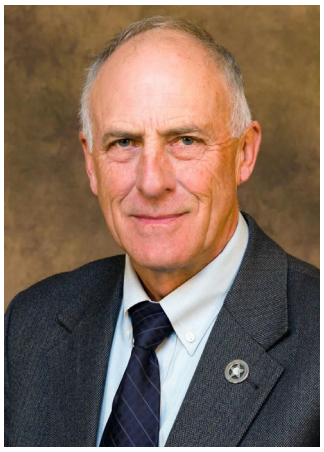
Regional Technical Forum
2025 Annual Report

Regional Technical Forum

Northwest Power and Conservation Council



Letter from the Council Chair

It's my honor to introduce the Regional Technical Forum's 2025 Annual Report, which reviews their work to advance the acquisition and verification of energy conservation in the Pacific Northwest.

In 1980, Congress passed the Northwest Power Act and created the Northwest Power and Conservation Council. The Power Act assures our four-state region of Idaho, Oregon, Washington, and Montana of an adequate, efficient, economical, and reliable power supply.

Over the past century, our region has benefited tremendously from the low-cost, reliable power generated by the Columbia Basin hydrosystem. Development of the hydrosystem in the basin and its expansion in the post-World War II era brought electrification to many rural communities in the Northwest, which transformed their livelihoods and economies.

Cost-effective energy conservation has played a crucial role in stretching the power of our rivers, and ensuring the benefits of the hydrosystem continue to accrue and grow. Acquiring energy conservation has been a cornerstone of the Council's eight power plans to date. In the late 1990s, Congress strengthened the efforts to acquire energy conservation in the Northwest by authorizing creation of the Regional Technical Forum.

In 1999, the Council joined the Bonneville Power Administration in creating the RTF, which maintains a library with data on savings, lifetime costs, and estimated value to the power system. This library encompasses thousands of energy conservation measure applications. The RTF provides centralized and unbiased technical review for energy conservation savings data and assumptions. The RTF provides a public forum to vet claims, discuss research and analysis, and keep up with changes in a field that continues to advance rapidly as technologies improve, and new ones come to markets. It also tracks and verifies data on the progress the Northwest makes each year to acquire energy conservation.

I encourage you to review this report summarizing their accomplishments over the past year, and highlighting where and how they will be focusing their efforts for the year to come.

Mike Milburn, Council Chair

Jennifer Light, RTF Chair

Letter from the RTF Chair

2025 was a year of transition and transformation at the Regional Technical Forum. It was my final year of serving as the RTF Chair, and thus wrapped up my 11 years of service to the RTF, where I started as Manager in 2014. It was also the first year of a new class of RTF members, as they kicked off their 2025-27 terms. Their insights, expertise, and perspectives brought fresh focus to achieving the core functions of the RTF.

In reflecting on the past decade, I have continually seen the impact and importance of the RTF's work to advance the acquisition and verification of cost-effective energy conservation in the Pacific Northwest. Some history is helpful to understand where the region has been, the RTF's role and value in these efforts, and where we're heading next.

Early on, many energy conservation programs were housed within Bonneville Power Administration, where they were designed and implemented. In the mid-1990s, a shift occurred that moved energy conservation acquisition to a decentralized approach. The reasoning was that markets and utility service territories in the Northwest had unique individual characteristics, so utilities could develop energy conservation programs that would be tailored to the needs of their communities, businesses, and industries. With this flexibility, however, there were concerns that a decentralized approach might decrease the region's ability to reliably and consistently verify and quantify energy conservation as a resource. That's the idea and purpose behind the RTF.

For the past 25 years, the RTF has played a key role in helping utilities evaluate and verify energy conservation savings opportunities. The RTF brings together 29 experts and a team of analysts spanning multiple disciplines, and areas of expertise. The RTF provides independent judgment on how much a utility can count on measures to reliably save energy. Because the RTF does this work at a regional level, it provides major cost-savings to utilities that implement energy conservation programs in their communities.

2025 provided a series of opportunities to advance this critical work on behalf of the region. The following pages of this annual report offers a review of the accomplishments of the RTF in 2025, as well as looking forward into the next year.

Introduction

In 1980, Congress passed the landmark Northwest Power Act, which formed the Northwest Power and Conservation Council as an interstate compact between Washington, Oregon, Idaho, and Montana. The Act charges the Council with ensuring that the region has an adequate, efficient, economical, and reliable power system. It does this by developing a 20-year power plan, reviewed every five years. This regional collaboration has become a model for power system planning in the U.S.

