Northwest **Power** and **Conservation** Council

May 5, 2020

MEMORANDUM

TO: **Council Members**

FROM: **Jennifer Light**

SUBJECT: **Regional Technical Forum 2019 Annual Report**

BACKGROUND:

Presenter: Jennifer Light and Annika Roberts

Summary: The Regional Technical Forum (RTF) submits its 2019 Annual Report to the Council. This report is intended to inform the Council and stakeholders about the RTF's activities in the previous year and to provide an update on the ongoing work in the current calendar year.

In 2019, the RTF continued to focus on its core efforts of developing consistent and reliable energy savings estimates and methodology. Much of this work focused on savings from residential heating and cooling through equipment upgrades and weatherization. The RTF also continued to explore how it could add more value to utility demand side management efforts. This included focusing resources on efficiency opportunities in commercial buildings and exploring demand response potential for technologies that provide both energy efficiency and demand response opportunities.

2019 also marked the last year of a five-year funding agreement supporting RTF work. To ensure continued work, the RTF Policy Advisory Committee developed a new long-term strategic plan for the RTF and collectively agreed to funding levels in support of that Plan. In 2020, the RTF is now starting the work of that new plan, which includes continued

emphasis on electric energy efficiency savings analysis while also expanding to evaluated natural gas efficiency opportunities.

Relevance: The RTF is an advisory committee to the Council. It is funded by Bonneville, Energy Trust of Oregon, and regional utilities. The Council also contributes to the RTF through staff and office and meeting space.

Workplan: B.1.3 Continue to lead the Regional Technical Forum and engage in the development and approval of measure savings estimates and protocols.

Background: Per its charter, the RTF is required to publish an Annual Report by mid-year. The 2019 Annual Report provides work highlights and financials for the 2019 calendar year. It also provides a preview of progress made to date in 2020.

RTF 2019 Annual Report

Jennifer Light and Annika Roberts

May 2020 Council Meeting

Presentation Overview

- Background on the RTF
- 2019 Highlights
  - Focus on HVAC
  - Commercial building emphasis
  - Subcommittee engagement
  - Financials and strategic plan development
- 2020 Progress
  - Introduction of natural gas
  - Supporting power plan development

20th Anniversary of the RTF!

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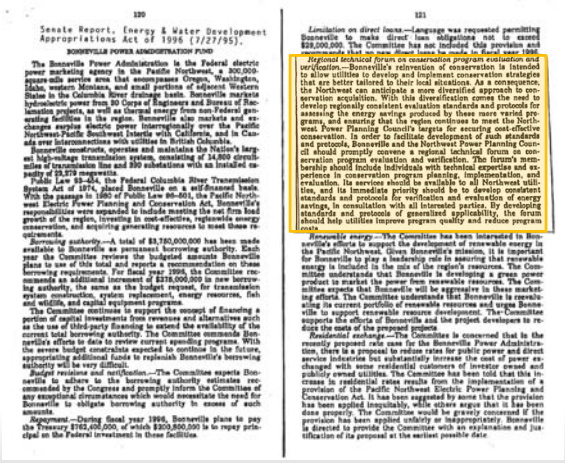
Formation of the RTF

- In 1996 Congress directed the Council and Bonneville to create a regional technical forum
- Focus on regionally consistent evaluation standards for energy efficiency
- Council created the RTF in 1999



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Senate Report, Energy & Water Development Appropriations Act of 1996 (7/27/95).

BONNEVILLE POWER ADMINISTRATION FUND

The Bonneville Power Administration is the Federal electric power marketing agency in the Pacific Northwest, a 300,000-square-mile service area that encompasses Oregon, Washington, Idaho, western Montana, and small portions of adjacent Western States in the Columbia River drainage basin. Bonneville markets hydroelectric power from 30 Corps of Engineers and Bureau of Reclamation projects, as well as thermal energy from non-Federal generating facilities in the region. Bonneville also markets and exchanges surplus electric power interregionally over the Pacific Northwest-Pacific Southwest Intertie with California, and in Canada over interconnections with utilities in British Columbia.

Bonneville constructs, operates and maintains the Nation's largest high-voltage transmission system, consisting of 14,800 circuit-miles of transmission line and 300 substations with an installed capacity of 29,279 megawatts.

Public Law 93-454, the Federal Columbia River Transmission System Act of 1974, placed Bonneville on a self-financed basis. With the passage in 1980 of Public Law 96-501, the Pacific Northwest Electric Power Planning and Conservation Act, Bonneville's responsibilities were expanded to include meeting the net firm load growth of the region, investing in cost-effective, regionwide energy conservation, and acquiring generating resources to meet those requirements.

Borrowing authority.—A total of $3,750,000,000 has been made available to Bonneville as permanent borrowing authority. Each year the Committee reviews the budgeted amounts Bonneville plans to use of this total and reports a recommendation on these borrowing requirements. For fiscal year 1996, the Committee recommends an additional increment of $378,000,000 in new borrowing authority, the same as the budget request, for transmission system construction, system replacement, energy resources, fish and wildlife, and capital equipment programs.

The Committee continues to support the concept of financing a portion of capital investments from revenues and alternatives such as the use of third-party financing to extend the availability of the current total borrowing authority. The Committee commends Bonneville's efforts to defer its review current spending programs. With the severe budget constraints expected to continue in the future, appropriating additional funds to replenish Bonneville's borrowing authority will be very difficult.

Budget revisions and ratification.—The Committee expects Bonneville to adhere to the borrowing authority estimates recommended by the Congress and promptly inform the Committee of any exceptional circumstances which would necessitate the need for Bonneville to obligate borrowing authority in excess of such amounts.

Repayment.—During fiscal year 1996, Bonneville plans to pay the Treasury $162,400,000, of which $200,800,000 is to repay principal on the Federal investment in these facilities.

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Limitation on direct loans.—Language was requested permitting Bonneville to make direct loan obligations not to exceed $29,000,000. The Committee has not included this provision and recommends that no new direct loans be made in fiscal year 1996.

