and industrial savings, respectively, from 2017 to 2025.

FIGURE 4-3: 2017-2025 COMMERCIAL SAVINGS

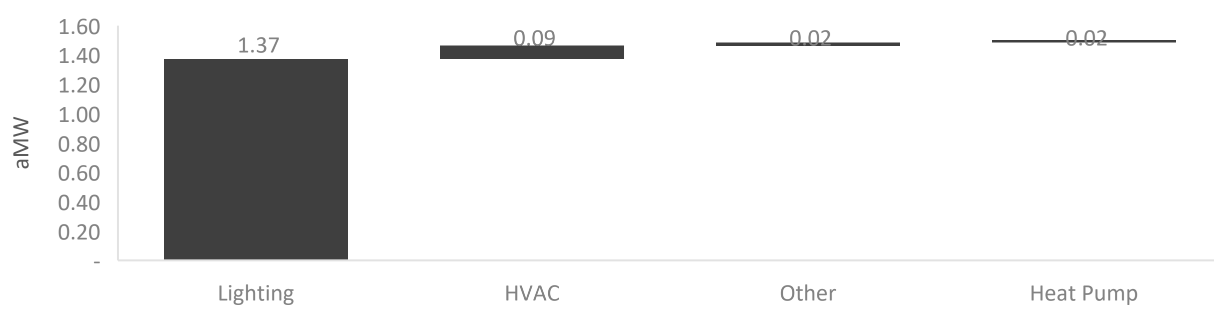
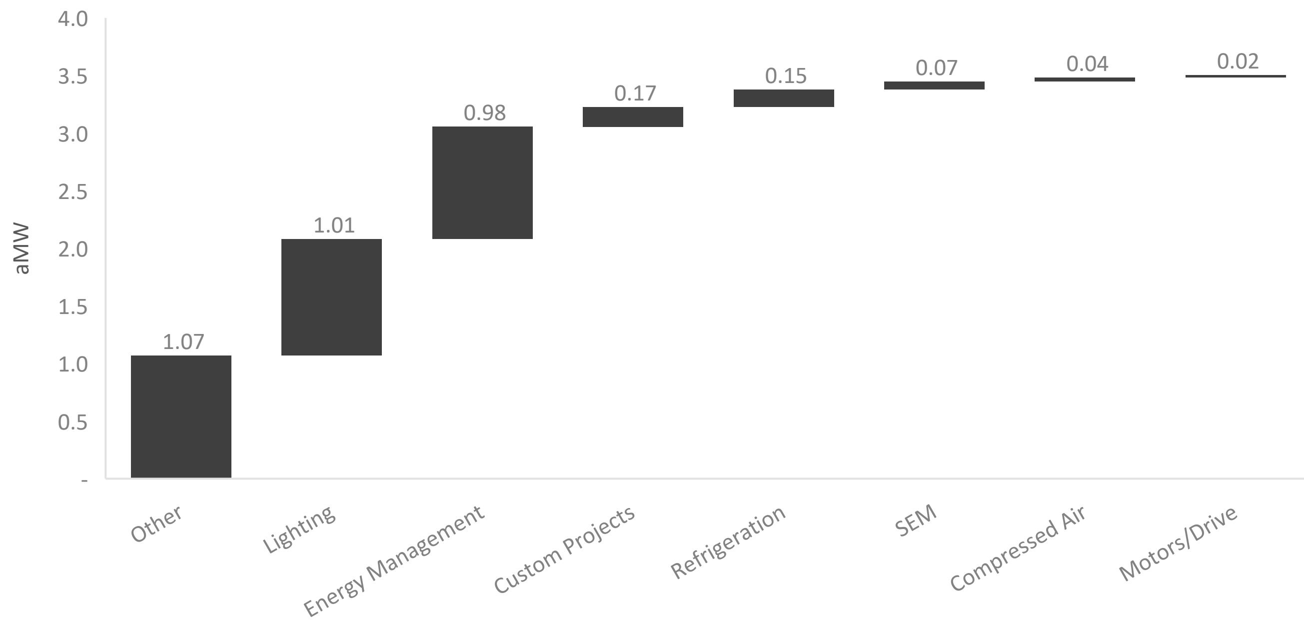


FIGURE 4-4: 2017-2025 INDUSTRIAL SAVINGS



4.3 AGRICULTURE

Savings in the agriculture sector have largely been due to scientific irrigation scheduling (SIS), irrigation hardware updates, and efficient pumps and motors. The District has helped farmers implement SIS on more than 55,000 acres annually. The RTF determined market transformation had occurred and therefore SIS is no longer available. The District continues to work with farmers to upgrade irrigation hardware.

4.4 CURRENT CONSERVATION PROGRAMS

The District offers a wide range of conservation programs to its customers. These programs include many types of deemed conservation rebates, energy audits, net metering, and custom projects. The current programs offered by the District are detailed below and the District's board resolution detailing the utility's conservation rebate policy is included as Appendix H.

4.4.1 Residential

- *Energy Star Rebates* – the District offers several rebates for Energy Star appliances. These include $30 for Energy Star clothes washers and $50 for clothes dryers.
- *Heat Pump Water Heater* – Rebates are available for heat pump water heaters based on capacity. Rebates include $700 for 40 gallon tanks and $900 for Tier 3 and Tier 4 50 gallon and above tanks. Split-System Heat Pump Water Heater rebate is $1,100.
- *Weatherization* – This program provides insulation rebates from $0.06 to $2.00 per square foot, depending on location and home type. The District offers window replacement rebates of $6 to $12 per square foot. Finally, qualified energy efficient doors are eligible for a $40 rebate.
- *HVAC Rebates* – This program provides rebates for a variety of space conditioning upgrades including: a heat-pump and ductless heat-pump rebates ($200 to $1,200), and up to $100 for qualifying smart thermostats. Additionally, the District offers $35 for communicating line voltage thermostats.

- *Energy Star Homes and Manufactured Homes Program* – The District provides rebates between $1,200 - $1,400 to Northwest Energy Efficient Manufactured (NEEM) certified homes as well as incentives for site-built single family homes. Pre 1976 manufactured home replacement rebates from $2,200 - $2,500
- *Level 2 Electric Vehicle Charger* - $20 rebates available for Energy Star qualified EV charges. The District also offers $250 rebates for leased or owned electric vehicles.
- *Low Income Rebates* – The District offers a low-income energy conservation program for electrically heated single-family and manufactured homes. The program offers rebates on weatherization projects such as insulation and windows, door replacements, and ductless heat pumps. Customers who have been income verified for the program by Benton Franklin Community Action Connections may qualify for rebates.

4.4.2 Commercial and Industrial

- *Lighting Energy Efficiency Program (LEEP)* – Owners of commercial or industrial buildings can apply for a lighting energy audit. Applicable rebate amounts are determined upon completion of the audit.
- *Custom Projects Rebates* – The District offers rebates for special projects that improve efficiency or process related systems including, but not limited to, compressed air, variable frequency drives, industrial lighting interactive with HVAC systems, and refrigeration. Rebates for this program vary.
- *Deemed Rebates*- Supply fan VFDs, smart thermostats, and efficient rooftop units.

4.4.3 Agriculture

- *Agricultural Rebate Program* – This program offers incentives for irrigation sprinklers, nozzles, and regulators as well as replacement of 25 to 500 horsepower pump motors, and variable frequency drives installed in onion and potato sheds. Rebate amounts vary, and an application form must be completed to qualify.

4.5 SUMMARY

The District plans to continue to invest in energy efficiency by offering incentives to all sectors. The results of this CPA will help the District program managers to structure energy efficiency program offerings, establish appropriate incentive levels, comply with the EIA and CETA requirements, and maintain the District's status as their customer's Trusted Energy Partner.

5 Customer Characteristics Data

The District serves over 58,100 electric customers in Benton County, Washington, with a service area population of approximately 118,000. A key component of an energy efficiency assessment is to understand the characteristics of these customers, primarily the building and end-use characteristics. These characteristics for each customer class are described below.

5.1 RESIDENTIAL

For the residential sector, the key characteristics include house type, space heating fuel, and water heating fuel. Tables 5-1 through 5-5 show relevant residential data for single family, multi-family and manufactured homes in the District's service territory. The data is based on billing data provided by the District, which was used to estimate the share of homes with electric heating systems, as well as the 2022 Residential Building Stock Assessment (RBSA), developed by NEEA.[13] The RBSA data is used in place of the District data only in cases such as appliance saturations (refrigerator, microwave etc.) or the share of electric water heaters upgraded to heat pump water heaters. Similarly, the ductless heat pump and heat pump saturations are adjusted as informed by the RBSA.

TABLE 5-1: RESIDENTIAL BUILDING CHARACTERISTICS

Heating Zone	Cooling Zone	Solar Zone	Residential Households	Total Population
1	3	3	46,958	225,228

TABLE 5-2: HOME HEATING & COOLING SYSTEM SATURATIONS

	Single Family	Multifamily - Low Rise	Manufactured
Existing Stock, Homes	71%	16%	13%
Electric Forced Air Furnace	8%	16%	56%
Heat Pump	61%	0%	19%
Ductless Heat Pump	14%	2%	0%
Electric Zonal/Baseboard	8%	67%	0%
Central Air Conditioning	20%	12%	44%
Room Air Conditioning	12%	63%	13%

[13] Northwest Energy Efficiency Alliance. *2022 Residential Building Stock Assessment*. April 2024. Available at: https://neea.org/data/residential-building-stock-assessment

TABLE 5-3: APPLIANCE SATURATIONS

	Single Family	Multifamily - Low Rise	Manufactured
Electric Water Heat	79%	77%	94%
Refrigerator	130%	100%	110%
Freezer	43%	7%	43%
Clothes Washer	96%	38%	88%
Clothes Dryer (Electric)	88%	37%	100%
Dishwasher	88%	69%	84%
Microwave	96%	96%	96%
Electric Oven	70%	79%	70%

TABLE 5-4: HOME HEATING & COOLING SYSTEMS, NUMBER OF HOMES

	Single Family	Multifamily - Low Rise	Manufactured
Electric Forced Air Furnace	2,667	1,202	3,419
Heat Pump	20,338	0	1,160
Ductless Heat Pump	4,668	150	0
Electric Zonal/Baseboard	2,667	5,034	0
Central Air Conditioning	6,668	902	2,686
Room Air Conditioning	4,001	4,733	794

TABLE 5-5: NUMBER OF APPLIANCES

	Single Family	Multifamily - Low Rise	Manufactured
Electric Water Heat	26,394	5,766	5,723
Refrigerator	46,009	7,814	7,142
Freezer	13,003	0	2,625
Clothes Washer	31,921	4,019	6,105
Clothes Dryer	30,503	3,669	6,105
Dishwasher	28,006	5,109	5,128
Microwave			
Electric Oven	16,315	7,513	3,434

5.2 COMMERCIAL

Building floor area is the key parameter in determining conservation potential for the commercial sector, as many of the measures are based on savings as a function of building area. The commercial building floor area used in the 2025 CPA started with the 2025 commercial load from the District’s forecast. This load was distributed among the different commercial business types based on the assumed distribution of load used in previous CPAs. The loads were then converted to floor areas using regional energy use intensity values from NEEA's Commercial Building Stock Assessment (CBSA).[14]

Table 5-6 shows estimated 2025 commercial square footage in each of the 18 building categories. The District provided a load forecast by rate class that was used to develop a sector-wide growth rate of 1.1% and a long-term growth rate of 0%. A regional demolition rate based on the Council's 2021 Plan assumptions is also used.

TABLE 5-6: COMMERCIAL BUILDING SQUARE FOOTAGE BY SEGMENT

Segment	Estimated 2025 Floor Area (Million Square Feet)
Large Office	0.34
Medium Office	2.89
Small Office	3.17
Extra Large Retail	1.30
Large Retail	2.17
Medium Retail	0.45
Small Retail	0.07
School (K-12)	0.12
University	0.22
Warehouse	6.14
Supermarket	0.87
Mini Mart	0.18
Restaurant	0.66
Lodging	1.75
Hospital	0.16
Residential Care	0.57
Assembly	0.94
Other Commercial	2.30
Total	**24.28**

The commercial square footage shown in Table 5-6 was used to estimate commercial potential for this assessment.

5.3 INDUSTRIAL

The methodology for estimating industrial potential is different than the approaches used for the residential and commercial sectors primarily because most energy efficiency opportunities are unique to specific industrial segments. The Council and this study use a "top-down" methodology that utilizes annual consumption by industrial segment and then disaggregates total usage by end-use shares. Estimated measure savings are applied to each sector's end-use shares.

[14] Navigant Consulting. 2014. *Northwest Commercial Building Stock Assessment: Final Report.* Portland, OR: Northwest Energy Efficiency Alliance.

The District provided 2025 load forecast for its industrial customers. Industrial sector energy consumption has not changed since 2020. Therefore, the loads in Table 5-7 are the same as the previous study. The District is forecasting zero growth for this class.

TABLE 5-7: INDUSTRIAL SECTOR LOAD BY SEGMENT

Industrial Segment	Estimated 2025 Retail Sales (MWh)
Frozen Food	9,665
Other Food	88,245
Metal Fabrication	1,494
Equipment	3,230
Cold Storage	2,656
Refinery	1,462
Chemical	62,258
Miscellaneous Manufacturing	13,494
Water Supply	24,240
Wastewater	15,169
Total	**221,914**

5.4 AGRICULTURE

The District provides electric service to agriculture customers in Benton County (Table 5-8); however, Benton REA also provides electric service to agriculture customers in Benton County. Minimal changes in agricultural customers were observed by the District since the previous study. Therefore, the data inputs used in the 2021 Power Plan and the District's previous study remain relevant.

TABLE 5-8: AGRICULTURAL INPUTS

Number of Dairy Farms	0
Total Irrigated Acreage	88,090
Total Number of Pumps	1,112
Total Number of Farms	914
Stock Tanks	1,167
Back-Up Generator	3

5.5 DISTRIBUTION EFFICIENCY

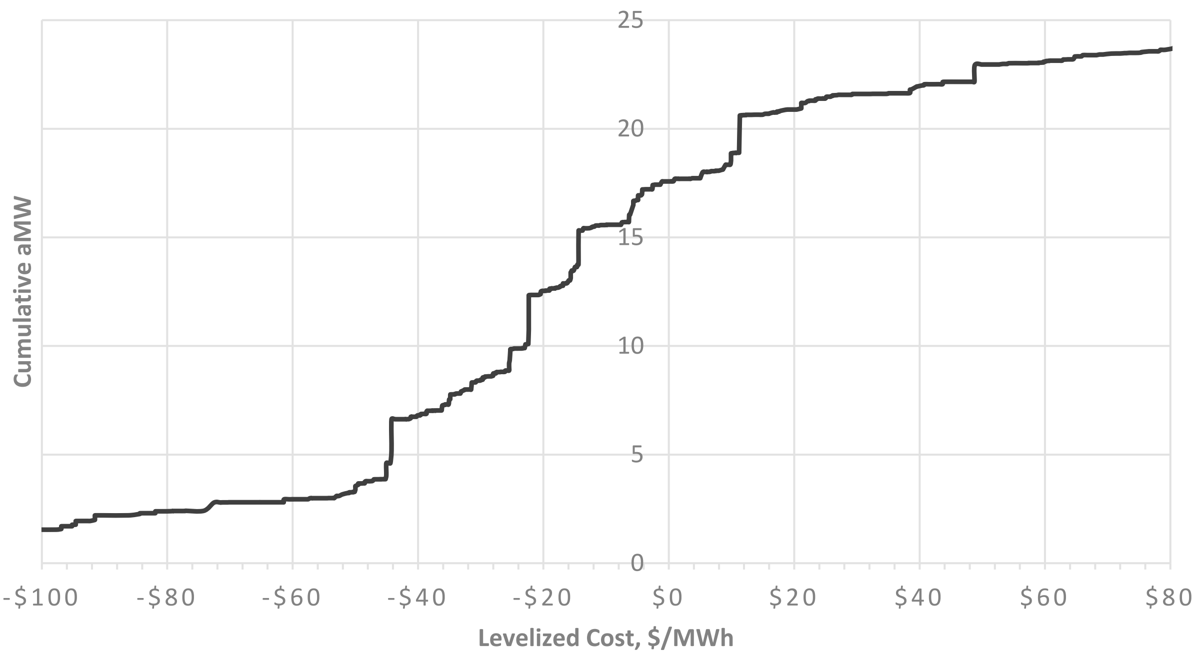
For this analysis, EES developed an estimate of distribution system conservation potential using the Council's 2021 Plan approach which applies measures savings to retail sales. The District provided a load forecast and a growth rate of 0.19% which was used to estimate the load through the 20-year study period. This growth rate is based on the compound average growth rate for the utility-provided forecast. Distribution system conservation is discussed in detail in the next section.