Energy conservation has been a cornerstone of the Council's work since its inception. The Act defines energy efficiency as a resource and requires the Council to prioritize cost-effective conservation over all other resources in its power planning. Energy conservation is now the region's second-largest resource after hydropower. Over the past four decades, utilities, program implementers, and countless other partners and collaborators have been integral to this success, leveraging energy efficiency's vast potential to help meet electricity demand, save money for residents, businesses, and industries, deliver more benefit from the low-cost power generated by the Columbia River hydro-system, reduce pollution, and ensure system reliability and resource adequacy.

As a technical body, the RTF has played a key role in helping to advance the acquisition of cost-effective energy conservation in the Northwest. The RTF can objectively generate peer-reviewed energy savings estimates through robust and unbiased analysis in a public forum. The RTF engages partners, collaborators, experts, and the public across the Pacific Northwest, and from all sectors of the energy efficiency industry. This commitment to collaboration informs all the RTF's work and results in widely respected technical analysis that is looked to for its accuracy, reliability, and consistency.

Accomplishments in 2025

The following report details the RTF's many accomplishments in 2025. To ensure that its existing unit energy savings and standard protocol measures continue to be relevant and reliable, the RTF continually sets review timelines for all measures. In 2025, the RTF reviewed 15 existing measures, including the commercial and industrial fans, voltage optimization, central air conditioners, and connected thermostats. The RTF also identified new opportunities to expand the measure library; and refined the methodology for estimating the benefit of resiliency from energy conservation measures

THE 2021 NORTHWEST POWER PLAN

Existing Portfolio Enhancement

The RTF continually sets review timelines for all measures to ensure that the existing unit energy savings and standard protocol measures remain relevant and reliable. Of the fifteen existing measures the RTF reviewed in 2025, the following measures represent a total of 368 aMW and 50 million therms of regional conservation potential.

Commercial and Industrial Fans

The RTF initially adopted its measure for commercial and industrial fans in 2020, based on research done by the Northwest Energy Efficiency Alliance. The measure encompasses the purchase of an efficient standalone fan for commercial or industrial applications. Savings depend on fan type, drive type, speed control, and the fan system's efficiency rating. This measure offers significant potential for savings in the region with 56 aMW in the commercial sector and 82 aMW in industrial facilities.

In 2025, the RTF approved updates to this measure. The updates incorporated newer datasets and revised the methods for determining load factor and fan cost. There are still questions about how fans are sized for actual loads, the operating hours of fans, and the variability of loads. The RTF approved a research strategy to analyze those questions. The RTF also approved an updated research strategy, adding language about research staging and clarifying that airflow and pressure management is needed, as well as adding a caution about a potential source of bias. Because efficient fans have a relatively small increase in cost compared to the alternative, the fans measure is cost-effective.

Voltage Optimization

The RTF originally approved its voltage optimization (VO) standard protocol in 2010, based on the fundamental principle that certain end uses consume less electricity at lower voltages. This measure applies to how utilities can optimize voltages on their distribution systems – which ultimately results in saving electric energy in the process – without compromising performance of end-use energy consumption. Under normal conditions, customer service voltages stay at certain levels, but many end uses (especially motors) use less energy at lower voltages without compromising performance. Energy is saved by reducing voltage along a voltage control zone, such as at a substation or distribution feeder, but the end of the line

must remain above its minimum allowable standard set by the American National Standards Institute.

The RTF has reviewed and made updates to this protocol while extending its sunset date in 2015, 2020, and most recently in 2025. The RTF applies this protocol to qualifying projects and provides a methodology for estimating savings with tabulated VO factors to simplify savings estimation and offers delivery verification guidance. An eligible project is one that is mostly residential, is able to reliably estimate average annual change in voltage experience by end users, and meets Benchmark Performance Thresholds.

In 2025, the RTF approved updates to the Voltage Optimization Standard Protocol, but recommended that at the next update in 2027 the scope of the measure be reconsidered to allow for an alternative and easier approach. The measure has significant regional potential, which is estimated to be 210 aMW for the Ninth Power Plan. The RTF's primary update to this measure is to adjust its savings rates and to include utility-side savings, which is estimated to be 10% of the customer side.

High Efficiency Residential Central Air Conditioners

In the early months of 2020, the RTF adopted its first cooling-focused measure for the installation of a new high efficiency single-speed or dual-speed central air conditioner in single or manufactured residences. Air conditioning and the need for space cooling has been a growing source of energy demand in the Northwest in the past several years, although summer-peaking utilities in the warmer parts of the region have long placed importance on efficient cooling. Forecasts for increased cooling loads, and the promise of warmer summer temperatures in the future, prompted the RTF to look at efficiency opportunities for this market in 2020.