Regional technical forum on conservation program evaluation and verification.—Bonneville's reinvention of conservation is intended to allow utilities to develop and implement conservation strategies that are better tailored to their local situations. As a consequence, the Northwest can anticipate a more diversified approach to conservation acquisition. With this diversification comes the need to develop regionally consistent evaluation standards and protocols for assessing the energy savings produced by these more varied programs, and ensuring that the region continues to meet the Northwest Power Planning Council's targets for securing cost-effective conservation. In order to facilitate development of such standards and protocols, Bonneville and the Northwest Power Planning Council should promptly convene a regional technical forum on conservation program evaluation and verification. The forum's membership should include individuals with technical expertise and experience in conservation program planning, implementation, and evaluation. Its services should be available to all Northwest utilities, and its immediate priority should be to develop consistent standards and protocols for verification and evaluation of energy savings, in consultation with all interested parties. By developing standards and protocols of generalized applicability, the forum should help utilities improve program quality and reduce program costs.

Renewable energy.—The Committee has been interested in Bonneville's efforts to support the development of renewable energy in the Pacific Northwest. Given Bonneville's mission, it is important for Bonneville to play a leadership role in assuring that renewable energy is included in the mix of the region's resources. The Committee understands that Bonneville is developing a green power product to market the power from renewable resources. The Committee expects that Bonneville will be aggressive in these marketing efforts. The Committee understands that Bonneville is reevaluating its current portfolio of renewable resources and urges Bonneville to support renewable resource development. The Committee supports the efforts of Bonneville and the project developers to reduce the costs of the proposed projects.

Residential exchange.—The Committee is concerned that in the recently proposed rate case for the Bonneville Power Administration, there is a proposal to reduce rates for public power and direct service industries but substantially increase the cost of power exchanged with some residential customers of investor owned and publicly owned utilities. The Committee has been told that this increase in residential rates results from the implementation of a provision of the Pacific Northwest Electric Power Planning and Conservation Act. It has been suggested by some that the provision has been applied inequitably, while others argue that it has been done properly. The Committee would be gravely concerned if the provision has been applied unfairly or inappropriately. Bonneville is directed to provide the Committee with an explanation and justification of its proposal at the earliest possible date.

Senate Report, Energy & Water Development Appropriations Act of 1996

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About the RTF

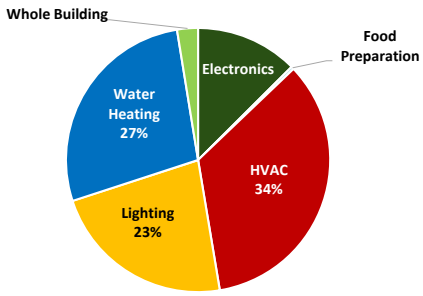
- Composed of individuals with technical expertise in planning, implementation, and evaluation
- Creates estimates used in program planning and evaluation through non-biased expertise, public processes, and transparent methods
- Is data driven and develops work products in response to regional interest and need
- Conducts annual survey of regional conservation progress from regional efficiency efforts

HIGHLIGHTS FROM 2019

Continued Measure Maintenance

- Significant focus on HVAC opportunities by updating:
  - Model calibration to ensure reliable estimation of savings
  - Lifetime savings and cost assumptions for weatherization and equipment upgrades
- Updated lighting savings estimates
- Updated/developed 23 measures in total

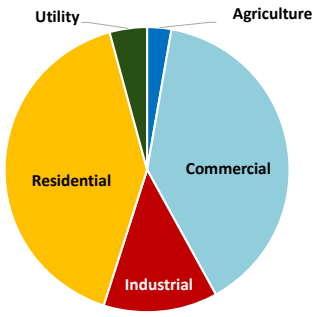
Seventh Plan 20-Year Residential Cost-Effective Potential



Emphasis on Commercial Buildings

- RTF has historically focused on lighting, grocery refrigeration, and cooking equipment
- Invested in commercial building models to better support savings estimation for HVAC equipment, building shell measures
- Expanding measure suite will be a continued area of focus

Seventh Plan 20-Year Cost-Effective Potential by Sector



Subcommittee Engagement

- 15 active subcommittees in 2019 supporting a range of topics
- Irrigation Hardware Working Group worked hard
  - Led by Idaho Power
  - Developed survey to address some questions around measure savings
  - Survey fielded this spring

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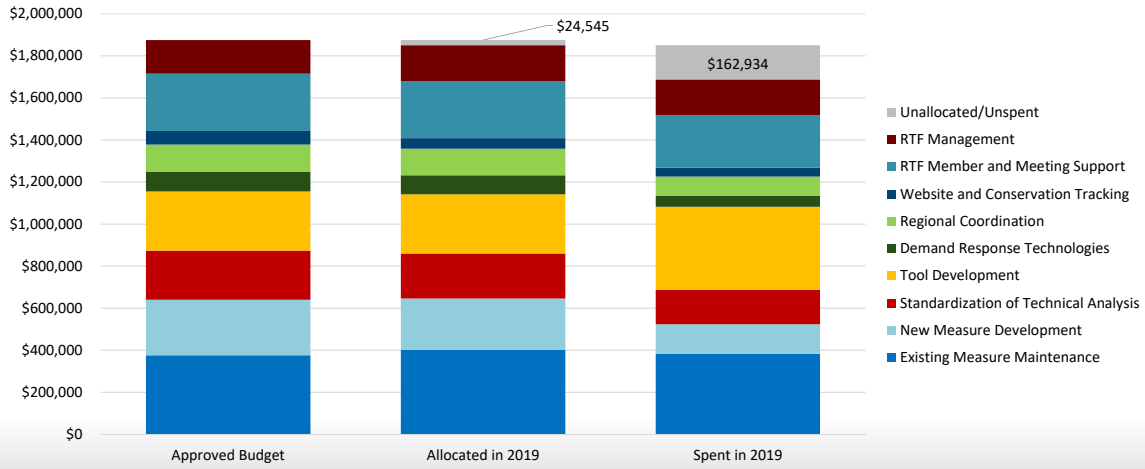
2019 Year End Financials



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PROGRESS IN 2020

Power Plan Support

- Per the charter, the RTF has a role in advising the Council during the development and implementation of its power plan
- RTF analyst team supports some measure development
- Meeting time used to review measures where there is RTF expertise and components that are likely to impact RTF work post plan

