Natural Gas Advisory Committee
Q3 2025 Sept 10 Webinar (Virtual)

DATE: September 10, 2025

TIME: 1:00-2:15 pm Pacific

WEBINAR: Click here to join the meeting (Meeting ID: 284 550 847 392 8 | Passcode: hf9Lj2s3)
(if needed) Call-in audio only: 971-323-0535 | Phone Conference ID: 289 029 927#

AGENDA (All Times Pacific)

1:00-1:05	**Welcome and Quick Introductions**	Alisyn Maggiora	
1:05-1:10	**Vote Process Refresher**	Alisyn Maggiora	**p.2**
1:10-1:20	**2026 Operations Planning Process + Preview** • Operations Planning timeline • Preview of portfolio focus areas for 2026 *Desired Outcome: Committee area of operations planning timing and what to expect.*	Emily Moore	**p.3**
1:20-2:05	**Dual-Fuel Residential HVAC** • Reminder: What is 'Concept Advancement' Vote • Concept Overview + 2026 Focus Areas • NGAC Feedback • ***VOTE*** *Desired Outcome: NGAC understands proposed next steps for efforts on the program and supports advancing it into the Program Development phase in NEEA's initiative lifecycle process.*	Emily Moore Deborah Sunada	**p.4-24**
2:05-2:15	**Housekeeping, public comment, wrap up and adjourn**	All	

Memorandum – *Agenda item*

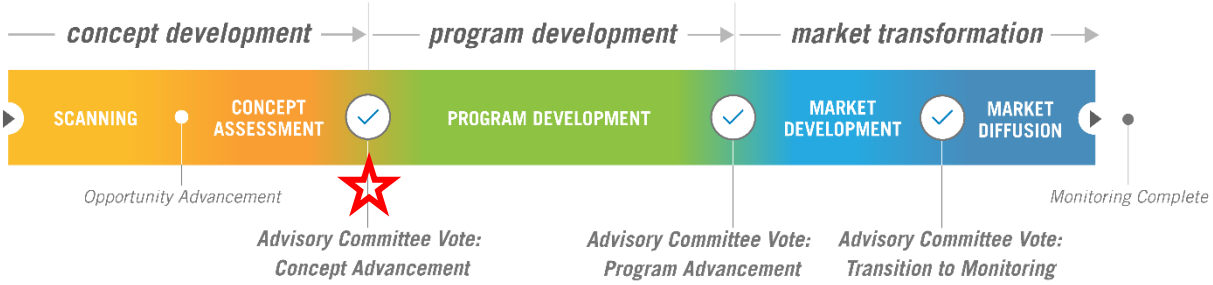
September 3, 2025

TO: Natural Gas Advisory Committee (NGAC)

FROM: Alisyn Maggiora, Sr. Stakeholder Relations Manager

SUBJECT: NGAC Vote on Dual-Fuel Residential HVAC 'Concept Advancement' Milestone

Our Ask of You:
Please review this refresher on the NGAC voting process and come to the September 10 NGAC webinar prepared to vote on the Dual-Fuel Residential HVAC 'Concept Advancement' milestone, which marks the program's transition from the Concept Assessment phase to the Program Development phase of NEEA's initiative lifecycle (diagram below).



Refresher on NGAC Voting Process:
The process is detailed in Addendum A of the NGAC Charter; in summary:

- A roll-call vote will be taken at NGAC and full consent must be reached by those casting votes for a NEEA program to advance.

- An NGAC Member may register his/her vote as follows:
  - A 'Yes' vote may be registered during the meeting by the NGAC member or an appointed delegate, or may be submitted in writing to NEEA staff in advance of the meeting.

  - A 'No' vote must be registered during the meeting by an NGAC member; an NGAC member voting 'No' shall identify their concern and propose a solution they feel addresses the concern as well as the viability of the NEEA market transformation effort.

  - Other:
    - 'Abstain' – An NGAC Member may choose to abstain as a means of registering a neutral opinion or dissent without voting 'No'.
    - 'Present, Not Voting' – An NGAC Member who is present may choose not to vote as a means of remaining neutral on a program's advancement.

For any questions on the voting process, please contact Alisyn Maggiora. For any questions on the Dual-Fuel Residential HVAC Concept Advancement milestone document (sent to NGAC on July 31) please contact Deborah Sunada and copy Emily Moore.

Memorandum – *Agenda item (Tier 1)*

September 3, 2025

TO: Natural Gas Advisory Committee (NGAC)

FROM: Emily Moore, Director, Market Strategy & Execution

SUBJECT: 2026 Operations Planning Process and Preview

Brief Overview:

NEEA staff have begun developing the 2026 Operations Plan and want to ensure RPAC members are aware of the process and the upcoming timeline for stakeholder engagement and feedback.

The 2026 process and Operations Plan deliverable will be very similar to years past and will culminate in Board approval at the December 8th Board meeting.

Here are the key dates for stakeholder review of the Operations Plan that RPAC members should be aware of:

- 10/14: Draft 2026 Operations Plan shared with regional stakeholders
- 10/16: Webinar meeting held to review the draft Operations Plan
- 10/30: Feedback is due to NEEA

In the Q3 NGAC meeting, we'll review the timeline and key focus areas expected in the 2026 plan. Please raise any questions you have at the meeting and/or contact **Emily Moore, emoore@neea.org**.