Because summer cooling had not historically been a significant priority across the region, there was less information and data as well as greater uncertainty about space cooling

loads and air conditioning units' performance in many parts of the Northwest. So, regional research and improved data collection and assumptions were key to this measure's implementation. The total estimated regional potential is 20 aMW.

In 2025, the RTF approved updates to its residential central air conditioners measure, kept the category as planning, changed its status from under review to active, and set the sunset date for July 31, 2028. The RTF may place active measures under review if there are indications that the savings estimation method or data sources will need to be updated to continue to comply with quality standards, or if the sunset date is approaching. This measure was placed under review in 2023 as new data from the Northwest Energy Efficiency Alliance's End Use Load Metering study was indicating a potential need to update the cooling loads in the RTF measure. In completing the analysis of this new data and updating the measure, the under review category was determined no longer necessary in the 2025 update.

Connected Thermostats

The RTF first adopted its measure for residential Connected Thermostats in 2016. Since that time, the market has seen thermostat technology shift to include artificial intelligence, improve algorithms, and change the settings and functionality compared to early equipment. This coupled with recent evaluations in the Northwest demonstrating little to no savings from connected thermostats, particularly for those used in electrically heated homes, resulted in the RTF questioning if connected thermostats setback logic continues to result in saving energy in the same way past models.

As part of the update to this measure in 2025, the RTF focused on two key areas: how to handle heat pumps being controlled by these thermostats, and whether the mechanism by which connected thermostats save energy is still valid. Through its process, the RTF determined that for heat pumps, connected thermostats as defined in this measure do not result in savings and there is a need for a measure to specifically focused on this equipment pairing to ensure energy savings

from these heating systems. To address the need for validation of how newer connected thermostats save energy, the RTF called upon the region to test this question through research, pilots, evaluations or specification development. The RTF placed a one-year sunset date on the measure, to allow time

for the region to determine if this technology was of interest and start efforts to validate the savings mechanism.

Expanding the Portfolio and Other RTF Focus Areas

The region has continued to highlight the importance of the RTF expanding its measure portfolio and, given this, it represents a significant piece of the annual work plan. In 2025, the RTF adopted a new measures for heat pumps and commercial dishwashers. Additionally, the RTF began the process of updating the portfolio of existing demand response products, and started a project to support the region in gaining a deeper understanding of the commercial electric vehicle market.

Heat Pumps

Savings from heat pumps in RTF measures have been declining, particularly as installation requirements and best practices for sizing were relaxed. Over the past few years, the RTF has been identifying how to improve the portfolio of its heat pump measures to ensure maximum savings from this equipment. The RTF identified the need for four new heat pump measures, two of which were for ductless heat pumps (DHP) and two for centrally ducted heat pumps.

In 2025, the RTF approved the first of these new heat pump measures. The Ductless Heat Pump One-to-One measure was adopted in May and is for the installation of a DHP that consists of a single head indoor unit connected to a single outdoor inverter driven unit. The indoor unit must be installed in the main living area of a home with existing zonal electric heat. The measure covers DHPs installed in both existing single family and manufactured homes. What differentiates this measure from previous RTF DHP measures is that it includes screening for homes that are heavily reliant on electricity for space heating. These homes are targeted by the measure because they offer the best opportunity for the program to realize savings from a DHP installation.

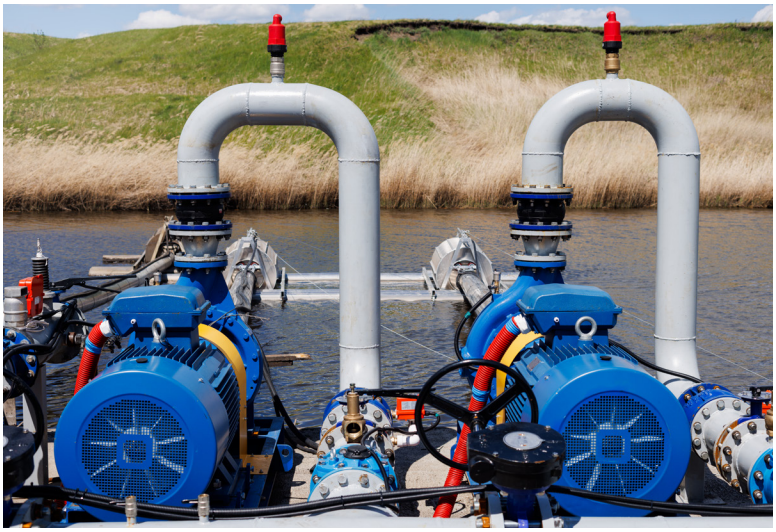
The new DHP measure has substantial potential in the region with 53 aMW in single

family homes and an additional .3 aMW for manufactured homes. To complement this measure, the RTF in 2026 will be developing a DHP measure for homes that install multiple indoor units to provide space heating for the entire residence, as well as completing the new measures for centrally ducted heat pumps.