THE 2021 NORTHWEST POWER PLAN
FOR A SECURE & AFFORDABLE ENERGY FUTURE

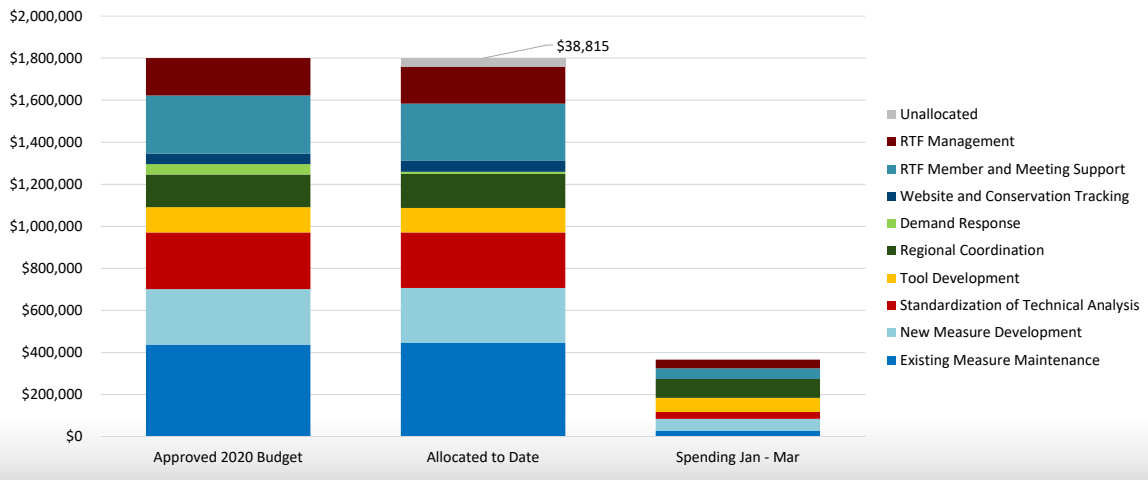
Introduction of Natural Gas

- Launched natural gas analysis work this year
- Established analytical tools needed to support analysis
- First measures with natural gas savings will be discussed at May RTF meeting
- Anticipate addressing at least 16 measures with a natural gas savings component this year

Measure Development in 2020

- Work plan anticipates updates to 23 existing measures and development of 6 new
- On track to meet or exceed those expectations
- Already developed 3 new measures:
  - Efficient fans, supporting commercial and industrial opportunities
  - Heat pump water heaters for commercial applications
  - Residential central air conditioning

Year-to-Date Financials (April 30)



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Questions

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Regional Technical Forum
2019 Annual Report

Regional
Technical Forum

Northwest **Power** and
Conservation Council

Letter from the Council Chair

Since 1980, the Pacific Northwest has been a pioneer in achieving energy efficiency. Through utility program investments, enough electricity has been saved to power six cities the size of Seattle, saving consumers $5 billion and lowering carbon emissions by 35 million metric tonnes.

This impressive record could not have been reached without the Regional Technical Forum. The forum's members, technical representatives from utilities, energy organizations, and consultants, bring expertise to the business of quantifying savings estimates. Through their work, all cost-effective energy efficiency potential is captured, which gives us the ability to set ambitious, yet feasible, efficiency targets.

In 2018, the forum made progress in several important areas: adding many new measures, including a number for small, rural communities; updates to lighting; and exploring how the timing of energy efficiency could help the region meet peaks in energy use.

The role of energy efficiency in ensuring our power system has never been more vital. To understand how it — our second largest resource after hydropower — has grown over time, one need only glance through the report. It details the nuts and bolts of acquiring this ubiquitous, under-the-radar, and most consequential energy resource.

Jennifer Anders, Chair
Northwest Power and Conservation Council

Letter from the RTF Chair

As 2019 has come to a close, I've been reflecting on all the good work we've gotten done and all the great folks we've accomplished it with. This year the RTF welcomed a new class of technical experts, celebrated big milestones, and served our original mission from congress while broadening our efforts to new and important things. As chair I've gotten to see firsthand the passion and care this body brings to every technical challenge it tackles and every piece of analysis it produces.

We inducted a new class of RTF members at the start of the year who learned the ropes quickly and dove into appraising measures, asking important questions, and making difficult decisions. Meetings have been lively with high attendance and engagement. The group tackled complex technical quandaries all year, and I'm excited to continue our work together for the remainder of their term.

Over the course of the year we've accomplished so much together. The RTF spent time revisiting our existing suite of measures, ensuring that everything remains accurate, up to date, and useful for the region. Significant focus was spent on our analysis of HVAC measures and commercial building work. Because of transformations in the lighting market and the import role HVAC opportunities play in meeting peak needs, these measures are becoming more important for programs activity in the future. The RTF also expanded our work to include demand response analysis, which has not been a part of the RTF charter but has started to emerge as an important resource for the region and is in need of reliable, standardized savings estimates.

We also crossed an exciting milestone; the RTF has been an advisory committee to the Council for 20 years! We celebrated the only way we know how, by advancing our mission, set for us 20 years ago, to support energy efficiency as a resource for the region ensuring consistent, reliable energy savings estimates. And also we had cake.

As this report is being published, we're a quarter in to 2020, and what a year it has been already. We've adopted a new 5-year funding agreement which sees us further expanding our charter to natural gas and demand response work, we're helping Council staff as they develop the 2021 Plan, and we've got a host of new measures coming down the pipeline. Times are deeply uncertain right now and we can't know how the rest of this year will go, but here at the RTF we're feeling lucky that we get to keep working and we're grateful for everyone that's sticking with us as we figure out what that looks like. Over the following pages of this annual report we'll review and celebrate everything the RTF accomplished over 2019 and look forward to what we can do in 2020.

Introduction

In 1980, Congress passed the landmark Northwest Power Act, which formed the Northwest Power and Conservation Council, an interstate compact comprised of Washington, Oregon, Idaho and Montana. The Act charges the Council with ensuring the region has an adequate, efficient, economical, and reliable power system, which it does through a twenty-year regional power plan reviewed every five years. This regional, multi-state collaboration has become a model to the rest of the nation for meaningful, effective power planning.

Energy efficiency has been a cornerstone of the Council's work since its inception. The Act innovatively defined energy efficiency as a resource. It requires the Council to prioritize cost-effective conservation over all other resources in its power planning. Due to this emphasis on energy efficiency, it is now the region's second largest resource after hydropower. Over the past four decades, utilities, program implementers, and countless other engaged stakeholders have been integral to this success, utilizing energy efficiency to its potential of mitigating regional load, reducing customer costs, cutting power sector carbon emissions, and improving system reliability.