6 Results – Energy Savings and Costs

6.1 ACHIEVABLE CONSERVATION POTENTIAL

Achievable potential is the amount of energy efficiency potential that is available regardless of cost. Figure 6-1, below, shows a supply curve of 20-year achievable potential. A supply curve is developed by plotting cumulative energy efficiency savings potential (aMW) against the levelized cost ($/MWh) of the savings when measures are sorted in order of ascending cost. The potential shown in Figure 6-1 has not been screened for cost effectiveness. Costs are levelized, allowing for the comparison of measures with different lifetimes. The supply curve facilitates comparison of demand-side resources to supply-side resources and is often used in conjunction with integrated resource plans. Figure 6-1 shows that approximately 22 aMW of cumulative saving potential are available for less than $50/MWh.

FIGURE 6-1: 20-YEAR ACHIEVEABLE POTENTIAL LEVELIZED COST SUPPLY CURVE



6.2 ECONOMIC CONSERVATION POTENTIAL

Economic or cost-effective potential is the amount of potential that passes the Total Resource Cost (TRC) test. This means that the present value of the benefits attributed to the conservation measure exceeds the present value of the measure costs over its lifetime.

Table 6-1 shows the economic potential by sector in 2, 4, 10 and 20-year increments. Compared with the technical and achievable potential, it shows that 20.85 aMW of the total 24 aMW is cost effective for the District. The last section of this report discusses how these values could be used for setting targets.

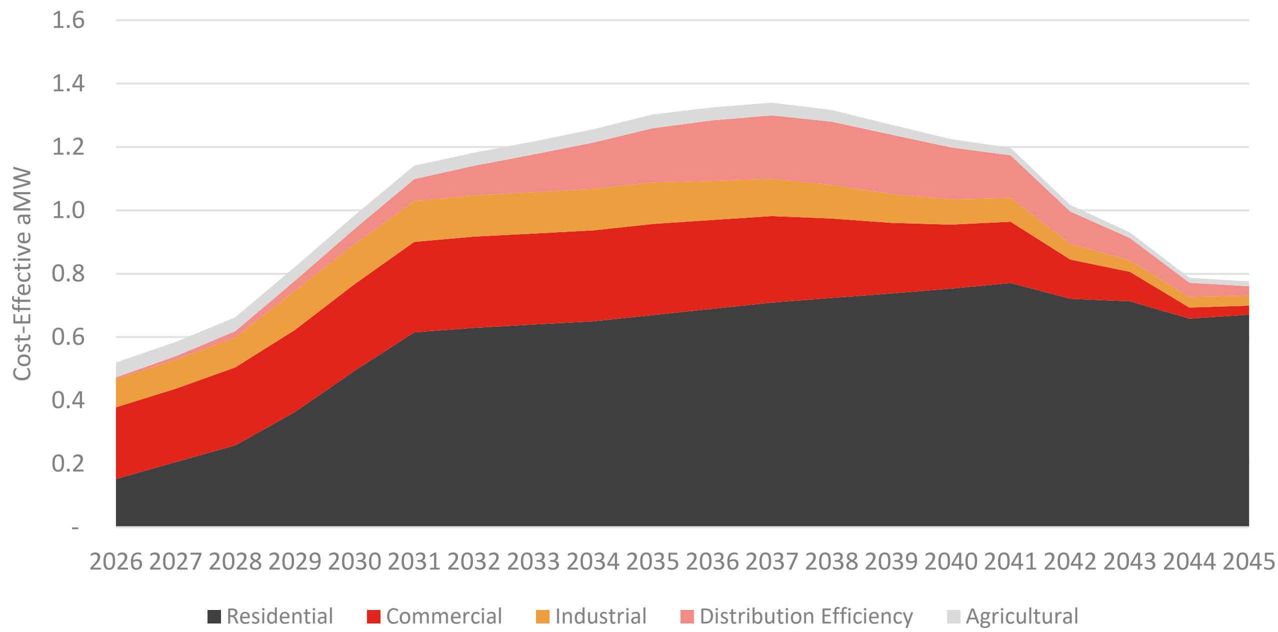
TABLE 6-1: COST-EFFECTIVE ACHIEVABLE POTENTIAL – BASE CASE (aMW)

	2-Year	4-Year	10-Year	20-Year
Residential	0.36	0.98	4.67	11.82
Commercial	0.46	0.96	2.67	4.37
Industrial	0.18	0.40	1.18	1.92
Distribution Efficiency	0.02	0.07	0.72	2.04
Agricultural	0.09	0.18	0.43	0.70
Total	**1.10**	**2.59**	**9.67**	**20.85**

6.3 SECTOR SUMMARY

Figure 6-2 shows economic potential by sector on an annual basis.

FIGURE 6-2: ANNUAL COST-EFFECTIVE POTENTIAL BY SECTOR



The largest share of the potential is in the commercial sector followed by substantial savings potential in the residential and industrial sectors. Ramp rates from the 2021 Power Plan were used to establish reasonable conservation achievement levels. In some cases, alternate ramp rates were assigned to reflect the District's current rate of program achievement. Achievement levels are affected by factors including timing of equipment turnover and new construction, supply chain delays, economic factors, program and technology maturity, market trends, and current utility staffing and funding.

6.3.1 Residential

Within the residential sector, water heating and HVAC (including weatherization) measures make up the largest share of savings (Figure 6-3). This is due, in part, to the fact that the District's residential customers rely mostly on electricity for space and water heating. Based on the District's long-running weatherization programs, the remaining weatherization opportunities are likely in hard-to-reach areas such as low income or rentals. The large amount of potential for water heating is primarily due efficient clothes washers, aerators, and heat pump water heaters.

FIGURE 6-3: ANNUAL RESIDENTIAL COST-EFFECTIVE POTENTIAL BY END USE

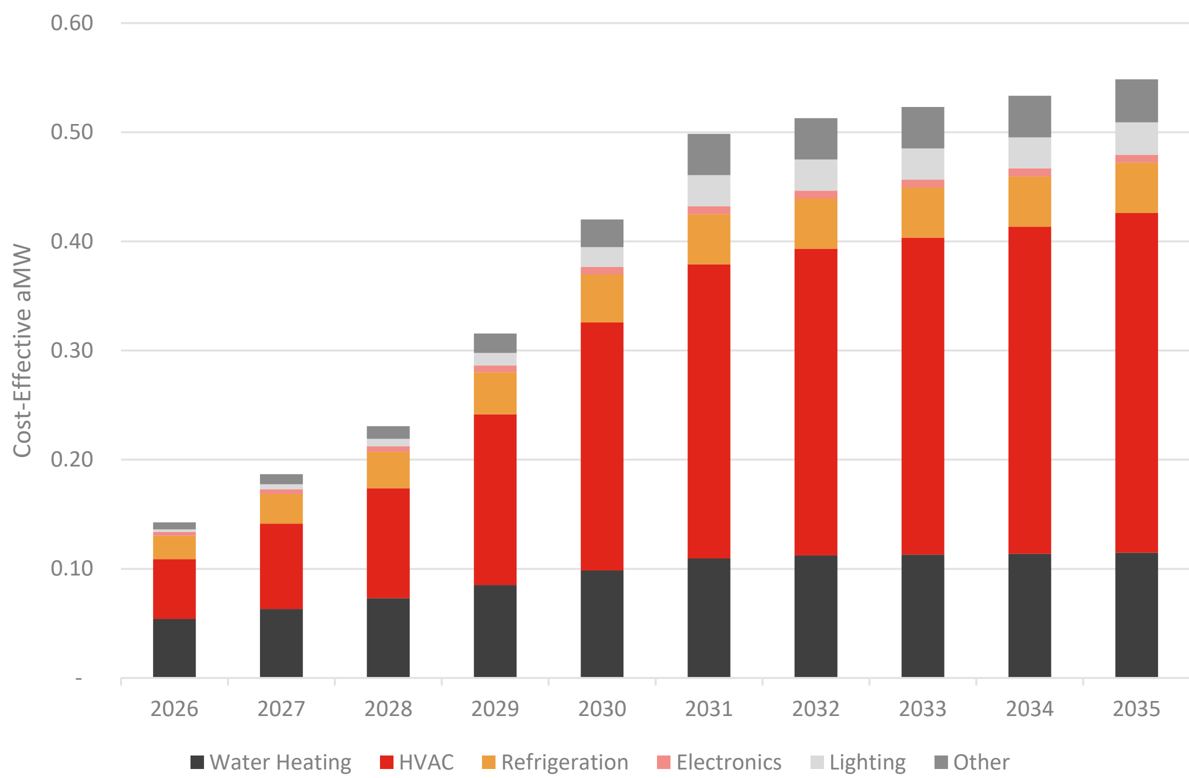


Figure 6-4 shows how the 10-year residential potential breaks down into end uses and key measure categories. The area of each block represents its share of the total 10-year residential potential.

FIGURE 6-4: RESIDENTIAL 10-YEAR COST-EFFECTIVE POTENTIAL BY END USE AND MEASURE CATEGORY

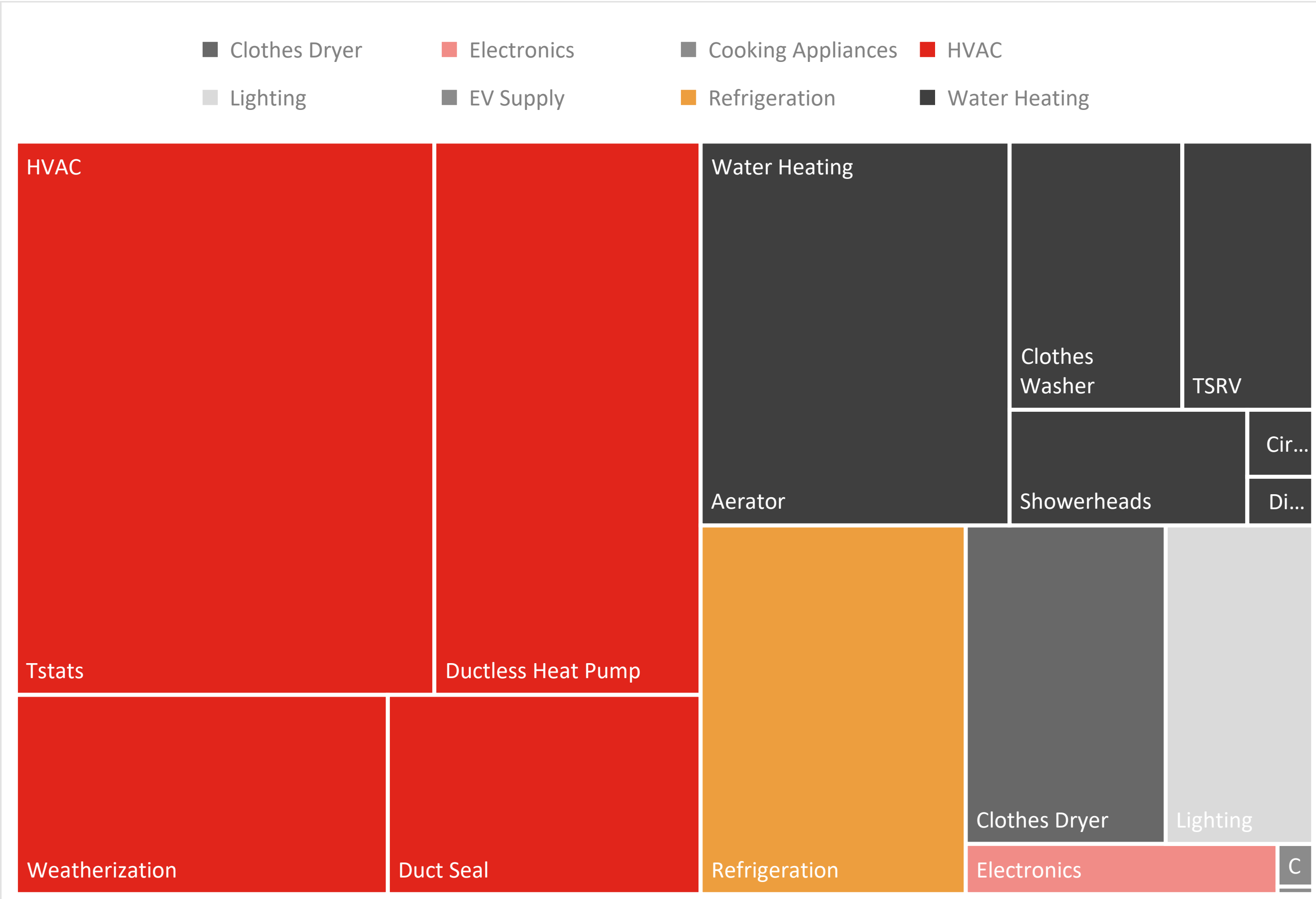


Table 6-2 compares how the savings potential has changed since the 2023 CPA. The primary drivers are changes in cost effectiveness, updated measure baselines, and the addition of measures.