Portfolio Metrics and Energy Savings Summary for Concept Advancement

Purpose: *Populates the Portfolio Metrics and Energy Savings Outputs for External Audiences.*
Audience: *NGAC/RPAC, Cross-functional program team members, Portfolio Management Team, NEEA Directors*

PROGRAM:	Dual-fuel Res HVAC
PRODUCT GROUP:	HVAC
LIFECYCLE STAGE GATE:	Program Development
MARKET ANALYST:	Ryan Brown
DATE LAST UPDATED:	3/28/2025

Portfolio Metrics

Assess Risk on Scale of 1-6, with 1 being minimal risk and 6 being high risk

AREA OF RISK	DESCRIPTION	SCORE
Cost Effectiveness	Determined by whether the benefits outweigh the costs over the 20 year period from the Total Resource Cost perspective?	1
Measurability	Determined by the ability to collect necessary data to forecast and report energy saved by the program. This may include but is not limited to: • Unit Energy Savings (UES) and site-specific considerations • Market data to track adoption and measure the whole market • Utility-incentivized and non-incentivized units • Incremental cost • Overlap with other NEEA Programs • Market diffusion in the program's market	4.5
Unproven Technology	Determined by the level of behavior change and level of barrier removal necessary to accelerate product adoption. Five factors that influence the diffusion process and the rate of adoption are: relative advantage, compatibility, complexity, trialability, and observability.	1
Unproven Market Approach	Determined by similarities in market dynamics and barriers to other recent NEEA programs and the key learning is understood and can be leveraged in this program. The program: • Has identified market barriers and solid leverage point for market diffusion, such as influential market actors and their communication channels • Has identified barrier removal approach(es) that have been proven in other NEEA programs and can be	4
Ramp Speed	Determined by how immediate and how fast the adoption of this product is in the market. We have previously called this risk "late life savings". The two primary factors in determining late life savings risk are the Market and Technology risk factors from the prior risk criteria, as well as overall market dynamics, market speed of transaction and measure life.	3

Summary of Savings Potential (Base Case)

20-Year Energy Savings	Electric (aMW)	Gas (Therms)	Description
Technical Achievable Potential	-63	60	The base case has a technical savings potential of 60 MM therms over 20 years but may result in negative electric savings of -63 aMW due to the potential of adding a cooling source, and now using supplemental gas heating with an electric source. At the same time, overall site energy use (gas + electric) is projected to drop by 4,164,735 MMBTUs. During Program Development, these initial estimates will be further refined to provide information on market size, market penetration, ramp rate for the technology, and peak impacts for both fuels to assess the overall impact of the program. NEEA staff will ensure full transparency with our funders.

Cost Effectiveness- Total Resource Cost Perspective

Cost Effectiveness	Description & Sources
Benefit-Cost Ratio	Measures range from a benefit cost ratio of 2.95 to 4.31 depending on climate zone and the range of performance seen in energy modeling work conducted in 2025. The estimates are based on preliminary runs of ProCost v5.11 using energy impacts modeled by Larson Energy Research and custom savings shapes developed by NEEA in alignment with guidance from the Cost Effectiveness Advisory Committee's Dual Fual Measurement Workgroup These are the Regional Perspective Gas Measure outputs from the ProCost tool.

Appendix to Dual-Fuel Residential HVAC Concept Advancement Proposal: Funder Questions on Program Proposal and NEEA Responses

Initially delivered to NGAC members 7/31/2025 with Milestone Document for review
Final version delivered to NGAC members 9/3/2025 in preparation for 9/10/2025 milestone vote

Thank you for your organization's review and feedback on the Dual-Fuel Residential HVAC (DFRHVAC) Program Proposal Preview, shared in the Q2 2025 NGAC meeting. The dialog we've had so far with your teams has resulted in rich Q&A. For anyone interested in a summary, we've packaged up the questions received along with NEEA's responses below.

Please review and reach out to Deborah Sunada, DSunada@neea.org, with any concerns or follow-up questions. Your input is crucial to informing the DFRHVAC Concept Advancement proposal. The Concept Advancement vote is scheduled for the next NGAC meeting, on September 10, 2025.

	Date Received	Source (Person, Org.)	Question	NEEA Response
1	4/9/2025	WUTC	General concerns over comfort issues given the prescribed setpoints for heat pump design and switchover temperature	Customer comfort and behaviors along with contractor/installation behaviors will be a focus during Program Development phase. A Market Characterization study will be completed along with other research to build on understanding behaviors to develop messaging and value propositions.
2	4/9/2025	Avista	Is 35F an optimal switchover temperature for cold climates?	The program currently aims to balance an optimum with some values that can support adoption. Based on the modelling analysis that was conducted, when the heat pump is designed for cooling and balance point of 30F even in colder climates, 35F remains a reasonable optimum as a switchover setpoint for cost and energy savings. Cold climate heat pumps or designing for lower balance point is possible and does provide additional savings but also increases the capital cost of the equipment disproportionally. The program vision is intentionally not focused on any specific heat pump to allow for affordability. Part of the Program Development phase will refine the prescriptive setpoint targets that were identified as a result of modelling work.