Commercial Dishwashers

Almost all commercial kitchens have a commercial dishwasher to clean dishware, silverware, and pots and pans used for food preparation and service. Dishwashers are a major source of energy use to serve water heating demand in commercial buildings. Energy savings for this equipment are minimal at the machine, but provide significant savings at the electric or gas water heater. The RTF previously maintained a unit energy savings (UES) measure for this equipment, which was deactivated in 2013 due to a lack of data and surveys indicating sparse interest in continuing it. Through the course of its new measure scan, the RTF determined that programs, including Puget Sound Energy and Avista, are now offering rebates for commercial dishwasher equipment and that the new ENERGY STAR® specifications provided an energy conservation framework for commercial dishwashers. Given this, at the end of 2024, the RTF decided to pursue the expansion of its portfolio to once again include this UES.

In 2025, the RTF approved a new commercial dishwashers measure. This planning measure is for the installation of a commercial dishwasher that meets the ENERGY STAR® version 3.0 specification, for undercounter dishwashers, models that use upright doors and high temperature tanks, and rack conveyors. As dishwashers are used in a diverse set of building types with different operating hours, the RTF identified a need for further granularity in the measure by if the building is a school or not, in order to recognize that schools won't be in session on weekends, at nighttime, or while on summer break.



There are approximately 25,000 commercial dishwashers operating in the Northwest region, with over 3,000 units sold annually. Analysis has shown that there is market potential to improve the efficiency of about half of those unit sales. Upright door dishwashers account for almost half of the market, followed by undercounter and rack conveyor units. The regional potential is estimated to be 13 aMW and 3 Mmtherm.

Demand Response Products

In 2019, the RTF began exploring the opportunity for it to support the region by building demand response products intended to inform inputs for energy planners supply curves. At that time, RTF developed six demand response products to support the region. The RTF scope and budget was officially expanded in 2020 to include work on demand response.

In 2024, the RTF began the process of updating the existing suite of demand response products with Irrigation Pump Controls being completed by the end of 2025 and Level 2 Electric Vehicle Chargers in January 2026. To ensure improved usability and clarity of the work products, the contract analyst team developed a workbook template and worked with experts, including the Demand Response Subcommittee, to identify the necessary information to support the planning estimates from the work products developed by the RTF. This work continues to build the foundation for the demand response work at the RTF, particularly as it updates the rest of the existing products and looks to developing new products next year.

Commercial Electric Vehicle Market Characterization

In 2023, the RTF completed a market characterization of the electric vehicle market focused on passenger or light duty class vehicles. As part of that study, it was identified that the RTF should also better understand the energy efficiency and demand response opportunities in the heavy duty or commercial class electric vehicles, which are vehicles weighing more than 8,501 lbs. In 2025, the RTF launched a follow

up study to characterize the heavy duty EV market.

This study focused on understanding the market, as this class of vehicles is broad and includes buses, vocational vehicles (i.e., dump trucks), box trucks, and heavy duty pickup trucks. The project sought to understand the types of commercial vehicles in the region and categorize the areas of biggest potential for deeper consideration. Additionally, the study catalogued the existing data, standards, and energy efficiency programs to determine the opportunity for a future conservation measure. Lastly, the study explored demand response to understand any potential opportunities to develop resources at the RTF to support demand response programs for fleet vehicle charging.

The study results were presented to the RTF in the first quarter of 2026. While the conclusions indicated that there is not a clear opportunity to define energy efficient commercial EVs due to a lack of data, the study did determine that there may be an opportunity for the RTF to focus on managed charging for this market in a future demand response product.

Regional Conservation Achievements

The RTF's 2024 Regional Conservation Progress survey found that the Pacific Northwest continues to make progress in acquiring cost-effective energy efficiency called for in the Council's 2021 Power Plan. In 2024, the region acquired 160 aMW of cost-effective energy efficiency savings, including 39 aMW from Bonneville Power Administration.