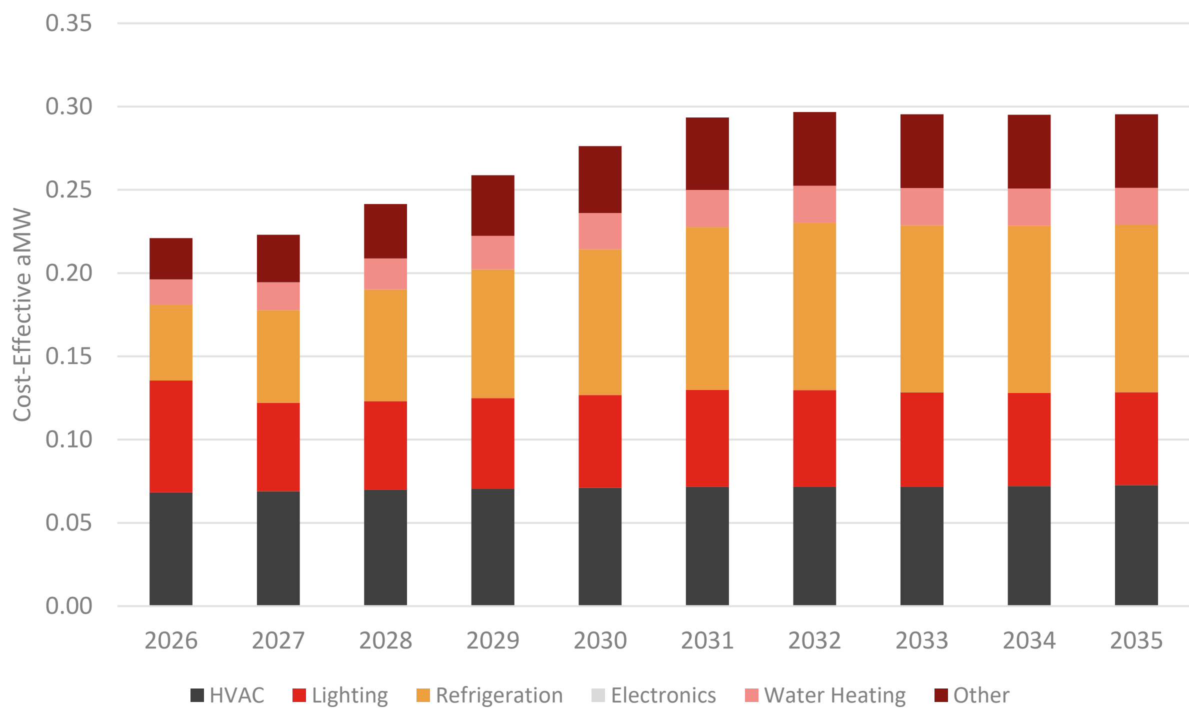
TABLE 6-2: COMPARISON RESIDENTIAL 20-YEAR ECONOMIC ACHIEVABLE POTENTIAL, AMW

End Use	2025 CPA	2023 CPA	Discussion
Water Heating	4.05	2.09	Updated Heat Pump Water Heater Measures
HVAC	5.62	4.55	Added Measure Permutations
Lighting	0.55	0.57	Accounted for Achievement
Electronics	0.12	0.00	Increased Cost-Effectiveness
Food Preparation	0.02	0.01	Increased Cost-Effectiveness
Dryer	0.69	0.08	Increased Cost-Effectiveness
Refrigeration	0.77	0.25	Increased Cost-Effectiveness
Whole Building/Meter Level	0.002	0.00	Minimal Change
Well Pumps	NA	NA	Well Pumps Not Cost-Effective
Total	**11.82**	**7.57**	

6.3.2 Commercial

The diverse nature of commercial building energy efficiency is reflected in the variety of end-uses and corresponding measures as shown in Figure 6-5. Beyond HVAC and lighting, additional sources of potential are available in water heating, refrigeration, motors, and process loads. The ramp rates used to distribute potential over the 20-year period were selected so that the District can increase achievement over the current program levels over time.

FIGURE 6-5: ANNUAL COMMERCIAL COST-EFFECTIVE POTENTIAL BY END USE



The key end uses and measures within the commercial sector are shown in Figure 6-6. The area of each block represents its share of the 10-year commercial potential.

FIGURE 6-6: COMMERCIAL 10-YEAR COST-EFFECTIVE POTENTIAL BY END USE AND MEASURE CATEGORY

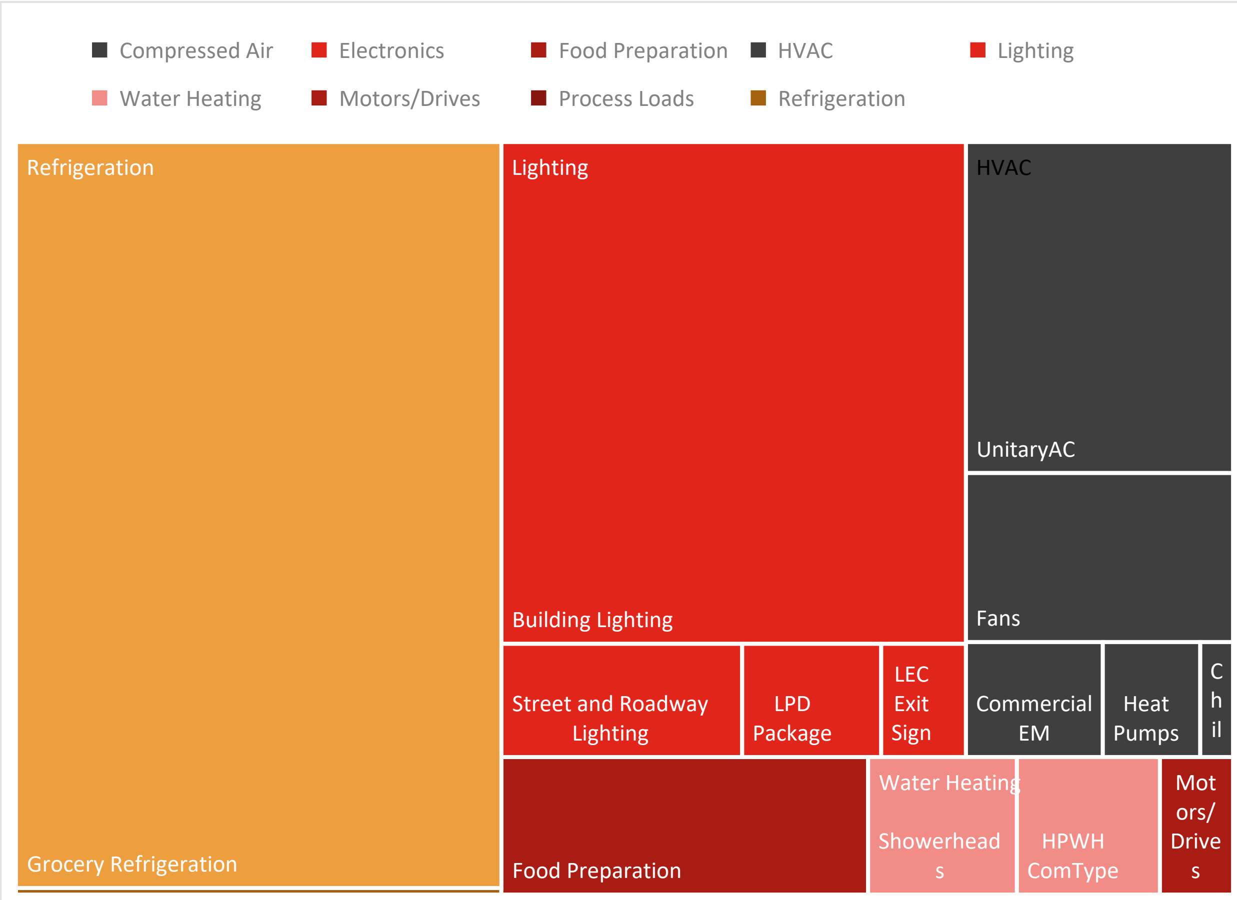


Table 6-3 provides a summary of the differences between the 2021 assessment and this 2023 CPA by end-use.

TABLE 6-3: COMPARISON COMMERCIAL 20-YEAR ECONOMIC ACHIEVABLE POTENTIAL, AMW

End Use	2025 CPA	2023 CPA	Discussion
Food Preparation	0.21	0.21	No Change
Lighting	0.92	0.27	Increased Cost-Effectiveness
Electronics	0.00	0.00	No Change
Refrigeration	1.60	1.04	Increased Cost-Effectiveness [1]
Process Loads	0.00	0.00	No Change
Compressed Air	0.00	0.00	No Change
HVAC	1.04	4.28	Applied Updated Measure Applicability for Ductless Heat Pumps
Motors/Drives	0.32	0.19	Increased Cost-Effectiveness
Water Heating	0.27	0.20	Increased Cost-Effectiveness
Total	**4.37**	**6.19**	

1. Grocery measures have not been part of BPA program offerings for several years. Significant savings have been achieved prior to the program cessation.

6.3.3 Industrial

Figure 6-7 illustrates the 10-year potential savings in the industrial sector. The majority of the savings is expected to be in compressed air and lighting measures. All electric savings includes energy management, water supply and wastewater treatment plant upgrades.

FIGURE 6-7: ANNUAL INDUSTRIAL COST-EFFECTIVE POTENTIAL BY END USE

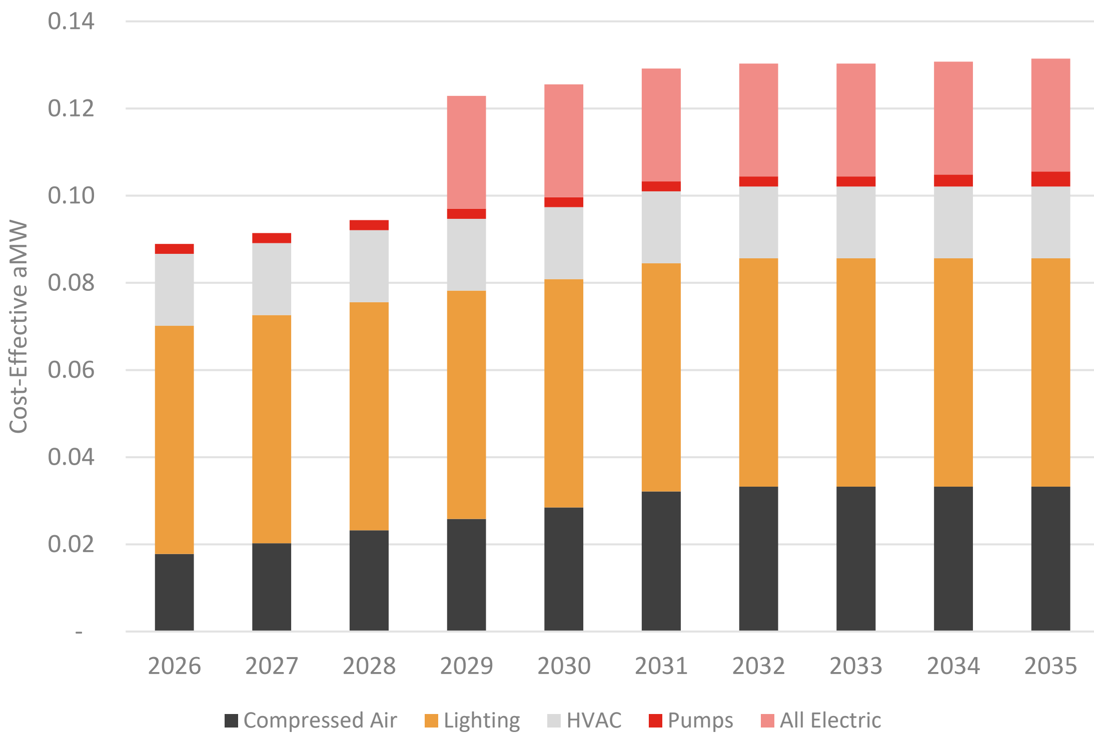
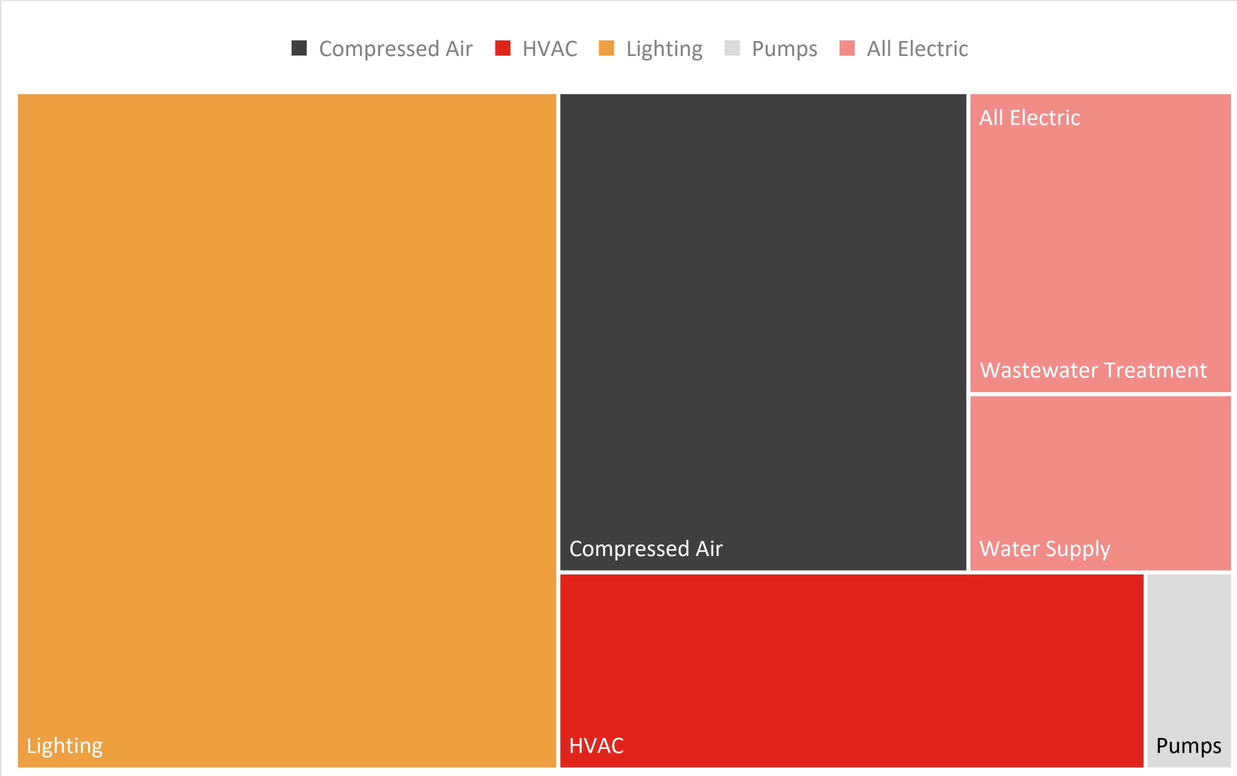


Figure 6-8 shows how the 10-year industrial potential breaks down by end use and measure categories.

FIGURE 6-8: INDUSTRIAL 10-YEAR COST-EFFECTIVE POTENTIAL BY END USE AND MEASURE CATEGORY



The most impactful change in the industrial savings potential is the adjustment for recent program achievements. The District has completed 0.6 aMW in energy efficiency projects since 2022. This is reflected in the updated results in the table below. Table 6-4 compares the potential estimated in this study to the 2023 assessment. Savings for All Electric and Lighting increased due to increased cost-effectiveness of water supply and wastewater treatment measures. Potential across other categories decreased primarily due to program achievements.

TABLE 6-4: COMPARISON INDUSTRIAL 20-YEAR ECONOMIC ACHIEVABLE POTENTIAL, AMW

End Use	2025 CPA	2023 CPA
Compressed Air	0.47	0.59
All Electric	0.44	0.00
Fans	0.00	0.00
Lighting	0.71	0.50
Pumps	0.07	0.10
HVAC	0.23	0.31
Total	**1.92**	**1.51**

6.3.4 Agriculture

Potential in agriculture is a product of total acres under irrigation in the District's service territory, number of pumps, and the number of farms. As shown in Figure 6-9, most of the cost-effective conservation potential is due to motors, drives, and irrigation hardware.