	Date Received	Source (Person, Org.)	Question	NEEA Response
3	4/9/2025	NW Natural	Will prescriptive 35F switchover temperature impact Natural Gas capacity issues?	The full efficient product definition includes not only 35F switchover temperature but also a heat pump designed at 30F balance point meaning that the heat pump can deliver heat down to Outdoor Air Temperature of 30F. The hypothesis is that below 35F in the Oregon/Washington climate, the electric grid will see a peak incident before the natural gas. Part of Program Development will be to test this hypothesis across climate areas and localized regions where this may not be an effective specification.
4	4/9/2025	Energy Trust	What are the impacts on customer bills? - Shared some concern about seeing customer bills increasing. MNCEE also seeing an increase in total energy bills	Part of Program Development phase will be to assess impact on overall customer energy and cost savings. The team recognizes the impact of electricity and gas pricing on the efficacy of dual-fuel systems and this is a significant element of the program intent.
5	5/15/2025	Avista	Is this dual-fuel program just load shifting?	The hypothesis is that gas customers who have chosen to install an efficient product (ie. heat pump) for cooling can also receive benefit of using heat pump for heating and choose the optimal fuel. When the gas/electricity rates have a higher differential, this could look like using a heat pump for heating in all but the coldest days after which the existing gas furnace can meet the heating requirements. In 2024, NEEA's Board of Directors approved principles to guide the organization's natural gas market transformation work heading into the 2025-2029 funding cycle. From there, operational guidelines for dual-fuel measurement and reporting were established with foundational criteria for programs and measures including: • The efficient solution must lead to a reduction in the combined system energy use required to provide the same or greater level of service as compared to the appropriate inefficient alternative baseline condition for that measure (see Appendix B). This may include absolute usage increases for one of the fuels involved. (see table 1) • The efficient solution must be cost effective following NEEA's existing cost effectiveness guidelines.

	Date Received	Source (Person, Org.)	Question	NEEA Response
				This implies that while the Dual-Fuel Residential HVAC program may see increased non-peak electric load, the overall expectation is there will be natural gas savings and the combined energy use is reduced. NEEA will work with funders where this approach is not consistent with internal metrics.
6	6/9/2025	NW Natural	What base parameters were used for the modelling analysis work?	The tool built allows the user to define multiple home characteristics such as heat loss (UA), In our study, the 2000 sqft house characteristics were held constant with heat loss rate set at 640 Btu/hrºF based on the average single family conductive UA from 2022 RBSA. Furnace type used: 95 AFUE condensing furnace and the TWH+AHU had nominal efficiency of 97% at full load (both systems assumed to be modulating)
7	6/9/2025	NW Natural	Can we quantify a(n electric) peak benefit? If there is a peak reduction then that is a benefit for natural gas utilities. If not natural gas utilities still need to maintain the system to meet peak demand.	Part of the Program Development phase will be to understand how to quantify electric grid peak reduction and value it accordingly for both electric and natural gas utilities. Currently NEEA has a demonstration project aimed at evaluating dual-fuel technology and one of the objectives is to quantify system energy use in different fuel “modes”. Partnering with both gas and electric utilities, data gathered during specific collection windows will provide some additional insight to electric and gas use profiles. For peak value at scale, this demonstration will provide some additional information before larger scale validation is conducted.
8	6/12/2025	PSE	How would NEEA try to encourage a switchover temperature of 35F? Particularly to avoid customers asking an HVAC tech to kick the furnace on at a warmer temperature.	The current hypothesis is through influencing manufacturers and “default settings”, training and education of installers on optimum dual-fuel settings. As this is currently a hypothesis, Program Development will continue to validate the efficacy of this switchover temperature. A Market Characterization study will aim to provide more insight on the barriers that might be causing customers to adjust set points outside of an optimal dual-fuel range.

	Date Received	Source (Person, Org.)	Question	NEEA Response
9	6/12/2025	PSE	Consider instead using the term "auxiliary lockout temperature" instead of "switchover temperature" along with some written notes so that it's consistently understood for all parties. There is some confusion about the terms "balance point," "lockout" and "switchover temperature:" all of these can mean different things to different people, and can lead to less than optimal results. This definition from PSE's website (PSE | Hybrid Heat Pump) might be helpful: "Auxiliary heat control/lockout temperature is the outdoor temperature above which the gas furnace auxiliary heat does not operate." Some of our contractors have confused the auxiliary lockout with the heat pump lockout, but they are separate settings and serve different functions.	Noted. The team recognizes the confusion around language and will use activities like Market Characterization study and other focus groups to help determine underlying barriers and intervention.
10	6/12/2025	PSE	Could we suggest manufacturer engagement on having more standardization (less proprietary design) across manufacturers? It's not just about having the equipment grid-enabled (it seems like manufacturers are okay with that), but that each brand of HP & each combo with different thermostats/control menus & language which makes it hard for even installers to get the settings right for day-to-day operations, let alone grid-enablement.	The team recognizes this challenge and agrees that some standardization could be helpful to reduce confusion across installers and other day-to-day operations. Developing the logic model will unearth ideas to support improved installation for the basic settings.

	Date Received	Source (Person, Org.)	Question	NEEA Response
11	6/12/2025	PSE	How will NEEA screen for how a HP is being sized for cooling? Moreover, how would a HP system balanced for 30F also be sized for cooling if this would normally mean it's sized for heating based on this information? (Is there an assumption that we are cooling down from 105F in the greater NEEA territory?)	The modelling data suggests that a heat pump designed with a balance point 30F (or 20F in coldest climate zones in Idaho), will meet heating load at 30F while still meeting cooling load. Program Development will continue to refine screening mechanisms or how we can work with market actors to correctly size equipment.
12	6/12/2025	PSE	Is there a specific DR standard NEEA is referring to?	NEEA is evaluating various DR standards/protocols (eg. AHRI 1380, OpenADR) and Program Development will work to define the path forward as policies become more established.
13	8/14/2025	Avista	Energy savings are highly dependent on switchover temp and utility rates - will program development research include analysis of different gas funding utility rates to determine if 35F will work for each particular funder territory (Not sure if Spokane also has more savings at 30F switchover setpoint like Portland does).	Agree that savings will be dependent on switchover temperature, outdoor air temperature, and utility rates. The modelling analysis used fixed rates and house profile and varied temperatures across multiple cities. Given the number of permutations across utility rates, heating zones, and home types, we suggest discussing specific needs and home profile assumptions. We can also make the levelized cost tool available to utilities to do detailed evaluations of specific rates in their own territories.
14	8/14/2025	Avista	With regards to overall customer bills, more in-depth analysis of rate structures may be needed to better define potential annual cost savings between both fuels - we've seen customers who've expected bigger cost savings even though there is an overall BTU savings. May need to take into account trends/projections of rates after DF install to have clear expectations of potential savings.	We would want to review the conditions leading to higher bills that have been seen during other studies and draw out possible behaviors or barriers causing the outcome of higher bills even with BTU savings. We could consider a smaller test where parameters are more tightly controlled or training is conducted to better optimize and protect the optimized conditions. In the early stages of Program Development, we would like to learn more about behaviors and barriers resulting in these non-optimized DF systems.