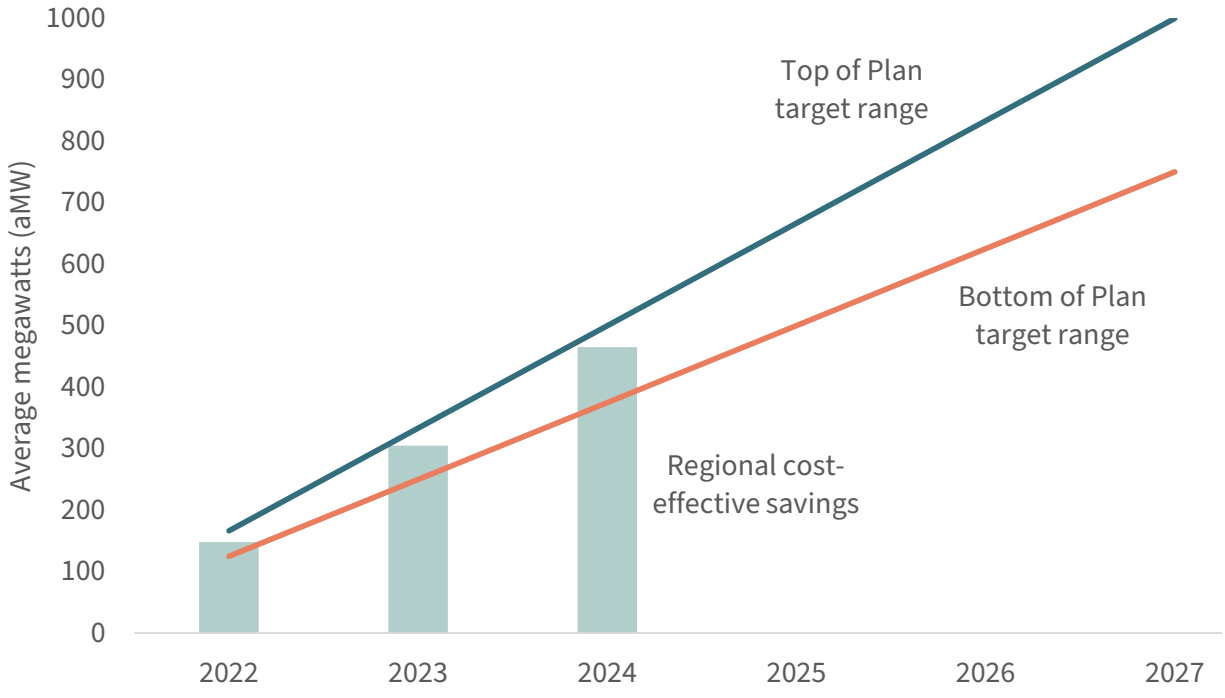
This puts the region on track to achieve the target of 750 – 1,000 aMW by 2027 called for in the 2021 Plan. Since the plan was adopted in February 2022, the region has acquired 465 aMW in total efficiency savings. For reference, the Northwest consumes about 22,000 aMW of electricity total each year. More work and continued investment will be needed to ensure that the 2021 Power Plan's full targets are met by 2027.

Every September, the Council reviews data on energy efficiency acquisition in the Northwest from its Regional Conservation Progress survey. The survey is conducted by the RTF and consults BPA, Energy Trust of Oregon, the Northwest Energy Efficiency Alliance, as well as investor- and consumer-owned utilities of all sizes in Washington, Idaho, Oregon, and Montana.

Over the past three years, the region has increased budgets and spending on acquiring energy efficiency. The region spent $386.7 million in 2022, $456.2 million in 2023, and $580.6 million in 2024. This increase in funding comes after a period of declining investment in this resource. This trend likely reflects the renewed need for energy efficiency in meeting regional load growth. Budgets are forecast to grow by 12% in 2025, compared to 2024 levels. Continuing this trend will be important to achieving the 2021 Plan's full target by 2027.

The 2024 survey found that commercial buildings accounted for 50% of the annual total efficiency savings, while the industrial sector accounted for 26%, the residential sector had 22%, and agriculture was 2%. Overall, however, the survey data shows that energy efficiency programs in the Northwest are capturing the cost-effective savings

