BONNEVILLE POWER ADMINISTRATION



# Energy Efficiency Implementation Manual 2022-2023

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# Section 1: Introduction

Bonneville Power Administration (BPA) pursues energy efficiency as a resource, which is stated in the 1980 Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act) and in the Northwest Power and Conservation Council's Northwest Power Plan (Power Plan).

The Energy Conservation Agreement (ECA) is the contractual mechanism for BPA to meet its statutory obligations. Customers may request an ECA[1] by writing to their Energy Efficiency Representative (EER). BPA shall review the request and, if accepted, will develop a draft ECA. BPA generally provides an opportunity for customer review. Once the ECA is final, the customer will receive a copy electronically.

The ECA, this Energy Efficiency Implementation Manual (IM), and BPA's Energy Efficiency Tracking System (BEETS) provide the implementation requirements for reporting measures to BPA.

The IM relies on the framework specified in the Long-Term Regional Dialogue Final Policy[2] and the BPA Energy Efficiency Post-2011 Implementation Program. For additional guidance on the Post-2011 program, see BPA's website. The IM specifies measures which can be implemented and the obligations on BPA and program participants related to implementation, reporting, payment amounts, and oversight and evaluation of energy savings, including self-funded energy savings.

## 1.1 OVERVIEW

BPA energy savings goals are guided by the the Council's Power Plan and BPA's Resource Program. The Council's Power Plan calls for a share of the Power Plan's regional energy efficiency target which represents BPA's public power customer load. BPA reports savings achievements in three major categories: programmatic, momentum, and market transformation. The IM covers only the programmatic savings component of BPA's conservations acquisitions.

BPA conducts planning efforts to ensure program offerings and funds expended are prudent and are expected to meet stated objectives. Programmatic offerings are considered reportable when they are reliable, cost effective, and meet eligibility and documentation requirements. Reportable measures are eligible for BPA payments outlined in this document. Unless otherwise noted or written preapproval has been provided by a contracting officer's technical representative (COTR), all equipment installed must be new to qualify for payment using a unit energy savings measure.

## 1.2 RELIABILITY

BPA has a responsibility to ensure the reliability of its energy-savings achievements. The Northwest Power Act specifically calls on BPA to pursue cost-effective energy efficiency that is "reliable and available at the time it is needed."[3] For BPA's Energy Efficiency organization, ensuring reliability is is an ongoing process that includes planning, implementing and using evaluation and oversight information to make improvements.

Reliability varies by savings type: unit energy savings (UES) measures, energy savings calculators and custom projects. For UES measures and calculators, measure specification and savings estimates must be approved by the Regional Technical Forum (RTF) or meet the requirements to be "BPA-Qualified," as described below. Custom projects require site-specific measurement and

[1] Occasionally, BPA may negotiate a non-standard agreement with a customer that contains variations from IM requirements, but only when there is a benefit to BPA (such as a reduction in the payment or staff time spent administering the agreement).
[2] Bonneville Power Administration Long-Term Regional Dialogue Final Policy," pp. 30-31.
[3] Power Act language summarized.

### Organization of the IM

Section 1 contains general information about the IM.

Section 2 contains information specific to funding.

Section 3 contains general requirements for customers using BPA funding.

Section 4 contains information on the custom project process.

Section 5 contains information on the custom program processes.

Section 6 provides an introduction to the respective sectors referenced by BPA and associated measure distribution channels

Sections 7 through 12 contain information about specific sectors (Agricultural, Commercial, Federal, Industrial, Residential, and Utility Distribution.



### Supporting Content

Regional Dialogue Policy

BPA Energy Efficiency Post-2011 Implementation Program

NW Council Website

verification (M&V) to support reliable savings estimates. BPA M&V Protocols[4] direct these activities and are the reference documents for reliable measurement and verification.

The RTF reviews and approves costs, savings, lifetime and specifications for measures which are based on the reliability standards in the RTF guidelines. BPA reviews RTF-approved measures and decides whether to adopt them into its program offerings. The primary and preferred path for BPA's measure and savings calculator development and maintenance is through RTF approval. The RTF has a well-developed public-review process, uniform quality standards and documentation, and the staff to review and update UES measures.

To provide BPA and customers with additional UES measure flexibility, BPA may conduct an internal approval of costs, savings, lifetime and specifications. This results in measures becoming BPA-Qualified. It may only be used for structural purposes (e.g., to adjust specifications or granularity for a gap in offerings) or research purposes (e.g., to gain experience with new technology or improve savings estimates). BPA-Qualified measures are noted in the title of the measure. Documentation requirements may be higher for BPA-Qualified measures to support research efforts.

To assure portfolio-level reliability, impact evaluation is also required. Impact evaluations follow RTF guidelines and are conducted on all savings types.

## 1.3 COST EFFECTIVENESS

BPA has a responsibility to ensure the cost effectiveness of its energy savings. BPA maintains a cost-effective energy efficiency portfolio with an aggregate total resource cost (TRC) benefit-to-cost ratio greater than or equal to one (TRC ≥ 1.0). To maintain a cost-effective portfolio, BPA maintains TRC ≥ 1.0 in each of the major savings types: UES, calculators and custom projects. BPA does not require that every measure or project is cost effective; instead it uses a combination of cost-effectiveness thresholds and measure bundling to ensure overall cost effectiveness, while providing flexibility.

## 1.4 PAYMENT

When BPA determines the appropriate payments, it assesses cost characteristics relative to established metrics and considers other factors. The cost metrics reviewed for payment are: the incremental cost, the first-year cost and the levelized cost of the measure. Payments are measured as a percentage of incremental cost and are capped based on savings-type policies (e.g., custom projects capped at 70% of incremental cost). BPA then reviews the first-year cost[5] with the goal of keeping each offering at or below the sector average cost goals. Finally, BPA compares the levelized cost of the payment against the Power Plan's avoided costs to ensure that BPA's payment does not exceed the resource value of the savings. Other factors considered include: programmatic considerations, market maturity or conditions, payment influence and free ridership, TRC cost effectiveness and regional benefits.

## 1.5 POLICY FOR MEASURE CHANGES/ADDITIONS

BPA reserves the right to make changes to policies, procedures, measure eligibility, specifications and requirements. On Oct. 1, 2015, the Change-Notice Policy was updated to reflect the "Revised Energy Efficiency Post-2011 Implementation Program." BPA has published the IM annually since Oct. 1, 2015, but shifted to publishing it every two years in alignment with the rate period that began Oct. 1, 2017. Changes that require notice are announced the previous April in a separate changes document. BPA's change-notice policy is as follows.

**Supporting Content**

Revised Energy Efficiency Post-2011 Implementation Program

[4] Protocols include: M&V Protocol Selection Guide; reference guides for sampling, regression, and glossary; protocols on metering, indexing, engineering calculations with verification, energy modeling, and existing building commissioning..

[5] First-year cost is calculated as the ratio of the payment and first-year savings.

| CHANGES TAKING EFFECT IN THE OCTOBER BIENNIAL IM WITH SIX-MONTHS' ADVANCE NOTICE IN THE PRECEDING APRIL CHANGES DOCUMENT | CHANGES TAKING EFFECT IN OCTOBER AND IN THE APRIL CHANGES DOCUMENT WITHOUT SIX-MONTHS' ADVANCE NOTICE | CHANGES TAKING EFFECT AT ANY TIME WITHOUT SIX-MONTHS' ADVANCE NOTICE |
|---|---|---|
| Savings change: up or down | New measure | Corrections |
| Payment amount change: up or down | Optional calculators | Limited changes to calculators and forms |
| Adding or substituting a requirement | Removal of a requirement | |
| Expiration of a measure | | |

Note that changes are different from corrections. Corrections are introduced to clarify ambiguous or incorrect language or to align conflicting terms between BPA's rules (e.g., the IM, the ECA, standards of conduct, spreadsheets, calculators, outside specifications and the BPA Energy Efficiency Reporting System). Corrections may be implemented at any time to provide immediate clarification for BPA and its customers. Limited changes are corrections made to supporting documents such as programmatic forms and calculators that are found in the IM Document Library and that do not affect payment, savings or requirements. These can be made at any time. Off-cycle corrections introduced outside of the April or October notice document will be announced in the Updates/Revisions section at the end of the IM.

## 1.6 OFFICIAL INTERPRETATIONS

The Energy Efficiency's Contract Administration manager may issue interpretations, determinations and findings related to the IM, unless delegated to other BPA staff, such as the COTR. Such interpretations, determinations and findings will be provided to the customer in writing. Only written statements (including email) by BPA officials acting within the scope of their authority are official BPA statements.

## 1.7 COTR REQUEST AND ACKNOWLEDGEMENT PROCEDURE

Under the COTR Request and Acknowledgment Procedure, customers must send a written request to their COTR to change participation in certain programs and processes. If the procedure is required, it will be listed in the specific section. The specific section may also require the customer to include supporting information with the request.

Some examples of when this procedure may be needed include the following:

- If a customer believes that a product should be on a Qualified Products List, and it is not.
- For approval to use a product or combinations of products not included on the Qualified Products List but meets a definition listed in the Basis for Energy Savings.
- To request enrollment in the Energy Smart Industrial (ESI) program.
- To request consideration for payment for a partial self-install of a ductless heat pump (DHP).
- To request pre-approval of a utility certification program related to Prescriptive Duct Sealing.
- To enroll in the Green Motors Rewind Initiative.
- To request a funding amount different than, but not exceeding, a customer's EEI allocation.

If approved, the COTR shall confirm the request by written notice. A customer request is not effective until the COTR issues written approval.

# Section 2: Funding

## 2.1 BPA FUNDING

Pursuant to Section 6 of the Energy Conservation Agreement (ECA), BPA Energy Efficiency will pay customers for the costs of energy savings from in-region projects.[1]

### 2.1.1 Funding Terminology

At the beginning of the rate period, BPA establishes the Initial Implementation Budget, which is a portion of an Energy Efficiency Incentive (EEI) established by BPA to purchase energy savings from a specific program participant during that rate period and based on the participant's Tier One Cost Allocation rate as defined in the ECA. The Available Implementation Budget is the amount available for BPA to purchase energy savings from a specific program participant at a given time, equal to the program participant's initial implementation budget plus any applicable carryover amount, plus or minus any applicable approved invoice payment amounts as defined in the ECA.

### 2.1.2 Implementation Budget Transfer

Implementation budget dollars can be bilaterally transferred between customers as an implementation budget transfer per the ECA. Transferred funds may be used for all BPA funded measures, unless otherwise specified in the IM or ECA. Transferred funding is administered through the customer's ECA and is referred to as the implementation budget (or, in certain instances, it is administered through a supplemental budget in a separate exhibit).

A customer's rate-period implementation budget is based on its Tier One Cost Allocation (TOCA). The TOCA is a billing determinant for applicable customer charges based annually on the lesser of the customer's Rate Period High Water Mark (RHWM) or the customer's forecast net requirement as prescribed by Tiered Rate Methodology. The latter is calculated as a percentage of the total of RHWMs for all customers. Customers may pursue budget changes under the ECA per the terms of the agreement according to parameters detailed below for budget redistribution, reduction and increase (from the Unassigned Account). Pursuant to Section 5(c) of the ECA, BPA shall not pay amounts in excess of the available implementation budget.

**1. EEI Allocation**

After the rate case final proposal is published, BPA calculates the EEI allocation for each customer and delivers this information in a letter or similar document. BPA will revise the customer's initial implementation budget to reflect the allocated funds effective the first day of each rate period (e.g. October 1) unless the customer indicates a different funding amount (not to exceed the EEI allocation) through the COTR Request and Acknowledgment Procedure. If the customer does not request a different funding amount, it commits to use or transfer its full EEI allocation for the acquisition of energy efficiency, per the requirements of the IM. EEI funds returned to BPA will be added to the Unassigned Account, which captures unclaimed EEI funds and unspent BPA programmatic funds.

**2. Inter Rate Period Budget Flexibility (Carryover)**

Customers have the ability to transfer up to 10% of their initial implementation budget or up to $50,000 of their available implementation budget, whichever is greater. The amount of funds remaining at the end of a given rate period, not to exceed the maximum carryover amount as previously described, will be added to the customer's EEI budget for the following rate period (and will be added to

[1]BPA will not pay for projects that have been or will be funded in part or full by another BPA funding source.



### Supporting Content

Bilateral Third-Party Agreement

COTR Request and Acknowledgement Procedure

the total implementation budget for the purpose of calculating performance payments). There is no requirement that carryover funding be tied to specific projects or programs.

**3. EEI Implementation Budget Redistribution (Transfers and Pooling Organizations)**

Customers may redistribute EEI funds among each other by forming a pooling organization or by requesting an implementation budget transfer in BEETS. Approved transfer requests will result in ECA implementation budget revisions.

**4. EEI Budget Reduction**

Customers may reduce their implementation budget at any time by submitting a request through the COTR Request and Acknowledgment Procedure. BPA will revise the customer's available implementation budget to reflect the reduction and the unallocated funds will be added to the Unassigned Account.

**5. EEI Budget Increase from the Unassigned Account**

BPA may increase customer implementation budgets (1) at months 6, 12 and 18 of the rate period; (2) on a monthly basis, beginning the 19th month of the rate period; or (3) at BPA's discretion as funding becomes available by distributing available EEI funds from the Unassigned Account. The Unassigned Account is a repository for unallocated and returned EEI funds. Customers will have 10 working days to request an implementation budget increase after BPA provides an accounting of available funds. If a customer's request is approved, funds will be added to their Available Implementation Budget.

Customers will submit requests for funds from the Unassinged Account in BEETS.

Customers that reduce their implementation budgets within the first 12 months of a rate period will receive second-priority access (behind BPA, which has first priority for allocations, if applicable) to the unassigned funds up to the amount reduced. The priority is based on the date the funds were released and carries through that rate period and the one immediately following. Once the customer has recovered all the reduced funds, priority access is removed.

### 2.1.3 Rules for Pooling Organizations

A pooling organization is two or more customers combining BPA funds to implement cost-effective conservation. A customer may put all or a portion of its BPA funding toward a pool and withdraw under terms and conditions agreed to by the pool. Pool membership can expand or contract as determined by the pool, but pooling organizations must provide written notice to BPA at least 30 days prior to membership formation, changes or dissolution.

A pooling organization must appoint a legally authorized representative (such as a customer or separate entity) to assume nontransferable liability for the organization. BPA will fund a pooling organization only after it has reviewed and approved documentation of pool status (e.g., pooling organization agreement, bylaws, articles of incorporation) submitted by requesting customers. If the authorized representative is not a BPA customer with an existing ECA, BPA will offer an ECA for signature. Savings must be allocated to the individual customer where the savings are located.

### 2.1.4 Performance Payments

In BEETS, customers will be assigned a performance payment budget along with their EEI budget and customers can request transfers between the two budgets. Transfers from the EEI budget to the performance payment budget will be limited to the maximum allowable performance payment the customer may claim.

BPA recommends customers use performance payments to support energy efficiency implementation activities. These activities may include but are not limited to (1) staff (direct labor and indirect overhead for the implementation and management of conservation activities); (2) marketing (market research, advertising, promotional material production and distribution); and (3) other operating costs and equipment (metering equipment, computer software/hardware, training, travel, and program development).

**Supporting Content**

Performance Payment Calculator

Performance payments rates and maximum limits depend on the customer's classification as small, rural, residential (SRR), or none of these (non-SRR), as defined in the table below.[2] If the customer or BPA makes a classification or calculation mistake, the SRR status change becomes effective immediately upon discovery of the mistake. When a mistake is discovered, corrections to invoices for over- or under-payments will address the full period of time impacted but will not exceed the statute of limitations (six years). Availability of historical invoice details may be limited due to availability within the reporting system of record.

| SRR STATUS | DEFINITIONS | PAYMENT RATE $/KWH, EFFECTIVE APRIL 1, 2022 | TOTAL MAXIMUM PERFORMANCE PAYMENT EARNED AS A % OF EEI BUDGET |
|---|---|---|---|
| Small | The customer's forecast net requirement is less than 10 aMW | $0.08 | 30% |
| Rural | The customer has fewer than 10 customers per line mile according to the Low-Density Discount calculations | $0.08 | 30% |
| Residential | The customer's load is greater than 66% residential according to U.S. Energy Information Administration data | $0.08 | 30% |
| Non-SRR | The customer is not small, rural, or residential | $0.04 | 20% |

Performance payments are earned from BPA approved EEI funded savings at the rates in the table above. Any SEM related earned performance payment shall be based on SEM Annual Savings Achieved (i.e. incremental savings) and the earned performance payment shall not be based on SEM Verified Savings. BPA does not allow a performance payment to be earned on self-funded activities. Self-funded activities are energy savings for which a customer chooses not to seek a payment from BPA.

The total maximum amount of performance payments a customer can earn is based on their EEI budget and limited to the amount in the table above. A customer's performance payment limit is based on the customer's initial implementation budget plus any applicable carryover amount, plus or minus any applicable implementation budget transfers (known collectively as the implementation budget). This amount can vary over the course of the rate period.

A customer can submit invoices for earned performance payments as long as there are sufficient funds in its designated performance payment budget and the total amount invoiced for performance payments does not exceed the customer's overall performance payment limit. Customers are not required to claim the total amount of available earned performance payments when submitting a performance payment invoice. Pooling organizations may claim performance payments up to the aggregate of each pool participant's allowance.

When funds are redistributed among customers (e.g. via an Implementation Budget Transfer), BPA may restrict the performance payment that can be claimed on the transferred funds[3]. An increase or decrease in a customer's EEI budget will result in a corresponding increase or decrease in their performance payment budget. If a customer transfers enough of its EEI budget so that its calculated performance payment budget becomes less than or equal to zero, it will not be required to repay prior payments. However, no additional performance payment will be allowed for the remainder of the rate period unless the customer receives additional EEI funds.



[2] BPA will notify customers of their rate period classification in the EEI allocation letter

[3] This restriction reduces the risk that BPA will overpay because performance payments are paid on a $/kWh basis, independent of payment amount (i.e., a customer could use all of its performance payment, receiving little payment, and then transfer its remaining implementation budget to another customer that similarly uses all of the performance payment).

## 2.2 FUNDING SOURCES AND SAVINGS ALLOCATION

When reporting savings to BPA, customers must select one or more of the following funding sources:

| FUNDING SOURCE | BPA ENERGY EFFICIENCY TRACKING SYSTEM TITLE | DESCRIPTION |
|---|---|---|
| Implementation Budget | EEI | BPA payment in the form of EEI funding according to the terms of the ECA |
| BPA-Accepted, Non-BPA Funds | Self-Funding | Activities generating energy savings for which a utility chooses not to seek payment from BPA* |
| Not-BPA-Accepted, Non-BPA Funds** | Non-Reportable | Non-BPA-funded activities that are not accepted by BPA. |

*This includes, but is not limited to100% of industrial SEM Verified Savings for each reporting year (i.e., year one of the SEM engagement and each subsequent reporting year).

**Customers are allowed, but not required, to include non-reportable savings to BPA. BPA will not review the non-reportable data and customers will not be credited for the energy savings. Non-reportable savings must be reported separately.

Customers are credited for all savings (except non-reportable) that are achieved in their service territory. Savings may be allocated to either the EEI or the customer depending on the amount of BPA payment requested by the customer.

| BPA PAYMENT AMOUNT REQUIRED | AVAILABLE APPLICATIONS | SAVINGS ALLOCATED TO EEI | SAVINGS ALLOCATED TO CUSTOMER |
|---|---|---|---|
| All | All | 100% | 0% |
| None | All | 0% | 100% |
| Partial | All | EEI and self-funded savings are allocated in proportion to the EEI and self-funding shares of BPA's willingness to pay. | |

# Section 3: General Requirements



## 3.1 DOCUMENTATION REQUIREMENTS

Measure specific documention requirements are listed in the corresponding IM section. All documentation must be retained in the customer's file (which may be in hard copy or electronic form) and certain documentation must be submitted to BPA via BPA's Energy Efficiency Tracking System (BEETS).

Unless otherwise noted, utility created forms can be substituted for forms provided by BPA to fulfill stated documentation requirements. Utility created forms must contain at a minimum all fields found in the BPA provided form in order to qualify as acceptable documentation.

Customers must retain required information for a minimum of four years after the measure has been invoiced through the reporting system. Information must be made available to BPA upon request. If a customer agent or contractor was used for some or all of the measure development, implementation or verification, the customer must also retain documentation that IM requirements have been met.

### Required Documents

UES Measure Upload Template

Option 2 Custom Project Template

Nonresidential Lighting Calculator

RTF-approved Small Compressed Air Calculator

Strategic Energy Management Savings Calculator

## 3.2 REPORTING REQUIREMENTS

Measures reported to BPA must include supporting documentation required by the IM and customers must establish and maintain files and supporting documentation for each submitted measure. After BPA receives a customer reported measure, a timely review will be conducted to determine whether the measure submitted conforms to IM requirements. Once BPA conducts its review, which may include an oversight review, BPA will notify the customer of any accepted measures which can be invoiced. BPA will not accept measures that are not in compliance with Energy Conservation Agreement or IM requirements. Should there be a disagreement regarding a reported measure, BPA will work with the customer to correct any errors.

Customers must use BEETS to report EEI funded, self-funded, and non-reportable energy efficiency savings. Customers may report energy savings at any time as long as the completion dates are in the current or previous rate period. There are specific reporting requirements for Unit of Energy Savings (UES) measures and nonresidential lighting. If a UES measure expires, the measure must be reported and submitted for compliance review within six months of the expiration date. If a UES measure is modified but not expired (e.g., has updated documentation requirements), the measure must be submitted per the current rate period reporting requirements and will receive the payment rate in effect at the reported completion date.

## 3.3 OVERSIGHT

As a part of the oversight review process, BPA reserves the right to perform detailed record reviews of IM required documentation and conduct site inspections of the measure or project. BPA may conduct oversight inspections of all measures, contact end users to verify reported measures, monitor or review the customer's procedures and records, and/or conduct site visits to verify claimed energy savings and oversee implementation. The number, timing and extent of inspections is decided by BPA and coordinated with the customer. BPA will normally provide written notice not less than 30 days prior to an inspection and inspections will occur at BPA expense.

BPA may contact appropriate federal, state or local jurisdictions regarding health, safety or environmental matters related to any activity under this IM. If at any time BPA finds noncompliance with the requirements of the IM or the customer's ECA, it may make adjustments to the customer's payments to achieve compliance.

## 3.4 EVALUATION

BPA may evaluate measures to assess the amount, cost effectiveness and reliability of conservation. BPA will determine the timing, frequency and type of evaluations with input from the customers on the evaluation plan.

BPA may also require customers to provide billing data and contact information for participants. If so, billing data must be linked to the reported measure (e.g., through a unique identification) to allow BPA to assess savings by measure.

BPA and/or regional participants will pay for evaluations initiated by BPA. In some cases, another party will manage the evaluation on behalf of BPA. BPA recognizes that customers participating in the evaluation provide some resource/cost, but the cost is not eligible for BPA payment.

When reporting savings for evaluation, customers should not apply realization rates to individual measure savings estimates in order to avoid embedded realization rates. BPA's recommended best practice is to apply realization rates to the total savings for a portfolio rather than to the individual measure savings data.

## 3.5 THIRD-PARTY OPERATED PROGRAMS

It is unlikely, but unforeseeable contract circumstances could result in the termination or change of third-party-operated programs without prior notice. If BPA changes a third-party-operated program, BPA will strive to minimize disruptions to delivery of program services through an alternate third-party provider or with BPA's own staff resources. BPA will give customers as much notice as possible of any terminations or changes, and will work with customers to conclude or transition any work in progress.

The following programs are operated by third parties: Comfort Ready Home, Energy Smart Industrial, Trade Ally Network Northwest, Technical Service Providers, Smart Savings Retail Promotion and the Green Motors Rewind Initiative.

# Section 4: Custom Projects

## 4.1 CUSTOM PROJECTS PAYMENT RATE

Effective upon the launch of the BPA Energy Efficiency Tracking System (BEETS), all custom projects will be submitted using that system. BPA will no longer accept any previous versions of the Option 1 or Option 2 custom project calculator.

In most instances of site-specific calculations (Option 1 Custom Projects, Option 2 Custom Projects, Lighting Calculators, etc.), the current site-to-busbar savings factor being used is 1.09056; however, the BPA lighting calculator uses 1.07478.

BPA's willingness to pay for a custom project is equal to the lesser of (1) the BPA payment rate ($/kWh) or (2) 70% of the documented incremental project cost. If incremental cost data is not available for commercial new-construction projects, incremental cost may be calculated as 2.86% of the whole building construction cost.

Customers may request less than the BPA's willingness to pay and will receive partial self-funding credit, as discussed in Section 2.2: Funding Sources and Savings Allocation.

The applicable BPA payment rate ($/kWh) is the rate in place:

Option 1 Utilities:

- When the custom project proposal was approved by BPA; or
- On the project start date, if no custom project proposal was submitted.

Option 2 Utilities:

- On the date the utility approves the custom project as eligible for incentives.