	Date Received	Source (Person, Org.)	Question	NEEA Response
15	8/14/2025	Avista	I think it will be important for NEEA to look into and/or gather incremental cost data of an A/C and a HP so that a customer can better understand the value and/or ROI. Per LER modeling for Spokane, a customer will want to know if a $200 annual overall cost savings will be enough to justify the additional added cost of a HP.	Agree. The current baseline target market is gas customers who have selected a non-optimized dual-fuel systems vs. optimized dual-fuel systems. However, we recognize the potential of an A/C switch to HP and can provide initial data on cost studies. As part of Program Development, the team is considering market research on first-cost pricing studies of dual-fuel systems.
16	8/14/2025	Avista	DF primary focused on gas savings down to 35F switchover setpoint - is the assumption that the single-speed HP will not be above code from a SEER standpoint to achieve kWh savings for cooling season? For those that have no cooling will the impact to summer peak be evaluated as well?	The modelling is showing that variable speed/Low-Load Efficient HP optimizes therm savings though single speed HPs still have some therm reduction. The baseline is currently gas customers who have already chosen a DF system and optimizing heating set up and with that definition, there would be little relative impact to summer peak. We understand the concern of summer peak impact when accounting for customers who added cooling and as we refine baseline assumptions may consider those direct implications.
17	8/14/2025	Avista	Looks like modeling based on 95% efficient furnace - How are the overall savings impacted with a different efficiency furnace? and/or will this be a prerequisite to have a minimum eff furnace when communicating value proposition to customers?	Modelling basis was a furnace with a single speed gas valve which has better performance at part load than modulating gas valve. Instead of defining 80% vs. 95%, we are considering a definition of single-speed gas valves on condensing furnaces as the improved product.
18	8/14/2025	Avista	With regards to NWN question #3, seems like a site vs source gas impact with the added electric load – it's unclear what the long-term impacts to both fuel rates, but it won't be zero and may decrease annual cost savings.	The team will continue to evaluate site vs. source impact as part of Program Development. Because fuel rates are set by the Power Council, we may consider those implications in the program.

	Date Received	Source (Person, Org.)	Question	NEEA Response
19	8/14/2025	Avista	PSE question #11, may need further clarification on this as well as sizing requirement will be for cooling, but unclear if real world equipment selection will translate to the 30F balance point. Lots of HVAC contractors use simple Accu-size quick sheets instead of full manual J calculations – will access to NEEA developed sizing tool be leveraged to ensure units are properly being sized for cooling and/or 30F balance point? If not, what is the impact of modeled savings w higher/lower BP?	Program Development will continue to refine the best ways to ensure that sizing is done properly and how to implement it in the market. In the modelling, the heat pumps were sized for heating and validated to ensure that cooling needs were met. In all cases, all had cooling loads met at 30F except for Boise where heating + cooling loads were met at 20F. However, this modelling was done on specifically-defined heat pump models (that we had performance data for) and would need to be validated if using other kinds of heat pump.
20	8/14/2025	Avista	Additional definition is needed for heat pump and/or natural gas furnace sizing (and maybe this will come later, after the concept phase). By saying a heat pump is sized for cooling needs isn't specific enough. When you match any dual-fuel system together it is hard to find an AHRI match as we've found with a couple of our pilot participants. For example, for "highly efficiency" systems to hit certain SEER and HSPF ratings, the AHRI can make this complicated but blower sizing, cabinet width, and evaporator coil match. As a result, the following can happen: • The heat pump may not come in ½ ton increments and must be sized up to the nearest ton. • The gas FAF may need to be sized up as well (blower size).	Agree that there may be a misalignment with AHRI matching. The point is noted and we will re-visit precedents and provide a position.

Dual Fuel Residential HVAC:

Concept Advancement Proposal

Contact: Deborah Sunada (dsunada@neea.org) or Debbie Driscoll (ddriscoll@neea.org)

Table of Contents:

Executive Summary

The value of energy efficiency is changing along with macro-trends across legislative, market, and regulatory activities in the Northwest. With the rapid shift in energy and climate policies, and more customers choosing to add or update cooling, the region is experiencing a burden on both natural gas and electric grid infrastructure. NEEA's Dual Fuel Residential HVAC Program Market Transformation vision aims to develop highly efficient dual fuel system solutions (electric heat pump + gas furnace) with grid-enabled controls delivering reduced energy waste, grid flexibility, cost savings, and year-round comfort. For customers using their gas furnace as a primary heating source, pairing a gas furnace with an electric heat pump and following proper design practices can improve the system heating efficiency beyond 95%, approaching 200% seasonal efficiency (i.e. COP 2.0).