The Regional Technical Forum (RTF) was created as an advisory committee to the Council in 1999 to further support these regional efforts by developing and maintaining a list of eligible energy efficiency resources. A goal of the RTF was to create a library of energy efficiency opportunities that outline reliable and consistent ways of estimating energy savings. This is intended to ease the planning and evaluative burden of energy efficiency programs in the region. As a technical body, the RTF is able to objectively generate peer-reviewed energy savings estimates through robust and unbiased analysis in a public forum. The RTF engages stakeholders from across the Pacific Northwest and from all sectors of the energy efficiency industry to ensure that the work they produce speaks directly to region's needs. This commitment to collaboration informs all of the RTF's work and results in widely respected technical analysis that is looked to for its accuracy, reliability, and consistency.

The following report details the many accomplishments in 2019. This includes an important focus on energy savings estimates for heating and cooling related measures, which represent a significant portion of future energy efficiency potential, as well as several other important measures in efficiency portfolios. With an eye on the future, the RTF also explored an opportunity to build on its existing expertise by estimating technical capacity savings potential for a variety of technologies that provide both energy efficiency and demand response expertise. As the RTF starts into a new decade, it looks forward to continuing to play a pivotal role in supporting the region's efforts to achieve all cost-effective energy efficiency.

Accomplishments in 2019

Emphasis on Residential HVAC Work

In 2019, the RTF dedicated significant time to updating its energy efficiency savings estimates for heating, cooling, and ventilation (HVAC) end-uses. In the Council's Seventh Power Plan, approximately one third of the cost-effective energy efficiency potential in the residential sector was from HVAC savings. Most of that potential represents savings from weatherizing homes, including adding insulation and retrofitting windows. This potential also includes savings for upgrades to heating equipment, such as the installation of a ductless heat pump or upgrading to a more efficient air source heat pump. In addition to the energy savings, HVAC represents an important efficiency opportunity, providing capacity savings during the winter peak by requiring less energy to heat a home, which in turn reduces the overall demand on the power system during a cold winter day.

The RTF uses building simulation models to estimate energy savings for this end use. In 2019, the RTF updated its calibration of the model outputs to better align with real world energy use. This effort leveraged the regional Residential Building Stock Assessment (RBSA), conducted by the Northwest Energy Efficiency Alliance (NEEA). The RBSA provides detailed information on actual homes throughout the northwest, allowing analysts to replicate the home in building models and compare the outputs with actual data on home energy usage. Since the building models focus on the underlying physics of heat transfer, this calibration is important to account for other factors impacting energy use, such as how occupants operate their heating systems. The RTF made other enhancement to its modeling of HVAC use, including using indoor temperature data to replicate thermostat settings, improving its method for selecting appropriate weather data, and simplifying its approach to accounting for the interaction between different measures.

Once the modeling enhancements were complete, the RTF used a combination of modeling and data from utility program

evaluations to estimate savings for weatherization measures, upgrades to HVAC equipment, and thermostat measures in both single family and manufactured homes. Through this work, the RTF was able to better highlight the importance of proper installation practices for ensuring energy savings. For example, the RTF found that not all air source heat pumps installed as part of an efficiency program are properly sized or controlled, resulting in equipment running less efficiently and providing fewer savings for the utility. With its work on ductless heat pumps, the RTF found the importance of targeting appropriate applications to ensure cost-effective efficiency development, such as homes that currently rely heavily on electric resistance heating in the winter. Collectively, the updated RTF analysis provides additional information to efficiency programs trying to capture this important energy efficiency potential.

Continued Updates to Lighting

Efficient lighting has always been an important energy efficiency resource opportunity. In the Council's Seventh Plan, lighting accounted for over 20 percent of the cost-effective potential in the residential sector and 40 percent of the cost-effective potential in the commercial sector. Since completion of the Seventh Plan, the Council's annual Regional Conservation Progress (RCP) report has shown that lighting represents the single largest savings any end use in the region. Given the significance of this, and the fast pace of market change, the RTF devotes resources annually to updating savings assumptions for this end use.

In 2019, the RTF made updates to savings for much of its lighting portfolio. On the residential side, the RTF updated its savings for lamps and fixtures based on newly available market data. These data show that penetration of efficient light emitting diodes (LEDs) is growing rapidly. This data provides strong evidence that efficiency programs

have been extremely successful in advancing the lamp market. At the same time, there appears to be value in shifting emphasis away from individual efficient bulbs, which consumers are purchasing naturally, towards efficient integrated fixtures, a newer product in the market.

The RTF also updated its non-residential lighting midstream measure. This is essentially a measure that provides energy savings estimates for those utility programs targeting distributors' selling of efficient lamps. As on the residential side, this market is evolving rapidly, with an ever-increasing shift towards efficient LED technologies. By revisiting this measure on an annual basis, the RTF ensures it is providing up to date and reliable savings estimates for use in energy efficiency programs.

Increased Emphasis on Commercial Building Efficiency

Roughly 40 percent of the cost-effective energy efficiency identified in the Seventh Plan was in the commercial sector. Similarly, over 40 percent of the energy savings achieved in the region since the start of the Seventh Plan have come from the commercial sector. The RTF's portfolio has traditionally been more limited in this sector, focusing mostly on lighting, commercial kitchens, and a handful of opportunities for groceries. This gap in the commercial sector is primarily due to the fact that many of the efficiency opportunities are more complex, requiring either site-specific analysis or different types of analytical modeling. In 2019, the RTF tackled several projects aimed at better addressing this sector.

As a start, the RTF focused on updates to several of existing measures. In addition to the lighting analysis described earlier, the RTF updated savings assumptions for a handful of commercial grocery measures. Most of these focused on reducing the refrigeration requirements of the store through refrigeration system upgrades and devices intended to keep refrigerated air separated from outside spaces.

In addition, the RTF invested significant resources into enhancing commercial building simulation models. Similar to the residential side, building simulation models provide an analytical tool to model changes in equipment and building shell and estimate savings. Unlike the residential side, there is significantly more diversity in the commercial sector. Commercial buildings range from retail strip malls, to various size office buildings, to warehouses, to hospitals, and more. Additionally, due to the size and complexity of these buildings, more detailed tools are often required. The RTF decided to leverage EnergyPlus models that were originally developed by the Pacific Northwest National Lab. These models were then tailored to better reflect commercial buildings in the Northwest, incorporating

standard assumptions around building operation and equipment and calibrating the models to energy use data from the region. The RTF anticipates that these models will expand its capacity to estimate energy savings for a variety of HVAC and building envelope measures, as well as enhance its ability to estimate improvements to refrigeration systems.