### Required Documents

BPA M&V Protocol Selection Guide

### Supporting Content

BPA Emerging Technologies Website

Option 2 Enrollment Request Form

COTR Request and Acknowledgment Procedure

BPA Engineering Calculations with Verification Protocol

Simplified Voltage Optimization (VO) Measurement & Verification (M&V) Protocol

The BPA payment rate is calculated according to the table below:

| PROJECT TYPE | MEASURE LIFE (YEARS) | SECTOR | PAYMENT RATE ($/KWH) |
|---|---|---|---|
| Nonresidential Lighting | All | Agricultural<br>Commercial<br>Industrial | $0.13 |
| Retrofit Construction (Excluding Nonresidential Lighting) | 1 | All | $0.025 |
| | 2-3 | Agricultural<br>Commercial — Non HVAC End Use<br>Residential | $0.05 |
| | | Commercial — HVAC End Use | $0.06 |
| | 4-19 | Commercial — Non HVAC End Use<br>Residential | $0.20 |
| | | Commercial — HVAC End Use | $0.23 |
| | | Agricultural<br>Industrial<br>Utility Distribution | $0.25 |
| | 20+ | Agricultural<br>Commercial — Non HVAC End Use<br>Industrial<br>Residential<br>Utility Distribution | $0.35 |
| | | Commercial — HVAC End Use | $0.40 |
| New Construction and Major Renovation (Excluding Nonresidential Lighting) | 1 | All | $0.025 |
| | 2-3 | Agricultural<br>Commercial — Non HVAC End Use<br>Residential | $0.05 |
| | | Commercial — HVAC End Use | $0.06 |
| | 4-19 | Industrial<br>Utility Distribution | $0.25 |
| | | Agricultural<br>Commercial — Non HVAC End Use<br>Residential | $0.27 |
| | | Commercial — HVAC End Use | $0.31 |
| | 20+ | Agricultural<br>Commercial — Non HVAC End Use<br>Industrial<br>Utility Distribution | $0.35 |
| | | Commercial — HVAC End Use | $0.40 |
| New Construction | 45+ | Residential | $0.45 |

## 4.2 CUSTOM PROJECTS SPECIAL FUNDING

### 4.2.1 Limited Availability Emerging Technology Field Test Projects

Limited Availability Emerging Technology Field-Test Projects allow BPA to collect detailed data to more accurately estimate savings and potential performance to create future unit energy savings (UES) and BPA-Qualified measures. BPA may contract with third-parties to deploy the emerging technology, evaluate performance, and verify energy savings.

On the BPA Emerging Technologies website, BPA maintains a list of available emerging technology projects with defined eligibility requirements, the number of installations targeted, participation obligations, savings, and payment.

If a customer is eligible and wishes to participate in a project, it must follow the requirements of the BPA Project Funding Agreement. To report the energy savings from the project, use the Option 1/Option 2 Custom Project Process. BPA will provide the information necessary and the measurement and verification (M&V) plan to complete the custom project documentation and will provide staff assistance in the development of the proposal and completion report.

BPA may require metering to continue after project completion and may require customers to perform additional duties to support the research efforts (i.e. customers may be asked to provide access to end-user billing history and contact information). If additional metering is required, it will not change the customer's payment or savings.

## 4.3 CUSTOM PROJECTS OVERVIEW

### 4.3.1 Custom Projects Process Option Overview and Enrollment

There are two paths available for custom projects: Option 1 and Option 2. Customers, by default, are enrolled in Option 1, but they may elect Option 2 by using the Option 2 Enrollment Request Form at the start of each rate period. They must submit/renew their application no later than July 1, preceding the new rate period. BPA will complete the review of the enrollment by September 1 of the same year. BPA may request additional information before notifying the customer of its approval/disapproval of Option 2 status.

Option 2 customers may switch to Option 1 through the COTR Request and Acknowledgment Procedure (1) for any reason at the start of a new rate period[1] , or (2) if customer circumstances change, making Option 2 unworkable.

**Option 1:** BPA manages the project performance and cost-effectiveness of the bundle of energy savings from Option 1 custom projects. Option 1 customers may request technical support from BPA or BPA program implementers (e.g. Energy Smart Industrial) to develop projects and complete M&V regardless of the size of the project or the requirement for review and comment.

**Option 2:** Customers manage the project performance and cost-effectiveness of the energy savings from their custom projects. The customer conducts all aspects of M&V and custom project quality control internally (e.g. project proposal and project completion documentation review). Technical assistance is available in relation to IM clarifications and consultations regarding M&V methods and protocols as they apply to a single project or the customer's portfolio of projects. Project-implementation assistance is not available unless provided by third-party implementation contractors as part of a program (e.g. Cascade Energy through Energy Smart Industrial, or Trade Ally Network Northwest). Option 2 customers that request special BPA funding (such as those performing Limited Availability Emerging Technology Field Test projects) must follow the terms of the funding agreement for reporting energy savings in addition to the IM requirements for reporting and invoicing Option 2 custom projects.

### 4.3.2 Custom Projects General Requirements

1. Custom projects must not result in fuel switching.
2. Custom projects are limited to one sector per project.

[1]Customers wishing to return to Option 1 at the start of a new rate period must submit their request no later than September 1, immediately preceding the new rate period.

3. The measures must be designed to result in improvements in the energy efficiency of electricity distribution or use and must have a savings life of at least one year.
4. UES measures and calculated projects may be included in custom projects on their own or in a project with other measures/projects unless specifically excluded in the measures information section of the IM. However, they must either (1) be included in the custom project M&V and not use the UES/calculated savings value or (2) be reported separately through the UES/calculated path and the savings must not be included in the custom project savings.
5. Option 1 Custom Projects must meet the following benefit/cost (B/C) ratio requirements:
    a. If the project savings are 200,000 kWh or less (800,000 kWh or less for Utility Distribution measures), no cost-effectiveness screen is applied.
    b. If the project savings are more than 200,000 kWh (exceeding 800,000 kWh for Utility Distribution measures), and the project has a BPA-approved proposal, the proposal must demonstrate that the project has a B/C ratio ≥ 0.5 based on proposed costs and savings. No additional screen will be applied at the completion report.
    c. If the project savings are more than 200,000 kWh (exceeding 800,000 kWh for Utility Distribution measures), and the project does not have a BPA-approved proposal, the completion report must demonstrate that the project has a B/C ratio ≥ 0.5.
6. Option 2 Custom Projects must meet the following B/C ratio requirements:
    a. If the project savings are 200,000 kWh or less (800,000 kWh or less for Utility Distribution measures), no cost-effectiveness screen is applied.
    b. If the project savings are more than 200,000 kWh (exceeding 800,000 kWh for Utility Distribution measures), the project must demonstrate a B/C ratio ≥ 0.5.
7. Option 1 and 2 Custom Projects must include incremental or total cost documentation as applicable. If incremental cost data is not available for commercial building new-construction projects, incremental cost may be calculated as 2.86% of the whole building construction costs.
8. Any nonresidential lighting project (See Section 8.3 Nonresidential Lighting) may be submitted as a custom project. Nonresidential lighting projects submitted by Option 1 customers as custom projects must use an M&V plan per the BPA M&V Protocol Selection Guide and are not eligible to use a BPA engineering calculation with verification plan. Nonresidential lighting projects submitted by Option 2 customers must follow Option 2 Custom Project requirements.
9. The BPA M&V Protocol Selection Guide for custom projects must be used to select an appropriate M&V plan and be documented in the customer file. The implemented plan will be either (1) engineering calculations with a verification plan or (2) a comprehensive M&V plan.

    **Engineering calculations with a verification plan**

    Detailed guidance on preparing engineering calculations with a verification plan is included in the BPA Engineering Calculations with Verification Protocol. As directed in the BPA M&V Protocol Selection Guide, engineering calculations with a verification plan may be used for projects with an expected annual energy savings of less than 200,000 kWh per year.

    **Comprehensive M&V Plan**

    Detailed guidance on preparing a comprehensive M&V plan is in the BPA M&V Protocols and Guidelines. In developing a custom project M&V plan, the customer has the option to use a custom M&V plan or a Simplified Protocol.

## 4.4 OPTION 1 CUSTOM PROJECTS

### 4.4.1 Custom Project Proposal

Option 1 Custom Project Proposals are not required unless the customer is performing a Limited-Availability Emerging Technology Field Test Project. Customers may, but are not required to, submit proposals to manage (1) energy savings risks (i.e. if BPA approves the M&V plan at the proposal stage, and the M&V is carried out as stated in the plan, then BPA will accept the savings) and (2) cost-effectiveness risks (i.e. customers can secure assurance of project eligibility based on proposed values rather than on completion report values). The customer may submit an Option 1 Custom Project Proposal to BPA via BEETS. When the custom project proposal is approved, the customer will receive an email from BEETS notifying them.

If the custom project is covered by a non-disclosure agreement, please contact your energy efficiency representative (EER) for assistance prior to submitting documentation to BPA.

### 4.4.2 Custom Project Completion Report

Option 1 customers must submit a Completion Report to BPA in BEETS. The report must include all completed documents: project information, energy savings calculations including any changes to the M&V plan, documentation of reported non-energy benefits, project costs documentation, and any additional documentation required for project verification.

### 4.4.3 BPA Review

Within 10 business days of receiving an Option 1 Custom Project Proposal or Completion Report, BPA will review the proposal or report and either (1) accept the submittal, (2) return the submittal for modification and resubmittal, or (3) reject the submittal. BPA determination of acceptability of a completion report is based on whether the:

- Option 1 Custom Project Proposal or Completion Report and supporting documentation contain all required information;
- Project meets all the requirements; and
- Verified energy savings are reliable (i.e. M&V was implemented per the approved M&V plan, or M&V was appropriate for the project and consistent with BPA M&V Protocols).

For Option 1 projects without BPA-approved proposals and insufficient M&V, BPA will work with customers to adjust Completion Report savings where appropriate and feasible. If it is not possible to make appropriate adjustments, the project will be rejected and will be ineligible for reporting to BPA.

## 4.5 OPTION 2 CUSTOM PROJECTS

For Option 2 Custom Projects, BPA does not require or review proposals or completion reports submitted to BPA unless requested by BPA for oversight. Option 2 customers may apply for special BPA funding such as through a Limited-Availability Emerging Technology Field Test project. If special BPA funding is approved, the projects will complete the requirements as listed in the Emerging Technology Funding Agreement prior to submitting the project savings into BEETS.

For all Option 2 projects, the customer must review and approve the completion report prior to submitting the savings into BEETS. The completion report and supporting documentation does not need to be submitted to BPA, but it must be retained by the customer for oversight and evaluation. The completion report should also contain any information on additional quality control conducted on the project. To receive payment for a custom project, the customer must submit the project information in BEETS using the Option 2 Custom Projects Upload Template.

BPA may reject Option 2 projects that do not (1) have a completion report that contains all required information and demonstrates that the project is consistent with the custom project requirements or (2) have verified energy savings that are reliable (i.e. M&V was implemented per the approved M&V plan, or M&V was appropriate for the project and consistent with BPA M&V Protocols).

## 4.6 CUSTOM PROJECTS DOCUMENTATION REQUIREMENTS

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| **Option 1 Custom Projects** | | |
| Option 1 custom project supporting documentation | X | |
| **Option 2 Custom Projects** | | |
| Project documentation including, at a minimum: basic project and measure information; baseline conditions; efficient measure conditions; M&V plan implemented; all pre/post nameplate and/or measurement data, assumptions, energy models, or calculations, verified savings and documentation showing how the projected non-energy benefits and operations and maintenance costs were calculated (if applicable); verified costs, including invoices; and delivery inspection report/date | | X |

# Section 5: Custom Programs



Custom programs are a combination of similar projects, measures, and/or end-users that have the same evaluation plan or measurement and verification (M&V) plan across the entire program. The scope of a custom program is multiple installations that may include one or more measures, or sectors,1 and that may occur at one or more end-user sites. Custom Program pre-screening/ proposals may be submitted at any time of year, but there may be longer delay if they are submitted July through October because of IM and rate period activities.

The customer may cease its Custom Program participation at any time using the COTR Request and Acknowledgment Procedure. BPA shall have no obligation for costs incurred for unreported savings.

Savings may be reported from projects that were completed prior to proposal approval, as long as those savings meet the savings estimation and reporting requirements and are consistent with the overall approved program.

**Required Documents:**

BPA Custom Project Calculator

**Supporting Content:**

BPA Custom Program Calculator Instructions

BPA M&V Protocol Selection Guide

COTR Request and Acknowledgement Procedure

## 5.1 CUSTOM PROGRAMS PAYMENT RATE

The total BPA will pay for an Evaluated Custom Program, or project within an M&V Custom Program, is equal to the lesser of (1) the BPA payment rate ($/kWh), or (2) the project cost cap.

The applicable BPA payment rate ($/kWh) is the rate in place at the time of Evaluated Custom Program approval or the start date for a project within an approved M&V Custom Program. BPA's payment rate is calculated according to the Custom Projects Payment Table located in Section 4.1 and shown below.

| PROJECT TYPE | MEASURE LIFE (YEARS) | SECTOR | PAYMENT RATE ($/KWH) |
|---|---|---|---|
| Nonresidential Lighting | All | Agricultural, Commercial, Industrial | $0.13 |
| Retrofit Construction (Excluding Nonresidential Lighting) | 1 | All | $0.025 |
| | 2-3 | Agricultural, Commercial — Non HVAC End Use, Residential | $0.05 |
| | | Commercial — HVAC End Use | $0.06 |
| | 4-19 | Commercial — Non HVAC End Use Residential | $0.20 |
| | | Commercial — HVAC End Use | $0.23 |
| | | Agricultural, Industrial, Utility Distribution | $0.25 |
| | 20+ | Agricultural, Commercial — Non HVAC End Use, Industrial, Residential, Utility Distribution | $0.35 |
| | | Commercial — HVAC End Use | $0.40 |

[1]Savings must be reported separately for each sector.

| PROJECT TYPE | MEASURE LIFE (YEARS) | SECTOR | PAYMENT RATE ($/KWH) |
|---|---|---|---|
| New Construction and Major Renovation (Excluding Nonresidential Lighting) | 1 | All | $0.025 |
| | 2-3 | Agricultural, Commercial — Non HVAC End Use, Residential | $0.05 |
| | | Commercial — HVAC End Use | $0.06 |
| | 4-19 | Industrial, Utility Distribution | $0.25 |
| | | Agricultural, Commercial — Non HVAC End Use, Residential | $0.27 |
| | | Commercial — HVAC End Use | $0.31 |
| | 20+ | Agricultural, Commercial — Non HVAC End Use, Industrial, Utility Distribution | $0.35 |
| | | Commercial — HVAC End Use | $0.40 |
| New Construction | 45+ | Residential | $0.45 |

Payment for all sectors is capped at 70% of the incremental project cost. If incremental cost data is not available for commercial new construction projects, incremental cost may be calculated as 2.86% of the whole building construction cost. Eligible costs include measure costs (incremental measure costs, operations, and maintenance costs) and program costs (implementation, evaluation, and M&V).

Customers may request less than what BPA is willing to pay and will receive partial self-funding credit as discussed in Section 2.2: Funding Sources and Savings Allocation.

Customers may request to report lower savings than determined by the Evaluation Report or M&V protocol.

## 5.2 CUSTOM PROGRAMS REQUIREMENTS

Both Option 1 and Option 2 customers are eligible for custom programs and both must meet the same requirements and follow the same process with BPA. Option 2 customers must use the custom program path when the BPA M&V Protocols for Option 2 Custom Projects are insufficient to provide direction; for example when an impact evaluation is needed to estimate savings.

Custom Programs must meet the following criteria:

a. Not result in fuel switching; and

b. Contain only measures with a savings life of one year or more.

UES measures and calculated projects may be included in custom programs on their own or in a program with other measures/projects. However, they must either (1) be included in the custom program M&V or evaluation and not use the UES/calculated savings value, or (2) be reported through the UES/calculated path and be netted out from the custom program savings.

There are two types of custom programs:

**Evaluated Custom Programs:** Savings estimation follows an impact evaluation plan which may include a census or sample of the participants. Evaluation methods are known and tested for the specific measure/application. Evaluations must be, at a minimum, consistent with RTF Guidelines Section 5 (Impact Evaluation).

Evaluated Custom Programs must be cost-effective at the program level (impact evaluation level) with total resource cost (TRC) of 1.0 or greater based on verified costs and savings at the time of completion report and invoicing.

**M&V Custom Programs:** Savings are determined for a sample of individual sites based on M&V methodologies. M&V methods are based on the M&V Protocol Selection Guide.

M&V Custom Programs must be cost-effective at the calculator level with total resource cost (TRC) of 1.0 or greater based on verified costs and savings at the time of completion report and invoicing.

Evaluation requirements differ for Evaluated and M&V Custom Programs but each evaluation plan must be customer-funded unless otherwise directed by BPA.

## 5.3 CUSTOM PROGRAMS APPROVAL AND MODIFICATION PROCESS

Custom program approval requires a three-phase process:

1. **Prescreening prior to submission of a utility custom program proposal**

   During this phase, customers must work with their energy efficiency representative (EER) and an assigned BPA engineer to determine whether a custom program is the appropriate method for the project(s) or whether a simpler approach would meet the utility's needs. If a custom program is appropriate, this process will also determine whether an evaluated custom program or M&V custom program is appropriate.

2. **Custom Programs Proposal**

   During this phase the utility must upload the following information into BPA's Energy Efficiency Tracking System (BEETS):

   a. Utility contact and any third-party contacts;

   b. Project name and short project description;

   c. Proposed date range for program to be implemented;

   d. Sector for the measures completed;

   e. Savings confirmation methodology to be used (Evaluated or M&V);

   f. Evaluation Plan (Evaluated);

   g. Who will perform the savings calculations (utility or third-party contractor to the utility);

   h. Estimated energy savings;

   i. Information about future measure viability including UES measure development or other incentive opportunity likelihood; and

   j. Links to any available research or evaluation of included technologies to help substantiate the viability of the proposal.

   Please note: Any substantive changes to proposal information after submission will require cancellation of the custom program and restarting from phase one.

3. **Custom Programs Completion Report**

   During this phase the utility must upload the following information into BEETS:

   a. Start date and completion date of the program;

   b. Number of sites included in the program;

   c. Project cost;

   d. Total site energy savings and documentation of energy savings;

      (1) Evaluated: Evaluation Report consistent with the previously approved evaluation plan in the proposal.

      (2) M&V: The following must be provided per the approved proposal: Documentation of basic project information, baseline conditions, efficient measure conditions, description of M&V procedures used for the project (e.g., protocol used for estimating savings,

calculations used, metering equipment, sampling) and deviations from planned M&V, detailed savings model including calculations and raw data if applicable, and verified savings.

e. Estimated project-level cost effectiveness; and

f. Whether the utility is requesting EEI reimbursement.

## 5.4 CUSTOM PROGRAMS DOCUMENTATION AND REPORTING REQUIREMENTS

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Custom Program Proposal | X | X |
| Custom Program Calculator | X | X |
| Custom Program Completion Report | X | X |

The reporting requirements differ depending on whether the custom program is (1) Evaluated or (2) M&V.

**Evaluated Custom Programs**

Prior to reporting in BEETS, BPA must approve the completion report (including the evaluation report) consistent with the previously approved evaluation plan in the proposal. Payment is based on evaluated savings per the evaluation report. Upon approval of the completion report, the COTR will direct the customer how to report the program savings to BPA with a custom program reporting tool.

**M&V Custom Programs**

Prior to customer submission in BEETS, BPA must approve the completion report to ensure alignment with the requirements given at the proposal. The customer must conduct M&V in accordance with its approved M&V plan, and must document the type and quantity of measures installed. BPA will define M&V Custom Program completion report requirements at the proposal stage. Upon approval of the completion report, the COTR will direct the customer how to report the program savings to BPA with a custom program reporting tool.

# Section 6: Introduction to Sectors and Measures



This section provides the fundamental criteria used to define the respective sectors referenced by BPA and associated measure distribution channels. These sectors, Agricultural, Commercial, Federal, Industrial, Residential, and Utility Distribution, are the means through which BPA claims energy savings. The measures can also be delivered through different distribution processes further described below. The following definitions contain general information to define the sectors and determine the appropriate delivery application across all sectors.

## 6.1 SECTOR SUMMARY

The **Agricultural Sector** includes electric energy used by a farm or business where the primary purpose is applying water for food production or vegetation growth (e.g., pumping and irrigation); or by a ranch or aquaculture (aquafarming) business where the primary business is breeding or raising domestic livestock, poultry, game animals, fish, oysters, etc. It also includes dairies and milk storage at a milking facility. However, milk storage by entities other than a dairy for processing milk products or its derivatives, such as dehydrating or homogenizing and bottling of milk are considered Industrial. Vineyard irrigation is considered Agricultural, whereas the same location's winery operation that includes grape-processing, wine-making, and bottling is considered Industrial.

The **Commercial Sector** includes electrical energy used in service-providing, non-manufacturing businesses and building facilities. These business types include federal, state, and local governments, as well as other public and private organizations. The Commercial Sector building types include, but are not limited to: office, retail, grocery, food service, hospital/healthcare, assembly, prisons/jails, educational institutions, and most warehouses, with the exception of those directly supporting a manufacturing process or those with significant process loads (e.g., refrigerated warehouses).

Most multifamily applications are considered Residential, including central water heating. However, the following multifamily applications are considered Commercial and are eligible for applicable Commercial unit energy savings (UES) measures, Nonresidential Lighting, and Custom Projects:

a. Central HVAC systems that serve any part of a multifamily mid-/high-rise building, including common areas, non-dwelling areas, and dwelling units with a single, building-wide system.

b. Lighting that serves building interior common areas, non-dwelling areas, and building exterior.

c. Commercial areas located within the building (e.g., stores located on the ground floor of a multi-story, multi-family building).

d. Lodging (e.g., hotels, motels), residential care (e.g., nursing homes), as well as dormitories or other generally temporary living quarters, are also considered Commercial.

The **Federal Sector** includes electrical energy used by sites that are owned or leased by the federal government or sites that use electrical energy paid for by the federal government. The site may be utility-served or direct-served. This sector does not have a unique set of measures and may use the measure offerings of all the other sectors.

The **Industrial Sector** includes electrical energy used by fixed pieces of equipment, buildings, or complexes to produce, manufacture, or store goods in connection with, or as part of, any process or system. This includes those

focused on durable goods manufacturing, high tech manufacturing, wood products industry, pulp and paper manufacturing, mining, chemical processing, food processing, transportation, and rail infrastructure.

These processes and systems also include, but are not limited to: electric distribution system hardware, voltage optimization, stand-alone data centers/server farm facilities, district heating and cooling systems, water/wastewater production, and treatment and pumping not associated with agricultural production. In general, Industrial Sector activities must not devote the majority of energy use within a facility to nonprocess-related HVAC or potable hot water.

The **Residential Sector** includes electrical energy used in a residential setting (e.g., single-family residences, multifamily structures, accessory dwelling units (ADUs), and manufactured homes). Multifamily housing that is three stories or fewer above ground is a multifamily low-rise. Multifamily housing that is four stories or more above ground is a multifamily mid-/high-rise. For central heating in multifamily mid-/high-rise buildings and common area lighting in all multifamily buildings, refer to the appropriate commercial measure. Excluded from the Residential Sector are temporary residences such as hotels, motels, nursing homes, dormitories, and other generally temporary quarters which are commercial building types.

Please note: Installations of high-intensity discharge lighting in residential settings must be reported as Commercial Sector measures. See the Nonresidential Lighting Program.

The **Utility Distribution Sector** acquires energy savings from work performed by utilities to improve their utility distribution systems and increase system efficiency.

## 6.2 MEASURE DISTRIBUTION CHANNELS

Many efficiency measures can be delivered through more than one channel. The Requirements and Specifications section for each measure contains the applicable distribution channels. Descriptions for each channel and associated documentation are listed below. Individual measures may have additional measure-specific requirements which can be found in the Documentation Requirements section associated with the individual measure.

Payments associated with measures eligible for installation in multiple sectors are identified in the body of the IM in the primary applicable sector.

| MEASURE DISTRIBUTION CHANNELS | |
|---|---|
| Retail | Retail distribution of eligible items provides pricing discounts on energy-saving technologies sold through a physical or digital retailer.<br>Retail distribution can occur through a utility-run program in either a traditional retail environment or at utility facilities or other utility-operated venues. Eligible items distributed through a program will have separate reference numbers. |
| By Request | Eligible items provided to end-users at their request either through the mail or direct distribution (such as at a county fair). The By Request channel applies to items given to end-users in a number of circumstances such as:<br>• Over the counter in the utility office;<br>• At events (such as county fairs or an annual utility meeting);<br>• Customer redemption of a utility coupon or postcard for a free item;<br>• Reimbursing the customer for a qualified purchase.<br>By Request measures may be fulfilled through a utility program or a BPA program; eligible items distributed through a BPA program will have separate reference numbers. |
| Direct Install | Eligible items that the utility or its agent provide and install for the end-user at no cost. Direct Install measures must be 1) installed by customer or agent; 2) witnessed by customer or agent; or 3) visually inspected by a representative sample after installation by another party. Direct install measures may be fulfilled through a utility program or a BPA program; eligible items distributed through a BPA program will have separate reference numbers. |
| Coupon or Instant Rebate | An instant discount applied to an eligible item at a physical or digital retailer. This discount can be based on a physical coupon, digital discount code, or other digital coupon.<br>Please note: This channel does not apply to utility flyers or mailers asking customers to return a form for free light lamps or similar promotions. These would be classified as By Request. |

| MEASURE DISTRIBUTION CHANNELS | |
|---|---|
| Standard Rebate Payment | Eligible items that are distributed or acquired outside of the channels above. Typically an end-user will purchase and install a qualifying measure on their own and seek a rebate through their serving utility by providing a receipt, invoice, and any necessary documentation. These measures are addressed simply as "payment" or as "standard rebate payment" in the body of IM and will not have any distribution-specific designators in the UES measure list. |

### Documentation Requirements By Channel

Many channels (such as By Request, Retail, and Direct Install) were available through the BPA-provided retail programs and may be available through any successor program. Whether utility-run or provided through a BPA program, documentation requirements will be consistent but measures offered through a BPA program will have a separate reference number.

| DOCUMENTATION REQUIRED* | | | | | | |
|---|---|---|---|---|---|---|
| DISTRIBUTION CHANNEL | METHODOLOGY ALLOCATING SAVINGS | END-USER IDENTIFYING INFORMATION (REQUIRED IN BEETS) | DOCUMENTATION OF REQUEST | SALES REPORT | EQUIPMENT/ CONTRACTOR INVOICE | DOCUMENTATION OF MAILING |
| Retail | X | | | X | | |
| By Request | | X | X | | X | X (when distributed by mail) |
| Direct Install | | X | | | X | |
| Coupon or Instant Rebate | | X | | X | | |
| Standard Rebate Payment | | X | | | X | |

*Additional requirements may apply and will be listed in the body of the IM for each measure category.

| DESCRIPTION OF DOCUMENTATION REQUIREMENTS | |
|---|---|
| Methodology Allocating Savings | The Retail Sales Allocation Tool (RSAT) or other approved method for allocating savings to utility service territory when items are sold in a retail location. |
| End-user identifying Information | Information documenting a unique site ID and address of the customer receiving efficiency measure. This information can be delivered via the measure distribution log or document containing the same information, by entering end-user identifying information (unique site ID and address) into the BPA reporting system, or through record of distribution for bulk measures. Measure-specific restrictions may apply and will be noted in the measure-specific section of the IM. |
| Documentation of Request | Documentation demonstrating a customer request. This can be fulfilled by using the measure distribution log, a postcard returned by the customer, meeting attendance roster, or other means to demonstrate a customer requested the efficiency measure. |
| Sales Report | A report or invoice detailing: the date period for sales, sales by store location, and qualified product make, model, and manufacturer sufficient to assign corresponding energy efficiency measure. If this report does not contain sufficient information to demonstrate that program requirements have been met (e.g., ENERGY STAR® labeling), additional documentation may be required. |
| Equipment/ Contractor Invoice | Equipment invoice or contractor invoice showing the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used), the order/purchase date, and cost. |
| Documentation of Mailing | Documentation of mailing air waybill or bill of lading to document the date the product entered the mail stream. |

# Section 7: Agricultural Sector

Please check the changes and corrections summary to see if revisions were made to any of the measures in this sector.