NEEA's Dual Fuel Residential HVAC program concept is focused on transforming the market by:

1. Offering a high performance, affordable solution that provides cost, energy, and carbon savings for gas customers choosing a dual fuel system when adding or updating cooling.
2. Identifying and developing dual fuel system configurations with high-performance heat pumps and grid-enabled controls that can switch between fuels to optimize performance while managing grid impacts (energy system resiliency and resource adequacy).

Customers and contractors are unaware of the choices that influence optimal operation of dual fuel systems, as well as the value proposition, and have few options for low-cost equipment or controls that optimize fuel choice. NEEA will seek to address these barriers through a multi-pronged approach:

1. Partnering with suppliers, utilities, and market actors to build awareness and communicate the value proposition
2. Developing ratings and specifications to support market development of dual fuel systems and grid-enabled controls that optimize performance while managing grid impacts
3. Support market actors developing initiatives that benefit dual fuel systems and monitoring codes and standards updates

Based on current assumptions, the program sees a moderate risk level for both near and long term opportunities. The estimated technical achievable potential is 60 million therms savings over a 20-year projection. These estimated savings do not fully represent the potential benefits to NEEA's gas portfolio including source energy, peak impacts and load flexibility benefits which will be refined through Program Development. With a Program Development budget estimate of $1.3M-1.5M, key activities will focus on understanding the market potential and customer/contractor behaviors through a Market Characterization study; demonstration projects to prove technology performance, identify product development barriers, and refine savings estimates; and identification of leverage points for future load flexibility opportunities.

The Program Development phase directly supports the HVAC Product Group vision supporting the region to expand beyond the limits of natural gas efficiency for the market segment using natural gas or other fossil fuels for their heating needs. Intersecting across NEEA's Advanced Heat Pump Program and End-Use Load Flex Special Funding Project, NEEA will monitor progress and share results with NGAC members as the region moves towards a future where load flexibility enables higher system integration and presents new complexities within the market.

1 - Background

The Northwest energy sector is undergoing a period of rapid change across legislative, market and regulatory activities, including state and local energy and climate policies, building out of renewable energy, changing roles of natural gas, resource adequacy and resilience, and the changing value of energy efficiency. Furthermore, extreme weather events are affecting the load shape and delivery of electricity as summer is marked by more frequent, longer and more intense heat waves. Customers are seeking year-round comfort and air conditioning use may continue to increase.

For residential gas customers choosing to add or update cooling, considering options that reduce whole home energy use is an approach that not only adds value to the customer, but also supports a larger regional challenge of resource adequacy and resilience. As the region considers a new energy system that selects technologies based on use, time of day/year, and decarbonization value, leveraging residential gas and electric loads may offer flexibility and adaptability.

NEEA's Dual Fuel Residential HVAC approach aims to develop key building blocks that enable customers to heat their home efficiently and cost-effectively without compromising on year-round comfort. It also aims to support a future where grid-enabled controls allow utilities large scale residential load flexibility providing an additional resource in an energy-constrained environment.

Scanning assessments and discussion across funders and extra-regional partners have highlighted growing interest in dual fuel systems (electric heat pump paired with a gas furnace). An early report from GTI Energy showcased the market landscape of residential hybrid systems and NEEA gas funders including Puget Sound Energy, Energy Trust, Avista, Cascade Natural Gas, and Northwest Natural, have engaged in field demonstrations of dual fuel systems in recent years.

With varying strategies and values surrounding dual fuel efficiency, the Dual Fuel Measurement Work Group (as part of the Cost Effectiveness Advisory Committee) put forth operational guidelines for measuring and reporting dual fuel market transformation programs.

To date, NEEA has conducted several market landscape studies and modelling exercises to identify dual fuel equipment configurations with preliminary estimates on annual energy use, operating costs, and greenhouse gas emissions. NEEA is also conducting a pilot study of an efficient product that offers utilities load flexibility and demand response opportunities. This residential demonstration will continue throughout the 2025-2026 heating season.

In the Program Development phase of the Initiative Lifecycle, NEEA will continue to develop both near-term and mid/long-term opportunities: supporting effective design and installation of dual fuel systems when gas customers are choosing to add or update cooling; and identifying longer-term dual fuel configurations that improve system efficiency and advance demand response capabilities in the region. Given complexity around load flexibility specifications, thermostat or control performance, and a demand response infrastructure that is not fully realized, the program will continue to identify system building blocks that aim to support the End-Use Load Flex opportunity as it is further developed.

2 - Program Concept

2.1 – Preliminary Market Transformation Theory

Northwest residential consumers now seek year-round comfort, especially as our region experiences an increasing number of days above 90 degrees.[1] For the 43% of single-family homes using a gas furnace as their primary heating source[2], pairing a heat pump with the gas furnace (a "dual fuel system") and following a few simple design practices can improve the system's heating efficiency from 95% to over 200%[3], resulting in over 50% energy savings and 25% lower energy costs.[4] A largely unrealized benefit of dual fuel systems is control capabilities allowing the ability to dynamically shift between the use of gas and electricity for heating. This grid-enabling feature could maximize customer value and provide essential electric or gas grid flexibility at times of peak demand. With average annual load growth now at 4% and trending upward, capacity constraints are likely to increasingly impact the Northwest and could lead to higher rates and lower grid reliability.[5]

While dual fuel systems can deliver large energy savings, there are several barriers to realizing these savings:

- Contractors and customers are typically unaware of the design and installation choices that influence optimal operation, resulting in systems that vary widely in their performance
- Initial costs are high for dual fuel systems, and
- Lack of product features and communication protocols necessary to realize the grid flexibility (and operating cost benefits) of the systems.