FIGURE 6-9: ANNUAL AGRICULTURE COST-EFFECTIVE POTENTIAL BY END USE

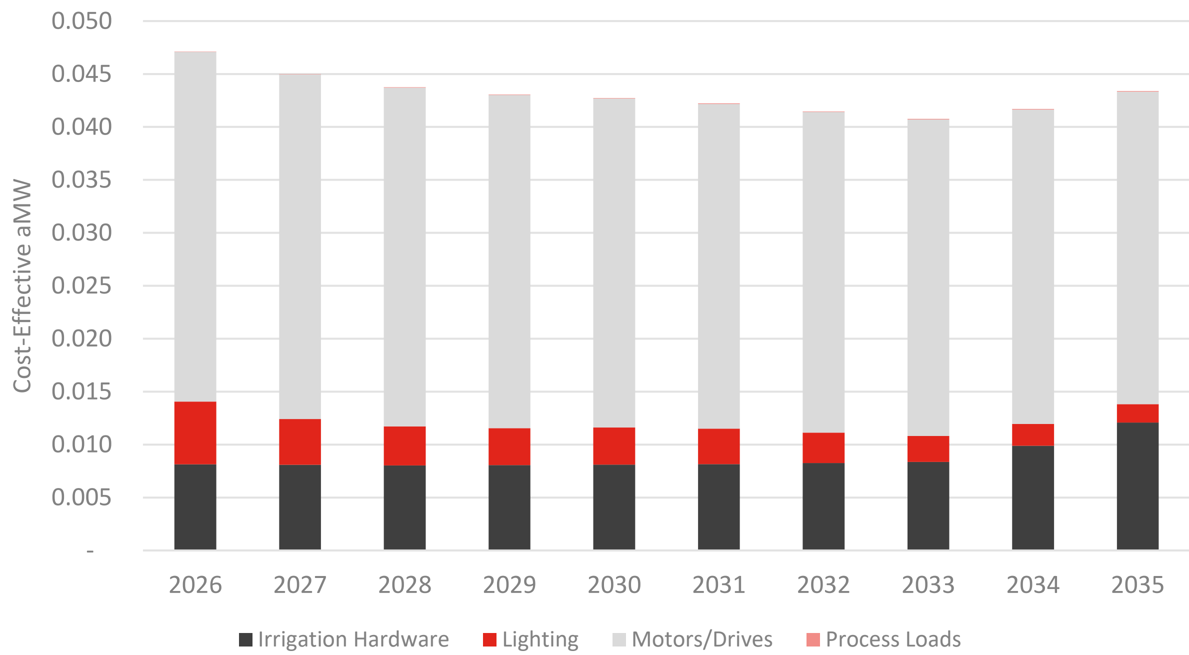


Table 6-5 compares the results of the 2021 CPA with this updated assessment.

TABLE 6-5: COMPARISON AGRICULTURAL 20-YEAR ECONOMIC ACHIEVABLE POTENTIAL, AMW

End Use	2025 CPA	2023 CPA
Irrigation Hardware	0.24	0.23
Stock Tanks	0.00	0.00
Lighting	0.04	0.04
Motors/Drives	0.42	0.42
Process Loads	0.00	0.00
Total	**0.70**	**0.690**

6.3.5 Distribution Efficiency

Distribution system energy efficiency measures regulate voltage and upgrade systems to improve the efficiency of utility distribution systems and reduce line losses. Distribution system potential was estimated using the Council’s 2021 Plan methodology. The 2021 Plan estimates distribution system potential based on end of system energy sales.

Table 6-6 compares the results of the 2023 CPA with this updated assessment. Potential savings increased due to increased cost-effectiveness of the measures.

TABLE 6-6: COMPARISON DEI 20-YEAR ECONOMIC ACHIEVABLE POTENTIAL, AMW

2025 CPA	2023 CPA
2.04	**0.33**

6.4 COST

Budget costs can be estimated at a high level based on the incremental cost of the measures (Table 6-7). The assumptions in this estimate include: 20 percent of measure cost for administrative costs and 35 percent of the incremental measure costs is assumed to be paid by the utility as incentives. A 20 percent allocation of measure costs to administrative expenses is a standard assumption for conservation programs. This figure was used in the Council's Seventh Power Plan. The 35 percent utility-share of measure costs is used in all sectors except in the utility distribution efficiency category, where the District is likely to pay the entire cost of any measures implemented and no incentives will be paid. These assumptions are consistent with the District's previous CPA.

This chart shows that the District can expect to spend approximately $4.78 million to realize estimated savings over the next two years including program administration costs. The bottom row of Table 6-7 shows the cost per MWh of first year savings.

TABLE 6-7: UTILITY PROGRAM COSTS ($2025)

	2-Year	4-Year	10-Year	20-Year
Residential	$1,550,000	$3,990,000	$16,760,000	$39,400,000
Commercial	$2,190,000	$4,590,000	$12,700,000	$21,090,000
Industrial	$800,000	$1,760,000	$5,170,000	$8,360,000
Distribution Efficiency	$100,000	$400,000	$4,100,000	$11,650,000
Agricultural	$140,000	$270,000	$660,000	$1,280,000
Total	**$4,780,000**	**$11,010,000**	**$39,390,000**	**$81,780,000**
$/First Year MWh	$494	$486	$465	$448

The cost estimates presented in this report are conservative estimates for future expenditures since they are based on historic values. Future conservation achievement may be more costly than historic conservation achievement since utilities often choose to implement the lowest cost programs first. In addition, as energy efficiency markets become more saturated, it may require more effort from the District to acquire conservation through its programs. Although not included in the above estimates, residential Low-Income programs are also significantly more costly to implement due to rebates being paid at 3 to 5 times the level of non-low income residential programs. The additional effort may result in increased administrative costs as shown in Table 6-8.

TABLE 6-8: TRC LEVELIZED COST (2025$/MWH)

	2-Year	4-Year	10-Year	20-Year
Residential	$47	$44	$40	$38
Commercial	$51	$51	$52	$53
Industrial	$55	$56	$58	$58
Distribution Efficiency	$59	$58	$58	$57
Agricultural	$15	$15	$16	$20
Total	**$47**	**$47**	**$44**	**$42**

7 Scenario Results

The costs and savings discussed throughout the report thus far describe the Base Case avoided cost scenario. Under this scenario, annual potential for the planning period was estimated by applying assumptions that reflect the District's expected avoided costs. In addition, the Council's 20-year ramp rates were applied to each measure and then adjusted to more closely reflect the District's recent level of achievement.

Additional scenarios were developed to identify a range of possible outcomes that account for uncertainties over the planning period. In addition to the Base Case scenario, this assessment tested low and high scenarios to test the sensitivity of the results to different future avoided cost values. The avoided cost values in the low and high scenarios reflect values that are realistic and lower or higher, respectively, than the Base Case assumptions.

To understand the sensitivity of the identified savings potential to avoided cost values alone, all other inputs were held constant while varying avoided cost inputs.

Table 7-1 summarizes the Base, Low, and High avoided cost input values. Relative to the values used in the 2023 CPA, many of the avoided cost assumptions have decreased including energy and capacity estimates. These changes reduced the 20-year potential estimate due to decreased cost-effectiveness; however, the adjusted ramp rates for the new time horizon increase the near-term potential slightly compared with the 2023 results.

Rather than using a single generic risk adder applied to each unit of energy, the Low and High avoided cost values consider lower and higher potential future values for each avoided cost input. These values reflect potential price risks based upon both the energy and capacity value of each measure. The final row tabulates the implied risk adders for the Low and High scenarios by summarizing all additions or subtractions relative to the Base Case values. Risk adders are provided in both energy and demand savings values. The first set of values is the maximum (or minimum in the case of negative values). The second set of risk adder values are the average values in energy terms. Further discussion of these values is provided in Appendix D.

TABLE 7-1: AVOIDED COST ASSUMPTIONS BY SCENARIO, $2025

	Base	Low	High
Energy	NWPCC April 2024 Base High Demand $19.62/MWh	2021 Plan High Demand Forecast $6.17/MWh	NWPCC Sept 2024 High Gas $26.30/MWh
Social Cost of Carbon, $/short ton	WAC 194-40-100 $48.30/MWh	WAC 194-40-100 $48.30/MWh	WAC 194-40-100 $48.30/MWh
Avoided Cost of RPS Compliance	Included in Social Cost of Carbon		
Distribution System Credit, $/kW-yr	$11.91	$11.91	$11.91
Transmission System Credit, $/kW-yr	$4.85	$4.85	$4.85
Deferred Generation Capacity Credit, $/kW-yr	$140	$0	$160
Implied Risk Adder, 20-year Levelized $/MWh $/kW-yr	N/A	Average: -$13.45/MWh and -$140/kW-year	Average: $6.68/MWh and $20/kW-year
Northwest Power Act Credit	10%	10%	10%

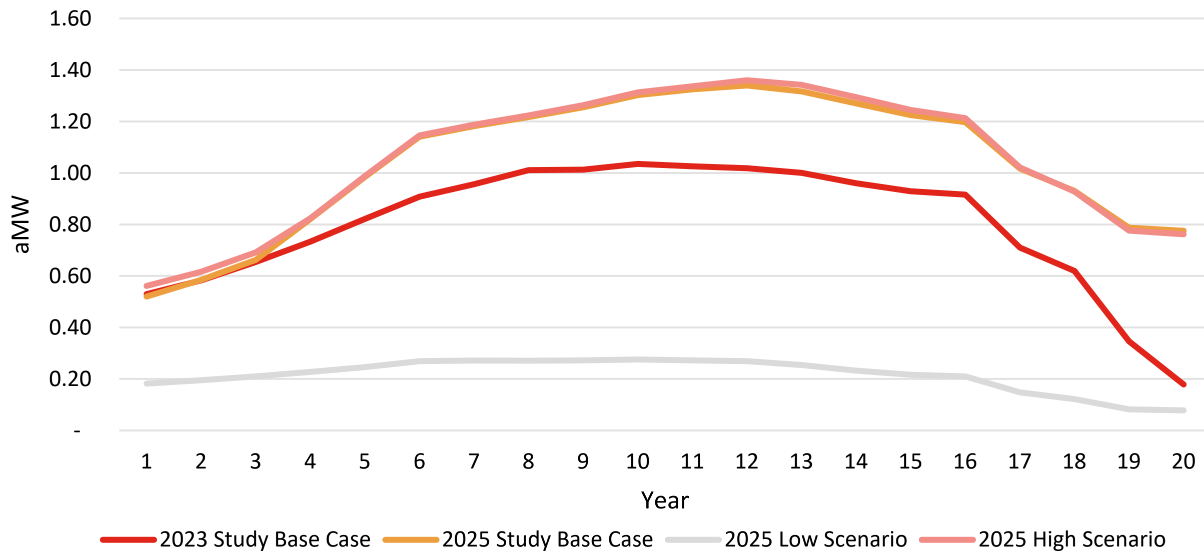
Table 7-2 summarizes results across each avoided input scenario, using Base Case load forecasts and measure acquisition rates.

TABLE 7-2: COST-EFFECTIVE POTENTIAL – AVOIDED COST SCENARIO COMPARISON

	2-Year	4-Year	10-Year	20-Year
Base Case	**1.10**	**2.59**	**9.67**	**20.85**
Low Scenario	0.38	0.81	2.42	4.30
High Scenario	1.18	3.21	9.81	21.09

Figure 7-1 compares the results of the scenario analysis with the base case from the 2023 assessment.

FIGURE 7-1: SCENARIO COMPARISON



8 Summary

This report summarizes the results of the 2025 CPA conducted for the District. The assessment provides estimates of energy savings by sector for the period 2026 to 2045with a focus on the first 10 years of the planning period, as required by the EIA. The assessment considered a wide range of conservation resources that are reliable, available, and cost effective within the 20-year planning period.

The cost-effective potential identified in this report is a low cost and low risk resource and helps to keep future electricity costs to a minimum. Additionally, conservation achievements inherently provide capacity savings to the District. Relative to the values used in the 2023 CPA, many of the avoided cost assumptions have increased including energy value estimates. These changes induced the 20-year potential estimate due to decreased cost-effectiveness.

8.1 METHODOLOGY AND COMPLIANCE WITH STATE MANDATES

The energy efficiency potential reported in this document is calculated using methodology consistent with the Council's methodology for assessing conservation resources. Appendix C documents the development of conservation targets for each WAC 194-37-070 requirement and describes how each item was completed. In addition to using methodology consistent with the Council's 2021 Power Plan, this assessment utilized many of the measure assumptions that the Council developed for the 2021 Power Plan. Additional measure updates subsequent to the 2021 Power Plan were also incorporated. Utility-specific data regarding customer characteristics, service-area composition, and historic conservation achievements were used, in conjunction with the measures identified by the Council, to determine available energy-efficiency potential. This close connection with the Council methodology enables compliance with the Washington EIA.

Three types of energy-efficiency potential were calculated: technical, achievable, and economic. Most of the results shown in this report are the economic potential, or the potential that is cost effective in the District's service territory. The economic and achievable potential considers savings that will be captured through utility program efforts, market transformation and implementation of codes and standards. Often, realization of full savings from a measure will require efforts across all three areas. Historic efforts to measure the savings from codes and standards have been limited, but regional efforts to identify and track savings are increasing as they become an important component of the efforts to meet aggressive regional conservation targets.

8.2 CONSERVATION TARGETS

The EIA states that utilities must establish a biennial target that is "no lower than the qualifying utility's pro rata share for that two-year period of its cost-effective conservation potential for the subsequent ten-year period."[15] However, the State Auditor's Office has stated that:

[15] RCW 19.285.040 Energy conservation and renewable energy targets.

> The term pro-rata can be defined as equal portions but it can also be defined as a proportion of an "exactly calculable factor." For the purposes of the Energy Independence Act, a pro-rata share could be interpreted as an even 20 percent of a utility's 10-year assessment but state law does not require an even 20 percent.[16]

The State Auditor's Office expects that qualifying utilities have analysis to support targets that are more or less than 20 percent of the ten-year assessments. This document serves as support for the target selected by the District and approved by its Commission.

8.3 SUMMARY

This study shows a range of conservation target scenarios. These scenarios are estimates based on the set of assumptions detailed in this report and supporting documentation and models. Due to the uncertainties discussed in the Introduction section of this report, actual available and cost-effective conservation may vary from the estimates provided in this report.

[16] State Auditor's Office. Energy Independence Act Criteria Analysis. Pro-Rata Definition. CA No. 2011-03. https://www.sao.wa.gov/local/Documents/CA_No_2011_03_pro-rata.pdf.

9 References

Bonneville Power Administration. BP-26 Rate Proceeding. November 2024. BP-26-E-BPA-10 Available online: https://www.bpa.gov/-/media/Aep/rates-tariff/bp-26/BP26EBPA10-Initial-Proposal-Power-Rate-Schedules-1115.pdf

Northwest Energy Efficiency Alliance. *2022 Residential Building Stock Assessment*. April 2024. Available at: https://neea.org/data/residential-building-stock-assessment

Northwest Power and Conservation Council. *Achievable Savings: A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions*. August 2007. Retrieved from: http://www.nwcouncil.org/library/2007/2007-13.htm.

Northwest Power and Conservation Council. September 2024 Wholesale Electricity Market Price and Avoided Emissions Rates Forecasts. https://nwcouncil.app.box.com/s/92rzpzc4hv7b2wzj2g1iy6mb8wvwlhyq

Northwest Power and Conservation Council. April 7, 2023 Wholesale Electricity Market Price and Avoided Emissions Rates Forecasts. https://nwcouncil.app.box.com/s/3b5rky1s5onfpqdqtqvqtzrlkwwo8y4m/file/1185194585607

Northwest Power and Conservation Council. CRAC Meeting February 21, 2025. Available at: https://nwcouncil.app.box.com/s/4e7sowhwsbu95msj5w76bsd15dqgz3mk

Northwest Power and Conservation Council Memorandum to the Power Committee Members. Subject; Updated Transmission & Distribution Deferral Value for the 2021 Power Plan. March 5, 2019. Available at: https://www.nwcouncil.org/sites/default/files/2019_0312_p3.pdf.

Conservation Resources Advisory Committee (CRAC) meeting. February 21, 2025. Available at: https://nwcouncil.app.box.com/s/4e7sowhwsbu95msj5w76bsd15dqgz3mk

Northwest Power and Conservation Council. *2021 Power Plan Technical Information and Data*. July 2020. Retrieved from: http://www.nwcouncil.org/energy/powerplan/2021/technical

State Auditor's Office. Energy Independence Act Criteria Analysis. Pro-Rata Definition. CA No. 2011-03. Retrieved from: https://www.sao.wa.gov/local/Documents/CA_No_2011_03_pro-rata.pdf

U.S. Environmental Protection Agency. *Guide to Resource Planning with Energy Efficiency.* Figure 2-1, November 2007.