Unless otherwise noted, all Agricultural Sector measures are available for the Agricultural Sector as well as the Commercial and Industrial sectors where applicable. Utilities shall report these measures as Agricultural when reporting to BPA. In addition, the payment levels described in the below table provide a summary only. Complete details of the payment levels and associated requirements may be found in the corresponding text of the IM. Please see the Table of Contents.

| 7.1 PAYMENT SUMMARY | |
|---|---|
| **MEASURE CATEGORY** | **PAYMENT** |
| 7.2 Freeze-Resistant Stock Water Tanks/Fountains | $140-$225 per tank or fountain |
| 7.3 Thermostatically Controlled Outlets | $14 per outlet |
| 7.4 Thermostatically Controlled Stock Tanks | $52 per stock tank |
| 7.5 Transformer De-Energization | $0.03 per kWh |
| **7.6 Irrigation Measures** | |
| 7.6.1 Irrigation System Conversions: LESA/LEPA/MDI | $14 per drop |
| 7.6.2 Sprinkler Package Replacements | $3-$14 per drop |
| 7.6.3 Irrigation System Conversions: High Pressure to Low Pressure | $12 per drop |
| 7.6.4 Irrigation Hardware | $1-$4 per measure |
| **7.7 Agricultural Pumps and VFDs** | |
| 7.7.1 Irrigation Pump Testing and System Analysis | $50-$300 per test or analysis |
| 7.7.2 Variable Frequency Drives for Centrifugal Agricultural Pumps (BPA-Qualified) | $50 per horsepower |
| 7.7.3 Variable Frequency Drives in Agricultural Turbine Pump Applications (BPA-Qualified) | $80 per horsepower |
| 7.7.4 Variable Frequency Drive for New Agriculture Pump Efficiency Installations (BPA-Qualified) | $50 per horsepower (new centrifugal pump)<br>$80 per horsepower (new turbine pump) |
| 7.7.5 Agricultural New Pump Efficiency Upgrade (BPA-Qualified) | $50 per horsepower |
| **Custom Projects** | |
| 7.8 New Agricultural Construction | See the Custom Projects Payment Table |
| 7.9 Other Agricultural Measures | See the Custom Projects Payment Table |



## Supporting Content

BPA-Qualified and Provisional UES Input Sheet

| 7.1 PAYMENT SUMMARY | |
|---|---|
| **MEASURE CATEGORY** | **PAYMENT** |
| **Additional Multisector Opportunities** | |
| Some Industrial and Commercial Sector measures may be applicable to Agricultural projects. Measures eligible for installation in multiple sectors are identified where applicable in the body of the IM in the primary sector. | |

## 7.2 FREEZE-RESISTANT STOCK WATER TANKS/FOUNTAINS

### Basis for Energy Savings

The baseline for freeze-resistant tanks/fountains that replace a tank heated with an electrically resistive element is called the electrically heated tank consumption estimate. The efficient case is zero electric heating. Savings are calculated by taking the difference between the baseline and efficient case. The annual consumption from a submersible electric resistant tank heater is estimated by using monitored results from site-metering studies. Baseline consumption is adjusted from the metering period to the full heating season using heating degree days (HDD) as a scaling factor. Savings are computed for each of the primary heating zones (HZ) by using the weighted average number of HDD of each heating zone. ~~Electric-resistance stock water tank heaters must be removed or permanently disabled. The new tank/fountain must be sized in accordance with manufacturer's specifications for the type and number of animals where it will be used, and the water supply must be hard-piped underground and stubbed up into the insulated portion of the fountain.~~

More information can be found on the Regional Technical Forum (RTF) website.

### Requirements and Specifications

Freeze-resistant stock water tanks/fountains are available as a measure in HZ 1, 2 and 3.

The new freeze-resistant stock water tanks/fountains must meet all of the following requirements:

a. New (i.e., not home or kit-made).
b. Enclosed, fully ~~foam or dead-air-space~~ insulated, ~~with the opening completely sealed~~.
~~d. Possess elliptical or flap closures that tip easily, so animals can drink without resistance.~~
e. Contain no electric heat.
~~f. Possess a minimum one-year manufacturer defect warranty.~~

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, farm name, meter number, GPS coordinates, or legal property description) | X | X |
| Proof of manufacturer defect warranty of at least ~~five~~ one year. | | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |

**Supporting Content**

Freeze Resistant Stock Water Tanks and Fountains - RTF Specifications

RTF UES Measures

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| HZ 1 | $140 per tank/fountain |
| HZ 2 | $165 per tank/fountain |
| HZ 3 | $225 per tank/fountain |

## 7.3 THERMOSTATICALLY CONTROLLED OUTLETS

**Basis for Energy Savings**

This measure requires the addition of a thermostatically controlled outlet or controller to control the heating load in a pump house or utility shed to prevent piping and other equipment from freezing. The base case for this measure is an electric-resistance heater operating in a pump house or utility room to provide freeze protection to piping and other equipment. The more efficient case for this measure adds thermostatically controlled outlets that provide power in specific temperature bands. The thermostatically controlled outlet will turn on when the building ambient temperature is below ~~35~~ 39 degrees Fahrenheit (F), and will stop providing power at a temperature no higher than 50 degrees F.

**Requirements and Specifications**

This measure is available to all sectors, but it must be reported under the Agricultural program. Thermostatically controlled outlets should turn on at approximately 39 degrees (F) to prevent freezing conditions and turn off at temperatures no higher than 50 degrees F. Only one outlet per pump house or utility room is eligible.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Thermostatically Controlled Outlet | $14 per outlet |

## 7.4 THERMOSTATICALLY CONTROLLED STOCK TANK DE-ICERS

**Basis for Energy Savings**

This measure is for the installation of a stock tank de-icer that is thermostatically controlled. The base case for this measure is an uncontrolled stock tank de-icer. This includes, but is not limited to, floating, submersible, and drain-plug de-icers. The efficient case is a stock tank de-icer that is thermostatically controlled to prevent both freezing and continuous operation in non-freezing conditions.

**Requirements and Specifications**

This measure is available to all sectors, but it must be reported under the Agricultural program. The de-icer must be thermostatically controlled to prevent freezing and to prevent continuous operation after the threat of freezing has passed. Only one thermostatically controlled tank de-icer per tank is eligible.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description) | X | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Thermostatically Controlled Stock Tank De-icer | $52 per stock tank de-icer |

## 7.5 TRANSFORMER DE-ENERGIZATION

**Basis for Energy Savings**

Transformer de-energization is disconnecting a transformer and downstream loads from the utility power supply during extended periods of agricultural inactivity and reconnecting prior to the irrigation season start-up. The base case for this measure assumes that irrigation loads are seasonal and the utility transformers serving the pump station are left energized all year. These energized transformers consume energy even when not serving any irrigation load. The efficient case is to de-energize the transformers during the non-irrigation season.

More information can be found on the RTF website.

**Requirements and Specifications**

Transformer de-energization is eligible for systems that serve only an agricultural load.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Complete the Transformer De-Energization Worksheet | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Transformer De-Energization | $0.03 per kWh |

## 7.6 IRRIGATION MEASURES

**Required Documentation**

Transformer De-Energization Worksheet

**Supporting Content**

RTF UES Measures

### 7.6.1 Irrigation System Conversion: LESA/LEPA/MDI

**Basis for Energy Savings**

The base case for this measure is for a new or existing center-pivot or linear-move system with high-pressure sprinklers on top or a Mid Elevation Sprinkler Application (MESA) configuration. High pressure means an irrigation system that delivers 35 pounds per square inch (psi) to the critical sprinkler. The efficient case for this measure converts the system, or portion of the system, to Low Energy Precision Agriculture (LEPA), Low Elevation Spray Application (LESA), or Mobile Drip Irrigation (MDI).

**Requirements and Specifications**

This measure requires conversion of a new or existing center-pivot or linear-move system, or a portion of the system, from high-pressure sprinklers on top or MESA to LESA, LEPA, or MDI configuration, including one gooseneck and drop tube, a low-pressure regulator, sprinkler assembly and nozzle, or drip tubing per drop. This measure may be combined with sprinkler package replacement measures, but it may not be combined with any other irrigation hardware measures.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| A system, or portion of system, converted to LEPA/LESA/MDI. | $14 per drop |

### 7.6.2 SPRINKLER PACKAGE REPLACEMENT

**Basis for Energy Savings**

Savings estimates are based on the retrofit installation of sprinkler packages as a maintenance measure, the replacement of leaky components, or as part of an entire system upgrade. The efficient case improves the application efficiency, and the energy savings is based on a weighted average of the RTF-approved, region-specific energy savings for each measure.

**Requirements and Specifications**

This measure is a retrofit replacement sprinkler package, either for maintenance or as part of an irrigation system conversion, for center-pivot or lateral-move systems. There are three types of eligible packages. The LESA/LEPA/MDI sprinkler package and the MESA sprinkler package both include a low-pressure regulator, nozzle, and rotating or multi-trajectory sprinkler. The High-Pressure Sprinkler Package includes a nozzle and an impact sprinkler.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| High-Pressure Sprinkler Package | $14 per package |
| MESA Sprinkler Package | $10 per package |
| LESA/LEPA/MDI Package | $4 per package |

### 7.6.3 IRRIGATION SYSTEM LOW PRESSURE CONVERSION: HIGH PRESSURE TO LOW PRESSURE

**Basis for Energy Savings**

The base case for this measure is for an existing irrigation system operating in a high-pressure configuration. High pressure means an irrigation system that delivers 35 pounds per square inch (psi) to the critical sprinkler. The efficient case for these measures converts the center-pivot or linear-move system, or a portion of the system, to a Mid Elevation Sprinkler Application (MESA) configuration or converts a wheel line or hand line system, or portion of the system, to a low pressure package.

**Requirements and Specifications**

This measure requires conversion of an existing center-pivot or linear-move system from a high-pressure to a MESA configuration including one gooseneck and drop tube per drop. This measure may be combined with sprinkler package replacement measures, but it may not be combined with any other irrigation hardware measures. This measure also applies to conversion of high pressure impact sprinklers on wheel-line and hand-line systems to a low-pressure sprinkler package which must include a low-pressure regulator, rotating-type sprinkler with a new nozzle. Conversion of wheel-line and hand-line systems to low pressure may be combined with other irrigation hardware measures that are not included above.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| A center-pivot or linear-move irrigation system, or portion of a system, converted from high pressure to MESA. | $12 per drop |
| A wheel-line or hand-line irrigation system, or portion of a system, converted from high pressure to low pressure operation. | $12 per head |

### 7.6.4 IRRIGATION HARDWARE

**Basis for Energy Savings**

The base case is an inefficient, pressurized irrigation system with potential for improvements in application efficiency. The efficient case improves the application efficiency, and the energy savings are based on a weighted average of the RTF-approved energy savings for each measure. The RTF-approved energy savings are based on regional location (irrigation system run-time and water-pumping lift are the primary drivers) and identified improvements in overall application efficiency and leak reduction. BPA has simplified each unit energy savings (UES) offering.

More information can be found on the RTF website.

**Requirements and Specifications**

Irrigation hardware measures each have specific requirements, as provided below:

a. Replace leaking impact sprinkler with new or rebuilt impact sprinkler: Eligible systems include wheel-lines, hand-lines, lateral moves, and center pivots. Brass impact sprinklers must be rebuilt by an established repair shop and must meet or exceed manufacturer's specifications. Limited to two units per sprinkled acre for solid set sprinklers.

b. Replace nozzle: Eligible systems include wheel-lines or hand-lines.

c. Replace leaking drain gaskets with new gaskets: Eligible systems include wheel-lines, hand-lines, lateral moves, and center pivots.

d. Replace Thunderbird wheel-line hubs: Eligible for wheel-line systems.

e. Rebuild or replace leaking or malfunctioning leveler with new or rebuilt leveler: Eligible for wheel-line systems.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice showing type of equipment or product installed/used, quantity, the order/purchase date, and cost. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Replace leaking impact sprinkler with new or rebuilt impact sprinkler | $1 per sprinkler |
| Replace nozzle | $3 per nozzle |
| Replace pipe section gasket | $4 per gasket |
| Replace leaking drain gaskets with new gaskets | $3 per drain |

**Supporting Content**

RTF UES Measures

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Replace Thunderbird wheel-line hubs | $4 per hub |
| Rebuild or replace leaking or malfunctioning leveler with new or rebuilt leveler | $1 per leveler |

# 7.7 AGRICULTURAL PUMPS AND VFDS

## 7.7.1 Irrigation Pump Testing and System Analysis (BPA-Qualified)

**Required Documentation**

Irrigation Pump Testing and System Analysis BPA Screening Tool

BPA Qualified and Provisional UES Input Sheet

### Basis for Energy Savings

This BPA-Qualified measure is intended to help the irrigator determine irrigation system health and identify potential energy efficiency improvements. Ideally, the pump test will be performed on systems that are inefficient as determined by the Irrigation Pump Testing and System Analysis BPA Screening Tool. The results of the pump test could be used in developing the custom project proposal. There are no energy savings associated with this reimbursement.

### Requirements and Specifications

This measure requires the following:

a. The irrigation pump must be electrically powered, 20 horsepower or greater, and must not have been tested through BPA-sponsored pump testing services within the past five years.

b. The irrigation pump must have been in operation for two of three previous years.

c. The irrigation pump test must be performed by an individual possessing pump testing knowledge and experience.

d. Customers and qualified vendors must use the Irrigation Pump Testing and System Analysis BPA Screening Tool to limit the amount of dry holes (i.e., pump tests that do not result in a BPA-approved custom project).

The customer may choose from the following tests:

a. Simple System Evaluation: Measure pump discharge pressure and evaluate the condition of the sprinkler nozzles.

b. Simple System Irrigation Pump Test (e.g., open discharge): Perform irrigation pump test.

c. Irrigation Pump Test and System Analysis: Perform irrigation pump test and evaluate mainlines and critical sprinklers.

Customers must deliver printed recommendation reports to the end user.

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, pump number, GPS coordinates, farm name, or legal property description). | X | X |
| Electronic or hard copies of the completed Irrigation Pump Testing and System Analysis BPA Screening Tool, irrigation pump test, and recommendation report. | X | X |
| Complete the "Agricultural Irrigation Pump Testing and System Analysis" tab in the BPA Qualified and Provisional UES Input Sheet. | X | X |

### Payment

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Simple System Evaluation | $50 per evaluation |
| Simple System Irrigation Pump Test (e.g., open discharge) | $100 per test |
| Irrigation Pump Test and System Analysis, 400 acres or less | $200 per test and analysis |
| Irrigation Pump Test and System Analysis, over 400 acres | $300 per test and analysis |
| Irrigation Pump Test and System Analysis, Complex Pumping System (over more than 400 acres with multiple operating pumps) | $200 per main pump plus $50 per booster pump |

### 7.7.2 VARIABLE FREQUENCY DRIVE FOR CENTRIFUGAL AGRICULTURAL PUMPS (BPA-QUALIFIED)

**Required Documentation**

Centrifugal Pump VFD Deemed Savings Tool (2022)

#### Basis for Energy Savings

The base case for this measure is a centrifugal-style pump used for irrigation purposes, which operates at a fixed speed but has a variation of flow or head requirements. The more efficient case for this measure would have a variable frequency drive (VFD) to better match pump performance to system requirements. BPA has collected data from custom project completion reports to determine energy savings, but it is collecting additional data on these upgrades to help support the RTF analysis of this measure.

BPA recommends that all new VFD installations meet the IEEE 519 harmonics standard. This measure provides an annual energy savings of 10% of the calculated annual energy usage of the centrifugal pump.

#### Requirements and Specifications

This measure requires the addition of a VFD to an existing, fixed-speed, centrifugal-style irrigation pump. This measure applies to pumping operations that deliver, distribute or transport irrigation water with qualifying VFDs from 7.5 to 1,000 horsepower. Eligible installations are limited to pumps with substantial variation in head pressure requirements (20% variation or more).

Customers must use the Centrifugal Pump VFD Deemed Savings Tool to estimate savings.

#### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |
| Complete the Centrifugal Pump VFD Deemed Savings Tool | X | X |

#### Payment

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Centrifugal Pump VFD | $50 per nameplate horsepower |

#### Additional Information

The requirement for a pump performance curve has been removed as of October 1, 2021.

## 7.7.3 VARIABLE FREQUENCY DRIVES IN AGRICULTURAL TURBINE PUMP APPLICATIONS (BPA-QUALIFIED)

**Required Documentation**

Turbine Pump VFD Deemed Savings Tool (2022)

### Basis for Energy Savings

The base case for this measure is a turbine-style pump used for irrigation purposes, which operates at a fixed speed but has a variation of flow or head requirements. The efficient case for this measure would have a VFD to better match pump performance to system requirements.

BPA is collecting data on these retrofits to support the RTF analysis of this measure. BPA recommends that all new VFD installations meet the IEEE 519 standard. This measure provides an annual energy savings of 20% of the average of the previous three operating years' annual energy usage of the pump.

### Requirements and Specifications

This measure applies to pumping operations that deliver, distribute, or transport irrigation water with qualifying VFDs from 7.5 to 1,000 horsepower. Eligible installations are limited to turbine pumps with substantial variation in flow rates (20% variation or more) or discharge pressure requirements (10% variation or more).

Customers must use the Turbine Pump VFD Deemed Savings Tool to estimate savings.

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |
| Complete the Turbine Pump VFD Deemed Savings Tool (2022) | X | X |

### Payment

| MEASURE CATEGORY | PAYMENT |
|---|---|
| VFD in Agricultural turbine pump | $80 per nameplate horsepower |

### Additional Information

The requirement for a pump performance curve has been removed as of October 1, 2021.

## 7.7.4 VARIABLE FREQUENCY DRIVE FOR NEW AGRICULTURAL PUMP INSTALLATIONS (BPA-QUALIFIED)

**Required Documentation**

New Construction Turbine or Centrifugal Pump VFD Deemed Savings Tool (2022)

### Basis for Energy Savings

The base case for this measure is a turbine- or centrifugal-style pump used for irrigation purposes, which operates at a fixed speed but has a variation of flow or head requirements. The efficient case for this measure would have a VFD to better match pump performance to system requirements. BPA has collected data from custom project completion reports to determine energy savings, but it is collecting additional data on these upgrades to support the RTF analysis of this measure. BPA recommends that all new VFD installations meet the IEEE 519 harmonics standard. This measure provides an annual energy savings of 20% of the estimated annual energy usage for turbine pumps and savings of 10% for centrifugal pumps.

**Requirements and Specifications**

This measure requires the addition of a VFD to a new turbine- or centrifugal-style irrigation pump. This measure applies to new pumping plants that deliver, distribute or transport irrigation water with qualifying VFDs from 7.5 to 1,000 horsepower.

Eligible installations are limited to pumps designed for substantial variation in flow rates (20% variation or more for turbine pumps) or discharge pressure requirements (10% variation or more for turbine pumps, or 20% variation or more for centrifugal pumps).

Customers must use the New Construction Turbine or Centrifugal Pump VFD Deemed Savings Tool to estimate savings.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |
| Complete the New Construction Turbine or Centrifugal Pump VFD Deemed Savings Tool (2022) | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| New Turbine pump VFD | $80 per nameplate horsepower |
| New Centrifugal pump VFD | $50 per nameplate horsepower |

**Additional Information**

The requirement for a pump performance curve has been removed as of October 1, 2021.

## 7.7.5 AGRICULTURAL NEW PUMP EFFICIENCY UPGRADE (BPA-QUALIFIED)

**Basis for Energy Savings**

The base case for this measure is a turbine- or centrifugal-style pump that is used for irrigation purposes. On a few custom projects, it has been observed that routine rebuilding of pumps can lead to thin impellers that are inefficient or can fail, or with other system changes is operating outside the optimum performance area of the pump curve. BPA has collected data from custom project completion reports to determine energy savings, but it will be collecting additional data on these new pumps to support the BPA and RTF analysis of this measure. BPA assumes that the pumps are at least 10 years old, the pumps have been rebuilt a number of times, and that a new pump will be more efficient.

**Requirements and Specifications**

This measure requires the installation of a new (e.g. newly manufactured) turbine- or centrifugal-style irrigation pump to replace an existing pump. This measure applies to pumping operations that deliver, distribute, or transport irrigation water. The pump must range from 20 to 500 horsepower. The existing pump being replaced must be centrifugal, turbine, or submersible turbine. The new replacement pump must have the same or lower horsepower rating, unless it is coupled with a VFD. A change from a turbine pump to a centrifugal pump or a centrifugal pump to a turbine pump is allowed. This measure may be used alone or in combination with the retrofit measures Variable Frequency Drive for Centrifugal Agricultural Pumps or Variable Frequency Drive for Turbine

**Required Documentation**

Agricultural Pump Efficiency Upgrade PIF

Agricultural Pumps. If there is no nameplate, contact your energy efficiency engineer to help you convert utility kilowatt readings to horsepower.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description). | X | X |
| Equipment or contractor invoice is to include: Manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date, and cost. | | X |
| Complete the Agricultural Pump Efficiency Upgrade PIF | X | X |
| Pump performance curve (available from the pump manufacturer). | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Agricultural New Pump Efficiency | $50 per nameplate horsepower |

## 7.8 NEW AGRICULTURAL CONSTRUCTION

**Basis for Energy Savings**

The base case and efficient case are determined through the custom project process.

**Requirements and Specifications**

New agricultural construction projects must be submitted as custom projects. Standardized measurement and verification (M&V) protocols must be provided for certain measures prior to project implementation.

**Documentation Requirements**

See the Custom Projects Documentation Requirements (Section 4.6).

**Payment**

See the Custom Projects Payment Table (Section 4.1).

## 7.9 OTHER AGRICULTURAL MEASURES

**Requirements and Specifications**

The following measures must be submitted as custom projects:

a. Low-pressure conversion with associated pump work.

b. Change to 40-foot spacing on hand- and wheel-lines to enable conversion.

c. Turf irrigation applications in landscaping, golf courses, government and municipalities, and other areas (including standard sprinkler measures, motor/pumping/VFD controls, and weather-station-driven irrigation scheduling).

d. Nursery and greenhouse project improvements in irrigation, air handling, temperature, and humidity controls for facilities using less than 1 aMW. Please note: If usage is above 1 aMW, projects at the facility are considered Industrial.

**Documentation Requirements**

See the Custom Projects Documentation Requirements (Section 4.6).

**Payment**

See the Custom Projects Payment Table (Section 4.1).

# Section 8: Commercial Sector

Please check the changes and corrections summary to see if revisions were made to any of the measures in this sector.

Unless otherwise noted, all Commercial Sector measures are available for the Commercial Sector as well as the Industrial and Agricultural sectors where applicable. Utilities shall report these measures as Commercial when reporting to BPA.

| 8.1 PAYMENT SUMMARY | |
|---|---|
| **PROGRAM COMPONENT OR MEASURE** | **PAYMENT** |
| 8.2 Commercial Custom Projects—Retrofits and New Construction | See the 4.1 Custom Projects Payment Rate |
| 8.3 Nonresidential Lighting | See 8.3 Nonresidential Lighting Payment Table and Program Offerings section of Lighting Calculator |
| **8.4 Commercial HVAC** | |
| 8.4.1 Advanced Rooftop Unit Control (ARC) | $100 per ton (ARC Retrofit - Lite)<br>$200 per ton (ARC Retrofit - Full) |
| 8.4.2 Connected Thermostat | $150 per connected thermostat (Initial Install)<br>$50 per connected thermostat (Verification) |
| 8.4.3 Ductless Heat Pump Retrofit and Upgrade (BPA-Qualified) | $1,000 per ton (Retrofit)<br>$300 per ton (Upgrade) |
| 8.4.4 Air-Source Heat Pump Retrofit and Upgrade (BPA-Qualified) | $1,000 per ton (Retrofit)<br>$150 per ton (Upgrade) |
| 8.4.5 Variable Refrigerant Flow System Retrofit (BPA-Qualified) | $1,000 per ton |
| 8.4.6 Variable Frequency Drive on Air Handling Unit Fan (BPA-Qualified) | $300 per horsepower |
| 8.4.7 Commercial Packaged Terminal Heat Pump (BPA-Qualified) | $600 per PTHP (Retrofit)<br>$100 per PTHP (New Construction) |
| **8.5 Commercial Shell Measures** | |
| 8.5.1 Commercial Insulation | $0.75-$2.10 per square foot |
| 8.5.2 Commercial Windows (BPA-Qualified) | $9 per square foot of window replaced (Heating Zone 1)<br>$18 per square foot of window replaced (Heating Zone 2)<br>$18 per square foot of window replaced (Heating Zone 3) |
| **8.6 Commercial Refrigeration** | |
| 8.6.1 Anti-Sweat Heater (ASH) Controls | $40 per linear foot of case |
| 8.6.2 Efficient Refrigeration Evaporator Fan Motor | $55 per motor (ECM or PMSM on Display Case)<br>$140 per motor (ECM or PMSM on Walk-In Cooler or Freezer) |

| 8.1 PAYMENT SUMMARY | |
|---|---|
| **PROGRAM COMPONENT OR MEASURE** | **PAYMENT** |
| 8.6.3 Strip Curtains for Walk-In Coolers and Freezers | $9 per square foot of doorway |
| **8.7 Commercial Kitchen and Food Service Equipment** | |
| 8.7.1 Demand Controlled Kitchen Ventilation (BPA-Qualified) | $200 per fan horsepower (one control sensor)<br>$400 per fan horsepower (multiple control sensors) |
| 8.7.2 Electric Commercial Steam Cookers | $500 per pan (6 pan) |
| 8.7.3 Hot Food Holding Cabinets | $250 per cabinet (Half Size)<br>$500 per cabinet (Full Size)<br>$1,000 per cabinet (Double Size) |
| 8.7.4 Electric Combination Ovens | $500 per oven (5-15 pan oven or 16-20 pan oven) |
| 8.7.5 Electric Convection Ovens | $200 per oven (Half size)<br>$400 per oven (Full size) |
| 8.7.6 Pre-Rinse Spray Wash Valves | $100 per spray valve |
| **8.8 Additional UES Offerings** | |
| 8.8.1 Generator Block Heaters (BPA-Qualified) | $200 per unit (Size <3 kW)<br>$1,500 per unit (Size ≥3 kW) |
| 8.8.2 Smart Power Strips | $15 per strip |
| 8.8.3 Vehicle Engine Block Heater Controls | $200 per unit |
| 8.8.4 Commercial Heat Pump Water Heaters | $300 per tier 1 unitary HPWH<br>$600 per tier 2 unitary HPWH<br>$600 per tier 3 unitary HPWH<br>$800 per split-system HPWH |
| 8.8.5 ENERGY STAR Commercial Clothes Washers | $25-$125 per washer |
| **Additional Multisector Opportunities** | |
| Some Agricultural, Industrial, or Residential measures may be applicable to Commercial projects. Measures eligible for installation in multiple sectors are identified where applicable in the body of the IM in the primary sector. | |



## 8.2 COMMERCIAL CUSTOM PROJECTS – RETROFITS AND NEW CONSTRUCTION

Many Commercial Sector energy efficiency opportunities are complex. They involve site-specific installations and there may be interactive effects between energy-consuming systems in a building. These opportunities include but are not limited to: new construction, HVAC, shell measures, existing building commissioning, strategic energy management, and, in rare circumstances, lighting projects.