To address these barriers, NEEA will partner with manufacturers, distributors, and utilities to build awareness and communicate the value proposition to contractors and customers of optimally designed and installed dual fuel systems. To support the market in developing and specifying the best performing systems, including grid-enabled controls benefits, NEEA will develop a dual fuel system rating and specification for dual fuel systems with grid-enabled controls that can switch between fuels to optimize performance while managing grid impacts. As these new products gain adoption, it will enable the market to include them in updated codes and standards.

As a result of these interventions, more efficient and grid-enabled dual fuel systems will become the standard dual fuel solution; manufacturers will produce and promote these systems; and contractors will design and install the most optimal systems, delivering reduced energy waste, grid flexibility, cost savings, and year-round comfort.

[1] Northwest residential single-family residences are adopting cooling at a rate of 5%/yr. (Regional Building Stock Assessment [RBSA], NEEA)
[2] RBSA
[3] 95% efficiency represent the typical highest efficiency gas furnace being installed today and is near the theoretical limit of gas efficiency of 100%. Dual fuel systems can achieve a combined seasonal coefficient of performance (COP) of 2.0 (i.e. 200% seasonal efficiency).
[4] These are rounded calculations based on the Larson research results for the 35-degree switchover and single speed heat pump *(Insert reference when Larson research is published)*
[5] PNUCC 2024 Northwest Regional Forecast, page 17.

2.2 – Preliminary Product Definition

The efficient product is a residential forced air ducted gas furnace combined with a heat pump. The system requires a controller (which could be as simple as a thermostat) that determines when to operate the heat pump or furnace. Critical design specifications and set point recommendations include:

- Heat Pump sized for cooling with a balance point of 30°F
- Switchover temperature set to 35°F degrees
- Demand response signals accepted

Desired improvements with manufacturer engagement include:

- Relevant improvements from the Advanced HP program over time, such as low load efficient operation and connected commissioning
- Optional configuration of tankless gas water heater with hydronic air handler in place of the gas furnace (that enables simultaneous operation of heat pump and furnace)
- Expanded demand response capabilities enabling the utility to request that the forced air ducted furnace operate instead of the HP (and vice versa), superseding any local control

Through the Program Development phase, recommendations will be validated and refined for regions that experience colder climates.

2.3 – Preliminary Target Market

The target market for this opportunity consists of existing centrally ducted single-family residential homes, in Oregon, Washington, and part of Idaho, with gas as their primary heating source, looking to add or update cooling. During the Program Development phase, the program will utilize market characterization, research, and demonstration project findings to gather key insights on market actors and influencers within these sectors.

2.4 – Next Phase: Planned Activities for Program Development

Activity	Desired Outcomes	Expected Timeframe
Assess and validate dual fuel system performance - Conduct lab testing of previously identified advanced dual fuel systems (i.e. Tankless water heater + hydronic air handler, simultaneous hybrid heating systems) - Support and conduct demonstration projects incorporating dual fuel emerging technology - Identify and assess component-level impact on overall efficiency • Validate field performance using different balance points and switchover points • Refine load flexibility specifications, parameters, and requirements that will provide future utility control through technical feasibility and utility impact study - Identify and prioritize improvements from NEEA's Advanced Heat Pump (AHP) program with highest impact on dual fuel systems that are expected to be installed within the target market and refine partnership strategy	- Identify barriers to performance optimization for dual fuel systems - Understand impact of thermostat on overall product performance and barriers to future smart fuel switching capabilities - Identify key parameters to support future advanced utility demand response programs for dual fuel systems - Improvements specified by AHP program that provide highest impact on dual fuel systems are identified, along with barriers relevant to Dual Fuel Residential HVAC program.	**Q4 2025 - Q4 2026**
Conduct a Market Characterization study and develop a report with key findings - Collect insights on dual fuel market size and characteristics to refine target market/potential and market dynamics - Identify and survey key market actors in the supply chain and decision makers in dual fuel systems • Gain understanding of decision-making criteria when selecting dual fuel systems • Understand barriers to efficient Dual Fuel system adoption • Investigate customer and contractor behaviors for selecting, purchasing, and installing dual fuel systems - Use findings to develop program logic model	- Understand dual fuel systems selection, specification, and use in residential single-family homes to inform baseline assumptions across climate areas, critical for reporting savings - Refine the target market potential for dual fuel systems - Refine barriers to efficient dual fuel system adoption - Refine barriers to smart switching (incorporating	**Q1 2026 - Q4 2026**

Activity	Desired Outcomes	Expected Timeframe
	inputs including demand response or grid-enabled controls) and future load flexibility capabilities - Identify leverage points in the supply chain and end-user decision makers - Identify inputs to develop program logic model, intervention strategies, and data plan	
Assess dual fuel technology developments to refine Product Plan and product roadmap - Validate assumptions through modelling studies and pilot demonstrations to assess product performance - Refine Product Plan and prioritize research list identifying advanced dual fuel systems with highest potential of adoption - Understand landscape of smart fuel switching capabilities - Develop product profiles for dual fuel system configurations	- Develop product profiles of dual fuel configurations - Identify barriers to performance optimization for dual fuel systems	**Q4 2025 - Q4 2026**
Refine Dual Fuel Residential HVAC system savings and potential estimates - Collect cost data to inform economic potential - Refine savings and potential estimates of fixed equipment setpoints and identify other infrastructure, utility, or rate impacts affecting 35F proposed setpoint	- Validate gas savings over baseline configuration - Refine technical achievable potential savings estimates	**Q3 2025 - Q3 2026**
Define value proposition for residential single-family home decision makers - Using Market Characterization study to gather feedback from key decision makers and market actors who influence heat pump and thermostat design and dual fuel system selection - Develop a dual fuel value proposition for utilities incorporating load flexibility, demand response, and regulatory considerations - Use Market Characterization study findings and demonstration projects to inform value proposition and messaging	- Identify what decision makers value most when selecting dual fuel systems - Identify what utility decision makers value most when developing load flexibility capabilities	**Q4 2026 - Q1 2027**