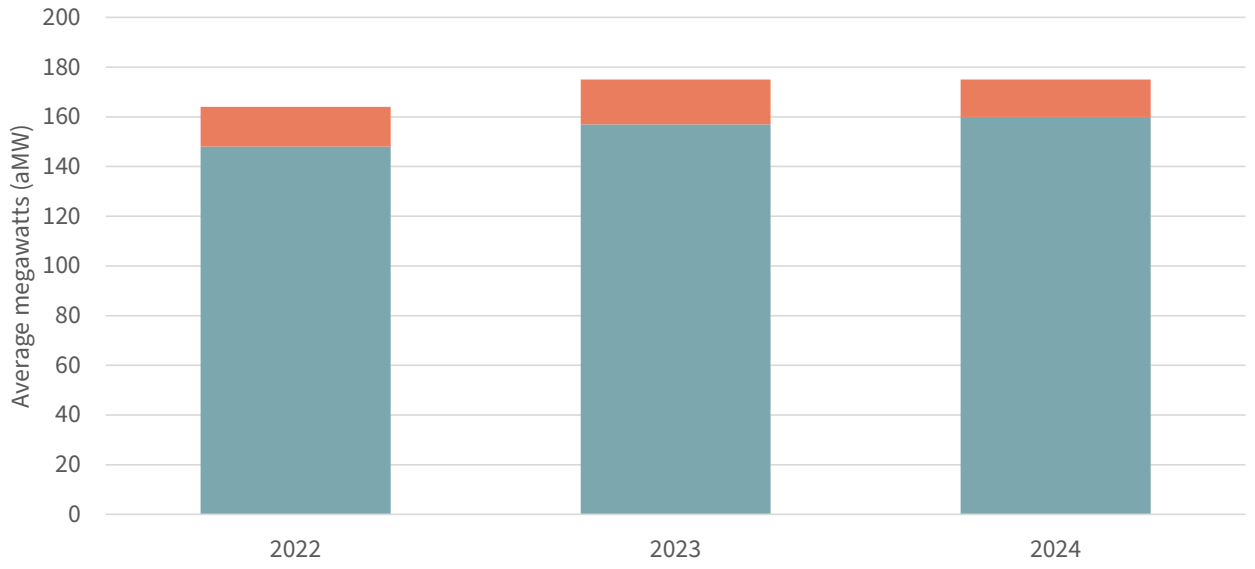
Figure 1. Cumulative Accomplishments Relative to Power Plan Target



expected by the 2021 Plan. The survey also showed continued investment in other areas of the 2021 Plan Conservation Program, including weatherizing homes although significant potential remains.

The 2021 Plan recognizes the importance of weatherization measures to support livability, and addressing these homes should be a continued focus for the region.

Figure 2. 2022-2024 Total Regional Savings



Subcommittees

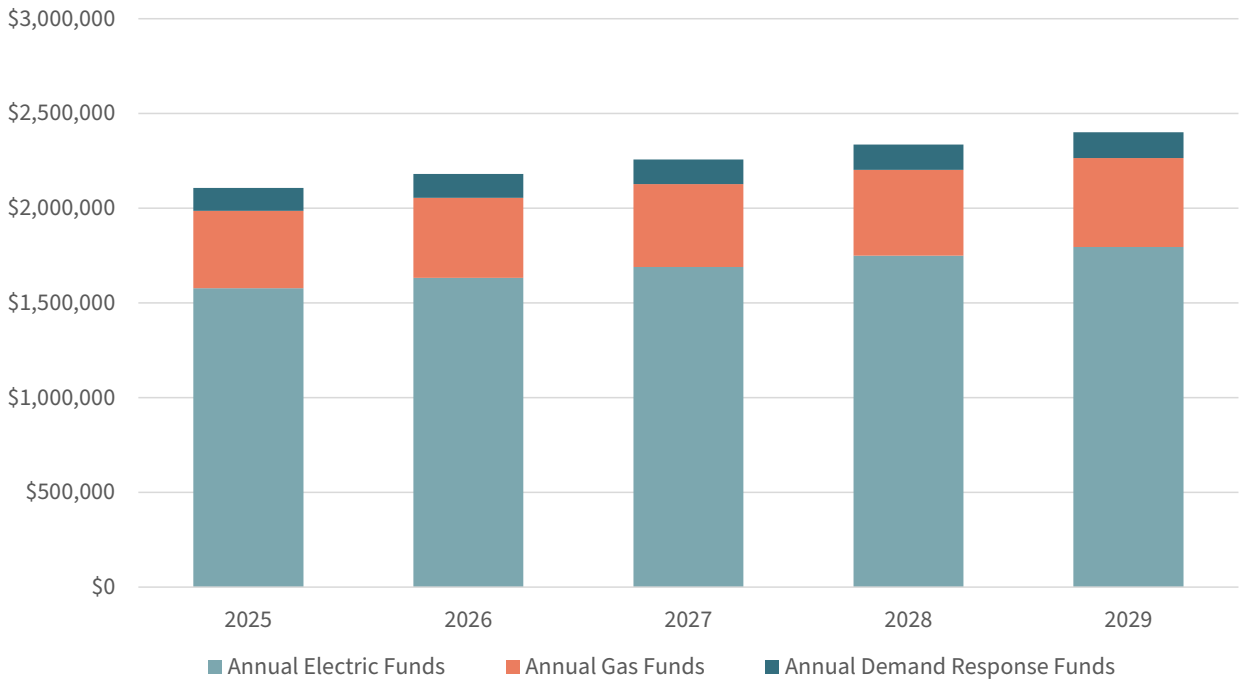
Throughout the year RTF convenes various subcommittees in support of its annual work. These subcommittees play an integral role in RTF work by providing insight and deep technical expertise and guidance on all aspects of the work. In 2025, the following subcommittees convened to support this year's work (also see **rtf.nwcouncil.org/subcommittees**):