Washington State Legislature. RCW 19.285.040 Energy conservation and renewable energy targets. Retrieved from: http://apps.leg.wa.gov/rcw/default.aspx?cite=19.285.040

Appendix A – Acronyms

ALH – Average Load Hours

aMW – Average Megawatt

BCR – Benefit-Cost Ratio

BPA – Bonneville Power Administration

CETA – Clean Energy Transformation Act

CPA – Conservation Potential Assessment

DVR – Demand Voltage Reduction

EIA – Energy Independence Act

ERWH – Electric Resistance Water Heater

EUI – Energy Use Intensity

GPM – Gallons per Minute

HLH – Heavy Load Hour Energy

HPWH – Heat Pump Water Heater

HVAC – Heating, Ventilation and Air-Conditioning

IRP – Integrated Resource Plan

kW – Kilowatt

kWh – Kilowatt-Hour

LED – Light-Emitting Diode

LLH – Light Load Hour Energy

MW – Megawatt

MWh – Megawatt-Hour

NEEA – Northwest Energy Efficiency Alliance

NPV – Net Present Value

O&M – Operation and Maintenance

RPS – Renewable Portfolio Standard

RTF – Regional Technical Forum

TRC – Total Resource Cost

UC – Utility Cost

Appendix B – Glossary

2021 Power Plan: A regional resource plan produced by the Northwest Power and Conservation Council (Council).

Average Megawatt (aMW): Average hourly usage of electricity, as measured in megawatts, across all hours of a given day, month or year.

Avoided Cost: Refers to the cost of the next best alternative. For conservation, avoided costs are usually market prices.

Achievable Potential: Conservation potential that takes into account how many measures will actually be implemented after considering market barriers. For lost-opportunity measures, there is only a certain number of expired units or new construction available in a specified time frame. The Council assumes 85% of all measures are achievable. Sometimes achievable potential is a share of economic potential, and sometimes achievable potential is defined as a share of technical potential.

Cost Effective: A conservation measure is cost effective if the present value of its benefits is greater than the present value of its costs. The primary test is the Total Resource Cost test (TRC), in other words, the present value of all benefits is equal to or greater than the present value of all costs. All benefits and costs for the utility and its customers are included, regardless of who pays the costs or receives the benefits.

Economic Potential: Conservation potential that considers the cost and benefits and passes a cost-effectiveness test.

Levelized Cost: Resource costs are compared on a levelized-cost basis. Levelized cost is a measure of resource costs over the lifetime of the resource. Evaluating costs with consideration of the resource life standardizes costs and allows for a straightforward comparison.

Lost Opportunity: Lost-opportunity measures are those that are only available at a specific time, such as new construction or equipment at the end of its life. Examples include heat-pump upgrades, appliances, or premium HVAC in commercial buildings.

MW (megawatt): 1,000 kilowatts of electricity. The generating capacity of utility plants is expressed in megawatts.

Non-Lost Opportunity: Measures that can be acquired at any time, such installing low-flow shower heads.

Northwest Energy Efficiency Alliance (NEEA): The alliance is a unique partnership among the Northwest region's utilities, with the mission to drive the development and adoption of energy-efficient products and services.

Northwest Power and Conservation Council "The Council": The Council develops and maintains a regional power plan and a fish and wildlife program to balance the Northwest's environment and energy needs. Their three tasks are to: develop a 20-year electric power plan that will guarantee adequate and reliable energy at the lowest economic and environmental cost to the Northwest; develop a program to protect and rebuild fish and wildlife populations affected by hydropower development in the Columbia River Basin; and educate and involve the public in the Council's decision-making processes.

Regional Technical Forum (RTF): The Regional Technical Forum (RTF) is an advisory committee established in 1999 to develop standards to verify and evaluate conservation savings. Members are appointed by the Council and include individuals experienced in conservation program planning, implementation and evaluation.

Renewable Portfolio Standards: Washington state utilities with more than 25,000 customers are required to meet defined percentages of their load with eligible renewable resources by 2012, 2016, and 2020.

Retrofit (discretionary): Retrofit measures are those that can be replaced at any time during the unit's life. Examples include lighting, shower heads, pre-rinse spray heads, or refrigerator decommissioning.

Technical Potential: Technical potential includes all conservation potential, regardless of cost or achievability. Technical potential is conservation that is technically feasible.

Total Resource Cost Test (TRC): This test is used by the Council and nationally to determine whether or not conservation measures are cost effective. A measure passes the TRC if the ratio of the present value of all benefits (no matter who receives them) to the present value of all costs (no matter who incurs them) is equal to or greater than one.

Appendix C – Documenting Conservation Targets

References:

1) Report – "Benton Public Utilities Conservation Potential Assessment 2026-2045". Final Report – June 26, 2025.
2) Model – "Benton PUD 2025 CPA Model.xlsm" and supporting files
    a. MC_and_Loadshape-Base.xlsm – referred to as "MC and Loadshape file" – contains price and load shape data

WAC 194-37-070 Documenting Development of Conservation Targets; Utility Analysis Option

NWPCC Methodology	Study Procedure	Reference
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 includes estimates for stock (e.g., number of homes, square feet of commercial floor area, industrial load) and the number of each measure that can be implemented per unit of stock. The technical potential is further constrained by the amount of stock that has already completed the measure.	Model – the technical potential is calculated as part of the achievable potential, described below.
b) Achievable 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 assessment conducted for the District used ramp rate curves to identify the amount of achievable potential for each measure. Those assumptions are for the 20-year planning period. Additional factors ranging from 85% to 95% were included to account for market barriers in the calculation of achievable potential. This factor comes from the 2021 Power Plan max achievability.	Model – the use of these factors can be found on the sector measure tabs, such as 'Residential Measures'. Additionally, the complete set of ramp rates used can be found on the 'Ramp Rates' tab.
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.	Benefits and costs were evaluated using multiple inputs; benefit was then divided by cost. Measures achieving a benefit-cost ratio greater than one were tallied. These measures are considered achievable and cost-effective (or economic).	Model – Benefit-Cost ratios are calculated at the individual level by ProCost and passed up to the model.

WAC 194-37-070 Documenting Development of Conservation Targets; Utility Analysis Option		
NWPCC Methodology	**Study Procedure**	**Reference**
d) **Total Resource Cost**: In determining economic achievable potential, perform a life-cycle cost analysis of measures or programs	The life-cycle cost analysis was performed using the Council's ProCost model. Incremental costs, savings, and lifetimes for each measure were the basis for this analysis. The Council and RTF assumptions were utilized.	Model – supporting files include ProCost files used by the Council. The life-cycle cost calculations and methods are identical to those used in the development of the Region's power plans.
e) 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	Cost analysis was conducted per the Council's methodology. Capital cost, administrative cost, annual O&M cost and periodic replacement costs were all considered on the cost side. Energy, non-energy, O&M and all other quantifiable benefits were included on the benefits side. The Total Resource Cost (TRC) benefit cost ratio was used to screen measures for cost-effectiveness (I.e., those greater than one are cost-effective).	Model – the "Measure Info Rollup" files pull in all the results from each avoided cost scenario, including the BC ratios from the ProCost results. These results are then linked to by the Conservation Potential Assessment model. The TRC analysis is done at the lowest level of the model in the ProCost files.
f) Include the incremental savings and incremental costs of measures and replacement measures where resources or measures have different measure lifetimes	Savings, cost, and lifetime assumptions from the Council's Final 2021 Power Plan Supply Curves, and RTF were used.	Model – supporting files include all of the ProCost files used updated with 2021 Power Plan and RTF updates as noted within the report. The life-cycle cost calculations and methods are identical to those used by the Council.
g) Calculate the value of 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	The Council's 2021 Power Plan measure load shapes were used to calculate time of day of savings and measure values were weighted based upon peak and off-peak pricing. This was handled using the Council's ProCost tool, so it was handled in the same way as the 2021 Power Plan models.	Model – See MC_AND_LOADSHAPE files for load shapes. The ProCost files handle the calculations.
h) Include the increase or decrease in annual or periodic operations and maintenance costs due to conservation measures	Operations and maintenance costs for each measure were accounted for in the total resource cost per the Council's assumptions.	Model – the ProCost files contain the same assumptions for periodic O&M as the Council and RTF.

WAC 194-37-070 Documenting Development of Conservation Targets; Utility Analysis Option		
NWPCC Methodology	**Study Procedure**	**Reference**
i) 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	The Council's April 2023 Baseline market price forecast was used to value energy in the Base Case Scenario.	Report –See Appendix D. Model – See MC_AND_LOADSHAPE files ("Base Market Forecast" worksheet).
j) Include deferred capacity expansion benefits for transmission and distribution systems	Deferred transmission capacity expansion benefits were given a benefit of $3.77/kW-year in the cost-effectiveness analysis. A distribution system credit of $9.26/kW-year was also used ($2016). These values were developed by the Council in preparation for the Ninth Power Plan.	Model – this value can be found on the ProData page of each ProCost file.
k) Include deferred generation benefits consistent with the contribution to system peak capacity of the conservation measure	Deferred generation capacity expansion benefits were given a value of $ 121.87/kW-year ($2016) in the cost effectiveness analysis for the Base Case Scenario. This is based upon the District's marginal cost for generation capacity. See Appendix D for further discussion of this value.	Model – this value can be found on the ProData page of the ProCost file.
l) Include the social cost of carbon emissions from avoided non-conservation resources	This CPA uses the social cost of carbon values specified in WAC 194-40-100	The MC_AND_LOADSHAPE files contain the carbon cost assumptions for each avoided cost scenario.
m) 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	In this analysis, risk was considered by varying avoided cost inputs and analyzing the variation in results. Rather than an individual and non-specific risk adder, our analysis included a range of possible values for each avoided cost input.	The scenarios section of the report documents the inputs used and the results associated. Appendix D discusses the risk adders used in this analysis.
n) Include all non-energy impacts that a resource or measure may provide that can be quantified and monetized	Quantifiable non-energy benefits were included where appropriate. Assumptions for non-energy benefits are the same as in the Council's most recent power plan. Non-energy benefits include, for example, water savings from clothes washers.	Model – the ProCost files contain the same assumptions for non-power benefits as the Council and RTF. The calculations are handled in ProCost.

WAC 194-37-070 Documenting Development of Conservation Targets; Utility Analysis Option		
NWPCC Methodology	**Study Procedure**	**Reference**
o) Include an estimate of program administrative costs	Total costs were tabulated and an estimated 20% of total was assigned as the administrative cost. This value is consistent with regional average and BPA programs. The 20% value was used in the Fifth, Sixth, Seventh Power plans and 2021 Power Plans.	Model – this value can be found on the ProData page of the ProCost V.4.006 file.
p) Include the cost of financing measures using the capital costs of the entity that is expected to pay for the measure	Costs of financing measures were included based on the weighted average cost of capital from the 2021 Power Plan.	Model – this value can be found on the ProData page of the ProCost V.4.006 file.
q) Discount future costs and benefits at a discount rate equal to the discount rate used by the utility in evaluating non-conservation resources	Discount rates were applied to each measure based upon the Council's methodology. A real discount rate of 3.7% was used, based on the Council's most recent analyses in support of the Ninth Power Plan.	Model – this value can be found on the ProData page of the ProCost V.4.006 file.
r) 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	A 10% bonus was added to all measures in the model parameters per the Conservation Act.	Model – this value can be found on the ProData page of the ProCost V.4.006 ProData page.

Appendix D – Avoided Cost and Risk Exposure

The District (District) Conservation Potential Assessment (CPA) was conducted for the period 2024 through 2043 as required under RCW 19.285 and WAC 194.37. According to WAC 197.37.070, the District must evaluate the cost-effectiveness of conservation by setting avoided energy costs equal to a forecast of regional market prices. In addition, several other components of the avoided cost of energy efficiency savings must be evaluated including generation capacity value, transmission and distribution costs, risk, and the social cost of carbon. The 2025 CPA considers three avoided cost scenarios: Base, Low, and High. Each of these is discussed below.

ENERGY VALUE

For the purposes of 2025, EES used the NW Council's September 2024 market price forecasts. These forecasts are described below.

- **Mid_C PRM Max** scenario has the highest levelized price at **$29.65/MWh.** [17] Assumptions include high regional demand, a limited 18% planning reserve margin for capacity, and mid-case natural gas prices.
- **Mid_C High Gas** scenario has a 20-year levelized price is **$26.30/MWh**. Assumptions include high regional demand, no limit on planning reserve margins, and high gas prices.
- **Mid_C base High Demand** scenario has a 20-year levelized price is **$19.62/MWh**. Assumptions include high regional demand, no limit on planning reserve margins, and mid-case gas prices.

[17] Discount rate per Conservation Resources Advisory Committee (CRAC) meeting. February 21, 2025 https://nwcouncil.app.box.com/s/4e7sowhwsbu95msj5w76bsd15dqgz3mk

Figure D-1 illustrates the annualized price forecasts.

FIGURE D-1: FORECAST MARKET PRICES ($2025)

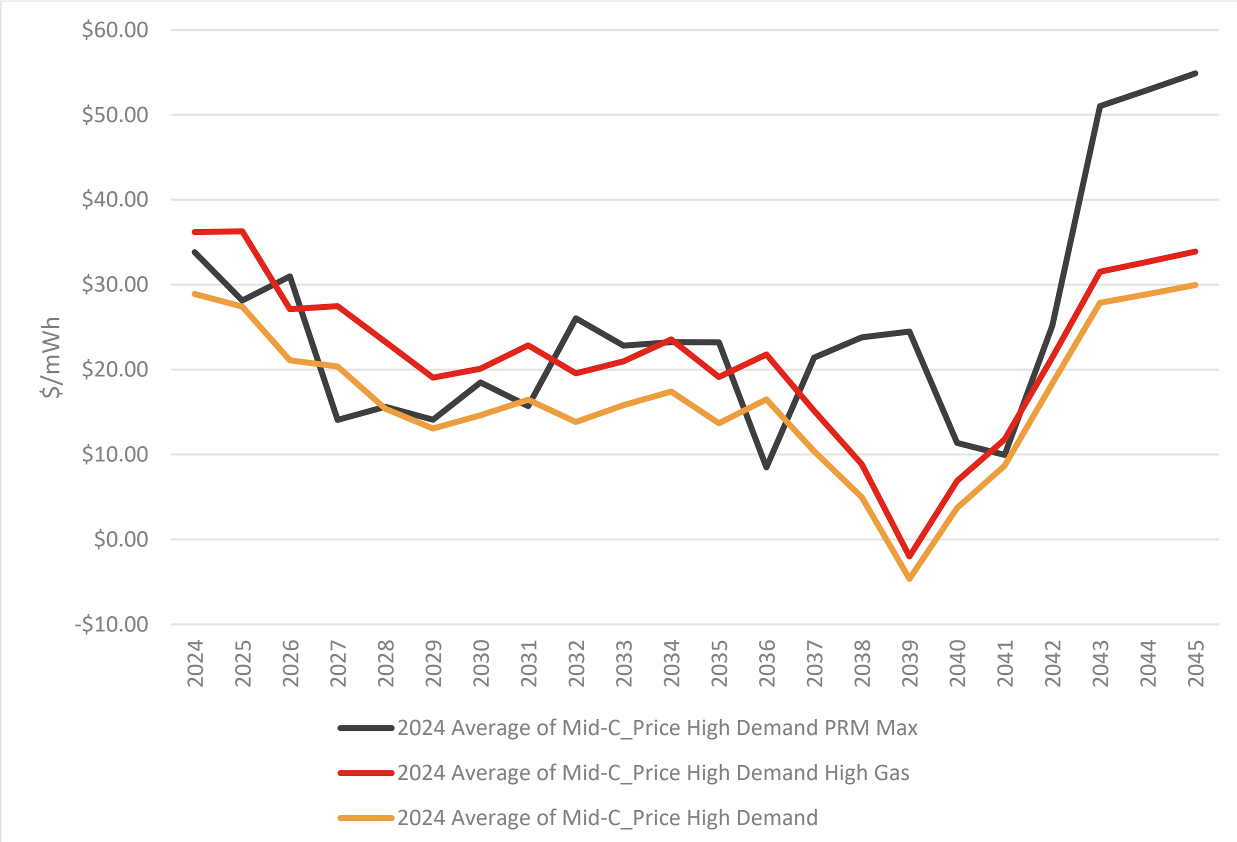


Figure D-2 compares the 2024 forecasts with the base case price forecast from the previous CPA (2023). The figure shows the 2024 price forecast is consistently higher than the 2021P forecast, reflecting stronger market expectations. Prices are projected to decline through 2029 but remain above prior estimates. From 2040 onward, the 2024 forecast shows a sharp upward trend, while the 2021P forecast remains negative or low with a levelized value of $6.17/MWh in 2025 dollars which is 76% lower compared to the average 2024 price forecast of around $25.70/MWh.