3 - Milestone Decision

3.1 – Concept Advancement Criteria

The Concept Advancement milestone represents a decision to allocate resources to define if the MT opportunity is worth pursuing and what the role for NEEA is. In the Program Development phase, we conduct research to understand and inform the product opportunity, market conditions, and define the MT program logic and intervention strategy. The internal stage gate go/no go criteria for Concept Advancement that NEEA uses include:

- **Preliminary Market Transformation Theory:** The market transformation theory represents a reasonable hypothesis, and it includes hypothesized barriers, interventions, how it diffuses, leverage points, and outcomes.
- **Product:** We have a reasonable product definition and clear product assessment/validation objectives.
- **Savings:** The energy savings potential is worth the anticipated cost/effort to intervene in the market, and we anticipate a viable way to measure savings.
- **Market:** We have reasonable preliminary target/defined market, as well as application.
- **Portfolio:** This program supports short-term and long-term portfolio needs, and there are available resources.

3.2 - What does the transition to Program Development entail?

Refine Initial Assumptions: While dual fuel systems assume proper design and switchover temperatures, existing gaps hinder optimal performance in homes. Through gathering further feedback from key decision makers and market actors who influence dual fuel system design, specification, selection, and installation, the program aims to validate the assumptions and key barriers to adoption across regional climate zones. Customer comfort or perceived comfort will be an element to be investigated.

Additionally, Program Development will focus on refining the grid-enabled control needs by the utility and market actors to support future infrastructure. Refining the understanding of building blocks needed to develop commercially sustainable infrastructure for the region to advance the load flexibility goals will inform future specifications.

Together, this feedback will help the team develop value propositions for manufacturers, installers, homeowners, and utility partners.

Demonstration Projects: While dual fuel systems currently exist, new technologies that support simultaneous hybrid heating are becoming more prevalent in the market. The performance insight gained from these projects and how they integrate with load flexibility goals will support product development pathways for the most promising solutions.

Validation of Market and Product Barriers: Market Characterization research, demonstration projects, and consumer and contractor behavior research findings will confirm or refute hypothesized barriers to market adoption. This information will support development of the logic model and refine market intervention strategies, which are necessary for a successful Market Development phase.

Engagement with Key Market Actors: Engaging with influential market players and key stakeholders is critical towards designing, selecting, and installing dual fuel systems with the most efficient performance

providing comfort, energy, and cost savings in the home. It establishes a system where grid-enabled controls and load flexibility can add further value for the customer and utility by providing electric and gas peak management at scale without compromising key parameters. This feedback will not only be key to a value proposition for the customer and build out Market Development strategies, but also work towards an energy system transition where load flexibility can meaningfully support the region's energy efficiency goals.

The program will continue to engage with partners beyond our Northwest region, such as Minnesota Center for Energy and the Environment, Advanced Heat Pump Coalition, and the Consortium for Energy Efficiency exploring co-funding opportunities.

3.3 – Investment

Proposed Investment for Program Development (Q4 2025 – Q2 2027)			
Activities	Amount (Direct Costs)		
Market Characterization and Research	$290k		
Dual Fuel demonstration projects	$750-$950k		
Product Development & Research	$240k		
Total	$1.3M-1.5M		
Total Proposed Program Investment – Direct Costs Only			
Phase	Investment to Date	Future Estimated Investment	Total
Scanning	$960k		
Concept Assessment			
Program Development	0	$1.3M-1.5M	
Market Development	N/A	TBD	TBD
Long-Term Monitoring and Tracking	N/A	TBD	TBD
Total Investment			

3.4 – Value Proposition

3.4.1 – Estimated Technical Potential

The potential residential dual fuel HVAC market is primarily made up of existing houses that contain centrally ducted gas furnaces, which are being used as their primary heating source. The intention of the dual fuel program is to ensure that once a customer chooses to pair an air source heat pump with their gas heating system that they are selecting the proper sizing and using the best practices to get the most energy efficiency out of it. The largest variable that will affect the forecast is the rate at which people will want to add or replace a centrally ducted cooling system with a centrally ducted air source heat pump.

There are a few uncertainties that might have a big impact on the forecast. First, the adoption rate of air source heat pumps. How many gas customers will choose to add or replace cooling in their homes and how often will they choose a heat pump over other options? Second, the way that centrally ducted heat pumps can be installed. Heat pumps can often be installed improperly when it comes to sizing or switchover temperature settings. This can largely impact how efficient the heat pump system is.

The technical achievable potential for the base case is estimated to be 60 MM therms over a 20-year savings period. However, there is clear recognition that there are also negative electric savings due to the potential of adding a cooling source and using an electric heating source when previously using gas (it is currently assumed that the electricity use is during non-peak periods). Future development of

demand response capabilities and other system integrations will hopefully lessen this impact. While evaluating the current base case scenario for dual fuel residential systems, the overall site energy use was expected to reduce (gas + electricity) and can be expressed in BTUs. Additional market research in Program Development will inform market size, market penetration, and ramp rate for the technology.