- Connected Thermostats
- Demand Response
- Distribution Efficiency
- Residential HVAC
- Implementers Group
- New Homes
- Non-Residential Lighting
- Research and Evaluation
- Heat Pump Water Heaters
- Small and Rural Utilities

Financial Information

The 2025 calendar year was the first year of the RTF's five-year funding cycle through 2029. During this funding cycle, the RTF Policy Advisory Committee expanded the budget for demand response and included budget for research into existing RTF Planning measures. The 2025-2029 funding cycle's total budget is $11,279,405 starting at $2.1 million in 2025 and increasing annually by about 3.5 percent to account for inflation. Of this budget, 75% will be for electric energy efficiency, 19% for natural gas energy efficiency, and 6% for demand response. The funding cycle continued to align with previous cycles'

Figure 3. 2025-2029 RTF Funding Commitments by Category



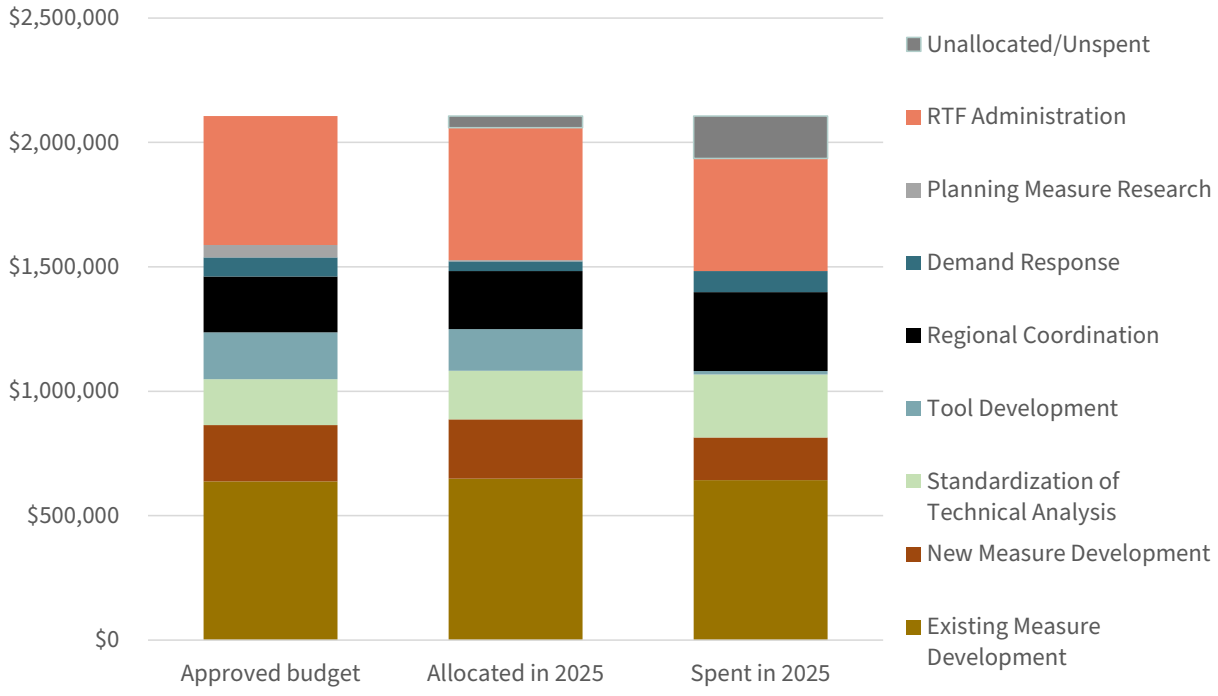
funding agreements and using the allocation method developed by the Northwest Energy Efficiency Alliance, as well as the previously agreed to approach for cost sharing across dual fuel work areas.