Finally, the RTF has been shifting some focus towards supporting robust energy saving estimation in whole building analysis. Since these types of analyses are unique to a specific building and set of efficiency projects, there is no single way to standardize the savings calculation methodology. Instead, the RTF is exploring how it can provide guidance around reliability and consistency where possible. As a first step, the RTF developed a white paper exploring the reliability of several data-driven models used to support whole building analysis. The RTF plans to expand on this work in the coming years.

Demand Response Exploration

In 2019, the RTF did an exploration into a potential role to support demand response technologies. While demand response was not explicitly in the RTF's charter, the Council saw value in leveraging the expertise of this technical body to support some analysis in this space. The work specifically focused on a handful of technologies that provide both

an opportunity for energy efficiency savings and demand response potential. One such technology is heat pump water heaters, which provide energy savings year around and the possibility to provided added peak benefits through sophisticated controls. Another example is a connected thermostat, which provides energy savings during heating and cooling seasons through more efficient operation and can also provide demand savings during peak hours with slight temperature adjustments.

The focus of the RTF analysis was on understanding the technical, per unit potential for each technology. For example, answering the question of how much capacity a single water heater or thermostat could provide. These estimates are intended to be one of many inputs used to support demand response potential assessments across the region. Based on the useful analysis provided in this space, the Council and RTF funders decided to expand the RTF charter to include continued analysis of demand response technologies going forward.

Subcommittees Advance Work

While the RTF makes final decisions on analysis at its monthly RTF meetings, subcommittees provide valuable insight and support along the way. The RTF convenes a

variety of subcommittees, from those that provide deep technical expertise for a specific measure area to those that provide guidance across our measures. Some highlights from subcommittee activity in 2019 include:

Irrigation Hardware Working Group

In 2018, the RTF updated its analysis approach to irrigation hardware measures. This includes measures such as replacing worn nozzles on center pivot systems, which is intended to reduce the amount of wasted water on a field and in turn the amount of energy needed to pump the water. The theory behind the measure is that those participating in programs perform more regular maintenance on their systems, and therefore have an overall reduction in wasted water compared to non-participants.

This change in approach reduced savings significantly, but also raised important questions about whether the measure provides the savings anticipated. Given the

Subcommittees

The RTF's subcommittees provide deeper technical insight into questions that arise in the course of RTF analysis. A subcommittee is convened when a measure's complexities or sensitivities require increased stakeholder involvement to provide justifiable recommendations to the RTF. Subcommittees that met in 2018 are listed below. Information on all active and currently suspended RTF subcommittees are at **rtf.nwcouncil.org/subcommittees**.

- Air Source Heat Pump Subcommittee
- C&I Fans Subcommittee
- Demand Response Subcommittee
- Ductless Heat Pump Subcommittee
- Electric Vehicles Subcommittee
- Implementers Group
- Irrigation Hardware Working Group
- Market Analysis Subcommittee
- Non-Residential Lighting Subcommittee
- Operations Committee
- Residential Lighting Subcommittee
- Research and Evaluation Subcommittee
- SEEM Calibration and Measure Interaction Subcommittee
- Small Rural Utilities Subcommittee
- Whole Building Subcommittee

importance of this measure to its portfolio, Idaho Power lead an RTF working group to explore paths for completing research. This group kicked off with an in-person workshop in March 2019, which was followed up by a series of webinars. The efforts culminated in the development of a customer survey intended to improve the RTF's understanding of irrigation system maintenance practices. Multiple utilities sent this survey to their customers in early 2020, and the RTF looks forward to learning from the results.

Market Analysis Subcommittee

The RTF's Market Analysis Subcommittee reviews the analysis and findings from the Bonneville Power Administration and the Northwest Energy Efficiency Alliance various market studies. These market studies combine a variety of data—such as product sales data, surveys of supply chain actors, etc.—to estimate total consumption and energy savings for a market. The RTF uses the results of these efforts to inform its baselines, or the starting points from which it estimates energy savings for a specific measure.

This subcommittee met five times in 2019. At those meetings, the subcommittee provided review and feedback on several different markets, including residential lighting, non-residential lighting, residential HVAC, residential hot water, and a handful of residential appliances. The RTF hopes to continue to build on these efforts in 2020 and put more resources towards supporting the work of this subcommittee.

Regional Conservation Achievements

Every year, the RTF is responsible for collecting data from the region's energy efficiency programs to inform on achievements towards the Council's Power Plan targets. In the Seventh Power Plan, the Council set a target of 1400 average megawatts of energy efficiency to be achieved through the first six years of the plan (2016 through 2021). The data collected in 2019 provides insight on the accomplishments for the first half of that period (2015 through 2018), as well as an early look into the remaining years.

The results from the 2019 regional conservation progress survey show that the region is currently on track for meeting the first six-year target set forward by the Council's Seventh Plan. Based on the data available to date, the region achieved 635 average megawatts of efficiency savings, compared to the three-year milestone of 600 average megawatts. Most of these savings are from energy efficiency programs directly working with customers to move towards more efficient equipment or practices. This data also reflects additional energy efficiency beyond what direct programs touch.

Energy efficiency from residential and commercial lighting represent almost 40 percent of the total efficiency savings during this three-year period. Most lighting achievements are in the commercial sector, which represents around 170 average megawatts of efficiency savings between 2016 and 2018. While much of this is driven by the significant energy efficiency program activity driving lighting technologies, the region is also seeing significant accomplishments outside of programs as customers chose to adopt these technologies on their own. The next largest end use of savings comes from HVAC, representing just over 10 percent of total regional savings.

While HVAC savings represent a smaller part of the efficiency savings portfolio, they provide a more significant contribution (approximately one third) of the contribution towards reducing winter peak. The reasons for this are clear, improvements in HVAC reduce energy savings particularly during the heating season and critical peak hours.

While these results show great progress, the region still has more work to do to develop all of the cost-effective energy efficiency identified in the Seventh Plan. This includes shifting emphasis away from lighting towards more challenging opportunities, such as HVAC. The RTF will continue to track the region's progress in the coming years.