#### Requirements and Specifications

Custom projects must follow all requirements per 4.0 Custom Projects.

**Documentation Requirements**

See 4.6 Custom Projects.

**Payment**

See 4.1 Custom Projects Payment Rate.

## 8.3 NONRESIDENTIAL LIGHTING

**Basis for Energy Savings**

Site-specific calculators are used to determine energy savings when there is too much variability in the range of savings associated with a given technology and/or application. In the case of nonresidential lighting, the unique hours of operation by space use type and the wide variety of building types and applications require the use of a site-specific BPA lighting calculator instead of a suite of lighting UES measures.

BPA's lighting calculator seeks to align with the Regional Technical Forum (RTF) Nonresidential Lighting Protocol around such factors as baseline determination, control savings fractions and HVAC interactive effects. These factors are built into the lighting calculator so the user only needs to enter information specific to the project such as hours of operation by space, existing technology, and proposed technology. Information about baselines and interactive effects are documented within the lighting calculator.

The lighting calculator additionally generates utility and customer project reports which provide a summary of all energy savings values.

More information on the RTF Nonresidential Lighting Protocol can be found on the RTF website.

**Requirements and Specifications**

Nonresidential Lighting measures are available via a BPA lighting calculator for the following:

a. Retrofit lighting projects and new construction projects.

b. Projects within Commercial, Industrial and Agricultural sectors.

The only eligible residential application using these measures applies to retrofits of existing High-Intensity Discharge (HID) lighting (metal halide, high-pressure sodium, low-pressure sodium and mercury vapor) in exterior applications. Customers shall report this measure as commercial when reporting to BPA.

**A. Lighting Calculator Versions**

Option 1 customers must use an eligible BPA lighting calculator. Option 2 customers may, but are not required to use a BPA lighting calculator.

The table below shows the planned effective dates and retirement dates for lighting calculators that are in use. BPA will periodically release new lighting calculators with improved functionality and other changes necessary to respond to an evolving lighting market. New lighting calculators may be released and retirement dates may be modified due to BPA business requirements. Customers will be informed no less than six months in advance of any new lighting calculator release or adjustment to retirement dates.

| LIGHTING CALCULATOR SERIES NAME | CALCULATOR VERSION | EFFECTIVE DATE | LIGHTING CALCULATOR RETIREMENT DATE* |
|---|---|---|---|
| LIGHTING CALCULATOR SERIES 5 | LC 5.1 | October 1, 2020 | TBD |

*"Lighting Calculator Retirement Date" is defined as the last date that customers may submit a completed lighting calculator to BPA.

### Required Documents

Nonresidential Lighting Calculators

### Supporting Content

RTF Non-Residential Lighting Retrofits

**B. Measure Types and Approval Procedures**

The lighting calculator includes two types of measures, deemed and calculated, and which are submitted as projects as outlined below:

1. **Deemed Lighting Measures**

Deemed lighting measures have been pre-approved by BPA and do not require review by BPA. Available deemed lighting measures are in the Program Offerings section of the lighting calculator.

**2. Calculated Lighting Measures**

If a proposed measure is not on the Deemed Measure List, it may be submitted as a calculated lighting measure. No BPA approval is required for decommissioning, fixture increase, or auto-calculated measures; for these measures, the lighting calculator will automatically apply a calculated payment.

Calculated measures must achieve a minimum payment of at least $5 and a net energy savings of at least 10% per measure, as determined by the lighting calculator. The lighting calculator offers four types of calculated lighting measures, defined as follows:

a. **Decommissioning:** The number of proposed fixtures is less than the number of existing fixtures.

b. **Fixture Increase:** The number of proposed fixtures is greater than the number of existing fixtures.

c. **Auto-Calculated:** The lighting calculator offers Signage and LED Linear measures with an auto-calculated incentive.

d. **Nonstandard:** The measure is not deemed, decommissioning, fixture increase or auto-calculated. For these measures, approval by BPA is required using the following procedure:

1. To request a nonstandard measure, the user should select the "nonstandard" option from the Measure Type drop-down menu.
2. The lighting calculator will highlight the measure in red to indicate the measure is nonstandard and requires BPA approval.
3. The customer sends the lighting calculator and any applicable product documentation requested by BPA such as cut sheets, product specification sheets, or third-party tests (e.g., LM-79) to lighting@bpa.gov for review and acceptance.
4. BPA will review the nonstandard measures and notify the customer whether the measures were accepted. Once the measures are accepted, the red highlighting will disappear. No further documentation is required for nonstandard measures.
5. The following types of measures may, at the customer's discretion, be submitted to BPA for review as a nonstandard measure using the procedure noted above:
   (a) Measures with hours of operation of at least 18 hours per day/seven days per week or 6,570 total annual hours.
   (b) Measures that earn a lower incentive as a nonstandard measure compared to the deemed measure incentive.

As the lighting market continues to evolve, new wattage options may emerge that are not included in the lighting calculator drop-down menus. In the event the lighting calculator does not include an option for the exact proposed wattage, a customer may choose one of two options:

a. Round the selected wattage in the lighting calculator to the nearest available value in the drop-down menu. Customers may not round more than 10 watts; or

b. Ensure the "nonstandard" option is selected in the Measure Type drop-down menu, and manually enter the exact wattage. Note that this option requires the measure be submitted to BPA for review as a nonstandard measure using the procedure noted above.

### C. Project Types and Requirements

The lighting calculator includes two types of projects: (1) new construction and (2) retrofit. Requirements and specifications are shown below.

#### 1. New Construction Projects

##### a. Eligibility

A nonresidential lighting project is considered new construction under any of the following conditions:

(1) The facility or exterior lighting system is newly constructed.

(2) The facility is a newly constructed addition to an existing facility.

(3) There is a change in occupancy type as part of the lighting project (e.g., the occupancy type changes from retail to office, or library to retail, etc.).

(4) The project is considered a major renovation for reasons other than lighting. A project is considered a major renovation whenever a whole building permit is required; i.e., if the only reason building energy codes are triggered is the lighting project itself, the project may be classified as a retrofit. However, if the project encompasses any other major building systems, such as HVAC, the project shall be considered new construction.

##### b. Requirements and Specifications

(1) New construction projects must achieve at least a 20% kWh reduction from the lighting power allowance, as determined by the lighting calculator.

(2) Customers with new construction projects with hours of operation differing from what is available in the lighting calculator may provide the specific hours of operation to BPA at lighting@bpa.gov, and request that the lighting calculator for that particular project be updated.

(3) Enter the lighting power allowance (i.e., the total watts allowed) into the lighting calculator as determined by one of the following:

- Applicable code compliance form; or
- Calculation using applicable state or local energy code (when using energy code to determine lighting power allowance, users may apply either the whole-building approach or the sum of the space-by-space approach); or
- When a code compliance form is not available or a project is exempt from code, the lighting power allowance may be determined by using a common practice calculation. Common practice refers to the lighting technology and wattage commonly associated with a particular building type and/or application.

(4) Enter the proposed lighting power (i.e., total proposed watts) into the lighting calculator as determined by either:

- Applicable code compliance form; or
- Calculation of total installed watts.

(5) For nonresidential new construction lighting projects, the incremental project cost must be entered into the Estimated Project Cost field of the lighting calculator. Nonresidential new construction lighting project incremental cost is defined as the difference in cost of materials between what must be installed to meet code (fixtures, lamps, and/or controls), and what is actually being installed. This excludes all other lighting-related project costs (e.g. labor). Incremental cost may be documented by using one of three methods:

- Provide detailed documentation that shows the project-specific incremental cost for the lighting project materials; or
- Calculate incremental cost as 25% of the cost of the installed lighting project materials; or
- For commercial projects, the incremental cost may be calculated as 2.86% of the whole building construction costs.

## 2. Retrofit Projects for Existing Buildings

### a. Eligibility

Nonresidential lighting projects that do not meet the criteria for new construction are eligible as retrofit projects. Batch projects are a type of retrofit that targets a specific technology and application type across a customer service territory (such as streetlights or area lights). Batch lighting projects may be submitted in a single lighting calculator and may include multiple measures.

### b. Requirements and Specifications

Project must achieve at least a 25% kWh reduction, as determined by the lighting calculator. For calculated measures, the minimum payment to the end user is $5 per measure, and the fully adjusted savings, as determined by the lighting calculator, must be at least 10% per measure. Projects saving 200,000 kWh or more, as determined by the lighting calculator, may, at the customer's discretion, be submitted to BPA at lighting@bpa.gov to request the project be converted to a 100% calculated incentive.

Batch retrofit projects have the following additional requirements:

(1) The location of individual installations shall be documented using one of the following available methods:

- The customer may enter the site addresses in the "notes" section of the Measures tab for each measure within a lighting calculator; or
- The customer may create a separate spreadsheet, to be kept in its customer file, which documents the site address for each installation site.
- For measures in batch lighting projects which do not have a physical address, the nearest intersection, utility pole identifier or geographic coordinates may be submitted as documentation.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| **New Construction Lighting Projects** | | |
| Completed lighting calculator | X | X |
| Product or contractor invoice showing:<br>1. Product order or purchase date<br>2. Installed cost | | X |
| One of the following documents:<br>An applicable code compliance form that documents the lighting power allowance and proposed lighting power; or, if not available a document showing the calculated lighting power allowance using applicable code and the proposed lighting power; or, if exempt from code a document showing the calculated lighting power allowance using common practice and the proposed lighting power. | | X |
| **Retrofit Lighting Projects** | | |
| Completed lighting calculator. | X | X |

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Product or contractor invoice showing:<br>1. Product order or purchase date<br>2. Installed cost | | X |
| For batch retrofit projects: Documentation of individual installation location, either in the "notes" section of the lighting calculator or in a separate customer-generated spreadsheet. | | X |

**Payment**

| LIGHTING CALCULATOR SERIES NAME | PAYMENT |
|---|---|
| Lighting Calculator 5 Series | See Program Offerings section of Lighting Calculator |

# 8.4 COMMERCIAL HVAC

## 8.4.1 Advanced Rooftop Unit Control (ARC)

### Basis for Energy Savings

Advanced Rooftop Control (ARC) retrofits add a variable frequency drive (VFD) and controls to existing, constant-speed HVAC rooftop unit (RTU) supply fans. Energy savings are predominantly achieved by reducing the operation of the supply fan. For this reason, the measure applies to both electric and gas systems. For the purposes of this measure, there are two types of ARCs, defined as follows:

**ARC Retrofit – Lite**

ARC-Lite products add one of the following equipment options to the existing RTU:

- A VFD and controller for variable-speed fan operation; or
- A multispeed motor and controller for multispeed fan operation.

**ARC Retrofit – Full**

Full-ARC products add one of the following equipment options to the existing RTU:

- A VFD and controller for variable-speed fan operation; or
- A multispeed motor and controller for multispeed fan operation.

Full-ARC products also add a controller with all of the following enabled:

- Digital, integrated economizer control with either differential dry-bulb or differential enthalpy with fixed dry-bulb high-limit shutoff; and
- Demand Control Ventilation with proportional control, based on $CO^2$ sensor reading.

More detailed information is available on the RTF website.

### Requirements and Specifications

This measure is available for retrofits only.

ARC projects are not eligible for a Connected Thermostat payment. See Section 8.4.2 for

**Supporting Content**

RTF UES Measures

Advanced Rooftop Control Qualified Products List

COTR Request and Acknowledgement Procedure

Connected Thermostats.

**Pre-conditions:**

- RTU heating fuel type may be electric or gas.
- Existing RTU has the following characteristics:
  - A cooling capacity equal to or greater than 5 tons;
  - A unitary system (split systems are not eligible); and
  - A constant-speed supply fan (RTUs with variable-speed fans are not eligible).

**Post-conditions:**

- Be installed on an existing rooftop unit; and
- Be listed on the ARC Qualified Products List (QPL).

If a product or combination of products meets a definition listed in the Basis for Energy Savings but is not on the Qualified Products List, please use the COTR Request and Acknowledgement Procedure for approval to use the product.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

Project reporting to BPA is based on whole tons of outdoor cooling capacity and must be calculated at a project level using one of the following two methods:

1. Sum the tons from all retrofitted RTUs installed and then round to the nearest whole ton, or
2. Round each individual retrofitted RTU to the nearest whole ton, then sum all rounded tons.

Two methods are provided in order to accommodate different types of equipment configurations and capacities.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| ARC Retrofit – Lite | $100 per ton |
| ARC Retrofit – Full | $200 per ton |

### 8.4.2 Connected Thermostat

**Basis for Energy Savings**

Connected thermostats save energy by controlling HVAC usage in single-zone HVAC systems. These thermostats connect to the internet and have features that include online alerts, monitoring and programming and/or control. Energy savings are associated with reduced heating and fan energy, primarily through scheduled temperature setbacks and setting the fan to auto mode during unoccupied hours.

Although the thermostat capabilities are an important part of realizing energy savings, correct programming and subsequent verification of these features help ensure persistence of energy savings.

While a connected thermostat product may include additional features as noted above, for the purpose of this measure, connected thermostat products are defined as meeting all of the following specifications:

- Capable of being connected to the web.
- Support multiple temperature set-back schedules.
- Support fan-mode scheduling (continuous-on versus auto mode).
- Support limited-duration overrides (e.g., reverts to programming after 24 hours).
- Automatically restore programmed settings after power outage.
- Support multiple cooling stages.

More detailed information is available on the RTF website.

**Requirements and Specifications**

- This measure is available for retrofits only.
- This measure is not eligible for lodging, 24/7 occupancy, or semi-conditioned spaces.
- Connected Thermostat projects are not eligible for an ARC payment. See Section 8.4.1 for Advanced Rooftop Unit Control (ARC).
- This measure provides for both initial installation and verification of programming for eligible connected thermostats and cannot be used for enabling feature sets on existing thermostats.
- A building is eligible to receive payments for more than one thermostat.

**Pre-conditions:**

- Heating fuel type of system to be controlled by new thermostat may be electric or gas; and
- The existing thermostat is not web-enabled.

**Post-conditions:**

**Initial Install:**

- The installed thermostat controls an existing HVAC supply fan and serves a single zone. "Invisible zones" are permitted (e.g., separate rooftop units serving different portions of a large retail space).
- The installed connected thermostat must be listed on the Connected Thermostat Qualified Products List (QPL).
- The thermostat must be programmed as follows:
  - Thermostat is connected to the web.
  - Temperature setback is used for unoccupied hours (heating and/or cooling, as applicable).

**Supporting Content**

RTF UES Measures

Connected Thermostat Qualified Products List

COTR Request and Acknowledgement Procedure

- Fan schedule uses auto mode for unoccupied hours (e.g., during unoccupied hours or holidays, the fan will only run when there is a demand for heating or cooling).
- Override duration set to three hours or less.
- For heat pumps, auxiliary resistance heat lock-out is enabled with appropriate temperature set point.
- In cases where two or more systems serve spaces that are not separated by physical barriers (e.g., "invisible zones"), simultaneous heating and cooling is eliminated (i.e., by having identical temperature set points and schedules with appropriate dead-bands, or through having network-coordinated controls).

**Verification:**

A thermostat is eligible for programming verification payments as follows:

- The thermostat received a payment for the initial install and was installed after October 1, 2019.
- The thermostat is eligible for up to four verification payments within two years of the initial install.
- A verification payment can be claimed in same year as the initial install, provided verification takes place at least three months after the initial install.
- The thermostat is programmed to meet the initial install programming requirements as described above under Initial Install Post-conditions.
- The thermostat is eligible for a verification payment twice within one calendar year. Verification may not be less than three months apart.
- Verification must occur in different seasons (e.g., one in summer and one in winter, or one in fall and one in spring). Verification may not be less than three months apart. Verification is not required to be conducted at regular intervals. The thermostat is eligible for a verification payment even if there has been a gap in verification activities. There is no restriction on who can complete verification.

If a connected thermostat product meets the product definition listed in the Basis for Energy Savings, but is not on the Qualified Products List, please use the COTR Request and Acknowledgement Procedure for approval to use the product.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| **Initial Install** | | |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Manufacturer, model, installed cost | X | |
| **Verification** | | |
| End-user identifying information including unique site ID and address. | X | X |

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| If completed by contractor, provide contractor invoice showing:<br>1. Service date<br>2. Installed cost | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Connected Thermostat – Initial Install | $150 per connected thermostat |
| Connected Thermostat – Verification | $50 per connected thermostat |

### 8.4.3 Ductless Heat Pump Retrofit and Upgrade (BPA-Qualified)

**Basis for Energy Savings**

Ductless Heat Pumps (DHPs, also commonly referred to as mini-splits) save energy using variable-speed compressors to continuously match the heating and cooling load and avoid the on/off cycling of conventional heating systems. DHPs eliminate over-cooling and over-heating of spaces that is common with central air systems. By moving heat instead of creating it, DHPs are two to three times more efficient than electric-resistance heaters.

A DHP Retrofit replaces the existing zonal or forced-air electric-resistance heating system with a DHP.

A DHP Upgrade either: 1) replaces an existing DHP with a more efficient DHP (e.g., replacing a code minimum DHP); or 2) is an efficient DHP installed as part of a building addition project, new construction project or major renovation project.

For the purposes of this measure, DHP equipment types are defined as follows:

- **Mini-Split:** Systems that have a single outdoor compressor and one or more indoor heads. Multi-head (or multi-zone) systems are considered mini-splits as long as they are served by a single outdoor compressor. Mini-split systems may be ducted or non-ducted.
- **Non-ducted:** An indoor unit that directly heats or cools air within the conditioned space without attached distribution ductwork. The following types of indoor units are considered non-ducted: Wall-mounted, floor-mounted, ceiling-suspended, and ceiling cassette (standard and compact).
- **Ducted:** An indoor unit that heats or cools air within the conditioned space through the use of distribution ductwork. Though ducted indoor units can be ceiling-suspended, they are typically ceiling-concealed and consist of short duct runs serving multiple zones from the single indoor unit.
- **Mixed:** A combination of ducted and non-ducted indoor units served by a single outdoor section.

Energy savings were calculated based on analysis of a sampling of heat pump projects completed in BPA territory with the BPA heat pump calculator tool, and which included a whole building billing analysis.

- For DHP Retrofits, the base case heating system is an electric-resistance heating system. The base case cooling system is a 2015 Washington code-compliant cooling system for the purposes of calculating savings above the baseline.

**Required Documents**

AHRI Certificate

**Supporting Content**

Ductless Heat Pump Qualified Applications List

- For DHP Upgrades, the base case is a 2015 Washington code-compliant heat pump for both the cooling and heating savings analysis.
- For both DHP Retrofits and Upgrades, the efficient case used to calculate energy savings is based on an anticipated average project installation representing the 88th percentile of efficiency.

Efficiency requirements listed below are based on the 75th percentile of performance for ductless heat pumps per the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) as of January 2019.

**Requirements and Specifications**

These measures cannot be used to retrofit packaged terminal air conditioning (PTAC) units. Please refer to Section 8.4.7 Commercial Packaged Terminal Heat Pump (BPA-Qualified).

**Pre-condition – DHP Retrofit:** The space is conditioned by zonal or forced-air, electric-resistance heat as the primary heating source. No other heating sources are eligible. A failed heat pump system operating with electric resistance back-up heat is not considered electric-resistance for the purposes of meeting pre-condition requirements.

**Pre-condition – DHP Upgrade:** The space is conditioned by an operational or failed DHP or air-source heat pump; or the space is part of a building addition, new construction, or major renovation project

**Post-conditions:** The DHP must have an AHRI certificate of product rating and the DHP outdoor condenser must meet BPA's efficiency requirements per the table below. The efficiency requirements apply to both single and multi-head systems.

| INDOOR UNIT TYPE | EFFICIENCY REQUIREMENT |
|---|---|
| Non-Ducted | 11.0 HSPF or 10.4 HSPF2 |
| Ducted or Mixed | 10.0 HSPF or 9.4 HSPF2 |

This measure utilizes a Qualified Applications List to document installation applications that are not addressed directly in the IM but were approved or disapproved by BPA following the publication of this document.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| AHRI Certificate documenting the efficiency requirements have been met. | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

Project reporting to BPA is based on whole tons of outdoor cooling capacity and must be calculated at a project level using one of the following two methods:

1. Sum the outdoor unit cooling capacity from all DHPs installed, then round to the nearest whole ton; or
2. Round the outdoor unit cooling capacity of each individual outdoor unit to the nearest whole ton, then sum all rounded tons.

The two methods are provided to accommodate different types of equipment configurations and capacities.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Ductless Heat Pump – Retrofit | $1,000 per ton |
| Ductless Heat Pump – Upgrade | $300 per ton |

### 8.4.4 Air-Source Heat Pump Retrofit and Upgrade (BPA-Qualified)

**Basis for Energy Savings**

An Air-Source Heat Pump (ASHP) Retrofit replaces an existing electric-resistance heating system with an efficient electric ASHP (e.g., adds an electric air-source heat pump to a system where one did not previously exist).

An ASHP Upgrade either: 1) replaces an existing electric air-source heat pump with a more efficient electric ASHP (e.g., replacing a code minimum heat pump that meets BPA's heat pump efficiency requirements); or 2) is an efficient electric ASHP installed as part of a building addition project, new construction project or major renovation project.

Energy savings were calculated based on analysis of a sampling of heat pump projects completed in BPA territory with the BPA heat pump calculator tool, and which included a whole building billing analysis.

- For Heat Pump Retrofits, the base case heating system is an electric-resistance heating system. The base case cooling system is a 2015 Washington code-compliant cooling system for the purposes of calculating savings above the baseline.
- For Heat Pump Upgrades, the base case is a 2015 Washington code-compliant heat pump for both the cooling and heating savings analysis.
- For both Heat Pump Retrofits and Upgrades, the efficient case used to calculate energy savings is based on an anticipated average project installation representing the 88th percentile of efficiency.

Efficiency requirements listed below are based on the 75th percentile of performance for air-source heat pumps per the AHRI as of January 2019.

**Requirements and Specifications**

These measures cannot be used to retrofit packaged terminal air conditioning (PTAC) units. Please refer to Section 8.4.7 Commercial Packaged Terminal Heat Pump (BPA-Qualified).

**Pre-condition – Heat Pump Retrofit:** The space is conditioned by zonal or forced-air, electric-resistance heat as the primary heating source. No other heating sources are eligible.

**Pre-condition – Heat Pump Upgrade:** The space is conditioned by an operational or failed ASHP or the space is part of a building addition, new construction, or a major renovation project.

**Post-conditions:** Each installed heat pump must:

- Be an air-to-air heat pump;
- Have an AHRI certificate of product rating; and
- Meet BPA's efficiency requirements for both heating and cooling per the table below.

**Required Documents**

AHRI Certificate

| EQUIPMENT SIZE (COOLING CAPACITY; BTU/H) | MODE | SUB-CATEGORY OR RATING CONDITION | EFFICIENCY REQUIREMENT |
|---|---|---|---|
| < 65,000 | Cooling | Split System and Single Package | 15.0 SEER or 14.3 SEER2 |
| | Heating | Split System and Single Package | 8.5 HSPF or 7.2 HSPF2 |
| ≥ 65,000 and < 135,000 | Cooling | Split System and Single Package | 12.4 IEER |
| | Heating | 47°F db/43°F wb Outdoor Air | 3.4 COP |
| | | 17°F db/15°F wb Outdoor Air | 2.3 COP |
| ≥135,000 Btu/h and <240,000 Btu/h | Cooling | Split System and Single Package | 11.6 IEER |
| | Heating | 47°F db/43°F wb Outdoor Air | 3.3 COP |
| | | 17°F db/15°F wb Outdoor Air | 2.25 COP |

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| AHRI Certificate documenting the efficiency requirements have been met. | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

Project reporting to BPA is based on whole tons of outdoor cooling capacity and must be calculated at a project level using one of the following two methods:

1. Sum the tons from all heat pumps installed, then round to the nearest whole ton; or
2. Round each individual heat pump to the nearest whole ton, then sum all rounded tons.