3.4.2 – Other Program Benefits

The proposed Dual Fuel Residential HVAC program aims to support gas/dual-fuel utility carbon reduction ambitions while providing solutions for customers optimizing fuel usage without sacrificing cost and comfort. Other program benefits will include refining the value proposition of natural gas resiliency during winter electric peak events and developing the building blocks necessary to support future infrastructure needs for an integrated energy system and leveraging the residential capacity for load flexibility opportunities.

Investigating energy system resource needs: As electric and natural gas systems experience strain due to the rapid growth of energy needs, the region is identifying opportunities to integrate and optimize the energy systems to ensure availability. Load flexibility includes a broad set of demand management strategies to meet various utility needs including peak load reduction, absorbing excess power or avoiding renewable curtailment, and reducing transmission congestion. This operation at scale requires new infrastructure, commercial and business models across electric and gas utilities, and potentially new market players along with updated regulatory measures. The program will support the alliance's End-Use Load Flex special project and funder programs in evaluating building blocks required to effectively leverage residential HVAC capacity as a distributed energy resource component.

Informing Dual Fuel System Policies: By demonstrating dual fuel technology performance capabilities, NEEA aims to develop ratings and specifications enabling confident selection and design of dual fuel systems. NEEA will continue to support codes and standards reviews along with supporting utility programs where appropriate.

3.5 – Portfolio Fit

This program provides a unique intersection across multiple NEEA programs, including the Advanced Heat Pump (AHP) program and End-Use Load Flex special project. It also provides foundational learnings for other dual fuel initiatives across existing gas programs. Because dual fuel systems include heat pumps, the team can leverage ongoing program work from the AHP program. Program Development efforts will identify and prioritize improvements proposed by the AHP program that are most applicable for the Dual Fuel Residential HVAC target market. If there are similar market barriers and interventions identified in the logic model, NEEA can leverage synergies across both programs. This complements the HVAC Product Group vision supporting the region to expand beyond the limits of natural gas efficiency for the market segment using natural gas or other fossil fuels for their heating needs.

With a technical savings potential of 60 million therms (over 20-year period), these estimated savings do not fully represent the potential benefits to NEEA's gas portfolio including source energy, peak impacts and load flexibility benefits, which will be refined through Program Development.

3.5.1 – Risk

Based on current assumptions, the near-term initiative has an average risk level of 2.7 across NEEA's five risk categories (where 6 equates the highest risk). The highest risk areas are "Measurability", "Unproven Market Approach", "Speed", and "Competitive Market," where dual fuel systems and heat pumps are available today but design criteria are not being consistently applied. Considering the longer-term market transformation vision, the "Cost Effectiveness" risk increases given the potential incremental cost increase when new load flexibility technology is required. The "Unproven Technology" risk also

increases given that load flexibility and demand response technology elements are currently difficult to find. The longer-term initiative would see an average risk level of 3.9/6.

3.5.2 – Regional Equity

The target market is focused on Oregon, Washington, and a portion of Idaho based on gas funding share of the program. The benefits of dual fuel systems increase based on pricing spread between electricity and gas rates. Gas rates are still relatively low in Idaho (and similar dynamics in Montana) compared to electricity, reducing the benefit of dual fuel systems where heat pumps provide heating load. Leverage points for Idaho may be explored during Program Development to validate these assumptions.

3.6 – Utility Role

Throughout the Program Development phase, NEEA will engage alliance funders to support local dual fuel system demonstration projects. NEEA will work to refine savings inputs and metrics that are relevant for utility programs while seeking alignment on performance measurement. As funders refine dual fuel strategies, transitioning towards load flexibility options will see new market actors, commercial models, and cooperation across the decision makers. Utilities will have a significant role to play, and NEEA will continue to work with funders on understanding overall needs to build market awareness of the value proposition and encourage adoption of grid-enabled controls that can switch between fuels.

4 - Program Risk Summary

4.1 – Risk and Response

Risk Event		Probability (H/M/L)	Impact (H/M/L)	Risk Response (Accept, Avoid, Mitigate, Transfer)	Response Plan
"IF" this happens	**"THEN" this will occur (impact)**				
IF design and installation criteria are not practiced,	THEN dual fuel systems will not meet occupant needs and may erode energy savings and potentially adding unintended load to electric and/or gas peak demand creating higher system instability	H	H	Mitigate	Validate initial assumptions for various climate zones and develop understanding of customer and contractor behaviors through Market Characterization research. Assess critical barriers around comfort (or perceived comfort) and coordinate with market actors to identify education efforts Partner with manufacturers and decision makers to develop ratings and specifications to enable confident selection and design of dual fuel systems
IF funders are unable to report dual fuel savings towards goals	**THEN** program may be seen as not cost-effective and may result in loss of funding	M	H	Mitigate	Identify strategic areas where NEEA can support funder needs to understand dual fuel goals, data requirements, and additional stakeholder engagement.

IF sales data on dual fuel systems or heat pumps data within the target market is not available	THEN NEEA is unable to track program influence and attribution	M	M	Mitigate	Develop measurable Market Progress Indicators and identify savings model data inputs during Program Development Leverage AHP program sales data efforts where appropriate
IF the electricity and gas rate spread reduces significantly in OR/WA over time	THEN energy savings and cost-effectiveness will need to be re-evaluated for the specific scenario and may reduce the MT opportunity	M	H	Accept	Focus on longer-term goals of foundation-building for advanced load flexibility opportunities and driving towards market adoption of higher efficiency solutions Monitor spark spread changes through funder engagement and feedback