Figure 1. Regional Energy Efficiency Accomplishments Compared to Plan Milestone (2016-2018)

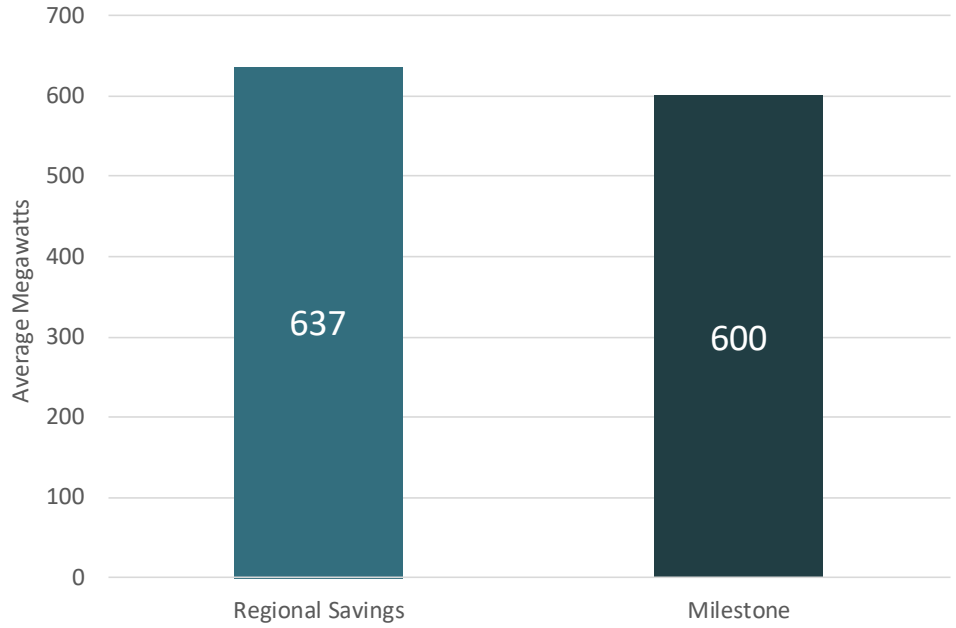
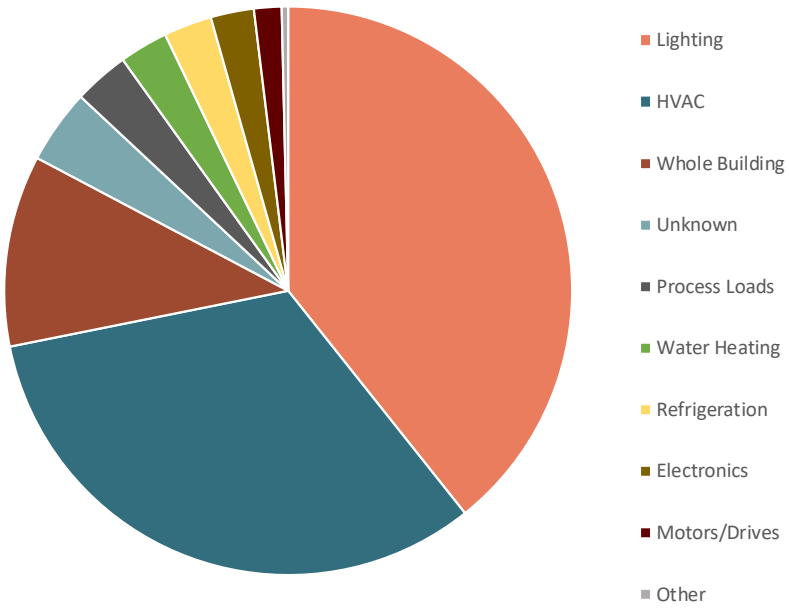


Figure 2. Efficiency's role in regional capacity savings by end use: 2016-2018 Winter Capacity Savings (1,222 MW)



Financial Information

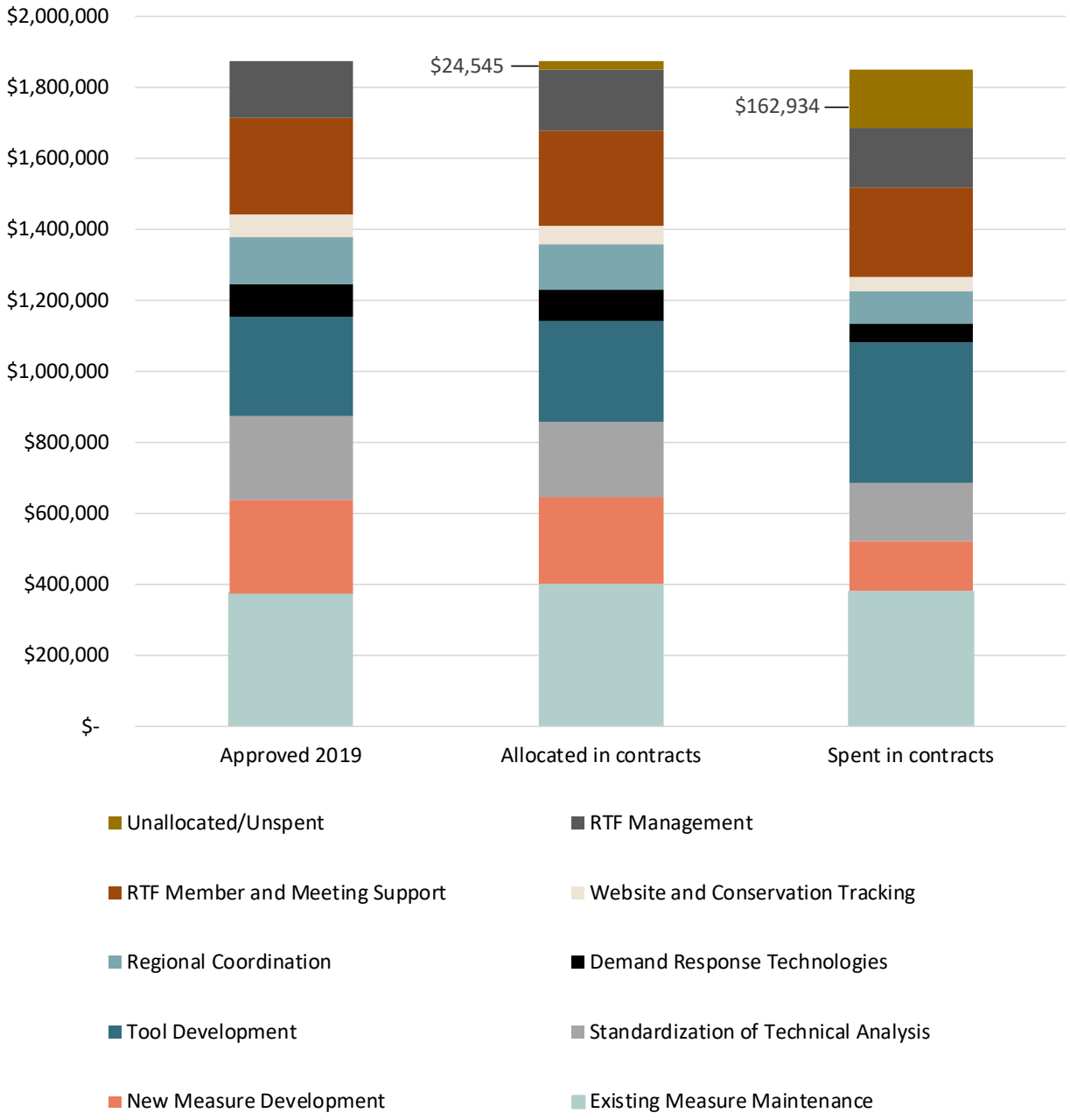
In 2014, the RTF Policy Advisory Committee secured five-year funding commitments for the RTF, which removed year to year uncertainty in budgets. 2019 represented the last year of these five-year agreements. The total budget in 2019 was $1,875,200. By the end of 2019, the RTF had obligated 99 percent of the budget to contracts and spent 91 percent of obligated funds. Unobligated and unspent funds were credited back to each funder according to their initial funding share.