The two methods are provided to accommodate different types of equipment configurations and capacities.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Air-Source Heat Pump – Retrofit | $1,000 per ton |
| Air-Source Heat Pump – Upgrade | $150 per ton |

### 8.4.5 Variable Refrigerant Flow System Retrofit (BPA-Qualified)

**Basis for Energy Savings**

Variable Refrigerant Flow (VRF) heat pumps have similar applications as Ductless Heat Pumps (DHP), though they are more commonly used for multi-zone commercial HVAC applications and are available in larger tonnages. A VRF system cools or heats a space more efficiently than standard systems by moving variable amounts of refrigerant through a piping system to each space independently. Compared with other heat pump systems, VRF systems save energy with better part-load performance, zone control, and heat recovery options.

Energy savings were calculated based on analysis of a sampling of heat pump projects completed in BPA territory with the BPA heat pump calculator tool, and which included a whole building billing analysis.

- For VRF Retrofits, the base case heating system is an electric-resistance heating system. The base case cooling system is a 2015 Washington code-compliant cooling system for the purposes of calculating savings above the baseline.
- For VRF Retrofits, the efficient case used to calculate energy savings is based on an anticipated average project installation representing the 88th percentile of efficiency.

Efficiency requirements listed below are based on the 75th percentile of performance for variable refrigerant flow equipment per the AHRI as of January 2019.

**Requirements and Specifications**

This measure applies to retrofits only.

**Pre-condition:** The space is conditioned by zonal or forced-air, electric-resistance heat as the primary heating source. No other heating sources are eligible.

**Post-conditions:** The installed VRF system must:

- Have an AHRI certificate of product rating.
- Meet BPA's efficiency requirements for both heating and cooling per the table below.

The installed VRF system is eligible even if it operates in tandem with a ventilation system that uses any fuel for heating ventilation air.

| EQUIPMENT SIZE (COOLING CAPACITY; BTU/H) | MODE | SUB-CATEGORY OR RATING CONDITION | EFFICIENCY REQUIREMENT |
|---|---|---|---|
| < 65,000 | Cooling | VRF Multi-split System | 21.0 SEER |
| | Heating | VRF Multi-split System | 11.0 HSPF |
| ≥ 65,000 and < 135,000 | Cooling | VRF Multi-split System (with or without heat recovery) | 12.0 EER and 23.0 IEER |
| | Heating | VRF Multi-split system 47°F db/43°F wb outdoor air | 3.7 COP |
| | | 17°F db/15°F wb outdoor air | 2.27 COP |
| ≥135,000 and <240,000 | Cooling | VRF Multi-split System (with or without heat recovery) | 10.7 EER and 20.5 IEER |
| | Heating | VRF Multi-split System 47°F db/43°F wb outdoor air | 3.5 COP |
| | | 17°F db/15°F wb outdoor air | 2.16 COP |
| ≥240,000 | Cooling | VRF Multi-split System (with or without heat recovery) | 9.8 EER and 18.9 IEER |
| | Heating | VRF Multi-split System 47°F db/43°F wb outdoor air | 3.5 COP |
| | | 17°F db/15°F wb outdoor air | 2.16 COP |

**Required Documents**

AHRI Certificate

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| AHRI Certificate documenting the efficiency requirements have been met. | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

Project reporting to BPA is based on whole tons of outdoor cooling capacity and shall be calculated at a project level using one of the following two methods:

1. Sum the outdoor unit cooling capacity from all VRF systems installed, then round to the nearest whole ton; or
2. Round the outdoor unit cooling capacity of each individual VRF system to the nearest whole ton, then sum all rounded tons.

These two methods are provided in order to accommodate different types of equipment configurations and capacities.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Variable Refrigerant Flow System Retrofit (BPA-Qualified) | $1,000 per ton |

### 8.4.6 Variable Frequency Drive on Air Handling Unit Fan (VFD on AHU Fan) (BPA-Qualified)

**Basis for Energy Savings**

A variable frequency drive (VFD) on an air handling unit (AHU) fan adds a VFD on a single-speed AHU. A typical building application for a VFD on an AHU fan is a multistory facility, such as a hospital, school, or office building. These types of HVAC systems are typically located in the building's mechanical room and not on the roof.

With this technology, the VFD varies the speed of the fan to meet the conditions of the air-handling system. As the fan motor slows down, it draws less power than at constant speed, resulting in energy savings.

Energy savings are based on BPA's analysis of historical custom project installations completed between 2011 and 2016.

**Requirements and Specifications**

This measure applies to retrofits only.

**Pre-conditions:** Building heating fuel type may be either electric or gas. VFD must be installed on existing AHU single-speed fan.

**Post-conditions:** The retrofit adds a VFD to control the fan with variable-speed operation. Any existing AHU throttling or bypass devices (e.g., inlet guide vanes, dampers, etc.) must be removed or permanently disabled.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

Project reporting to BPA is based on whole horsepower and shall be calculated at a project level using one of the following two methods:

1. Sum the horsepower for all VFDs installed, then round to the nearest whole horsepower; or
2. Round the horsepower for each individual VFD to the nearest whole horsepower, then sum all rounded horsepower amounts.

These two methods are provided in order to accommodate different types of equipment configurations and capacities.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Variable Frequency Drive on Air Handling Unit Fan (BPA-Qualified) | $300 per horsepower |

### 8.4.7 Commercial Packaged Terminal Heat Pump (BPA-Qualified)

**Basis for Energy Savings**

Commercial Packaged Terminal Heat Pumps (PTHPs) are an HVAC equipment type commonly used in lodging applications. A PTHP retrofit replaces a Packaged Terminal Air Conditioner (PTAC) or zonal electric-resistance heating system.

Energy savings from PTHPs are primarily from a more efficient use of heating during the winter months of operation compared to a PTAC or zonal electric-resistance heating system. Savings are calculated based on an analysis of annual heating requirements for a PTAC compared to a PTHP. The base case heating system is a code-compliant PTAC unit with an annual coefficient of performance (COP) of 1.0. The efficient case used to calculate savings is based on a COP of 3.45, which reflects the weighted COP for a mix of commonly available PTHP sizes.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

This measure is eligible to be installed in either:

- A lodging building type which, for the purposes of this measure, includes hotel, motel, bed and breakfast, boarding/rooming house, apartment hotel, dormitory, and shelter; or
- In a residential care building type which, for the purposes of this measure, includes nursing home, retirement home, and assisted living facilities.

No other building types are allowed.

**Pre-conditions for retrofit installations:** The space is conditioned by a PTAC or zonal electric-resistance heat as the primary heating source. No other heating sources are eligible.

**Post-conditions:** The installed PTHP must have an AHRI certificate of product rating. All AHRI-certified PTHPs qualify for this incentive regardless of the rated COP.

**Required Documents**

AHRI Certificate

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| AHRI Certificate | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Packaged Terminal Heat Pump Retrofit | $600 per PTHP |
| Packaged Terminal Heat Pump New Construction | $100 per PTHP |

# 8.5 COMMERCIAL SHELL MEASURES

## 8.5.1 Commercial Insulation

**Basis for Energy Savings**

The base case used to calculate energy efficiency savings for commercial insulation is based on pre-condition wall, roof, and attic levels with very little (defined as R-0 to R-5) insulation value. The efficient case used to calculate savings is based on wall, roof, and attic insulation value ranges that are shown in the payment table below. Energy savings are dependent on the building type, heating zone, and heating system types.

Attic insulation is defined by insulation that is installed in the attic crawl space, typically on a horizontal surface. Roof insulation is defined by insulation that is installed in direct contact with the building's roof, typically a flat or slightly pitched surface.

**Requirements and Specifications**

This measure applies to retrofits only.

**Pre-conditions:** The primary heating system is electric and the existing insulation value is between R-0 and R-5.

**Post-condition:** The installation of insulation in wall or attic/roof spaces will be per the levels shown in the Payment table below. Installation of insulation in floor or crawl spaces is not eligible

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| ~~AHRI Certificate documenting the efficiency requirements have been met.~~ | | ~~X~~ |

**Payment**

| MEASURE CATEGORY | PAYMENT | | |
|---|---|---|---|
| LOCATION AND R VALUE | HEATING ZONE 1 | HEATING ZONE 2 | HEATING ZONE 3 |
| **Attic/roof insulation payment per square foot:** | | | |
| ≤R-5 to R-19 | $1.35 | $1.75 | $2.00 |
| ≤R-5 to R-30 | $1.40 | $1.85 | $2.05 |
| ≤R-5 to R-49 | $1.50 | $1.95 | $2.10 |
| **Wall insulation payment per square foot:** | | | |
| ≤R-5 to R-11 | $0.75 | $1.00 | $1.15 |
| ≤R-5 to R-19 | $1.00 | $1.25 | $1.40 |

### 8.5.2 Commercial Windows (BPA-Qualified)

**Basis for Energy Savings**

Savings estimates for commercial windows are based on an analysis of efficient windows in small commercial buildings. Energy savings vary by heating zone and heating system type.

**Requirements and Specifications**

This measure applies to retrofits only.

**Pre-conditions:** This measure is eligible in commercial buildings with the following characteristics:

- Primary heating system is electric; and
- Pre-existing windows that are single-pane, single-pane with storms, or double-paned metal-frame windows.

**Post-condition:** Installation of replacement window assemblies that have a National Fenestration Rating Council-rated U-value of 0.30 or lower.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| HEATING ZONE 1 | $9 per square foot of window replaced |
| HEATING ZONE 2 | $18 per square foot of window replaced |
| HEATING ZONE 3 | $18 per square foot of window replaced |

# 8.6 COMMERCIAL REFRIGERATION

## 8.6.1 Anti-Sweat Heater (ASH) Controls

### Basis for Energy Savings

Anti-sweat heater (ASH) controls reduce the energy consumption of anti-sweat heaters on reach-in doors. This measure applies to cooler and freezer reach-in glass door cases in a commercial building.

This measure only applies to technologies that reduce energy consumption of anti-sweat heaters based on sensing humidity. It does not apply to doors equipped with low/no anti-sweat heat.

More detailed information is available on the RTF website.

### Requirements and Specifications

This measure is applicable to retrofits and new construction.

**Pre-conditions:**

- Cooler Case: Any uncontrolled ASH that uses greater than 0.20 amps/ft. of case (door rail, glass, and/or frame heating element combined); or
- Freezer Case: Any uncontrolled ASH that uses greater than 0.39 amps/ft. of case (door rail, glass, and/or frame heating element combined).

**Post-conditions:**

- Cooler Case: Installation of a controller with settings that reduce the ASH run time by at least 50%. Includes any heating element in a door rail, glass, and/or frame; or
- Freezer Case: Installation of a controller that reduces the ASH run time by at least 50%. Includes any heating element in a door rail, glass, and/or frame.

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Product Specification Sheet (also referred to as cut sheet) that documents product name and model number. | | X |

### Payment

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Anti-Sweat Heater (ASH) Controls – Freezer | $40 per linear foot of case |
| Anti-Sweat Heater (ASH) Controls – Cooler | $40 per linear foot of case |

**Supporting Content**

RTF UES Measures

### 8.6.2 Efficient Refrigeration Evaporator Fan Motors

**Basis for Energy Savings**

This measure is for existing, shaded pole evaporator fan motors in refrigerated reach-in display cases, walk-in coolers and walk-in freezers that are replaced by electronically commutated motors (ECM) or permanent magnetic synchronous motors (PMSM).

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to retrofits only.

- For walk-in coolers and freezers: Motors must have fans that are 10 inches in diameter or larger.
- For refrigerated display cases: All fan sizes are eligible.

**Pre-condition:** Shaded pole evaporator motor in a refrigerated display case, walk-in cooler or freezer.

**Post-condition:** Replace a shaded pole evaporator fan motor with an ECM or PMSM.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| ECM or PMSM on Display Case | $55 per motor |
| ECM or PMSM on Walk-In Cooler or Freezer, ≤ 23 Watts | $140 per motor |
| ECM or PMSM on Walk-In Cooler or Freezer, > 23 Watts | $140 per motor |

**Supporting Content**

RTF UES Measures

### 8.6.3 Strip Curtains for Walk-In Coolers and Freezers

**Basis for Energy Savings**

Strip curtains and plastic doors on walk-ins keep cool air from escaping and warm air from entering the unit. This measure is for the installation of new strip curtains or plastic swinging doors on qualifying walk-in cooler and freezer doorways.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to retrofits only.

**Pre-conditions:**

- Eligible applications include grocery walk-in freezers and coolers, convenience store walk-in

**Supporting Content**

RTF UES Measures

freezers, and restaurant walk-in freezers where there are no existing curtains or plastic doors.

- The following applications are not eligible: Walk-in freezers located inside of walk-in coolers; walk-in coolers in restaurants, drug, or convenience stores; replacement of existing strip curtains; or strip curtains on display cases.

**Post-conditions:** Installation of strip curtains or swinging doors ≥ 0.06-inches thick and low-temperature strip curtains or doors must be used on low-temperature applications.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Product Specification Sheet (also referred to as cut sheet) that documents product name and model number. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Strip Curtains for Walk-in Coolers and Freezers | $9 per square foot of doorway |

# 8.7 COMMERCIAL KITCHEN AND FOOD SERVICE EQUIPMENT

## 8.7.1 Demand Controlled Kitchen Ventilation (BPA-Qualified)

**Basis for Energy Savings**

Demand-controlled kitchen ventilation (DCKV) automatically reduces kitchen hood and make-up air fan speed during times of low activity or demand. Energy savings are achieved as a result of reduced fan power and reduced make-up air heating requirements.

**Requirements and Specifications**

This measure applies to retrofits and new construction.

**Pre-conditions:** For existing applications, the ventilation system has a constant-speed exhaust fan. For new construction applications, there are no pre-conditions.

**Post-conditions:** Installed demand-controlled kitchen ventilation equipment that:

- Controls the primary ventilation and make-up air units in the zone; and
- Utilizes one or more control sensors to modify the fan speeds.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Demand Controlled Kitchen Ventilation- New or Retrofit- One control sensor | $200 per fan horsepower |
| Demand Controlled Kitchen Ventilation- New or Retrofit- Multiple control sensors | $400 per fan horsepower |

### 8.7.2 Electric Commercial Steam Cookers

**Basis for Energy Savings**

Savings for electric commercial steam cookers occur from (1) reduced idle energy consumption from improved insulation and gaskets, and (2) the use of connectionless or closed-system design. Additional benefits include up to 90% water reduction for connectionless models.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

Installed equipment must be minimum ENERGY STAR v1.2-Certified.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change from the specifications in place in April 2022, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. | | X |

## Supporting Content

RTF UES Measures

ENERGY STAR Products List

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Electric Commercial Steam Cooker - 6 pan | $500 per pan |

### 8.7.3 Hot Food Holding Cabinets

**Basis for Energy Savings**

Savings for hot food holding cabinets occur from reduced idle energy consumption due to improved thermal characteristics and may include other advanced features such as auto-door closers and magnetic door gaskets. ENERGY STAR defines the following equipment sizes:

- Half Size: < 13 cu. ft.
- Full Size: ≥ 13 and < 28 cu. ft.
- Double Size: ≥ 28 cu. ft.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

Installed equipment must be minimum ENERGY STAR v2.0-Certified.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change from the specifications in place in April 2022, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Hot Food Holding Cabinet – Half Size | $250 per cabinet |
| Hot Food Holding Cabinet – Full Size | $500 per cabinet |
| Hot Food Holding Cabinet – Double Size | $1,000 per cabinet |

## Supporting Content

RTF UES Measures

ENERGY STAR Products List

### 8.7.4 Electric Combination Ovens

**Basis for Energy Savings**

Combination ovens provide three functions: convection, steam, and combination cooking. In the convection mode, the oven circulates dry heat – suitable for pastries and breads. The steam mode injects water into the oven to poach fish, rice, and vegetables. In the combination mode, both dry heat and steam are used to maintain exact humidity levels. Savings occur from (1) reduced idle energy consumption from improved insulation and gaskets, and (2) the use of infrared heating.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

Installed equipment must be minimum ENERGY STAR v2.2-Certified.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change from the specifications in place in April 2022, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Electric Combination Oven – 5-15 pan oven | $500 per oven |
| Electric Combination Oven – 16-20 pan oven | $500 per oven |

### 8.7.5 Electric Convection Ovens

Convection ovens use fans to circulate hot air within the cabinet. Savings occur from (1) reduced idle energy consumption from improved insulation and gaskets, and (2) the use of infrared heating. Convection oven sizes are defined as follows:

- Half Size: 18″ x 13″ x 1″ pan size
- Full Size: 18″ x 26″ x 1″ pan size

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

Installed equipment must be minimum ENERGY STAR v2.2-Certified.

**Supporting Content**

RTF UES Measures

ENERGY STAR Products List

**Supporting Content**

RTF UES Measures

ENERGY STAR Products List

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change from the specifications in place in April 2022, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Electric Convection Oven - Half | $200 per oven |
| Electric Convection Oven - Full | $400 per oven |

### 8.7.6 Pre-Rinse Spray Valves

**Basis for Energy Savings**

This measure is for the installation of reduced flow pre-rinse spray valves in commercial kitchens. Savings are achieved as a result of reduced hot water use.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to retrofits only.

**Pre-conditions:** The pre-rinse spray valve must use hot water heated with an electric water heater.

**Post-conditions:** The valve must be EPA WaterSense-qualified or have a minimum spray force of 4.0 ounces-force and the new spray valve must have a maximum flow rate of 1 gallon per minute.

**Documentation Requirements**

Pre-rinse spray valves are available through the following channels:

- By Request
- Direct Install

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X * |

## Required Documents

Commercial Sector Measure Distribution Documentation Form

## Supporting Content

RTF UES Measures

Measure Distribution Channels

*Unless otherwise specified in Section 6.2

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Pre-Rinse Spray Wash Valve | $100 per spray valve |

## 8.8 ADDITIONAL UES OFFERINGS

### 8.8.1 Generator Block Heaters (BPA-Qualified)

**Basis for Energy Savings**

The following two generator block heater sizes were used to calculate energy savings:

- Less than 3 kW; and
- Greater than or equal to 3 kW.

The generator engine block heater base case used to calculate energy savings was thermosiphon heaters, which are electric-resistance heaters without a pump. The efficient case used forced-circulation heaters, which are electric-resistance heaters with a pump. The measure savings for the two block heater sizes are based on weighted averages of the base and efficient case energy usage from a BPA emerging technology pilot. The pilot found that in addition to energy savings, forced-circulation heaters provide better overall block temperature control and reduce extreme temperature swings, possibly extending hose lifetimes, reducing maintenance costs and improving generator reliability. Savings vary by size of heater.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

**Pre-conditions:** The forced-circulation generator engine block heater must replace a thermosiphon, electric-resistance block heater or be a new block heater. The generator or engine must be stationary and fixed.

**Post-condition:** Installed generator engine block heaters must be forced-circulation heaters.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Manufacturer, model, installed cost | X | |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Generator Engine Block Heater – Size <3 kW | $200 per unit |

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Generator Engine Block Heater – Size ≥3 kW | $1,500 per unit |

### 8.8.2 Smart Power Strips

**Basis for Energy Savings**

The base case used to calculate energy savings for commercial smart power strips was commercial office-related plug-loads that remain on even when not in use.

Energy savings assume that smart power strips are used in accordance with the manufacturer's instructions on equipment not previously controlled by a smart power strip.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

**Pre-condition:** No smart power strip was in place.

**Post-conditions:**

- Power strip turns off power to control office equipment not in use.
- Control mechanism may be any of the following:
  - Load sensor (controlled outlets power down when idle power level is detected in the master outlet); or
  - Motion sensor (controlled outlets powered down when no motion has been detected in the area for a set period of time); or
  - Timer (controlled outlets powered down for user-programmed periods of the day).

**Documentation Requirements**

Smart Power Strips are available through the following channels:

- By Request
- Direct Install

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X * |

*Unless otherwise specified in Section 6.2

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Smart Power Strip | $15 per strip |

### 8.8.3 Vehicle Engine Block Heater Controls

**Requirements and Specifications**

Vehicle engine block heater controls use a combination of temperature sensing and heater cycling to save energy. Studies have confirmed energy savings for all heating zones associated with controls that keep block heaters off when the ambient air temperature is above the temperature

## Required Documents

Commercial Sector Measure Distribution Documentation Form

## Supporting Content

RTF UES Measures

Measure Distribution Channels

## Supporting Content

RTF UES Measures

setting, and deliver only as much heat as necessary when the temperature drops below the setting. Savings assume the factory-default temperature setting. Good candidates include any vehicle that uses block heaters during cold months.

More detailed information is available on the RTF website.

**Requirements and Specifications**

Retrofit of existing installations and new equipment are both eligible.

**Pre-conditions:**

- Wall outlet must be a single uncontrolled outlet with one or two plugs.
- Large centralized wall plug systems designed for many vehicles are not eligible.

Systems that are portable, such as extension cord models, are not eligible.

**Post-conditions:** Installation of a vehicle engine block heater control that is:

- A hard-wired outlet or engine-mounted type;
- Thermostatically-controlled; and
- Compatible with 110-volt, single-phase resistance immersion heaters.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Vehicle Engine Block Heater Controls | $200 per unit |

### 8.8.4 Commercial Heat Pump Water Heaters

**Basis for Energy Savings**

Commercial heat pump water heaters save energy by using ambient heat to raise the temperature of water, rather than relying solely on electric-resistance heat such as with a conventional electric storage water heater.

Unitary heat pump water heaters combine the tank and compressor in a single unit, while split-system heat pump water heaters have interior storage tanks and outdoor compressors installed outside the building.

More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure is available for retrofits only.

**Pre-condition:** Existing water heater must be an electric-resistance water heater.

**Post-condition:** The installed heat pump water heater must be listed on the Heat Pump Water

## Supporting Content

RTF UES Measures

Heat Pump Water Heater Qualified Products List

COTR Request and Acknowledgement Procedure

Heater Qualified Products List (QPL).

If a product meets the requirements but is not on the QPL, please use the COTR Request and Acknowledgement Procedure for approval to use the product.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost<br>3. Manufacturer<br>4. Model number | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Unitary Heat Pump Water Heater Tier 1 - Any size tank | $300 per HPWH |
| Unitary Heat Pump Water Heater Tier 2 - Any size tank | $600 per HPWH |
| Unitary Heat Pump Water Heater Tier 3 - Any size tank | $600 per HPWH |
| Split-System Heat Pump Water Heater– Any size tank | $800 per HPWH |

**Additional Information**

Models identified on the HPWH Qualified Products List as Tier 4 are eligible for the Tier 3 measure.

### 8.8.5 ENERGY STAR Commercial Clothes Washers

**Basis for Energy Savings**

Energy savings assumes that the volume of water used is for commercial purposes, such as laundry in laundromats or the service industry. Savings vary by fuel used for water heating and drying.

More detailed information is available on the RTF website.



**Supporting Content**

RTF UES Measures

ENERGY STAR Products List

**Requirements and Specifications**

This measure applies to both retrofits and new construction.

**Pre-conditions:** Eligible existing equipment to be replaced includes electric or gas water heating and electric or gas drying.

**Post-condition:** Installed equipment must be minimum ENERGY STAR v2.2-Certified.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change from the specifications in place in April 2022, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Clothes Washer – Electric Water Heater/ Electric Dryer | $125 per washer |
| Clothes Washer - Electric Water Heater/ Gas Dryer | $100 per washer |
| Clothes Washer - Gas Water Heater/ Electric Dryer | $75 per washer |
| Clothes Washer - Gas Water Heater/Gas Dryer | $25 per washer |

# Section 9: Federal Sector

Unlike other sectors, the Federal Sector does not have a unique set of measures. Rather, this sector incorporates the offerings of all other sectors. As such, a federal project is any energy efficiency project (available elsewhere in this IM) installed in a qualifying federal facility.

A qualifying federal facility is one that meets the following requirements:

1. The site is (a) owned or leased by the federal government or (b) uses electric energy paid for by the federal government;
2. The site is (a) utility served or (b) direct served:
    - **Utility served**: The site uses electricity purchased from a BPA customer.
    - **Direct served**: The site uses electricity purchased directly from BPA.

Federal projects must follow the requirements of the section under which they are offered. Customers must report new projects under "federal," and customers, rather than BPA, must provide incentive payments to end-users.

# Section 10: Industrial Sector

Please check the changes and corrections summary to see if revisions were made to any of the measures in this sector.

Unless otherwise noted, all Industrial Sector measures are available for the Commercial and Agricultural sectors where applicable. Utilities shall report these measures as Industrial when reporting to BPA. The payment levels described in this table provide a summary only. Complete details of the payment levels and associated requirements may be found in the corresponding text of the IM. Please see the Table of Contents.

| 10.1 PAYMENT SUMMARY | |
|---|---|
| **PROGRAM COMPONENT OR MEASURE** | **PAYMENT** |
| **10.2 Energy Smart Industrial** | |
| 10.2.1 Industrial Custom Projects | See Section 4.1 Custom Projects Payment Rate. |
| 10.2.2 Small Industrial Projects | See Section 4.1 Custom Projects Payment Rate. |
| 10.2.3 BPA-Funded Technical Service Providers (TSP) | Paid by BPA through ESI program third-party contract. |
| **10.3 Energy Management** | |
| 10.3.1 Energy Project Manager | Lesser of $0.025 per kWh of verified energy savings or $150,000 per site, per rate period. |
| 10.3.2 Strategic Energy Management | $0.025 per kWh of verified energy savings . |
| 10.3.3 Performance Tracking System | Initial installation: Lesser of documented costs or $15,000, per two-year performance period<br>Annual maintenance: Lesser of documented costs or $10,000, per two-year performance period. |
| **Other Industrial Measures** | |
| 10.4 Variable Frequency Drives for Fans in Potato and Onion Storage Facilities | $200 per horsepower. |
| 10.5 Small Compressed Air Systems | Lesser of $0.25 per kWh or 70% of project cost. |
| 10.6 High Frequency Battery Charger Upgrade (BPA-Qualified) | Lesser of $0.25 per kWh or 70% of project cost. |
| 10.7 Welder Upgrade (BPA-Qualified) | Lesser of $0.25 per kWh or 70% of project cost. |
| 10.8 Water System Leak Abatement (BPA-Qualified) | Lesser of $0.25 per kWh or 70% of project cost. |
| **Additional Multisector Opportunities** | |
| Some Commercial and Agricultural Sector measures may be applicable to Industrial Sector projects.<br>Measures eligible for installation in multiple sectors are identified where applicable in the body of the IM in the primary applicable sector. | |

## 10.2 ENERGY SMART INDUSTRIAL

Customers must enroll in the Energy Smart Industrial (ESI) Program to receive BPA funding for custom project incentives and technical services.