FIGURE D-2: COMPARISON WITH 2021 PLAN PRICE FORECAST ($2025)

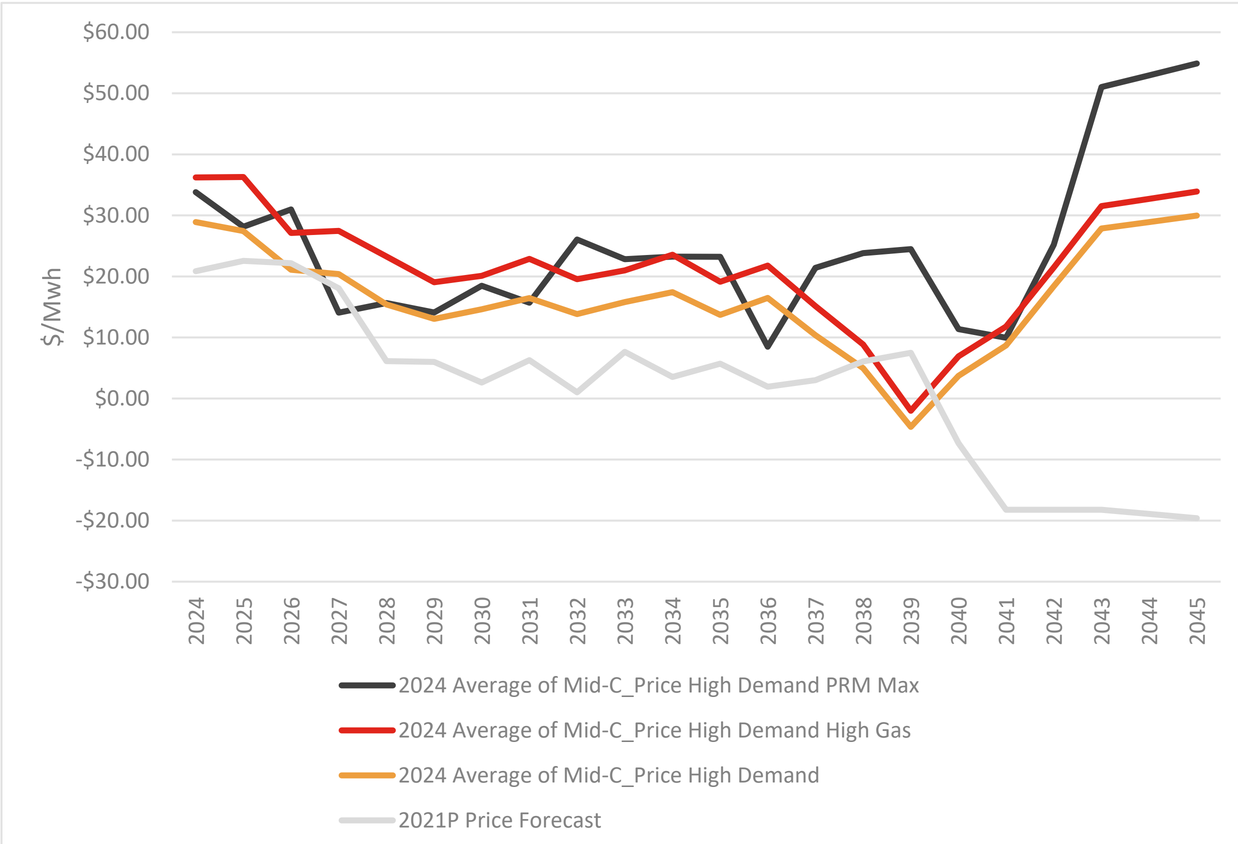


Figure D-3 Shows the varying levels of price uncertainty of the three forecasts. The PRM Max scenario exhibits the greatest variability.

FIGURE D-3: ANNUAL MID-C PRICES IN 2030 ($2016/MWH)

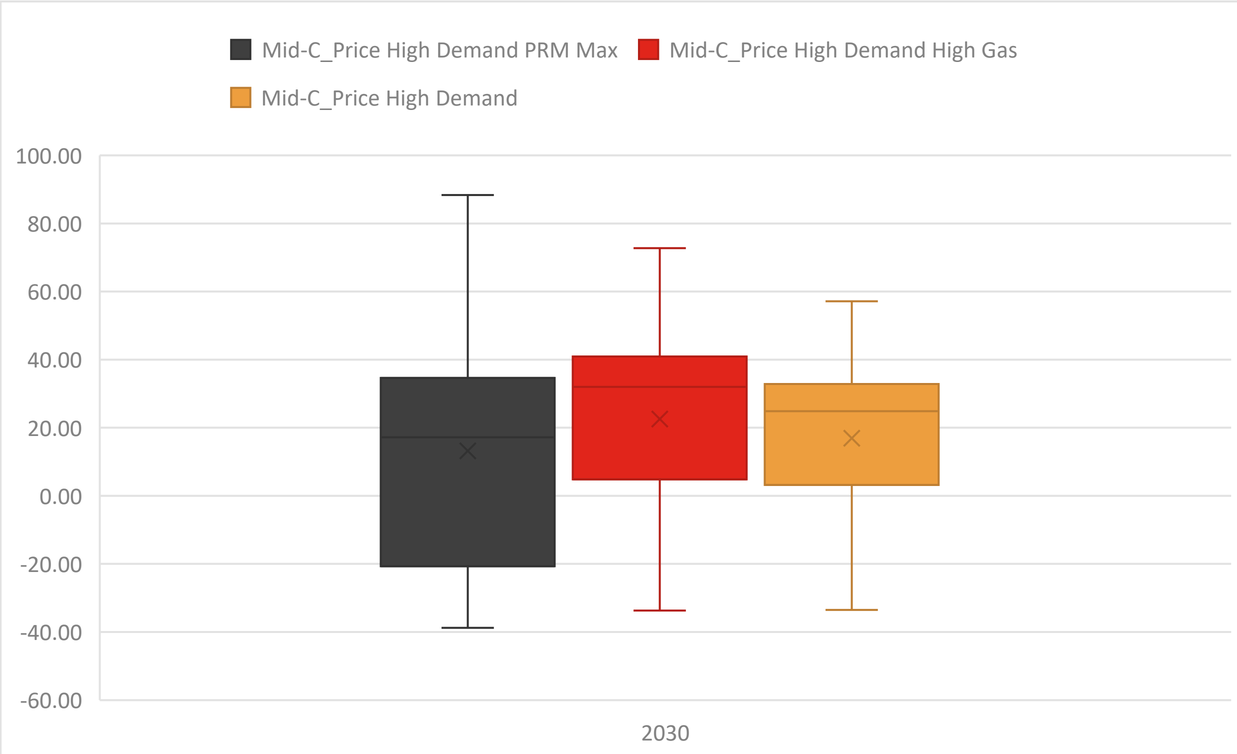


Figure D-4 shows that prices fluctuate across the months, showing clear seasonal variations. Some months exhibit significant price volatility, with a wider range of possible values, while others are more stable. The PRM Max scenario tends to have the highest price range. Negative prices appear during spring due to regional hydroelectric production and lower seasonal demand.

FIGURE D-4: MONTHLY MID-C PRICES IN 2030 ($2016/MWH)

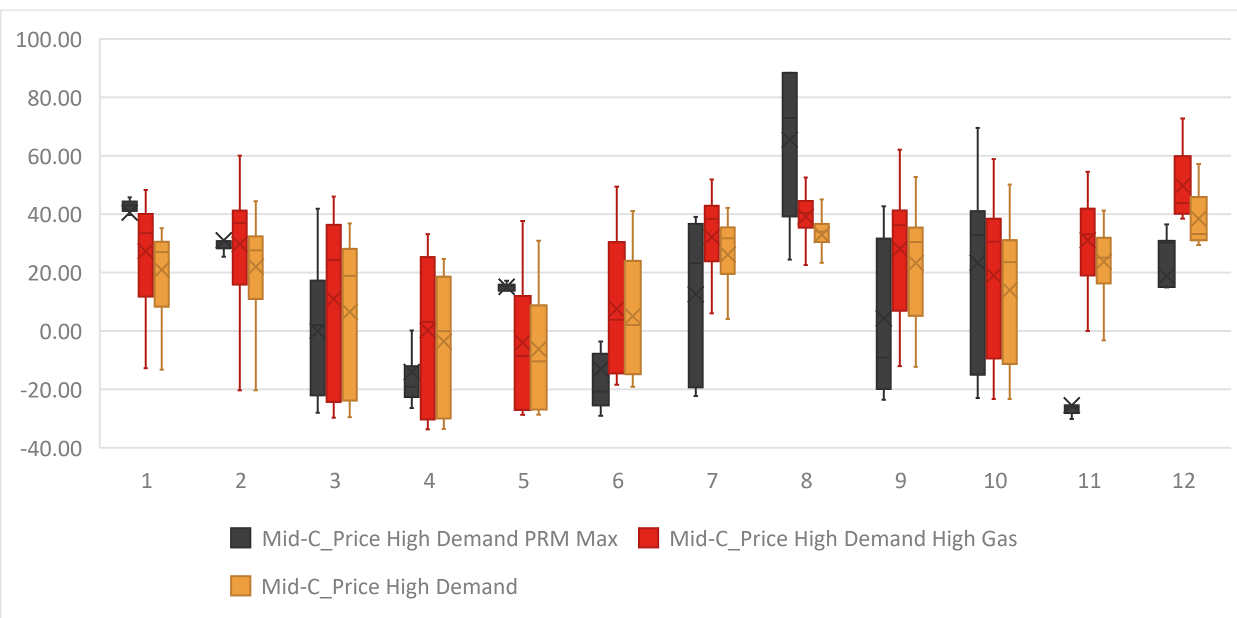
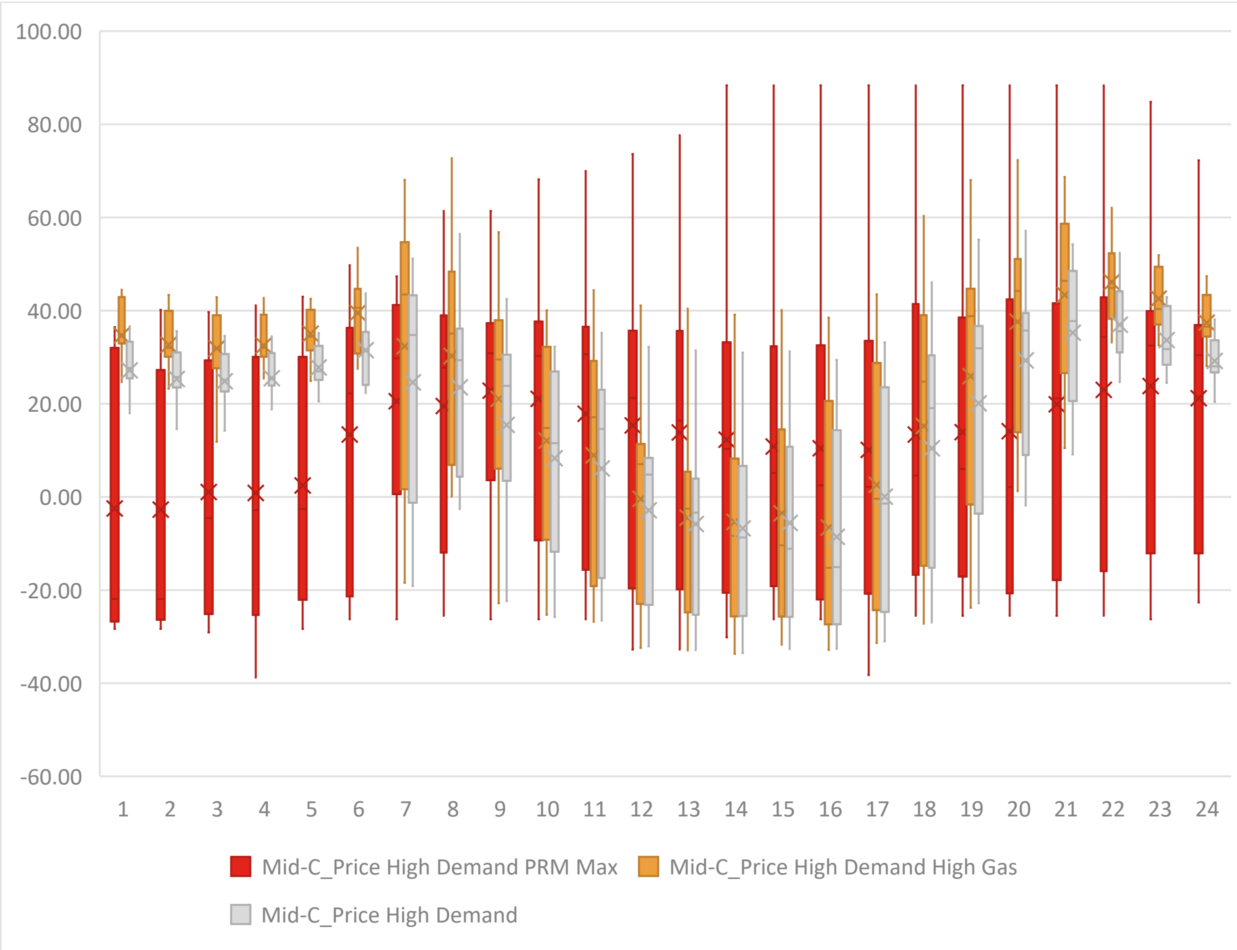


Figure D-5 shows the prices tend to be lower during off-peak hours (late night and early morning). Prices increase significantly during peak demand hours, with the highest variability observed in the evening hours. The PRM Max scenario exhibits the highest degree of uncertainty, with wide price swings. The presence of negative prices at certain hours represent excess generation during specific times such as during daylight hours when California solar generation peaks.

FIGURE D-5: HOURLY MID-C PRICES IN 2030, $2016/MWH



Based on the above analysis, the High Gas price forecast is used in the High conservation scenario. The High Gas scenario is more similar to the High Demand forecast used in the base case than PRM Max. This makes it a more reasonable high case. Because the high scenario is primarily about testing higher market prices (as opposed to testing the underlying assumptions of the "PRM Max" scenario), it is appropriate to use the High Gas case to test sensitivity.

NON-ENERGY VALUES

From a total resource cost perspective, energy efficiency provides multiple benefits beyond the avoided cost of energy. These include deferred capital expenses on generation, transmission, and distribution capacity; as well as the reduction of required renewable energy credit (REC) purchases, avoided social costs of carbon emissions, and the reduction of utility resource portfolio risk exposure. Since energy efficiency measures provide both peak demand and energy savings, these other benefits are monetized as value per unit of either kWh or kW savings (Figure D-6).