The majority of funding in 2019 went to measure development. This was both in the form of direct analytical work, as well as the time for the contract analyst team to review and enhance each other's work ("standardization of technical analysis") and the resources involved in convening the RTF membership to weigh in on the analysis ("RTF member and meeting support"). The RTF also invested significant funds into tool development, which directly supported key accomplishments in 2019. Approximately 50 percent of the tool development work supported enhancements of the commercial EnergyPlus models described earlier. Another 40 percent was time spent enhancing the RTF's residential building model used to estimate savings from HVAC and weatherization.

Since 2019 was the last year of the existing funding agreements, the RTF staff again worked with the RTF Policy Advisory Committee to develop a new strategic plan for 2020 through 2024. This new funding cycle starts with a $1.8 million budget, growing to $1,968,800 by the end of the five years. Much of the work in this plan builds upon the RTF's existing strengths of estimating energy efficiency savings in support of regional utility programs.

The RTF Policy Advisory Committee also agreed to expand the scope of the RTF. In addition to including some long-term

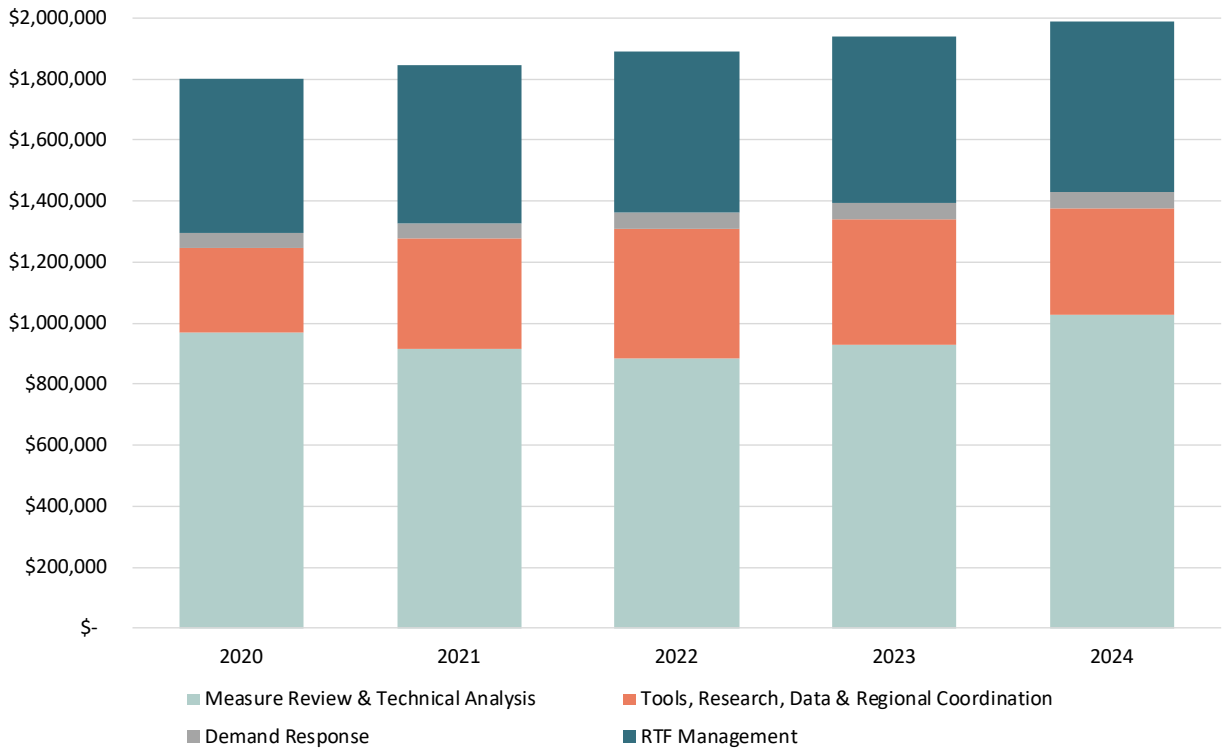
Figure 3. Allocation of final 2019 budget compared to work plan



funding in support of demand response analysis, the new strategic plan includes energy efficiency analysis of natural gas measures. Despite natural gas energy efficiency not being within the Council's purview, the RTF already has the expertise and infrastructure to expand its analysis to natural gas measures. Additionally, several measures in the RTF's portfolio have the potential to provide both electric and natural gas savings. The general consensus of the Council and RTF Policy Advisory Committee was that it would a natural fit to broaden the RTF's analysis in this way.

In addition to the long-standing funders of the RTF, four new entities came to the table. This included two additional electric only utilities and two gas only utilities. The funders collectively agreed to using the funding allocation methodology developed by the Northwest Energy Efficiency Alliance. Further, it agreed to a reasonable split of funding across electric and gas ratepayer dollars for the dual fuel analysis and infrastructure.