The bulk of industrial program offerings are located in ESI which is managed by a third-party contractor (ESI program partner). ESI participants are assigned an ESI Partner (ESIP) and are offered the following program components:

- Industrial Custom Projects
- Small Industrial Projects
- Technical Service Providers (TSP)

**Requirements and Specifications**

Enrollment: A customer must request enrollment in ESI using the COTR Request and Acknowledgment Procedure. BPA acceptance of the request is discretionary.

ESI program partner: The customer must meet with the ESI program partner (in person or over the phone) to outline its intended level of program engagement and end-user communication expectations for the ESI program partner. The customer may engage the ESI program partner on any other pertinent topic including the customer's industrial load, savings goals and desired program component rollout. The ESI program partner will email an acknowledgment to the customer documenting the decisions made during the meeting.

ESIP: The ESIP assigned to the customer is the single point of contact to help customers understand and implement ESI. The customer ultimately determines the level of ESIP engagement but generally, the ESIP performs the following:

- Serves as an industrial technical resource to customers;
- Works closely with the customer to develop an action plan for its end users;
- Manages and reviews technical work products including technical analysis of custom project submittals; and
- Helps the customer identify custom projects and secure BPA approval.

Industrial Lighting Specialists (Nonresidential Lighting Program) are also available. Lighting specialists can help industries save energy and increase profitability by providing a variety of services including:

- Perform and deliver lighting audits;
- Review lighting design and installation proposals;
- Offer guidance on the best lighting technology for an industry's specific application; and
- Complete the BPA Lighting Calculator

BPA's Trade Ally Network Northwest is a community of lighting distributors, electrical contractors, and manufacturers who play a critical role in the market adoption of efficient lighting technologies as well as develop and implement industrial lighting projects.

Please see Commercial Section 8.3 Nonresidential Lighting for specific requirements and specifications, documentation requirements, etc.

### 10.2.1 Industrial Custom Projects (Optional ESI Component)

The end-user designs and constructs energy efficiency projects and is encouraged to solicit bids for such work.

The customer may receive assistance during the custom project process. The following chart demonstrates the party responsible for each step.

**Required Documents**

ESI Hub

Nonresidential Lighting Calculators

**Supporting Content**

Nonresidential Lighting Program

COTR Request & Acknowledgment Procedure

**Supporting Content**

Custom Projects General Requirements

Custom Projects Documentation Requirements

| CUSTOM PROJECT PROCESS STEPS | RESPONSIBLE PARTY | |
|---|---|---|
| | OPTION 1 CUSTOMER | OPTION 2 CUSTOMER |
| Develop an M&V plan | ESIP, TSP or Customer | ESIP, TSP or Customer |
| Prepare Option 1 Custom Project Proposal (optional) | ESIP or Customer | n/a |
| Submit Option 1 Custom Project Proposal (optional) into BEETS | Customer | n/a |
| Review Option 1 Custom Project Proposal, if submitted | ESI Quality Control engineer, BPA engineer, and COTR | n/a |
| Provide Technical Advice to Customer | ESIP | ESIP |
| Develop Custom Project Results Data and gather required documentation | ESIP, TSP or Customer | ESIP, TSP or Customer |
| Prepare Custom Project Completion Report | ESIP or Customer | ESIP or Customer |
| Submit Custom Project Completion Report and upload documentation into BEETS | Customer | Customer |
| Review Custom Project Completion Report documentation | ESI Quality Control engineer, BPA engineer, and COTR | Customer, see Section 4.5 |

**Requirements and Specifications**

See Section 4.3.2 Custom Projects General Requirements

**Documentation Requirements**

See Section 4.6 Custom Projects Documentation Requirements.

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Industrial Custom Projects | See Section 4.1 Custom Projects Payment Rate |

### 10.2.2 Small Industrial Projects (Optional ESI Component)

**Basis for Savings**

Small Industrial (SI) Projects provide a cost-effective approach for managing custom projects with a limited scope and repeatable analysis method. SI Projects often involve trade-ally support and annual energy savings are typically less than 200,000 kWh.

Simplified analysis tools may be available to assist with project development.

Projects of this size justify a simple, streamlined analytical approach including measurement and verification (M&V), due to the small scale of energy savings and incentive. An ESIP is closely involved with SI Projects.

**Requirements and Specifications**

See Section 4.3.2 Custom Projects General Requirements

**Documentation Requirements**

See Section 4.6 Custom Projects Documentation Requirements.

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Small Industrial Projects | See Section 4.1 Custom Projects Payment Rate |

### 10.2.3 BPA-Funded Technical Service Providers (Optional ESI Component)

**Supporting Content**

Custom Projects General Requirements

Custom Projects Documentation Requirements

BPA funding, through the ESI program partner, is available for eligible technical services necessary to develop and complete custom projects and Strategic Energy Management (SEM) projects.

TSP consultants can be utilized for scoping, project assessments, completion reports, M&V, SEM training, and miscellaneous consulting.

BPA funding of technical services is based on the cost-effectiveness of the proposal and the likelihood that the end user will implement it.

## 10.3 ENERGY MANAGEMENT

### 10.3.1 Energy Project Manager

**Basis for Energy Savings**

The Energy Project Manager (EPM) measure provides a payment to help overcome on-site staffing resource barriers. The payment is associated with development and implementation of an EPM Comprehensive Site Plan by a site's designated EPM, and which results in verified energy savings.

An EPM payment is an additional payment above and beyond other payments provided by BPA for verified energy savings (e.g. payments and savings associated with UES, nonresidential lighting, SEM, and custom projects that have been completed and approved by BPA).

For this measure, the following definitions apply:

The EPM:

- Is a designated individual who helps support development and implementation of the EPM Comprehensive Site Plan.
- Provides project-specific, on-site support.
- May be an end user's direct employee or contractor.
- Designation individual may change from one individual to another with written notice to BPA.

The EPM Comprehensive Site Plan:

- Is a written plan that describes a holistic set of potential and planned custom, UES, lighting, and all other energy savings opportunities and projects at a site.
- May be a single or multi-year plan.
- Is a "living"' document such that the version submitted as part of the EPM enrollment process (e.g., Initial Plan) is superseded by subsequent versions of the plan that have been updated to reflect projects that have been completed and any new projects that have been identified (e.g., Updated Plan).

**Requirements and Specifications**

This measure is available for the Commercial and Industrial Sectors. An eligible site may consist of a single building, facility, municipality, or school district, or it may include multiple contiguous buildings (e.g., a medical or educational campus). To enroll or re-enroll a site in the EPM measure, submit to BPA:

- Site name, address, and contact details;
- EPM name, title and contact details;
- EPM Comprehensive Site Plan (e.g., Initial Plan);
- Estimated Comprehensive Site Plan savings potential; and
- Estimated commencement date.

The EPM commencement date is the date listed on the EPM Comprehensive Site Plan and serves to establish the beginning of the EPM engagement. Projects must be completed on or after the EPM commencement date to be eligible for EPM incentives. The EPM commencement date must be April 1, 2022, or later unless the participant was actively enrolled in Energy Management: Energy Project Manager (Optional ESI Component) on March 31, 2022.

Other requirements include:

Projects included in the EPM Comprehensive Site Plan cannot use hours worked by the individual identified as the EPM in their project costs.

Each completed project is eligible for only one EPM payment.

After the initial EPM enrollment is approved by BPA, the customer may invoice BPA multiple times in a rate period as long as all post-conditions are met with each invoice.

**Pre-conditions:**

The EPM must develop an EPM Comprehensive Site Plan.

The EPM Comprehensive Site Plan (Initial Plan) must be reviewed and approved by BPA.

The EPM Comprehensive Site Plan (Initial Plan) must include the following at a minimum:

EPM name, title, and end user site affiliation.

Site name.

EPM commencement date.

Project names and details for all potential and planned custom, UES, lighting, and other energy savings opportunities including:

Project description;
Estimated energy savings with a brief description of the approach used to estimate the value;
Estimated completion date;
Estimated cost.

The sum of identified energy savings must exceed 200,000 kWh.

At least one project listed must be categorized in an end-use other than lighting.

**Post-conditions:**

The EPM must oversee implementation of the energy efficiency project(s) defined in the EPM Comprehensive Site Plan.

The EPM Comprehensive Site Plan (Updated Plan) must be reviewed and approved by BPA.

The EPM must complete an EPM Comprehensive Site Plan (Updated Plan) that includes all the following, at a minimum:

EPM name, title, and end user site affiliation;

Site name;

EPM commencement date;

Updated plan date;

New projects identified since the Initial Plan or previous Updated Plan, in addition to existing planned project names and details, including:

Project description;
Estimated energy savings with a brief description of the approach used to estimate the value;
Estimated completion date;
Estimated cost.

Completed project names and details for which an EPM payment is being requested:

Project description;
Verified energy savings;
Site ID;
BPA project approval date.

Completed project names and details for which an EPM payment was previously paid:

Project description;
Verified energy savings;

Site ID;
BPA project approval date.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Enrollment Application | X | |
| EPM Comprehensive Site Plan (Initial Plan) | X | X |
| EPM Comprehensive Site Plan (Updated Plan) | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Energy Project Manager | Lesser of $0.025 per kWh of verified energy savings or $150,000 per site, per rate period |

**Additional Information**

There is an optional template for the EPM Comprehensive Site Plan.

The use of this template is not required. For customers enrolled in ESI, ESI staff are available to support customers in identifying prospective EPMs in the Industrial sector and to support enrolled EPMs operating in the Industrial sector in developing the EPM Comprehensive Site Plan. ESI staff are not available to support EPMs operating in the Commercial sector.

### 10.3.2 Strategic Energy Management

**Basis for Energy Savings**

Strategic Energy Management (SEM) is designed to acquire energy savings over the course of a two-year performance period by improving facilities' energy intensity through behavioral, operational, and maintenance improvements. Participants allocate personnel time and resources to engage in activities including energy management training, opportunity identification and implementation, and energy-use tracking which result in SEM savings. Savings are primarily achieved through participant time and effort.

SEM participants often identify custom, lighting, and UES measures that can be pursued concurrent with SEM enrollment. Savings attributed to other program components are not attributable to SEM.

**Requirements and Specifications**

This measure is available for the Commercial and Industrial Sectors. An eligible site may consist of a single building, facility or municipality, or it may include multiple contiguous buildings (e.g., a medical or educational campus).

Enrollment Application. To enroll or re-enroll a site in the SEM measure a customer must submit to BPA:

Site name, address, and contact details;

Estimated baseline annual energy consumption (kWh/yr);

Confirmation that site has committed to a minimum two-year performance period;

Estimated SEM energy savings potential for the two-year performance period;

Estimated performance period start date.

**Required Documents**

SEM Calculator

**Supporting Content**

BPA C&I SEM M&V Reference Guide

Measurement and verification (M&V):

Verified SEM savings must be calculated following an M&V option described in the BPA Commercial and Industrial (C&I) SEM M&V Reference Guide.

Verified SEM savings do not include energy savings from other BPA programs (e.g., custom projects, lighting projects, or UES measure projects).

Verified SEM savings are relative to the SEM baseline or the savings achieved in year two of the previous performance period. If re-baselining was necessitated by the BPA C&I SEM M&V Reference Guide or customer request, it will reset the SEM baseline.

The initial SEM performance period starts date must be:

No earlier than the SEM kick-off workshop or tune-up event, whichever is applicable;

No later than the date determined by the customer;

April 1, 2022, or later unless the participant was actively enrolled in Stategic Energy Management Projects (Optional ESI Component) and the project completion date was on or after October 1, 2021.

Annual SEM Reports: Customers are required to submit an annual SEM Report documenting SEM activities and resulting energy savings. No cost documentation is required. The SEM Report must include at a minimum:

Verified SEM savings;

Site-specific written summary describing SEM systems and practices implemented, including persistence strategies;

Documentation of M&V compliance with BPA C&I SEM M&V Reference Guide;

Opportunity register that documents individual energy efficiency measures implemented, including subsystem, measure name and description, and when it was implemented;

Performance Tracking System (PTS) Maintenance Documentation, if applicable. See Section 10.3.3 Performance Tracking Systems for requirements.

SEM Calculator: Customers are required to submit a SEM Calculator documenting the SEM cumulative verified site savings, SEM annual site savings, and SEM verified site savings as defined in the BPA C&I SEM M&V Reference Guide.

Projects reporting Year-1 performance period must report Year-2 performance, including projects with 0 or negative verified savings achieved.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Enrollment Application | X | |
| Annual SEM Report | X | X |
| SEM Calculator | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Strategic Energy Management | $0.025 per kWh of SEM Verified Savings |

**Additional Information**

There are optional templates for the Annual SEM Report and SEM Calculator. The use of these templates is not required.

For customers enrolled in ESI, ESI staff and TSP resources are available to support customers in identifying prospective SEM participants in the Industrial Sector and to provide SEM coaching and technical assistance to enrolled SEM participants in the Industrial Sector. ESI staff and TSP resources are not available to support SEM projects in the Commercial Sector.

### 10.3.3 Performance Tracking Systems

**Basis for Energy Savings**

The Performance Tracking System (PTS) measure provides a payment to help overcome data barriers. PTS payments are associated with the verified installation of metering hardware and/or electric-energy data collection software that tracks key variables used to develop a meaningful, normalized energy-use profile. Improved awareness of how energy is used leads to better-informed decisions which results in verified energy savings.

The initial PTS installation may be required prior to starting a SEM performance period or may be concurrent with a performance period. After the initial PTS setup payment, annual PTS maintenance payments are eligible. These maintenance payments cover annual services and other data barriers identified over the course of the SEM engagement.

A PTS payment is an additional payment above and beyond other payments provided by BPA for verified energy savings (e.g., payments and savings associated with completed UES measures, nonresidential lighting, SEM, and custom projects).

**Requirements and Specifications**

**Pre-conditions:**

Site's current enrollment in SEM is approved by BPA;

PTS is defined as metering hardware and/or software used to measure baselines, determine energy savings, or help establish cause and effect;

PTS is installed and owned by the end user.

**Post-conditions:**

PTS setup or the initial installation of a PTS system is documented through a PTS Verification Report that includes all the following, at a minimum:

Site name and SEM measure affiliation;

Description of PTS system;

Verification of installation through photos and/or data;

Documentation demonstrating the PTS system data is valid;

Cost documentation.

PTS Maintenance Documentation may be submitted as a stand-alone document or incorporated into a SEM Annual Report. Documentation must include the following, at a minimum:

Site name and SEM measure affiliation;

Description of PTS hardware or software;

Cost documentation.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| PTS Verification Report (Initial Installation) | X | X |
| PTS Maintenance Documentation | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| PTS Initial Installation | Lesser of PTS costs or $15,000 |
| PTS Maintenance | Lesser of PTS costs or $10,000 per two-year performance period |

## 10.4 VARIABLE FREQUENCY DRIVES (VFD) FOR FANS IN POTATO AND ONION STORAGE FACILITIES

**Basis for Energy Savings**

The base case used to calculate this measure is a fixed-speed fan that is used to blow air at 100% airflow, year-round. The efficient case would have a variable-speed drive to better match the airflow necessary for winter season performance.

**Requirements and Specifications**

Ventilation fan VFD installations in potato and onion storage facilities have a UES of 1,193 kWh per horsepower. BPA recommends that all new VFD installations meet the IEEE 519 standard.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description) | X | X |
| Equipment or contractor invoice showing:<br>• Equipment manufacturer<br>• Equipment model number<br>• Size (horsepower) and quantity installed or used<br>• Order or purchase date<br>• Installed cost | | X |

**Payment**

To calculate the payment, the customer will add the total fan VFD horsepower installed on a per-building basis.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| VFD for Fans in Potato and Onion Storage Facilities | $200 per horsepower |

## 10.5 SMALL COMPRESSED AIR SYSTEMS

**Basis for Energy Savings**

The base case for this measure is an air compressor that operates at a fixed speed with some variation in compressed airflow requirements. The efficient case would have a variable frequency drive to better match compressor performance to compressed air-system requirements.

**Requirements and Specifications**

VFDs applied to a single air compressor or installation of cycling refrigerated air dryers of 75 horsepower or less must use the RTF-approved Small Compressed Air Savings Calculator.

Additional requirements include:

Each VFD compressor must be submitted as an individual project (i.e. compressors may not be combined or divided). The calculator will determine energy savings;

Energy savings and incentive amounts must be entered manually into the Compressed Air Program in BEETS.

This measure is available for the Agricultural, Commercial and Industrial sectors. Utilities shall report this measure to the applicable sector when reporting to BPA.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Equipment or contractor invoice showing:<br>• Equipment manufacturer<br>• Equipment model number<br>• Size (horsepower) and quantity installed or used<br>• Order or purchase date<br>• Installed cost | | X |
| Completed RTF-approved Small Compressed Air Savings Calculator. | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Small Compressed Air Systems | Lesser of $0.25 per kWh or 70% of project cost |

**Required Documents**

RTF-approved Small Compressed Air Savings Calculator

## 10.6 HIGH FREQUENCY BATTERY CHARGER UPGRADE (BPA-QUALIFIED)

**Basis for Energy Savings**

The base case for this measure is an existing transformer-based (ferroresonant or silicon-controlled rectifier) battery charger that is commonly used to charge indoor equipment such as fork trucks and lifting equipment. The efficient case would be a new, high frequency, inverter-based battery charger that requires far less standby power and improves the AC to DC conversion efficiency.

The Battery Charger Calculator estimates energy savings based on user-entered inputs of energy per charge and charges per year for the baseline and retrofit cases.

BPA will collect data on these retrofits to help support RTF analysis.

**Required Documents**

Battery Charger Calculator

UES Measure Upload Template

**Requirements and Specifications**

This measure applies to the retrofit of existing ferroresonant or silicon-controlled rectifier (SCR) chargers, specifically through the installation of a new, high frequency inverter-based battery charger, with rated input power of more than 2 kW and that uses 10W or less of standby power.

New construction projects are not eligible. This measure also does not apply to small, household-type chargers for products such as cell phones, toothbrushes or power tools.

- Customers must use the current version of the Battery Charger Calculator to calculate savings and associated incentives
- Energy savings and incentive amounts must be entered manually into the BPA UES Measure Upload Template in the calculator results fields and uploaded into BEETS
- The Battery Charger Calculator and electronic copies of the invoice(s) must be uploaded into BEETS for program oversight

This measure is available for the Agricultural, Commercial, and Industrial sectors. Utilities shall report this measure to the applicable sector when reporting to BPA.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Equipment or contractor invoice showing:<br>1. Order or purchase date<br>2. Installed cost | X | X |
| Completed Battery Charger Calculator | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| High Frequency Battery Charger Upgrade | Lesser of $0.25 per kWh or 70% project cost |

## 10.7 WELDER UPGRADE (BPA-QUALIFIED)

**Basis for Energy Savings**

The base case is an existing transformer-based welder that is used for manufacturing and repair operations. The efficient case is an inverter-based welder. The majority of the savings comes from a reduction in standby power. Energy savings will be calculated based on equipment data and site operational data for the baseline and retrofit cases.

The Welder Upgrade Calculator estimates energy savings based on user-entered inputs of operational data and specific equipment information including standby power and the power used during the welding process. From this information the baseline and retrofit energy use is calculated.

BPA will collect data on these retrofits to help support RTF analysis.

**Required Documents**

Welder Upgrade Calculator

UES Measure Upload Template

**Requirements and Specifications**

This measure covers installation of an inverter-based welder retrofit rated for a minimum of 200 amps. New construction projects are not eligible.

- Customers must use current version of the Welder Upgrade Calculator to calculate savings and associated incentives
- Energy savings and incentive amounts must be entered manually into the BPA UES Measure Upload Template from the calculator results fields and uploaded into BEETS
- The Welder Upgrade Calculator and electronic copies of the invoice(s) must be uploaded into BEETS for program oversight

This measure is available for Agricultural, Commercial, and Industrial sectors. Utilities shall report this measure to the applicable sector when reporting to BPA.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Equipment or contractor invoice showing:<br>1. Order or purchase date<br>2. Installed cost | X | X |
| Completed Welder Upgrade Calculator | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Welder Upgrade | Lesser of $0.25 per kWh or 70% project cost |

## 10.8 WATER SYSTEM LEAK ABATEMENT (BPA-QUALIFIED)

**Basis for Energy Savings**

The base case is a large water distribution system such as municipal water district, golf course, or irrigation distribution system (not above-ground sprinklers). The efficient case proactively addresses losses using leak-detection system surveys.

BPA will collect data on these retrofits to help support RTF analysis.

**Requirements and Specifications**

An audit must be conducted to detect leaks, and they must be repaired in accordance with the American Water Works Association's (AWWA) methodology.

Visible or known water-line breaks or leaks are not eligible.

Savings are calculated using the Leak Abatement Tool that is based on the AWWA's methodology which calculates the rate of water loss from various leaks.

Energy and Water production data will be collected from the pumping system providing water to the leak location, to arrive at the energy intensity (kWh per gallon pumped).

Energy savings will be estimated by multiplying the energy intensity by the annualized volume of the leaks repaired (determined by the pipe diameter, system pressure, and energy used to distribute the water in the system).

**Required Documents**

Leak Abatement Tool

UES Measure Upload Template

Customers must use the current version of the Leak Abatement Tool to calculate savings and associated incentives.

Energy savings and incentive amounts must be entered manually into the BPA UES Measure Upload Template from the calculator results fields and uploaded into BEETS.

The Leak Abatement Tool and electronic copies of the invoice(s) must be uploaded into BEETS for program oversight.

This measure is available for the Agricultural, Commercial, and Industrial sectors. Utilities shall report this measure to the applicable sector when reporting to BPA.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Equipment or contractor invoice showing:<br>1. Order or purchase date<br>2. Installed cost | X | X |
| Completed Leak Abatement Tool | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Water System Leak Abatement | Lesser of $0.25 per kWh or 70% of project cost |

## 10.9 GREEN MOTORS REWIND INITIATIVE

**Basis for Energy Savings**

The base case is induction motors between 15 and 5,000 horsepower that require motor repair and rewinding, and are repaired and rewound by motor service centers that use methods and equipment that do not meet the ANSI/EASA Standard AR100-2010 requirements. The efficient case is to test and verify each motor to be sure there is no permanent motor core damage, then repair and rewind by a Green Motors Initiative-certified motor service center that follows the ANSI/EASA Standard AR100-2010. Energy savings are based on the unit energy savings (UES) approved by the RTF for this set of measures.

More details on the testing and motor service center requirements, and a list of certified motor service centers, can be found at: http://www.greenmotors.org/

More details on the recommended practice for the repair of rotating electrical apparatus can be found at: https://easa.com/resources/resource-library/ansieasa-standard-ar100-2020-recommended-practice-for-the-repair-of-rotating-electrical-apparatus.

**Requirements and Specifications**

The Green Motors Rewind Initiative uses direct acquisition. The incentives paid through the Green Motors Rewind Initiative are paid by BPA as part of the third-party program and are not counted against customer's EEI budget. No payments are required to BPA, the program implementer, or the participating end user. Customers receive credit for all energy savings achieved by the program in their service territory.

Qualified motors include National Electric Manufacturers Association (NEMA) standard horsepower-rated motors between 15 and 5,000 horsepower (either NEMA premium or other) that are rewound via certified Green Motors Initiative-certified motor service centers. Customers may enroll using the COTR Request and Acknowledgment Procedure.

### Supporting Content

ANSI/EASA Standard AR100-2020: Recommended Practice for the Repair of Rotating Electrical Apparatus

COTR Request and Acknowledgement Procedure

A monthly report and annual report is created and sent to participating customers with end user names, total horsepower rewound, energy savings and incentives paid. Monthly reports will only be created and sent to customers with end-user participation in their service territory.