FIGURE D-6: OVERVIEW OF PORTFOLIO REQUIREMENTS

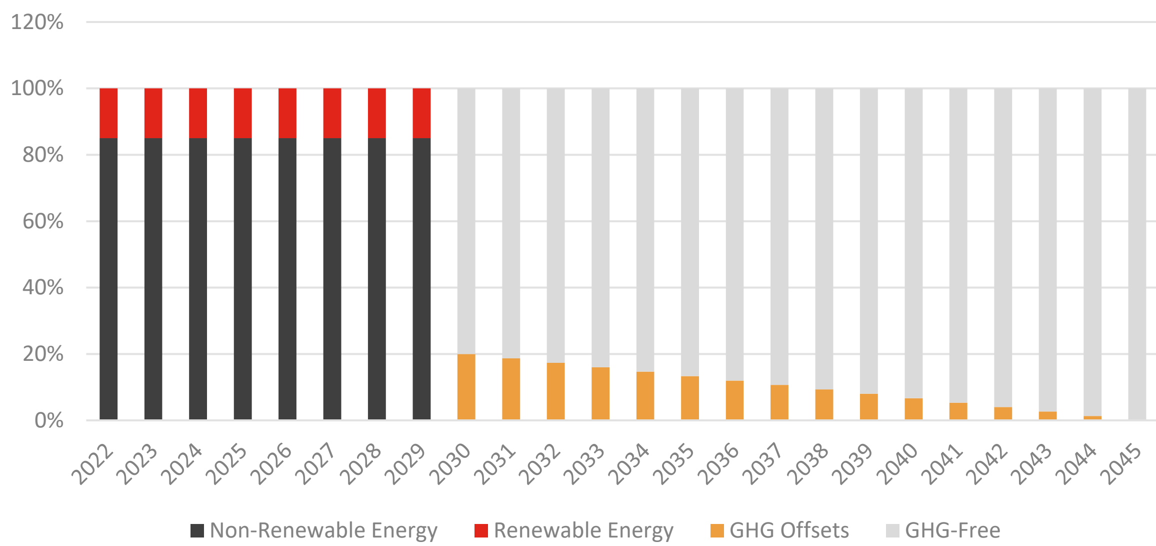
Energy-Based	Capacity Based
• Social Cost of Carbon • Renewable Energy Credits • GHG-Free or Neutral Resources • Risk Reduction Premium	• Generation Capacity Deferral • Transmission Capacity Deferral • Distribution Capacity Deferral • Risk Reduction Premium

The estimated values and associated uncertainties for these avoided cost components are based on the District's 9th Northwest Regional Power plan and relevant portfolio requirements from the Clean Energy Transformation Act (CETA). The timeline below summarizes the relevant milestones for portfolio planning. The type of energy the District will need to procure is based on these requirements; therefore, the requirements set the avoided cost as it relates to capacity, renewable, and GHG-free power supply (Figure D-7).

FIGURE D-7: OVERVIEW OF PORTFOLIO REQUIREMENTS

Through 2030, the District must meet the renewable portfolio standard (RPS) set for Washington State Utilities of 15% of the system load. The RPS can be met through either bundled or unbundled RECs. Next, CETA establishes a 100% GHG neutral requirement by 2030. The requirement states that at least 80% of a utility's portfolio must be sourced directly from either renewable[18] or non-emitting resources.[19] A utility may then meet the mandate by purchasing no more than 20% of its portfolio in offsets such as unbundled REC purchases. The offsets will then be phased out by 2045 as shown in Figure D-8.

FIGURE D-8: SUMMARY OF RPS AND CETA PORTFOLIO REQUIREMENTS (MINIMUM REQUIREMENT EXAMPLE)



Social Cost of Carbon

The social cost of carbon is a cost that society incurs when fossil fuels are burned to generate electricity. Both the EIA rules and CETA require that CPAs include the social cost of carbon when evaluating cost effectiveness using the total resource cost test (TRC). CETA further specifies the social cost of carbon values to be used in conservation and demand response studies. These values are shown in Table D-1 below.

[18] Renewable resources include water, wind, solar energy, geothermal, renewable natural gas, renewable hydrogen, wave, ocean or tidal power, and biodiesel not derived from crops raised on land cleared from old growth forest or first growth, or biomass. (Chapter 173-444 WAC available at: https://ecology.wa.gov/DOE/files/c0/c08b45ae-7140-4b30-a3c2-faf8aa042651.pdf)

[19] Non-emitting resources are those that generate electricity or provide capacity of ancillary services to an electric utility that do not emit greenhouse gases as a by-product. *See id*.

TABLE D-1: SOCIAL COST OF CARBON VALUES[20]

Year in Which Emissions Occur or Are Avoided	Social Cost of Carbon Dioxide (in 2007 dollars per metric ton)	Social Cost of Carbon Dioxide (in 2018 dollars per metric ton)
2020	$62	$74
2025	$68	$81
2030	$73	$87
2035	$78	$93
2040	$84	$100
2045	$89	$106
2050	$95	$113

According to WAC 194-40-110, values may be adjusted for any taxes, fees or costs incurred by utilities to meet portfolio mandates.[21] For example, the social cost of carbon is the full value of carbon emissions which includes the cost to utilities and ratepayers associated with moving to non-emitting resources. Rather than adjust the social cost of carbon for the cost of RECs or renewable energy, the values for RECS and renewable energy are excluded from the analysis to avoid double counting.

The emissions intensity of the marginal resource (market) is used to determine the $/MWh value for the social cost of carbon. Ecology states that unspecified resources should be given a carbon intensity value of 0.437 metric tons of CO_2e/MWh of electricity (0.874 lbs/kWh).[22] This is an average annual value applied to in all months in the conservation potential model.[23]

Avoided Renewable Energy Purchases

Renewable energy purchases need to meet both RPS and CETA and can be avoided through conservation. Utilities may meet Washington RPS through either bundled energy purchases such as purchasing the output of a wind resource where the non-energy attributes remain with the output, or they may purchase unbundled RECs.

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[20] WAC 194-40-100. Available at: https://apps.leg.wa.gov/wAc/default.aspx?cite=194-40-100&pdf=true

[21] WAC 194-40-110 (b).

[22] WAC 173-444-040 (4).

[23] Typically, the emissions intensity would be higher in months outside of spring run-off (June-July). The seasonal nature of carbon intensity is not modeled due to the prescriptive annual value established by Ecology in WAC 173-444-040.

As stated above, the value of avoided renewable energy credit purchases resulting from energy efficiency is accounted for within the social cost of carbon construct. The social cost of carbon already considers the cost of moving from an emitting resource to a non-emitting resource. Therefore, it is not necessary to include an additional value for renewable energy purchases prior to 2045 when all energy must be non-emitted or renewable.

Beginning in 2045, the social cost of carbon may no longer be an appropriate adder in resource planning. However, prior to 2045 utilities may still use offsets to meet CETA requirements. Since the study period of this evaluation ends prior to 2045, the avoided social cost of carbon is included in each year. For future studies that extend to 2045 and beyond, it would be appropriate to include renewable energy or non-emitting resource costs as the avoided cost of energy rather than market plus the social cost of carbon.

Risk Adder

In general, the risk that any utility faces is that energy efficiency will be undervalued, either in terms of the value per kWh or per kW of savings, leading to an under-investment in energy efficiency and exposure to higher market prices or preventable investments in infrastructure. The converse risk—an over-valuing of energy and subsequent over-investment in energy efficiency—is also possible, albeit less likely. For example, an over-investment would occur if an assumption is made that economies will remain basically the same as they are today, and subsequent sector shifts or economic downturns cause large industrial customers to close their operations. Energy efficiency investments in these facilities may not have been in place long enough to provide the anticipated low-cost resource.

In order to address risk, the Council develops a risk adder ($/MWh) for its cost-effectiveness analysis of energy efficiency measures. This adder represents the value of energy efficiency savings not explicitly accounted for in the avoided cost parameters. The risk adder is included to ensure an efficient level of investment in energy efficiency resources under current planning conditions. Specifically, in cases where the market price has been low compared to historic levels, the risk adder accounts for the likely possibility that market prices will increase above current forecasts.

The value of the risk adder has varied depending on the avoided cost input values. The adder is the result of stochastic modeling and represents the lower risk nature of energy efficiency resources. In the Sixth Power Plan the risk adder was significant (up to $50/MWh for some measures). In the Seventh Power Plan the risk adder was determined to be $0/MWh after the addition of the generation capacity deferral credit. The 2021 Power Plan used the same methodology as the Seventh Plan. While the Council uses stochastic portfolio modeling to value the risk credit, utilities conduct scenario and uncertainty analysis. The scenarios modeled in the District's CPA include an inherent value for the risk credit such has higher market prices due to a number of factors including electrification, and increased renewables integrated onto the grid.

For the District's 2025 CPA, the avoided cost parameters have been estimated explicitly, and a scenario analysis is performed. Therefore, no risk adder was used for the base case. Variation in other avoided cost inputs covers a range of reasonable outcomes and is sufficient to identify the sensitivity of the cost-effective energy efficiency potential to a range of outcomes. The scenario results present a range of cost-effective energy efficiency potential, and the identification of the District's biennial target based on the range modeled is effectively selecting the utility's preferred risk strategy and associated risk credit.

Deferred Transmission and Distribution System Investment

Energy efficiency measure savings reduce capacity requirements on both the transmission and distribution systems (Table D-2). In preparation of the Council's 9th Power plan, the Council has updated these avoided costs to $4.77/kW-year and $11.71/kW-year for transmission and distribution systems, respectively ($2024).[24] These assumptions, converted to 2025 dollars, are used in all scenarios in the CPA.

TABLE D-2: T&D DEFERRAL VALUES UPDATED VS PREVIOUS, ($2016)

	Previous[25]	Updated East Region
Distribution System Credit, $/kW-yr	$6.85	$9.26
Transmission System Credit, $/kW-yr	$3.08	$3.77

Deferred Investment in Generation Capacity

Beginning in October 2023, the District will be a load following customer of BPA. As a load following customer, the District's avoided cost of capacity is built into BPA's preference rates. BPA's Initial Proposal BP26 demand rates are escalated 3% each rate period (every two years).[26] Over the 20-year analysis period, the resulting cost of avoided capacity is $140/kW-year ($2025) in levelized terms.

A generation capacity value of $148/kW-year ($2025) is used in the high scenario to represent the cost of battery storage.

[24] Northwest Power and Conservation Council. CRAC Meeting February 21, 2025. Available at: https://nwcouncil.app.box.com/s/4e7sowhwsbu95msj5w76bsd15dqgz3mk

[25] Northwest Power and Conservation Council Memorandum to the Power Committee Members. Subject; Updated Transmission & Distribution Deferral Value for the 2021 Power Plan. March 5, 2019. Available at: https://www.nwcouncil.org/sites/default/files/2019_0312_p3.pdf.

[26] BP-26 Rate Proceeding. November 2024. BP-26-E-BPA-10 Available online: https://www.bpa.gov/-/media/Aep/rates-tariff/bp-26/BP26EBPA10-Initial-Proposal-Power-Rate-Schedules-1115.pdf

SUMMARY OF SCENARIO ASSUMPTIONS

Table D-3 summarizes the recommended scenario assumptions. The Base Case represents the most likely future.

TABLE D-3: AVOIDED COST ASSUMPTIONS BY SCENARIO, $2025

	Base	Low	High
Energy	NWPCC April 2024 Base High Demand $19.62/MWh	April 2023 Council Baseline Forecast $8.15/MWh	NWPCC Septl 2024 High Gas $26.30/MWh
Social Cost of Carbon, $/short ton	WAC 194-40-100 $48.30/MWh	WAC 194-40-100 $48.30/MWh	WAC 194-40-100 $48.30/MWh
Avoided Cost of RPS Compliance	Included in Social Cost of Carbon		
Distribution System Credit, $/kW-yr	$11.91	$11.91	$11.91
Transmission System Credit, $/kW-yr	$4.85	$4.85	$4.85
Deferred Generation Capacity Credit, $/kW-yr	$140	$0	$160
Implied Risk Adder, 20-year Levelized **$/MWh** **$/kW-yr**	N/A	Average: -$13.45/MWh and -$140/kW-year	Average: $6.68/MWh and $20/kW-year
Power Act Credit	10%	10%	10%

Appendix E – Ramp Rate Documentation

This section is intended to document how ramp rates were adjusted to align near term potential with recent achievements of the District programs.

Modelling work began with the 2021 Power Plan ramp rate assignments for each measure. The District's program achievements from 2020 through 2024 were compared at a sector level with the first two years of the study period, 2026-2027. This allowed for the identification of sectors where ramp rate adjustments may be necessary.

Table E-1 below shows the results of the comparison by sector after ramp rate adjustments were made. The District has recorded 0.77 aMW per year on average across all sectors in program achievement. The District's share of NEEA savings has averaged an additional 0.15 aMW since the 2021 Power Plan. While historic achievement is higher than the CPA potential, from a sector-level perspective, the 2026-2027 potential is more aggressive when comparing the potential by sector. Industrial savings are predicted to decline in the future since many or the measures have already been implemented. This leaves the majority of savings that need to come from harder to reach applications such as small commercial and residential customers.

TABLE E-1: RESULTS OF COMPARISON BY SECTOR

Comparison of Sector-Level Program Achievement and Potential (aMW)						
	Program History			Average	CPA Potential	
	2022	2023	2024	2020-2024	2026	2027
Residential	0.12	0.28	0.03	0.13	0.15	0.21
Commercial	0.09	0.21	0.20	0.22	0.23	0.23
Industrial	0.14	0.34	0.18	0.35	0.09	0.09
Agricultural	0.00	0.28	0.03	0.06	0.05	0.04
Distribution Efficiency	0.02	0.00	0.00	0.01	0.01	0.01
NEEA	0.13	0.15	0.18	0.15		
Total	**0.50**	**1.26**	**0.62**	**0.92**	**0.52**	**0.58**

*Projected

The potential estimates in this study were developed based on customized ramp rates. Customized ramp rates were necessary to project reasonable program savings based on the District's recent achievement. It is expected that much of the future potential be achieved from harder to reach residential and commercial customers. The District has detailed its continued efforts to improve energy efficiency for low-income customers in its Clean Energy Implementation Plan.

Appendix F – Measure List

This appendix provides a high-level measure list of the energy efficiency measures evaluated in the 2025 CPA. The CPA evaluated thousands of measures; the measure list does not include each individual measure; rather it summarizes the measures at the category level, some of which are repeated across different units of stock, such as single family, multifamily, and manufactured homes. Specifically, utility conservation potential is modeled based on incremental costs and savings of individual measures. Individual measures are then combined into measure categories to more realistically reflect utility-conservation program organization and offerings. For example, single family attic insulation measures are modeled for a variety of upgrade increments: R-0 to R-38, R-0 to R-49, or R-19 to R-38. The increments make it possible to model measure savings and costs at a more precise level. Each of these individual measures are then bundled across all housing types to result in one measure group: attic insulation.

The following tables list the conservation measures (at the category level) that were used to model conservation potential presented in this report. Measure data was sourced from the Council's 2021 Plan workbooks and updates developed by the Regional Technical Forum for proven and active measures as of March 1, 2025. Please note that some measures may not be applicable to an individual utility's service territory based on characteristics of the utility's customer sectors.