2025 Budget and Spending

For 2025, the total approved budget was $2.106 million, and 98 percent of the budget was allocated to contracts. Of the allocated budget, the RTF spent approximately 94 percent of its funding, with about $124,130 unspent. The unspent funds were primarily due to less measures requiring review by the QAQC contractor than expected, fewer member support hours needed, and less CAT time needed to meet work plan objectives.

Approximately 55 percent of the budget in 2025 was focused on measure development and standardizing technical analysis, including updates to existing measures that required RTF review due to sunset dates this year. The second largest portion of the budget was spent on special projects and regional coordination, representing a total of 16% in 2025, which this year included a follow up study to characterize the market of heavy duty commercial electric vehicles.

Figure 4. 2025 Workplan and Spending



The RTF thanks these sponsor organizations for providing funding:

Avista Utilities

Bonneville Power Administration

Cascade Natural Gas

Chelan County PUD

Clark County PUD

Cowlitz County PUD

Energy Trust of Oregon

Eugene Water & Electric Board

Idaho Power

NW Natural

Pacific Power

Portland General Electric

Puget Sound Energy

Rocky Mountain Power

Seattle City Light

Snohomish County PUD

Tacoma Power

A Look Ahead

The RTF is well underway in accomplishing the work in the 2026 RTF Work Plan. In 2026, the RTF will continue to focus on energy efficiency measure work, which makes up 58% of the budget for the year and includes the development of multiple new measures including heat pumps, residential induction cooktops and ranges, and gas rooftop units.

The RTF will also continue its focus on demand response by continuing to update its existing work products and developing increased standardization across this work. In 2026, the RTF will launch efforts to support regional coordination on heat pump research through providing analysis on the existing research to identify the remaining questions and facilitating a discussion with regional researchers on how those questions can be answered to advanced heat pump efficiency in the Northwest.

RTF Staff

The RTF is an advisory committee to the Northwest Power and Conservation Council and shares several staff members. The asterisks in the list below indicate Council-funded staff members who work closely with the RTF.

- Jennifer Light, Chair*
- Christian Douglass, Vice Chair*
- Laura Thomas, Manager
- Chad Madron, Coordinator*

The last meeting of 2025 marked the final year of Jennifer Light's tenure as RTF Chair, as she stepped down to focus on her role as Power Division Director for the Council. Jennifer served the RTF for over 11 years, starting as the RTF Manager and later also assuming the role as Chair. Her contributions to the RTF over this time were critical to solidifying and advancing the core functions of the RTF to better serve the conservation needs of the region. In addition to RTF staff, several members provide operational and administrative leadership to the forum by serving on the operations subcommittee, and in 2025 those members included: Mark Jerome, Phillip Kelsven, Eric Miller, Laney Ralph, and Kevin Smit.

The RTF also contracts a team of analysts who provide dedicated support throughout the year. The 2025 contract analysts include: David Bopp, Logan Douglass, Ryan Firestone, Adam Hadley, Denis Livchak, Josh Rushton, and Paul Sklar.

2025 – 2027 Regional Technical Forum Members

This year saw the start of a new RTF Membership class which will serve from 2025-2027. The new group brings a high level of technical expertise and a breadth of experience in planning, implementation, evaluation of efficiency programs and demand response products, as well as proficiencies in economic, statistical, and engineering analysis. In its first year, this RTF demonstrated a deep attention to detail and focus on not only ensuring measures meet the needs of the region today but providing feedback to guide future updates to improve measures longevity and impact.

Name	Organization
Jennifer Light (RTF Chair)	Northwest Power and Conservation Council
Christian Douglass (RTF Vice-Chair)	Northwest Power and Conservation Council
Jamie Anthony	Bonneville Power Administration
Landon Barber	Idaho Power
David Baylon	Independent
Gregory Brown	Tierra Resource Consultants
Kyle Chase	Jefferson County PUD
Noe Contreras	Northwest Energy Efficiency Alliance
Bob Davis	Independent
Lisa Gartland	Oregon Department of Energy
Kevin Geraghty	Independent
Andrew Grant	Cadmus
Michael Hoch	Energy Trust of Oregon
Mattias Järvegren	Clallam PUD
Mark Jerome	CLEAResult
Phillip Kelsven	Bonneville Power Administration
Bruce Manclark	Earth Advantage
Rob Marks	Snohomish County PUD
Eric Miller	Independent
Andi Nix	Energy Trust of Oregon
Nick O'Neil	Energy 350
Andrew Paul	Avista Utilities
Laney Ralph	NW Natural
Jes Rivas	Swift Strategy
Samuel Rosenberg	Pacific Northwest National Laboratory
Eva Urbatsch	Puget Sound Energy
Jim White	Chelan County PUD

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