Customers may be contacted by the program implementer to verify an end users' eligibility to receive incentives through the program.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Third-party provided monthly reports | | X |
| Third-party provided annual reports | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Green Motors Rewind Initiative | $2 per horsepower is paid to the rewind service center (A $1 per horsepower credit is applied to the end user's invoice) |

# Section 11: Residential Sector

Please check the changes and corrections summary to see if revisions were made to any of the measures in this sector. Also note that installations of high-intensity discharge lighting in residential settings must be reported as Commercial Sector measures. See the Nonresidential Lighting Program. Lastly, the payment levels described in the following table provide a summary only. Complete details of the payment levels and associated requirements may be found in the corresponding sections of the manual.

| 11.1 PAYMENT SUMMARY | |
|---|---|
| **PROGRAM COMPONENT OR MEASURE** | **PAYMENT** |
| **11.2 Lighting** | |
| 11.2.1 LED Lamps | $2.50-$9/LED |
| 11.2.2 TLED Lamps | $3-$5/TLED |
| **11.3 Advanced Power Strips & Energy Saver Kits** | |
| 11.3.1 Advanced Power Strips/Load Sensing (for Home Entertainment Centers) | $15–25/unit |
| 11.3.2 Energy Saver Kits | See the Payment section of this measure |
| **11.4 Appliances** | |
| 11.4 ENERGY STAR® Clothes Washers | $25-$100/washer |
| 11.4 ENERGY STAR® Clothes Dryers | $50-$175/dryer |
| **11.5 EV Chargers** | |
| 11.5.1 EV Chargers | $20.00 |
| **11.6 Electric Water Heating** | |
| 11.6.1 Thermostatic Shut-Off Valves | $14-$20/unit |
| 11.6.2–11.6.3 Unitary Heat Pump Water Heaters | $300-$700/ water heater |
| 11.6.4 Split System Heat Pump Water Heaters | $800/water heater |
| 11.6.5 Pipe Insulation | $5-$25/unit |
| **11.7 Heating, Ventilation, Air Conditioning (HVAC) Measures** | |
| 11.7.1.1 – 11.7.1.2 Ductless and Ducted Mini-Split Heat Pumps | See the Payment section of this measure |
| 11.7.2 HVAC Performance Tested Comfort Systems (PTCS) | See the Payment section of this measure |
| 11.7.2.1 PTCS Air-Source Heat Pumps (BPA-Qualified) | See the Payment section of this measure |
| 11.7.2.2 PTCS Variable-Speed Heat Pumps (BPA-Qualified) | See the Payment section of this measure |
| 11.7.2.3 PTCS Commissioning, Controls, and Sizing (BPA-Qualified) | See the Payment section of this measure |
| 11.7.2.4 PTCS Ground Source Heat Pumps (BPA-Qualified) | See the Payment section of this measure |
| 11.7.2.5 PTCS Duct Sealing | $200-$250 |
| 11.7.3 Prescriptive Duct Sealing (BPA-Qualified) | $200-$250 |
| 11.7.4 Duct Insulation | $.60 per linear foot insulated |

| 11.1 PAYMENT SUMMARY | |
|---|---|
| **PROGRAM COMPONENT OR MEASURE** | **PAYMENT** |
| 11.7.5 ASHP Conversion (without PTCS) | $800 |
| 11.7.6 ASHP Conversion to Variable-Speed (without PTCS) | $1,000 |
| 11.7.7 ASHP Upgrade (without PTCS) | $20 |
| 11.7.8 Variable-Speed ASHP Upgrade (without PTCS) | $150 |
| 11.7.9 Centrally Ducted Air Conditioners | $60 |
| 11.7.10 Packaged Terminal Heat Pump | $125-$200 |
| **11.8 Thermostats** | |
| 11.8.1 Line Voltage Thermostats | $18 |
| 11.8.2 Advanced Smart Thermostats | $140-165 |
| 11.8.3 Communicating Line Voltage Thermostats | $35 |
| **11.9 New Construction** | |
| 11.9.1 NEEM 1.1 and 2.0 versions | $1,200-$1,400/home |
| 11.9.2 Replacement of Pre-1976 Manufactured Home with NEEM Certified Home | $2,200-$2,500/home |
| 11.9.3 Single-Family New Construction Performance Path | Varies based on measures installed |
| 11.9.4 Montana House | See the Payment section of this measure |
| 11.9.5 Energy Efficient New Multifamily Construction | See the Payment section of this measure |
| 11.9.6 Zero Energy Ready New Multifamily Construction | See the Payment section of this measure |
| **11.10 Weatherization** | |
| 11.10.1 Insulation | See the UES Measure List |
| 11.10.2 Prime Window and Patio Door Replacement | $2–$16/square foot |
| 11.10.3 Low-E Storm Windows | $2/square foot |
| 11.10.4 Exterior Insulated Doors | $40/door |
| 11.10.5 Whole House Air Sealing and Testing | See the UES Measure List |
| 11.10.6 Prescriptive Air Sealing | See the UES Measure List |
| **11.11 Low-Income Energy Efficiency Measures** | |
| Weatherization, Ductless and PTCS Ducted Air-Source Heat Pumps, PTCS and Prescriptive Duct Sealing, Duct Insulation, Contractor-installed Smart Thermostats, and Heat Pump Water Heaters | See the Low-Income Payment section for these measures |
| **11.12 Behavioral** | |
| 11.12.1 Behavioral Home Energy Reports (BPA Qualified) | $12/household |

# 11.2 LIGHTING

## 11.2.1 LED Lamps

**Basis for Energy Savings**

An LED lamp or LED light bulb is an electric light that produces light using light-emitting diodes (LEDs). LED lamps labeled ENERGY STAR are significantly more energy-efficient than equivalent incandescent lamps and can be significantly more efficient than most fluorescent lamps. More information about the basis for savings can be found on the RTF website.

**Requirements and Specifications**

These measures are available for all types of residential buildings (single-family, manufactured, and multifamily).

LED lamps are available through the following channels:

By Request (All states except Washington);

Direct Install.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility run programs.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging, which includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR Certified at the time they were manufactured. | | X |
| Please see Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Payment**

| TYPE | LUMENS | BY REQUEST | DIRECT INSTALL |
|---|---|---|---|
| LED Decorative and Minibase* | 250-2600 | Not Eligible | $7 |
| LED General Purpose and Dimmable, Three-Way (Omnidirectional)* | 250-1049 | | $7 |

### Supporting Content

RTF UES Measures

Measure Distribution Channels

| TYPE | LUMENS | BY REQUEST | DIRECT INSTALL |
|---|---|---|---|
| LED General Purpose and Dimmable, Three-Way (Omnidirectional)* | 1050-1489 | $2.50 | $7 |
| LED General Purpose and Dimmable, Three-Way (Omnidirectional)* | 1490-2600 | Not Eligible | $7 |
| LED Globe | 250-2600 | | $7 |
| LED Reflectors and Outdoor (Directional, includes R, PAR, BR, MR)* | 250-1049 | | $9 |
| LED Reflectors and Outdoor (Directional, includes R, PAR, BR, MR)* | 1050-1489 | | $9 |
| LED Reflectors and Outdoor (Directional, includes R, PAR, BR, MR)* | 1490-2600 | | $9 |
| Bi-Pin Multifaceted Reflector (MR) | 250-499 | | $5 |
| Bi-Pin Multifaceted Reflector (MR) | 500-999 | | $5 |

*Savings are determined by LED lamp type and lumen categories. See the UES Measure List for details.

**Additional Information**

Direct Install measures are also categorized by the RTF using the Residential Building Stock Assessment as Exterior, Moderate/High-Use Interior, or Low-Use Interior. Use the following table to select the proper measure from the UES Measures list for Direct Install lamps.

| RBSA ROOM TYPE | RTF CATEGORY |
|---|---|
| Exterior | Exterior |
| Bedroom<br>Dining Room<br>Family Room<br>Garage<br>Kitchen<br>Laundry Room<br>Living Room<br>Master Bedroom | Moderate and High-Use Interior |
| Bathroom<br>Closet<br>Hall<br>Office<br>Other | Low-Use Interior |

Measures that can be distributed By Request may be distributed at events such as trade shows, annual meetings or community events after asking attendees a question such as, "Would you like to try an efficient LED?"

Program support materials, including BPA lighting materials, use the terms bulb and lamp interchangeably and they are intended to mean the same thing.

### 11.2.2 TLED Lamps

**Basis for Energy Savings**

A TLED lamp is a tubular electric light that produces light using light-emitting diodes (LEDs). TLEDs lamps are significantly more energy-efficient than equivalent T8 fluorescent lamps. More information about the basis for savings can be found on the RTF website.

**Requirements and Specifications**

This measure is available for all types of residential buildings (single-family, manufactured, and multifamily).

TLEDs are available through the Direct Install distribution channel.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility run programs.

TLEDs must meet the Design Lights Consortium's standard of 100 lumens per watt and be on the Design Lights Consortium's Qualified Product List.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Payment**

| TYPE | LUMENS | DIRECT INSTALL |
|---|---|---|
| TLED | 1000-1999 | $4 |
| TLED | 2000-3999 | $5 |

**Additional Information**

Use the following table to select the proper measure for Direct Install TLED lamps.

| RBSA ROOM TYPE | RTF CATEGORY |
|---|---|
| Exterior | Exterior |
| Bedroom<br>Dining Room<br>Family Room<br>Garage<br>Kitchen<br>Laundry Room<br>Living Room<br>Master Bedroom | Moderate and High-Use Interior |
| Bathroom<br>Closet<br>Hall<br>Office<br>Other | Low-Use Interior |

## Supporting Content

RTF UES Measures

DesignLights Consortium® Qualified Product List

Measure Distribution Channels

# 11.3 ADVANCED POWER STRIPS & ENERGY SAVER KITS

## 11.3.1 Advanced Power Strips/Load Sensing (for Home Entertainment Centers)

These measures are also referred to as Tier 1 Advanced Power Strips. BPA, however, uses the Load Sensing name.

**Basis for Energy Savings**

Advanced Power Strips (APS) are power strips with built-in features that are designed to reduce the amount of energy used by many consumer electronics. There are numerous types of APS on the market but they all operate on the same basic principle of shutting off power supply to devices not in use. Replacing a standard power strip with an APS can significantly cut the amount of electricity used in a home office and by entertainment center devices. More information about the basis for savings can be found on the RTF website.

**Requirements and Specifications**

This measure is available for all types of residential homes.

Load-Sensing APS measures are available through the following channels:

Retail;

By Request;

Direct Install.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility run programs. When an installer is unable to install the APS, the APS may be left with the homeowner and claimed as a "By Request" measure.

Qualified products can be found on the Advanced Power Strip Qualified Products List. If a customer believes a product should be on the list and it is not, the customer should use the COTR Request and Acknowledgment Procedure to request approval to use the product.

Load-Sensing APS must meet the following qualifications:

Load sensing;

Consume less than 1W of energy;

One-year warranty and any length warranty for connected devices;

Surge protection to 740 joules;

UL1449-listed or BPA-approved equivalent;

Rated for 15 amps; and

Resettable circuit breaker.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Supporting Content**

RTF UES Measures

Advanced Power Strip Qualified Product List

COTR Request and Acknowledgement Procedure

Measure Distribution Channels

**Payment**

| MEASURE | RETAIL | BY REQUEST | MAILED NON-REQUEST | DIRECT INSTALL |
|---|---|---|---|---|
| Advanced Power Strip —Load Sensing (Home Entertainment Centers) | $15 | $15 | Not Eligible | $25 |

**Additional Information**

Use the following table to select the proper measure for Load-Sensing APS.

| INSTALL LOCATION | DEFINITION |
|---|---|
| Home Entertainment: Load Sensing ("Tier 1" Peripheral Control Only) | Load Sensing ("Tier 1" Peripheral Control Only): Load-sensing (master/peripheral) APS, home-entertainment. APS shuts off power to selected peripheral devices when the television enters sleep mode or is turned off |

Measures that can be distributed By Request may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try a load-sensing advanced power strip on your home entertainment center?"

### 11.3.2 Energy Saver Kits

**Basis for Energy Savings**

The base case used to calculate energy efficiency savings for the BPA Residential Energy Saver Kits measures are explained in each measure section relevant to the component. The aggregate of the total components in the kit make up the measure savings.

These measures are an aggregate of the individual RTF UES measures for each kit component. More detailed information on energy savings assumptions is available on the RTF website.

| INSTALL LOCATION | DEFINITION |
|---|---|
| Energy Saver Kit 1 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 2 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Load-Sensing Advanced Power Strip |
| Energy Saver Kit 2 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 4 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Load-Sensing Advanced Power Strip |
| Energy Saver Kit 3 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 8 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Load-Sensing Advanced Power Strip |
| Energy Saver Kit 4 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 2 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Thermostatic Shut-Off Valve |
| Energy Saver Kit 5 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 4 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Thermostatic Shut-Off Valve |
| Energy Saver Kit 6 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 8 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Thermostatic Shut-Off Valve |
| Energy Saver Kit 7 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 2 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve |
| Energy Saver Kit 8 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 4 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve |
| Energy Saver Kit 9 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 8 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve |

**Supporting Content**

RTF UES Measures

Measure Distribution Channels

| INSTALL LOCATION | DEFINITION |
|---|---|
| Energy Saver Kit 10 | Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve |
| Energy Saver Kit 11 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 4 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Advanced Smart Thermostat |
| Energy Saver Kit 12 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON) | 8 LED (ENERGY STAR A-Lamps 1050-1489 Lumens), Advanced Smart Thermostat |
| Energy Saver Kit 13 | Thermostatic Shut-off Valve, Advanced Smart Thermostat |
| Energy Saver Kit 14 | Load-Sensing Advanced Power Strip, Advanced Smart Thermostat |
| Energy Saver Kit 15 | Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve, Advanced Smart Thermostat |

**Requirements and Specifications**

This measure is available for all types of residential homes (single-family, manufactured, and multifamily).

Energy Saver Kits are available by request.

Kits other than the configurations listed here created out of individual reference numbers for each component continue to be available for assembly by utilities or their vendors.

Participation in the BPA program is not required to order kits.

Energy Saver Kits must meet the following qualifications:

Individual products must meet the requirements outlined in their sections in the current IM;

Limit of one kit type per household.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility-run programs.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| If the kit configuration includes a smart thermostat, documentation of the thermostat make and model | X | |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Payment**

| MEASURE | BY REQUEST |
|---|---|
| Energy Saver Kit 1 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 2 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Load-Sensing Advanced Power Strip | $21.00 |
| Energy Saver Kit 2 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 4 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Load-Sensing Advanced Power Strip | $26.00 |
| Energy Saver Kit 3 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 8 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Load-Sensing Advanced Power Strip | $36.00 |
| Energy Saver Kit 4 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 2 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Thermostatic Shut-Off Valve | $23.00 |
| Energy Saver Kit 5 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 4 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Thermostatic Shut-Off Valve | $28.00 |
| Energy Saver Kit 6 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 8 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Thermostatic Shut-Off Valve | $38.00 |
| Energy Saver Kit 7 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 2 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve | $36.00 |
| Energy Saver Kit 8 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 4 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve | $43.00 |
| Energy Saver Kit 9 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 8 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve | $53.00 |
| Energy Saver Kit 10 : Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve | $33.00 |
| Energy Saver Kit 11 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 4 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Advanced Smart Thermostat | $160.00 |
| Energy Saver Kit 12 (ELIGIBLE IN ALL STATES EXCEPT WASHINGTON): 8 LED (ENERGY STAR A-Lamps 1050–1489 Lumens), Advanced Smart Thermostat | $170.00 |
| Energy Saver Kit 13 : Thermostatic Shut-off Valve, Advanced Smart Thermostat | $170.00 |
| Energy Saver Kit 14 : Load-Sensing Advanced Power Strip, Advanced Smart Thermostat | $170.00 |
| Energy Saver Kit 15 : Load-Sensing Advanced Power Strip, Thermostatic Shut-Off Valve, Advanced Smart Thermostat | $185.00 |

**Additional Information**

Measures that can be distributed By Request may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try an Energy Saver Kit?"

## 11.4 APPLIANCES

**Basis for Energy Savings**

About 80% of American homes have a clothes washer and dryer. The Federal standard serves as the baseline for these laundry appliances. ENERGY STAR rated laundry appliances use at least 20% less energy than the Federal standard. Clothes washers have additional characteristics for savings based on the associated water heater fuel type (for their use of heated water) and dryer fuel type (for the electric savings on drying time). Please note: A slight deduction of dryer savings for the very small percentage of more efficient electric dryers was included in the last update to the clothes washer measure.

Clothes dryers have additional characteristics for the efficient case depending on the efficiency level of the new equipment from electric-resistance to a heat pump dryer, and whether the dryer is vented or ventless. The savings for dryers are discounted by the portion of savings assigned to clothes washers.

BPA documentation requirements consider these factors. More detailed information is available on the RTF website.

**Requirements and Specifications**

These measures are available for all types of residential buildings (single-family, manufactured, multifamily, and multifamily common areas).

Clothes washers and electric clothes dryer measures are available through the following channels:

Retail;

Standard Rebate.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility-run programs. Standard rebate measures will be blank in the Key Characteristic 4 column of the UES Measure List.

Laundry appliances must meet the following qualifications:

- Clothes washers must be ENERGY STAR-Certified.
- Clothes dryers must be electric and ENERGY STAR-Certified. BPA measures include three different tiers of clothes dryers. BPA tiers are provided on the BPA Clothes Dryer Qualified Product List on the BPA Energy Efficiency ENERGY STAR Appliances webpage.

As ENERGY STAR specifications change, BPA will continue to accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. A copy of the product information insert or packaging that includes the ENERGY STAR logo and the model number can be used to document qualification.

Current and archived ENERGY STAR-Certified appliance lists may be found on the BPA Energy Efficiency ENERGY STAR Appliances webpage.

The "any" appliance measures assume a weighted average of reported measures. Utilities that report appliances using the tiered measures should not also use the "any" measures for the same unit submitted to BPA. Utilities may switch to the "any" measures if reporting the tier-specific measures delivers little benefit.

**Supporting Content**

RTF UES Measures

Appliances and Consumer Products Essentials (bpa.gov)

Appliance Qualified Products List

Measure Distribution Channels

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. In the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured, or a copy of the BPA-Qualified Product List showing the product if applicable. | | X |
| Documentation of water heater fuel and clothes dryer fuel (applies to clothes washers only, if claiming measures with fuel-specific savings). Customers who are able to document the absence of natural gas within their service territory (through a statement or map provided by the public utilities commission or equivalent regulatory body) may claim clothes washer electric domestic hot water heater/electric dryer without the verification of water heater or dryer fuel type. | | X |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

### Payment

| MEASURE CATEGORY | PAYMENT (ALL DISTRIBUTION CHANNELS) |
|---|---|
| Any Front-load ENERGY STAR Clothes Washer (gas water heater/electric dryer; electric water heater/electric or gas dryer; any water heater/any dryer) | $35 |
| Any Top-Load ENERGY STAR Clothes Washer (gas water heater/electric dryer; electric water heater/electric or gas dryer; any water heater/any dryer) | $30 |
| Any ENERGY STAR Electric Clothes Dryer | $50 |
| ENERGY STAR Electric Clothes Dryer — BPA Tier 1 | $75 |
| ENERGY STAR Electric Clothes Dryer — BPA Tier 2 | $125 |
| ENERGY STAR Electric Clothes Dryer — BPA Tier 3 | $175 |
| ENERGY STAR Clothes Washer Multifamily Common Area (electric water heater/electric dryer) | $100 |
| ENERGY STAR Clothes Washer Multifamily Common Area (electric water heater/gas dryer) | $50 |
| ENERGY STAR Clothes Washer Multifamily Common Area (gas water heater/gas dryer) | $25 |
| ENERGY STAR Clothes Washer Multifamily Common Area (gas water heater/electric dryer) | $50 |

# 11.5 EV CHARGERS

## 11.5.1 Level 2 Electric Vehicle Chargers (Effective April 1, 2020)

### Basis for Energy Savings

Electric Vehicles (EVs) and Plug-in Hybrid Electric Vehicles (PHEVs) receive energy needed to charge the battery through Electric Vehicle Supply Equipment (EVSE), more commonly referred to as EV Chargers. There are two primary types of EV Chargers, one using alternating-current (AC) electricity and the other using direct-current (DC) electricity to deliver current to the vehicle battery. AC EV chargers come in two varieties: Level 1 and Level 2. The BPA EVSE measure represents ENERGY STAR Certified 240-volt (V) AC Level 2 models with networking capability. Networking capability, also referred to as connected functionality, refers to the mechanism for bi-directional data transfers between the EVSE and one or more external applications, devices or systems.

BPA documentation requirements consider these different charger types. More detailed information is available on the RTF website.

### Requirements and Specifications

This measure is available for all types of new and existing residential buildings (single-family, manufactured, and multifamily).

ENERGY STAR Level 2 EV Charger measures are available through the following channels:

Standard Rebate;

By Request.

Level 2 EV chargers must be ENERGY STAR-Certified at the time of purchase.

ENERGY STAR Level 2 EV chargers with connected functionality are provided on the Level 2 EV Charger Qualified Products List.

As ENERGY STAR specifications change, BPA will continue to accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. A copy of the product information insert or packaging that includes the ENERGY STAR logo and the model number can be used to document qualification.

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| A copy of the qualified product list showing the product. | | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed Cost<br>3. Model number, type, and quantity of equipment purchased | | X |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

### Payment

| MEASURE CATEGORY | PAYMENT |
|---|---|
| ENERGY STAR EVSE Level 2 Networked Charger | $20 |

## Supporting Content

RTF UES Measures

EV Charger Qualified Products List

Measure Distribution Channels

# 11.6 ELECTRIC WATER HEATING

## 11.6.1 Thermostatic Shut-Off Valves (TSV)

### Basis for Energy Savings

A thermostatic shut-off valve (TSV) is a device installed between a shower arm and the showerhead fixture. It places a hold on water flow once it reaches 95 degrees Fahrenheit to reduce hot water waste while waiting for water warm-up. Products reduce the showerhead's flow to a trickle when a water temperature of 95 degrees Fahrenheit or greater reaches the fixture. The reduced trickle continues until normal flow is restored manually. Once restored, water flows at its normal rate until being shut off. The unit automatically resets itself for the next use.

BPA documentation requirements consider the factor listed above. More detailed information is available on the RTF website.

### Requirements and Specifications

These measures are available for all types of residential buildings (single-family, manufactured, and multifamily).

TSV measures are available through the following channels:

Retail;

By Request;

Direct Install (only eligible in homes with electric water heaters.)

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility run programs.

By Request claims must document water heater fuel type, if using fuel-specific measures.

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Fuel source documentation (By Request and Direct Install if using fuel-specific measures). Customers who are able to document the absence of natural gas within their service territory (through a statement or map provided by the public utilities commission or equivalent regulatory body) may claim electric domestic hot water heater without the verification of fuel type. | | X |
| End-user identifying information including unique site ID and address. (Except for the Retail Delivery Channel) | X | X |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

### Payment

| TYPE | RETAIL | BY REQUEST | DIRECT INSTALL |
|---|---|---|---|
| TSV — valve only | $14 | $15 | $20 |
| TSV — valve with efficient showerhead (Use the valve only reference number) | $14 | $15 | $20 |

**Supporting Content**

RTF UES Measures

Measure Distribution Channels

**Additional Information**

Measures that can be distributed By Request may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try a thermostatic shut-off valve?" If for any reason the homeowner refuses the contractor-installed Direct Install application, the installer can default to By Request and leave the TSV with the homeowner.

Combination showerhead/TSV units will still be eligible for TSV measures, but savings and payments will be based on the stand-alone TSV savings only.

### 11.6.2 Unitary Heat Pump Water Heater – 40 gallon

**Basis for Energy Savings**

Unitary heat pump water heaters (HPWH) combine a tank and heat pump compressor in a single unit. The heat pump compressor harvests heat from the immediate space around it using a vapor compression cycle. HPWHs are at least twice as efficient as a standard electric resistance water heater. This BPA qualified measure was created due to potential savings differences based on the tank size between previously manufactured units and new smaller units entering the market. The savings were determined through the use of SEEM modeling, Electric Power Research Institute (EPRI) laboratory test results, and Residential Building Stock Assessment (RBSA) market data.

Unitary HPWHs must be installed according to manufacturer's specifications.

**Requirements and Specifications**

These measures are available for existing single-family homes, manufactured homes, and multifamily homes. They are not available for new construction.

A maximum of one unitary HPWH measure may be claimed per home. Accessory dwelling units with separate plumbing systems qualify for this measure even if they are on the same electrical meter.

Unitary HPWHs must be listed on BPA's HPWH Qualified Products List. If a customer believes a product should be on the list, and it is not, the customer should use the COTR Request & Acknowledgment Procedure to request approval to use the product.

Unitary HPWH measures are available through the following channels:

Retail;

Standard Rebate.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility-run programs. Standard rebate measures will be blank in the Key Characteristic 4 column of the UES Measure List.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. (Except for the Retail Delivery Channel) | X | X |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Supporting Content**

Heat Pump Water Heater Qualified Products List

COTR Request and Acknowledgement Procedure

Measure Distribution Channels

**Payment**

| MEASURE | PAYMENT (ALL DISTRIBUTION CHANNELS) |
|---|---|
| Unitary HPWH All tiers — 40 gallon tank | $600 |

**Additional Information**

If conditioned or unconditioned space documentation is collected, standard rebate measures with the associated heating space should be claimed. If this information is not collected, the retail utility-run measures with lower savings should be used.

### 11.6.3 Unitary Heat Pump Water Heater – 50 gallon and above

**Basis for Energy Savings**

Unitary heat pump water heaters (HPWHs) combine a tank and heat pump compressor in a single unit. The heat pump compressor harvests heat from the immediate space around it using a vapor compression cycle. HPWHs are at least twice as efficient as a standard electric resistance water heater. More detailed information is available on the RTF website.

Unitary HPWHs must be installed according to manufacturer's specifications.

**Requirements and Specifications**

These measures are available for existing single-family homes, manufactured homes, and multifamily homes. They are not available for new construction.

A maximum of one unitary HPWH measure may be claimed per home. Accessory dwelling units with separate plumbing systems qualify for this measure even if they are on the same electrical meter.

Unitary HPWHs must be listed on BPA's HPWH Qualified Products List. If a customer believes a product should be on the list and it is not, the customer should use the COTR Request & Acknowledgment Procedure to request approval to use the product.

Unitary HPWH measures are available through the following channels:

Retail;

Standard Rebate.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility-run programs. Standard rebate measures will be blank in the Key Characteristic 4 column of the UES Measure List.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. (Except for the Retail Delivery Channel) | X | X |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Supporting Content**

RTF UES Measures

Heat Pump Water Heater Qualified Products List

COTR Request and Acknowledgement Procedure

Measure Distribution Channels

**Payment**

| MEASURE | PAYMENT (ALL DISTRIBUTION CHANNELS) |
|---|---|
| Unitary HPWH Tier 1 — 50 gallon and above | $300 |
| Unitary HPWH Tier 2 — 50 gallon and above | $600 |
| Unitary HPWH Tier 3 — 50 gallon and above | $600 |
| Unitary HPWH Tier 4 — 50 gallon and above | $700 |

**Additional information**

If conditioned or unconditioned space documentation is collected, standard rebate measures with the associated heating space should be claimed. If this information is not collected, the retail utility-run measures with lower savings will need to be used.

Tier 4 measures do not need to be selected by state. Beginning April 1, 2022, Tier 1 through 3 measures will no longer have state identifiers.

### 11.6.4 Split-System Heat Pump Water Heater

**Basis for Energy Savings**

Split-system heat pump water heaters (HPWH) have interior storage tanks and outdoor compressors installed outside the house. The heat pump compressor harvests heat from the immediate space around it using a vapor compression cycle. HPWHs are at least twice as efficient as a standard electric resistance water heater. More detailed information is available on the RTF website.

**Requirements and Specifications**

These measures are available for new and existing single-family homes, manufactured homes, and multifamily homes.

A maximum of one split-system HPWH measure may be claimed per home. Accessory dwelling units with separate plumbing systems qualify for applicable measures even if they are on the same electrical meter.