TABLE F-1: RESIDENTIAL END USES AND MEASURES

Residential End Uses and Measures		
End Use	**Measures/Categories**	**Data Source**
Appliances	Heat Pump Clothes Dryer	2021 Power Plan
	Clothes Dryer	Regional Technical Forum
	Oven	2021 Power Plan
Electronics	Advanced Power Strips	2021 Power Plan
	Desktop	2021 Power Plan
	Laptop	2021 Power Plan
	Monitor	2021 Power Plan
	Air Cleaners	2021 Power Plan
Food Preparation	Electric Oven	2021 Power Plan
	Microwave	2021 Power Plan
HVAC	Air Source Heat Pump	2021 Power Plan
	Controls, Commissioning, and Sizing	2021 Power Plan
	Central Air Conditioning	2021 Power Plan
	Ductless Heat Pump	2021 Power Plan
	Ducted Heat Pump	2021 Power Plan
	Duct Sealing	2021 Power Plan
	Ground Source Heat Pump	2021 Power Plan
	Heat Recovery Ventilation	2021 Power Plan
	Attic Insulation	2021 Power Plan
	Floor Insulation	2021 Power Plan
	Wall Insulation	2021 Power Plan
	Windows	2021 Power Plan
	Cellular Shades Whole House Fan	2021 Power Plan 2021 Power Plan
	Wi-Fi Enabled Thermostats	2021 Power Plan
Lighting	Linear Fluorescent Lighting	2021 Power Plan

	Floor/Table Lamps	2021 Power Plan
	Ceiling and Wall Flush Mount	2021 Power Plan
	Downlight Fixture	2021 Power Plan
	Exterior Porch	2021 Power Plan
	Linear Porch	2021 Power Plan
	Track Lighting	2021 Power Plan
	Linear Base	2021 Power Plan
	Decorative Base	2021 Power Plan
Refrigeration	Freezer	2021 Power Plan
	Refrigerator	2021 Power Plan
Water Heating	Aerator	2021 Power Plan
	Water Heater Pipe Insulation	2021 Power Plan
	Clothes Washer	2021 Power Plan
	Dishwasher	2021 Power Plan
	Heat Pump Water Heater	Regional Technical Forum
	Showerheads	2021 Power Plan
	Solar Water Heater	2021 Power Plan
	Circulator Controls	2021 Power Plan
	Thermostatic Valve on Showerheads	2021 Power Plan
	Wastewater Heat Recovery	2021 Power Plan
Whole Building	EV Charging Equipment	2021 Power Plan
	Behavior	2021 Power Plan
	Well Pump	2021 Power Plan

TABLE F-2: COMMERCIAL END USES AND MEASURES

Commercial End Uses and Measures		
End Use	**Measures/Categories**	**Data Source**
Compressed Air	Controls, Equipment, & Demand Reduction	2021 Power Plan
Electronics	Desktop Computer	2021 Power Plan
	Laptop Computer	2021 Power Plan
	Smart Plug Power Strips	2021 Power Plan
	Data Center Measures	2021 Power Plan
Food Preparation	Combination Ovens	Regional Technical Forum
	Convection Ovens	Regional Technical Forum
	Fryers	Regional Technical Forum
	Hot Food Holding Cabinet	Regional Technical Forum
	Steamer	Regional Technical Forum
	Pre-Rinse Spray Valve	Regional Technical Forum
HVAC	Advanced Rooftop Controller	2021 Power Plan
	Chiller Upgrade	2021 Power Plan
	Commercial Energy Management	2021 Power Plan
	Demand Control Ventilation	2021 Power Plan
	Ductless Heat Pumps	2021 Power Plan
	Economizers	2021 Power Plan
	Secondary Glazing Systems	2021 Power Plan
	Variable Refrigerant Flow	2021 Power Plan
	Web-Enabled Programmable Thermostat	2021 Power Plan
	Fans	2021 Power Plan
	PTPH	2021 Power Plan
Lighting	Bi-Level Stairwell Lighting	2021 Power Plan
	Exterior Building Lighting	2021 Power Plan
	Exit Signs	2021 Power Plan
	Lighting Controls	2021 Power Plan
	Interior Lighting	2021 Power Plan
	Garage Lighting	2021 Power Plan
	Street & Roadway Lighting	2021 Power Plan
Motors/Drives	ECM for Variable Air Volume	2021 Power Plan
	Motor Rewinds	2021 Power Plan
Process Loads	Municipal Water Supply	2021 Power Plan
Refrigeration	Grocery Refrigeration Bundle	2021 Power Plan
	Freezer	2021 Power Plan
Water Heating	Commercial Clothes Washer	2021 Power Plan
	Showerheads	2021 Power Plan
	Clean Water Pumps Heat Pump Water Heaters Circulator Pumps	2021 Power Plan 2021 Power Plan 2021 Power Plan
Process Loads	Elevators Engine Block Heater Control	2021 Power Plan 2021 Power Plan

TABLE F-3: INDUSTRIAL END USES AND MEASURES

Industrial End Uses and Measures		
End Use	**Measures/Categories**	**Data Source**
Compressed Air	Air Compressor Equipment	2021 Power Plan
	Demand Reduction	2021 Power Plan
Energy Management	Air Compressor Optimization	2021 Power Plan
	Energy Project Management	2021 Power Plan
	Fan Energy Management	2021 Power Plan
	Fan System Optimization	2021 Power Plan
	Cold Storage Tune-up	2021 Power Plan
	Chiller Optimization	2021 Power Plan
	Integrated Plant Energy Management	2021 Power Plan
	Plant Energy Management	2021 Power Plan
	Pump Energy Management	2021 Power Plan
	Pump System Optimization	2021 Power Plan
Fans	Efficient Centrifugal Fan	2021 Power Plan
	Fan Equipment Upgrade	2021 Power Plan
Hi-Tech	Clean Room Filter Strategy	2021 Power Plan
	Clean Room HVAC	2021 Power Plan
	Chip Fab: Eliminate Exhaust	2021 Power Plan
	Chip Fab: Exhaust Injector	2021 Power Plan
	Chip Fab: Reduce Gas Pressure	2021 Power Plan
	Chip Fab: Solid State Chiller	2021 Power Plan
Lighting	Efficient Lighting	2021 Power Plan
	High-Bay Lighting	2021 Power Plan
	Lighting Controls	2021 Power Plan
Low & Medium Temp Refrigeration	Food: Cooling and Storage	2021 Power Plan
	Cold Storage Retrofit	2021 Power Plan
	Grocery Distribution Retrofit	2021 Power Plan
Material Handling	Material Handling Equipment	2021 Power Plan
	Material Handling VFD	2021 Power Plan
Metals	New Arc Furnace	2021 Power Plan
Misc.	Synchronous Belts	2021 Power Plan
	Food Storage: CO2 Scrubber	2021 Power Plan
	Food Storage: Membrane	2021 Power Plan
Motors	Motor Rewinds	2021 Power Plan
Paper	Efficient Pulp Screen	2021 Power Plan
	Material Handling	2021 Power Plan
	Premium Control	2021 Power Plan
	Premium Fan	2021 Power Plan
Process Loads	Municipal Sewage Treatment	2021 Power Plan
Pulp	Efficient Agitator	2021 Power Plan
	Effluent Treatment System	2021 Power Plan
	Premium Process	2021 Power Plan
	Refiner Plate Improvement	2021 Power Plan
	Refiner Replacement	2021 Power Plan
Pumps	Equipment Upgrade	2021 Power Plan
Transformers	New/Retrofit Transformer	2021 Power Plan
Wood	Hydraulic Press	2021 Power Plan

	Pneumatic Conveyor	2021 Power Plan
All Electric	Wastewater Treatment Water Supply Electric Forklift Battery	2021 Power Plan

TABLE F-4 AGRICULTURE END USES AND MEASURES

Agriculture End Uses and Measures		
End Use	**Measures/Categories**	**Data Source**
Dairy Efficiency	Efficient Lighting	2021 Power Plan
	Milk Pre-Cooler	2021 Power Plan
	Vacuum Pump	2021 Power Plan
Irrigation	Low Energy Sprinkler Application	2021 Power Plan
	Irrigation Hardware	2021 Power Plan
	Line Pressure Reduction	2021 Power Plan
Lighting	Agricultural Lighting	2021 Power Plan
Process Loads	Circulating Block Heater for Back -Up Generator	2021 Power Plan
	Energy Free Stock Tank	2021 Power Plan
Motors/Drives	Green Motor Rewinds	2021 Power Plan

TABLE F-5: DISTRIBUTION EFFICIENCY END USES AND MEASURES

Distribution Efficiency End Uses and Measures		
End Use	**Measures/Categories**	**Data Source**
Distribution Efficiency	ECM-1 LDC Voltage Control without VVO & AMI	2021 Power Plan
	ECM-2 & ECM 3 LDC Voltage Control with VVO & AMI	2021 Power Plan

Appendix G –Energy Efficiency Potential by End-Use

TABLE G-1: RESIDENTIAL ECONOMIC POTENTIAL (AMW)				
	2 Year	4 Year	10 Year	20 Year
Dryer	0.02	0.04	0.25	0.69
Electronics	0.01	0.02	0.06	0.12
Food Preparation	0.00	0.00	0.01	0.02
HVAC	0.13	0.39	2.07	5.62
Lighting	0.01	0.03	0.19	0.55
Refrigeration	0.05	0.12	0.39	0.77
Water Heating	0.15	0.38	1.70	4.05
Whole Building/Meter Level	0.00	0.00	0.00	0.00
Total	**0.36**	**0.98**	**4.67**	**11.82**

TABLE G-2: COMMERCIAL ECONOMIC POTENTIAL (AMW)				
	2 Year	4 Year	10 Year	20 Year
Compressed Air	0.00	0.00	0.00	0.00
Electronics	0.00	0.00	0.00	0.00
Food Preparation	0.02	0.04	0.12	0.21
HVAC	0.13	0.26	0.67	1.04
Lighting	0.16	0.30	0.68	0.92
Motors/Drives	0.02	0.05	0.18	0.32
Process Loads	0.00	0.00	0.00	0.00
Refrigeration	0.10	0.25	0.87	1.60
Water Heating	0.02	0.05	0.15	0.27
Total	**0.46**	**0.96**	**2.67**	**4.37**

TABLE G-3: INDUSTRIAL ECONOMIC POTENTIAL (AMW)				
	2 Year	4 Year	10 Year	20 Year
Compressed Air	0.04	0.09	0.28	0.47
Fans	0.00	0.00	0.00	0.00
Lighting	0.10	0.21	0.52	0.71
Pumps	0.00	0.01	0.02	0.07
HVAC	0.03	0.07	0.16	0.23
Low Temp Refer	0.00	0.00	0.00	0.00
Med Temp Refer	0.00	0.00	0.00	0.00
All Electric	0.00	0.03	0.18	0.44
Material Processing	0.00	0.00	0.00	0.00
Material Handling	0.00	0.00	0.00	0.00
Melting and Casting	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00
Total	**0.18**	**0.40**	**1.18**	**1.92**

TABLE G-4: AGRICULTURAL ECONOMIC POTENTIAL (AMW)				
	2 Year	4 Year	10 Year	20 Year
Dairy Efficiency	0.00	0.00	0.00	0.00
Irrigation	0.02	0.03	0.09	0.24
Lighting	0.01	0.02	0.03	0.04
Motors/Drives	0.07	0.13	0.31	0.42
Process Loads	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00
Total	**0.09**	**0.18**	**0.43**	**0.70**

TABLE G-5: DISTRIBUTION EFFICIENCY ECONOMIC POTENTIAL (AMW)				
	2 Year	4 Year	10 Year	20 Year
EMC-1 LDC with no VVO	0.00	0.01	0.11	0.32
ECM-2 & ECM-3 LDC with VVO & AMI	0.01	0.06	0.60	1.72
Total	**0.02**	**0.07**	**0.72**	**2.04**

Appendix H – Board Resolution Adopting Conservation Rebate Policy

RESOLUTION NO. 2312

MARCH 24, 2015

A RESOLUTION OF THE COMMISSION OF PUBLIC UTILITY DISTRICT NO. 1 OF BENTON COUNTY ADOPTING THE DISTRICT CONSERVATION REBATE POLICY

WHEREAS, Resolution No. 2048 was passed on September 8, 2009 authorizing establishment of an Energy Conservation Plan; AND

WHEREAS, The General Manager is authorized to enter into Bonneville Power Administration's Conservation Programs and other District determined programs financially beneficial to our service area as a means to achieve energy savings; AND

WHEREAS, Washington State Energy Independence Act (EIA), RCW 19.285 (Initiative 937) mandates that each qualifying utility pursue all available conservation that is cost-effective, reliable and feasible; AND

WHEREAS, District Commissioners set a biennial target every two years to meet the requirements of the EIA; AND

WHEREAS, District staff establish biennial conservation budgets to assure the targets are met; AND

WHEREAS, Conservation program offerings are managed to meet the biennial budget and funding may not be adequate to provide rebates for all customer requests; AND

WHEREAS, The District wishes to outline the policy by which it will provide conservation rebates in an equitable manner.

NOW, THEREFORE BE IT HEREBY RESOLVED By the Commission of the Public Utility District No. 1 of Benton County that the attached Conservation Rebate Policy be adopted.

ADOPTED By the Commission of Public Utility District No. 1 of Benton County at an open meeting, with notice of such meeting being given as required by law, this 24th day of March, 2015.

Barry Bush, Vice-President

ATTEST:

Jeff Hall, Secretary

Benton PUD Conservation Rebate Policy

The District offers conservation rebates to all customers in a variety of diverse offerings with the primary purpose of saving energy that will count towards the Energy Independence Act requirements and providing customers opportunities to save energy on their electric bill.

The following outlines the District's Conservation Rebate Policy:

1. Every odd year the Benton PUD Commission approves an Energy Independence Act (EIA) Conservation Biennial Target in an open public meeting to establish a two year conservation target. The target is determined by the District's Conservation Potential Assessment (CPA) or other accepted target setting requirements of the EIA.
2. Following CPA approval by Commission, staff will prepare and present a two year Conservation Budget Plan that allocates the estimated necessary budget amounts to each customer class to achieve the EIA Conservation Biennial Target.
3. The District may budget a larger portion of the Commission approved target for the first year of each biennium to mitigate risk of postponed or cancelled projects and to ensure the biennial target is reached.
4. The District will consider using BPA funds first, when available, followed by District self-funding.
5. Conservation program rebate offerings and the unit energy savings (UES) per measure are calculated by the entity responsible (Northwest Power and Conservation Council, Bonneville Power Administration (BPA), District, etc.) for establishing the energy savings values, but can change throughout the biennial period.
6. The District may allow for Conservation Smoothing which allows banking of achieved savings that exceed the biennial target by up to 50% and spreads the excess over the next two bienniums beginning January 1, 2014.
7. Applications for conservation rebates will be reviewed on a first come first served basis and once approved by District staff, will be disbursed upon installation or project completion. When all funding is allocated, customers will be advised funds are no longer available and they may request rebates for the following year subject to item numbers 8 and 9 below.
8. Any potential rebate to a customer in excess of $100,000 must be presented to Commission for approval.
9. The Commission must approve any single customer request for a rebate that is greater than 50% of that customer class biennial budget or 50% of self-funding customer class biennial budget in the case of marijuana industry related rebate requests.

10. The Commission recognizes that large energy savings projects will be reviewed and discussed with District customers many months in advance to prepare for budgeting and project coordination and that some projects may take several years from beginning to end.
11. A baseline of energy consumption must be available for all customers requesting a rebate for new construction projects. If no baseline is available, supporting information will be required to satisfy documentation requirements for meeting EIA.
12. Any customer requesting conservation incentives related to the marijuana industry must be licensed with the State of Washington for legal marijuana activities. BPA conservation funds are not allowed for marijuana industry related rebates.
13. Distribution System Efficiency Savings programs may be funded via conservation funds from BPA, District Self-Funding, or through normal Engineering/Operations capital funding which is included in the District annual budget and approved by Commission as work orders.