Figure 4. 2020-2024 RTF Work Plan by Category



The work of the RTF is made possible from sponsor funding. We want to thank these organizations for providing funding:

Avista Utilities
Bonneville Power Administration
Clark County PUD
Cowlitz County PUD
Energy Trust of Oregon
Eugene Water and Electric Board
Idaho Power
NorthWestern Energy
PacifiCorp
Puget Sound Energy
Snohomish County PUD
Tacoma Power

And we are excited to welcome these new funders for the 2020-2024 cycle:

Cascade Natural Gas
Chelan County PUD
Northwest Natural
Rocky Mountain Power

Looking Ahead to 2020

As the RTF launches into 2020, the work brings an interesting mix of old and new. The current membership is entering its second year of a three-year term, and they continue to bring sharp insight and engaging discussion. The RTF work plan is filled with analysis to update assumptions for several key measures, while also having space to assess and bring forward new savings opportunities. Here are some highlights of the progress to date and a look at the road ahead.

Getting Ready for Natural Gas Analysis

2020 launches the first year of including analysis for natural gas efficiency measures. Before the RTF can develop savings for its first measure, there are several pieces of infrastructure that need to be expanded.

One key piece of the infrastructure was a gas-focused calibration of its residential building model. As highlighted earlier, much of 2019 was spent ensuring good alignment between the model outputs and real-world energy data. That work, however, only focused on modeling energy use in electrically heated homes. Over 50 percent of single-family residences are heated with natural gas rather than electricity; meaning that when a homeowner adds insulation, they are more likely reducing gas heating needs. To support future analysis of HVAC and weatherization measures for gas-heated homes, the RTF is building on its residential model calibration efforts with a narrow focus on gas energy. After this is complete, the RTF will be able to start its gas analysis, expanding the existing weatherization measures to include savings for gas homes.

As the final pieces of infrastructure fall into place, the RTF looks forward to kickstarting its dive into analysis of natural gas measures. This will start with expanding current measures in its portfolio to reflect both electric and gas efficiency. This includes measures such as enhancements to new homes, commercial cooking equipment, and commercial HVAC equipment. Additionally, the RTF

will look to expand its portfolio to include new measures that are of specific interest to natural gas efficiency programs. 2020 represents just the start of this effort, with a goal of developing a robust portfolio of measures for both fuels by the end of the strategic plan period.

Supporting the Council's Power Plan Development

In addition to supporting regional efficiency programs, the RTF provides analytical support to the Council on energy efficiency and demand respond. To that end, much of the RTF resources in the first quarter of 2020 have been dedicated to supporting the Council staff in the development of efficiency inputs for the upcoming 2021 Regional Power Plan. Several of the contract analysis have provided direct analytical support to help inform measures across sectors. This includes building on their knowledge of RTF measures, such as the recently completed residential HVAC and weatherization analysis, or leveraging RTF developed tools, such as the commercial building models.

The RTF itself has also weighed in on the development of the plan. The RTF's February meeting was primarily focused on highlighting important analytical considerations for the next power plan, as well as running through a few specific measures seeking technical feedback. The RTF will continue to be available to provide technical review to the Council staff, if needed, as they work to complete the development of the draft plan.

Continued Support of Measure Development

Even with some of the new analysis opportunities, much of the RTF's work will continue to focus on its core mission, developing reliable, unbiased, energy efficiency savings estimates for the region. In 2020, the RTF has plans to revisit and update around 20 of its existing measures. This includes a range of measures from residential appliances, such as clothes washers and dryers, to opportunities in the commercial and industrial sectors around efficient pumps, lighting, and HVAC controls. The RTF will also be addressing a handful of measures that look at the savings opportunities in new construction. This includes measures across the entire residential sector of single family, manufactured, and multifamily homes. It also includes new construction opportunities in the commercial sector around lighting.

In addition to measure updates, the RTF is anticipating that it will be able to add new measures to its library. The majority of new measures will be focused

on savings opportunities across the commercial sector. For smaller commercial opportunities, the RTF will likely be adding a measure for installation of ductless heat pumps in these applications. The RTF is also considering a new measure of controls in guest rooms in hotels and other lodging facilities. Further, the RTF's first two gas-only measures are likely to be focused on space heating equipment in the commercial sector. Regardless of the specific measures added to the library this year, the RTF looks forward to providing continued support for the Northwest energy efficiency community through its development of unbiased, robust energy efficiency analysis.

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, RTF Chair/Manager
- Charlie Grist, Vice Chair*
- Annika Roberts, RTF Assistant* (started Nov 2018)

The RTF also contracts a team of contract analysts who provide dedicated support throughout the year. The 2019 contract analysts include:

- Gregory Brown
- Christian Douglass
- Ryan Firestone
- Josh Rushton
- Paul Sklar
- Eric Shum

In addition to RTF staff, several members provide operational and administrative leadership to the forum by serving on the Operations Subcommittee. For 2019, those members are: Jennifer Finnigan, Sarah Castor, Eric Miller, and Bill Welch.

2019 – 2021 Regional Technical Forum Members

Name	Organization
Jennifer Light (RTF Chair)	Northwest Power and Conservation Council
Charlie Grist (RTF Vice-Chair)	Northwest Power and Conservation Council
Rebecca Blanton	Independent
David Baylon	Independent
Sarah Castor	Energy Trust of Oregon
Mohit Chhabra	Natural Resources Defense Council
Rachel Clark	Tacoma Power
Bob Davis	Ecotope
Bryce Eschenbacher	Avista Utilities
Jennifer Finnigan	Seattle City Light
Lauren Gage	Apex Analytics
Kevin Geraghty	Independent
Jackie Goss	Energy Trust of Oregon
Mark Jerome	CLEAResult
Don Jones Jr.	PacifiCorp
Josh Keeling	LO3
Phillip Kelsven	Bonneville Power Administration
Rick Knori	Lower Valley Energy
Eric Miller	Benton REA
Graham Parker	Independent
Janice Peterson	Bonneville Power Administration
Jessica Raker	Puget Sound Energy
Cory Read	EcoMetric
Mark Rehley	NEEA
Jes Rivas	Illume Advising
Peter Therkelsen	Lawrence Berkeley Lab
Kevin Watier	Snohomish PUD
Bonnie Watson	Bonneville Power Administration
Bill Welch	Independent
Sarah Widder	Cadeo Group
Jim Woodward	Washington UTC*

+ Ex officio, non-voting, member

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