Split-System HPWHs must be listed on BPA's HPWH Qualified Products List. If a customer believes a product should be on the list and it is not, the customer should use the COTR Request and Acknowledgment Procedure to request approval to use the product.

Split System HPWH measures are available through the following channels:

Retail;

Standard Rebate.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility run programs. Standard rebate measures will be blank in the Key Characteristic 4 column of the UES Measure List.

**Additional Information**

Manufacturers' installation specifications may include:

All water or refrigerant lines connecting the tank and outdoor units be insulated with minimum R-4;

If domestic hot water pipes outdoors are freeze-protected with heat cable, the cable be installed per manufacturer's instructions, underneath the insulation, and be thermostatically controlled to prevent the tape from operating above 38 degrees Fahrenheit;

No resistance heating is allowed (except heat tape for freeze protection); and

The system plumbed with a thermal mixing valve which is equipped with internal check valves on the hot and cold water lines connecting to it.

**Supporting Content**

RTF UES Measures

Heat Pump Water Heater Qualified Products List

COTR Request and Acknowledgement Procedure

Measure Distribution Channels

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. (Except for the Retail Delivery Channel) | X | X |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |

**Payment**

| TANK SIZE | PAYMENT (ALL DISTRIBUTION CHANNELS) |
|---|---|
| Split-System Heat Pump Water Heater — Any size tank | $800 |

### 11.6.5 Pipe Insulation Short and Whole House (BPA-Qualified)

**Basis for Energy Savings**

The base case used to calculate energy efficiency savings for Short and Whole House pipe insulation is both uninsulated hot and cold water pipes connected to an electric water heater. Energy savings are calculated on the reduction of standby losses in the pipes, reducing warm-up times from cold starts, a reduction in tank thermostat set point, and savings from wastewater treatment (resulting from reducing the amount of water wasted from cold starts). Energy savings are provided for two measures: Short: insulating the first 6 feet of both hot and cold water pipes; and Whole House: insulating all accessible water pipes. BPA documentation requirements for this BPA-Qualified measure consider these factors.

**Requirements and Specifications**

This measure is available for single-family, manufactured, and multifamily low-rise buildings with an electric water heater. This measure is not available for multifamily mid-/high-rise buildings.

The Short and Whole House pipe insulation measures may only be reported under standard rebate.

Customers may claim only one measure per water heater.

The Whole House insulation measure requires that insulation must be installed on all accessible hot water pipes. If hot water pipes (trunk and branch lines) are already covered with floor or attic insulation, the project is not eligible.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Water heater fuel type | | X |
| Equipment or contractor invoice showing:<br>• Equipment order or purchase date<br>• Installed cost | | X |

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Documentation that product requirements have been met (manufacturer, model number, type, size and quantity of equipment or product installed or used). | | X |
| End-user identifying information including unique site ID and address. | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Pipe Insulation Short wrap (3-6 foot minimum, hot and cold water pipes) | $5 |
| Whole House (trunk lines and all exposed hot water pipe) | $25 |

**Additional Information**

Hot and cold pipes should be insulated with a minimum of R-3 closed-cell, foam insulation for at least the first 3 feet past the water heater and if accessible, up to 6 feet adjacent to the water heater.

Insulation material, jackets or facing, and adhesive (if used) should have a flame spread/smoke density rating in accordance with ASTM E-84.

Pipe insulation should not cover pressure-relief valves, handles, safety drain valves, or any other safety control device.

All pipe elbows and joints should be mitered to ensure coverage at the same thickness as straight runs.

Pipe insulation should be secured with twine, corrosion resistant wire, or plastic compression ties every 12 inches and within 3 inches of the ends.

# 11.7 HEATING, VENTILATION, AIR CONDITIONING (HVAC)

## 11.7.1 Ductless and Ducted Mini-Split Heat Pumps

### 11.7.1.1 Ductless and Ducted Mini-Split Heat Pumps

**Basis for Energy Savings**

A heat pump is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system or ductless air handler. A heat pump is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures for ductless and ducted mini-split heat pumps that are conversions from an electric forced-air furnace or upgrades from zonal electric heating. More information about the basis for savings can be found on the RTF website.



### Required Documents

AHRI Certificate

### Supporting Content

RTF UES Measures

Best Practices for Installing Ductless Heating and Cooling Systems

COTR Request and Acknowledgement Procedure

Ductless Heat Pump Qualified Products List

NEEP Cold Climate Air-Source Heat Pump Products List (neep.org)

**Ductless and Ducted Mini-Split Heat Pump: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | Eligible | Not Eligible | Eligible | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Not eligible** | | Not eligible | | |
| Ductless Mini-Split Heat Pump | See DHP Upgrade 11.7.1.2 | | See DHP Upgrade 11.7.1.2 | | |
| Zonal (Electric)* | Eligible | | Eligible | | |
| Wood | Not eligible** | | Not eligible | | |
| Oil/Propane/ Gas | | | | | |
| None existing | | | | | |

*Zonal includes zonal hydronic systems. For electric hydronic upgrades, claim as zonal if heat distribution is through in-floor radiant or wall radiators, and claim as an existing forced-air furnace if distribution is through a duct system.

**Existing single-family residential additions where the primary electric or nonelectric system's duct work has not been extended to the addition and/or where the current heating source in the addition is electric zonal are eligible for a DHP. Otherwise this measure is not available.

**Requirements and Specifications**

This measure is for ductless or ducted mini-split heat pumps in homes supplied by one or more outdoor compressors when the previous heating system was electric zonal heat or an electric forced-air furnace (for homes with a previously installed ductless heat pump, see Section 11.7.1.2 Ductless Heat Pump Upgrade). This measure is for configurations with: (1) single or multiple ductless indoor heads; (2) single or multiple ducted indoor heads; (3) combination of ductless and ducted indoor head(s); or (4) multiple ductless indoor heads, multiple ducted indoor head(s), or combination indoor head(s) and multiple outdoor compressors.

The Ducted Mini-Split option does not include whole-home centrally ducted systems; see Sections 11.7.2.1 or 11.7.2.2 for Performance Tested Comfort Systems (PTCS) Air-Source Heat Pumps (ASHP) or Sections 11.7.5 and 11.7.6 for ASHP Conversions (without PTCS) for further information on whole-home centrally ducted systems.

Qualifying applications for existing homes include:

Existing homes conditioned by zonal or forced-air electric resistance heat as the primary heating source. No other heating sources are eligible. A failed heat pump system operating with electric resistance back-up heat is not considered electric-resistance for the purposes of meeting pre-condition requirements. Use Ductless Heat Pump Upgrade section 11.7.1.2.

Single-family residential additions where the primary electric or nonelectric system's duct work has not been extended to the addition and/or where the current heating source in the addition is electric zonal.

Qualifying equipment/installation requirements:

Heating seasonal performance factor (HSPF): DHPs or Ducted Mini-Split must be a split-system heat pump employing an inverter-driven outdoor compressor with inverter-driven or variable-speed indoor blower rated with a minimum of 9.0 HSPF or 7.6 HSPF2 by the Air Conditioning, Heating, and Refrigeration Institute (AHRI).

DHPs must be installed on a dedicated electrical circuit, according to manufacturer's specifications and the Best Practices for Installing Ductless Heat Pumps Guide.

Only one DHP may be claimed per home regardless of the number of outdoor or indoor units installed and regardless of the home's square footage. For homes 4,500 square feet or larger,

the home is also eligible for a PTCS or non-PTCS ASHP incentive.

- The DHP must be installed by a licensed contractor. ~~The customer must use the COTR Request and Acknowledgment Procedure to consider payment for a partial self-install. These will only be considered when a contractor has installed the fittings and refrigerant.~~

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address | X | X |
| Documentation of manufacturer, model number for the outdoor unit and total installation cost. | X | X |
| Equipment or contractor invoice showing:<br>Equipment order or purchase date<br>Installed cost | | X |
| AHRI Certificate demonstrating an HSPF of 9 or 7.6 HSPF2 or greater | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Existing single-family homes: Zonal electric heat pre-condition | $800 |
| Existing single-family homes: Electric forced-air furnace pre-condition | $800 |
| Existing manufactured homes: Zonal electric heat pre-condition (including new manufactured homes once on site for occupancy) | $800 |
| Existing manufactured homes: Electric forced-air furnace pre-condition (including new manufactured homes once on site for occupancy) | $800 |

**Additional Information**

- At this time Variable Refrigerant Flow (VRF) technologies (also known as VRV) do not qualify for the residential DHP measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential DHP configuration.
- Existing homes with electric forced-air furnaces are eligible for PTCS or Prescriptive Duct Sealing.

### 11.7.1.2 Ductless Heat Pump Upgrade

**Basis for Energy Savings**

A ductless heat pump (DHP) is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system or ductless air handler. A DHP is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are upgrades from less efficient ASHPs. More information about the basis for savings can be found on the RTF website.

**Required Documents**

AHRI Certificate

**Supporting Content**

RTF UES Measures

Best Practices for Installing Ductless Heating and Cooling Systems

COTR Request and Acknowledgement Procedure

Ductless Heat Pump Qualified Products List

NEEP Cold Climate Air-Source Heat Pump Products List (neep.org)

**Ductless Heat Pump Upgrade: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: EXISTING |
| Electric Forced-Air Furnace | Eligible | Not eligible | Eligible | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | | | | | |
| Ductless Mini-Split Heat Pump | | | | | |
| Zonal (Electric) | | | | | |
| Wood | | | | | |
| Oil/Propane/ Gas | | | | | |
| None existing | | | | | |

**Requirements and Specifications**

Measure includes upgrading an existing DHP for existing single-family and manufactured homes in all states.

DHP must be:

- A split-system heat pump employing an inverter-driven outdoor compressor with inverter-driven or variable-speed indoor blower(s), rated with a minimum of 11.0 HSPF or 10.4 HSPF2 or greater by AHRI.
- Installed on a dedicated electrical circuit according to manufacturer's specifications and the Best Practices for Installing Ductless Heat Pumps Guide.
- Installed by a licensed contractor. ~~The customer must use the COTR Request and Acknowledgment Procedure to consider payment for a partial self-install, these will only be considered when a contractor has installed the fittings and refrigerant.~~

Only one DHP may be claimed per home regardless of the number of outdoor or indoor units installed and regardless of the home's square footage. For homes 4,500 square feet or larger, the home is also eligible for a PTCS or non-PTCS ASHP incentive.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation of manufacturer, model number for the outdoor unit and total installation cost. | X | X |
| AHRI Certificate demonstrating an HSPF of 11 or 10.4 HSPF2 or greater | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| DHP Upgrade: Existing Single-Family and Manufactured Homes: Ductless heat pump pre-condition | $100 |

**Additional Information**

At this time, Variable Refrigerant Flow (VRF) technologies (also known as VRV) do not qualify for the residential DHP measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential DHP configuration.

### 11.7.2 HVAC PTCS

This section covers:

11.7.2.1 PTCS Air-Source Heat Pumps

11.7.2.2 PTCS Variable-Speed Heat Pumps

11.7.2.3 PTCS Commissioning, Controls and Sizing

11.7.2.4 PTCS Ground-Source Heat Pumps

11.7.2.5 PTCS Duct Sealing

### 11.7.2.1 PTCS Air-Source Heat Pumps (BPA-Qualified)

**Basis for Energy Savings**

An air-source heat pump (ASHP) is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system. An ASHP is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are conversions from an electric forced-air furnace or upgrades from less efficient ASHP, other less efficient heating systems, or residences without a heating system. PTCS ASHPs include savings from efficient installation practices and controls. More information about the basis for savings can be found on the RTF website.

**Supporting Content**

RTF UES Measures

PTCS Online Registry

PTCS Program Requirements

PTCS Air-Source Heat Pump Specifications

Residential HVAC Website

PTCS Air-Source Heat Pump Optional Data Collection Tool

PTCS Heat Pump and Central Air Conditioner Sizing Calculator

**PTCS Air-Source Heat Pumps: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: EXISTING |
| Electric Forced-Air Furnace* | Conversion | Upgrade | Conversion | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump** | Upgrade | | Upgrade | | |
| Ductless Mini-Split Heat Pump | Upgrade | | Upgrade | | |
| Zonal (Electric)*** | Upgrade | | Upgrade | | |
| Wood | Upgrade | | Upgrade | | |
| Oil/Propane/ Gas | Upgrade | | Upgrade | | |
| None existing | Upgrade | | Upgrade | | |

*If home is hydronically heated, an electric water heater serving a forced-air hydronic coil is considered equivalent to an electric furnace.

**Replacing a PTCS ducted air-source heat pump that is no longer functioning with a new PTCS certified heat pump would qualify for an upgrade.

***Zonal is including zonal hydronic systems that do not utilize a duct system for distribution.

**Requirements and Specifications**

Measures include PTCS air-source heat pump upgrades and conversions, and must be:

Rated as having at least 9.0 HSPF or 7.6 HSPF2, and 14 SEER, or 13.4 SEER2 (for ducted systems with an HSPF below 9.0, or HSPF2 below 7.6, see Section 11.7.2.3). HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology.

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Performed by a PTCS technician listed in the online site registry and certified according to the PTCS Program Requirements.

Commissioned and installed according to the current PTCS Air-Source Heat Pump Specifications.

Entered in the online site registry.

For whole-home centrally ducted systems (for ducted mini-split heat pumps (DHPs), see Section 11.7.1.1; for PTCS Variable-Speed Heat Pumps, see Section 11.7.2.2).

At this time, VRF technologies (also known as VRV) do not qualify for the residential PTCS ASHP measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential PTCS ASHP configuration.

Applicable home types:

New construction single-family;

Existing construction single-family;

Existing manufactured homes (including new manufactured homes once on site for occupancy).

Air-Source Heat Pump upgrade applies to the following situations:

Replacing an existing heat pump.

Installing an ASHP in single-family new construction.

Installing an ASHP in an existing single-family or existing manufactured home without any previously existing primary heating system.

Adding a heat pump to a nonelectric heating system (e.g., gas, oil, propane, or wood).

Upgrading from zonal (including zonal hydronic systems that do not utilize a duct system for distribution) to ASHP.

Replacing a ductless mini-split heat pump.

Replacing a PTCS ASHP that is no longer functioning with a new PTCS-certified heat pump.

All upgrades can be claimed as Any Electric or Non-Electric Heating System.

Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump applies to the following situations:

Converting an electric forced-air furnace to a high-efficiency heat pump

Converting from a hydronically heated system with an electric resistance water heat serving a forced-air hydronic coil

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump, but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two ASHP payments but no more, even if there are more than two duct systems.

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted ASHP (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area may qualify for up to two heat pump measures and no more provided all other program requirements are met

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| PTCS site registry Measure ID reflecting 'BPA Approved' status | X | X | |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Air-Source Heat Pump Upgrade | $500 |
| Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump | $1,400 |

**Additional Information**

The former "PTCS Air-Source Heat Pump Form" has been renamed "PTCS ASHP Optional Data Collection Tool" and is now optional. The following heat pump sizing forms are also now optional: CheckMe!® Heat Pump Protocol Data Entry Form for PTCS Summer and Winter, PTCS Heat Pump and Central Air Conditioner Sizing Calculator, and a heat load/heat loss calculation and associated balance point worksheet (e.g., a calculator, graph, or chart).

PTCS ASHP are subject to quality assurance inspection by a BPA-approved quality assurance inspector.

### 11.7.2.2 PTCS Variable-Speed Air-Source Heat Pumps (BPA-Qualified)

**Basis for Energy Savings**

A variable-speed ASHP is an inverter compressor driven electric heating and cooling system that distributes conditioned air through a centralized duct system. It is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are conversions from an electric forced-air furnace or upgrades from less efficient ASHPs, other less efficient heating systems, or residences without a heating system. PTCS variable-speed ASHPs include savings from efficient installation practices and controls. More information about the basis for savings can be found on the RTF website.

**PTCS Variable-Speed Heat Pumps: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: EXISTING |
| Electric Forced-Air Furnace* | Conversion | Upgrade | Conversion | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump** | Upgrade | | Upgrade | | |
| Ductless Mini-Split Heat Pump | Upgrade | | Upgrade | | |
| Zonal (Electric)*** | Upgrade | | Upgrade | | |
| Wood | Upgrade | | Upgrade | | |
| Oil/Propane/ Gas | Upgrade | | Upgrade | | |
| None existing | Upgrade | | Upgrade | | |

*If home is hyrdonically heated, an electric water heater serving a forced-air hydronic coil is considered equivalent to an electric furnace.
**Replacing a PTCS variable-speed heat pump that is no longer functioning with a new PTCS certified heat pump would qualify for an upgrade.
***Zonal includes zonal hydronic systems that do not utilize a duct system for distribution.

**Requirements and Specifications**

Measures include PTCS variable-speed heat pump upgrades and conversions, and must be:

Rated as having at least 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2 (for ducted systems with an HSPF below 9.0 or HSPF2 below 7.6, see Section 11.7.2.3). HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology.

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

**Supporting Content**

- RTF UES Measures
- PTCS Online Registry
- PTCS Program Requirements
- PTCS Air-Source Heat Pump Specifications
- Residential HVAC Website
- PTCS Air-Source Heat Pump Optional Data Collection Tool
- PTCS Heat Pump and Central Air Conditioner Sizing Calculator
- NEEP Cold Climate ASHP List (neep.org)

Inverter-driven outdoor compressor.

Performed by a PTCS technician listed in the online site registry and certified according to the PTCS Program Requirements.

Commissioned and installed according to the current PTCS ASHP Specifications.

Entered in the online site registry.

For whole home centrally ducted systems (for ducted mini-split heat pumps, see Section 11.7.1.1; for non-variable-speed PTCS Air-Source Heat Pumps, see section 11.7.2.1).

At this time, Variable Refrigerant Flow (VRF) technologies (also known as VRV) do not qualify for the residential PTCS Variable-Speed ASHP measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential PTCS Variable-Speed ASHP configuration.

Applicable Home Types:

New construction single-family

Existing construction single-family

Existing manufactured homes (including new manufactured homes once on site for occupancy)

Variable-Speed Heat Pump Upgrade applies to the following situations:

Replacing an existing heat pump.

Installing a variable-speed heat pump in single-family new construction (only the upgrade measure applies).

Installing a variable-speed heat pump in an existing single-family or existing manufactured home (including new manufactured homes once on site for occupancy) without any previously existing primary heating system.

Adding a variable-speed heat pump to a nonelectric heating system (e.g., gas, oil, propane, or wood).

Upgrading from zonal (including zonal hydronic systems that do not utilize a duct system for distribution) to ASHP.

Replacing a PTCS variable-speed heat pump that is no longer functioning with a PTCS heat pump.

Replacing a ductless mini-split heat pump.

All upgrades can be claimed as Any Electric or Non-Electric Heating System.

Conversion from Electric Forced-Air Furnace to Variable-Speed Heat Pump applies to the following situations:

Converting an electric forced-air furnace to a high-efficiency variable-speed heat pump.

Converting from a hydronically heated system with an electric resistance water heat serving a forced-air hydronic coil.

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump (DHP), but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two ASHP payments but no more even if there are more than two duct systems.

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted air-source heat pump (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area qualify for up to two heat pump measures and no more provided all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| PTCS site registry Measure ID reflecting 'BPA Approved' status | X | X | |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Variable-Speed Heat Pump Upgrade | $700 |
| Conversion from Electric Forced-Air Furnace to Variable-Speed Heat Pump | $1,600 |

**Additional Information**

The former "PTCS Air-Source Heat Pump Form" has been renamed "PTCS ASHP Optional Data Collection Tool" and is now optional. Also, the following heat pump sizing forms are now optional: CheckMe!® Heat Pump Protocol Data Entry From for PTCS Summer and Winter, PTCS Heat Pump and Central Air Conditioner Sizing Calculator, and a heat load/heat loss calculation and associated balance point worksheet (e.g., a calculator, graph, or chart).

PTCS variable-speed heat pumps are subject to a quality assurance inspection by a BPA-approved quality assurance inspector.

Access is available to the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Specification List for air-source heat pumps (including ductless heat pumps). This is an optional resource. Utilities are not required to utilize models on this list for program implementation.

See Section 11.7.2.1 for information about PTCS Air-Source Heat Pumps.

### 11.7.2.3 PTCS Commissioning, Controls, and Sizing (BPA-Qualified)

**Basis for Energy Savings**

The PTCS Commissioning, Controls, and Sizing measure allows the use of air-source heat pumps (ASHP) that are < 9.0 HSPF or < 7.6 HSPF2. An ASHP is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system. An ASHP is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are conversions from an electric forced-air furnace or upgrades from less efficient ASHPs, other less efficient heating systems, or residences without a heating system. PTCS Commissioning, Controls, and Sizing include savings from efficient installation practices and controls. More information about the basis for savings can be found on the RTF website.



## Supporting Content

RTF UES Measures

PTCS Online Registry

PTCS Program Requirements

PTCS Air-Source Heat Pump Specifications

Residential HVAC Website

PTCS Air-Source Heat Pump Optional Data Collection Tool

PTCS Heat Pump and Central Air Conditioner Sizing Calculator

NEEP Cold Climate ASHP List (neep.org)

**PTCS Commissioning, Controls, and Sizing for Heat Pumps with an HSPF below 9.0 or HSPF2 below 7.6: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: EXISTING |
| Electric Forced-Air Furnace* | Eligible | Eligible | Eligible | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Eligible | | Eligible | | |
| Ductless Mini-Split Heat Pump | Eligible | | Eligible | | |
| Zonal (Electric)** | Eligible | | Eligible | | |
| Wood | Eligible | | Eligible | | |
| Oil/Propane/ Gas | Eligible | | Eligible | | |
| None existing | Eligible | | Eligible | | |

*If home is hydronically heated, an electric water heater serving a forced-air hydronic coil is considered equivalent to an electric furnace.
**Zonal includes zonal hydronic systems that do not utilize a duct system for distribution.

**Requirements and Specifications**

Any new ducted air-source and variable-speed heat pumps, and they must be:

Rated as having an HSPF below 9.0 or below 7.6 HSPF2 that meets the federal minimum standard. (For systems with an HSPF of 9.0 or above, see Sections 11.7.2.1 and 11.7.2.2). HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology.

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Performed by a PTCS technician listed in the online site registry and certified according technician to the PTCS Program Requirements.

Commissioned and installed according to the current PTCS Air-Source Heat Pump Installation Specification.

Entered in the online site registry.

Cannot be claimed in combination with any other heat pump measure.

For whole-home centrally ducted systems (for ducted mini-splits, see Section 11.7.1.1).

At this time, VRF technologies (also known as VRV) do not qualify for the residential PTCS ASHP measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential PTCS ASHP configuration.

Applicable Home Types:

New construction single-family;

Existing construction single-family;

Existing manufactured homes (including new manufactured homes once on site for occupancy).

Commissioning, Controls, and Sizing (for air-source and variable-speed heat pumps) applies to commissioning any new ASHP with an HSPF < 9.0 or HSPF2 < 7.6 when replacing any heating system type, adding an ASHP to an existing single-family or existing manufactured home without any previously existing primary heating system, or installing a new heat pump in single-family new construction.

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump (DHP), but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two ASHP payments but no more, even if there are more than two duct systems;

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted air-source heat pump (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area qualify for up to two heat pump measures and no more provided all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| PTCS site registry Measure ID reflecting ~~'BPA Approved'~~ 'PTCS Certified Only' status | X | X | |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Commissioning, Controls, and Sizing | $300 |

**Additional Information**

The former "PTCS Air-Source Heat Pump Form" has been renamed "PTCS ASHP Optional Data Collection Tool" and is now optional. The following heat pump sizing forms are also now optional: CheckMe!® Heat Pump Protocol Data Entry From for PTCS Summer and Winter, PTCS Heat Pump and Central Air Conditioner Sizing Calculator, and a heat load/heat loss calculation and associated balance point worksheet (e.g., a calculator, graph, or chart).

PTCS commissioning, controls, and sizing installations are subject to quality assurance inspection by a BPA-approved quality assurance inspector.

Beginning October 1, 2019, BPA will begin offering access to the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Specification List for variable-speed ASHPs (including DHPs) that retain their efficiency at lower operating temperatures. This is an optional resource. Utilities will not be required to utilize models on this list.

### 11.7.2.4 PTCS Ground Source Heat Pumps (BPA-Qualified)

**Basis for Energy Savings**

A ground source heat pump is a compressor driven electric heating and cooling system that distributes conditioned air through a centralized duct system. A ground source heat pump is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are conversions from an electric forced-air furnace or upgrades from less efficient ASHP, zonal electric heating, heating provided by wood, oil, propane, and gas, or a residence without any existing heating system. PTCS ground source heat pumps include savings from efficient installation practices and controls. More information about the basis for savings can be found on the RTF website.

**PTCS Ground-Source Heat Pumps*: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING HZ 2 & 3 ONLY | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: EXISTING |
| Electric Forced-Air Furnace | Conversion | Upgrade | Not eligible | Not eligible | Not eligible |
| Ducted Heat Pump | Upgrade | | | | |
| Ductless Mini-Split Heat Pump | Upgrade | | | | |
| Zonal (Electric) | Conversion: Boiler, Forced-Air Hydronic Heating, or Zonal Radiant Heating<br>Upgrade: Zonal Electric | | | | |
| Wood | Upgrade | | | | |
| Oil/Propane/ Gas | Upgrade | | | | |
| None existing | Upgrade | | | | |

*Projects that replace only the compressor portion of an existing ground source heat pump system may be eligible for an upgrade measure. See details under Requirements and Specifications.

**Requirements and Specifications**

Measures include PTCS ground source heat pump upgrades or conversions with or without a desuperheater and must meet the following requirements and specifications:

Systems must be ENERGY STAR-Certified as determined by the PTCS call center personnel.

PTCS work must be performed by a PTCS technician(s) listed in the online site registry and certified according to the PTCS Program Requirements and International Ground Source Heap Pump Association (IGSHPA). Multiple technicians may be employed to meet these certification requirements, but they must have been present during the installation to qualify.

## Supporting Content

RTF UES Measures

PTCS Online Registry

PTCS Program Requirements

PTCS Ground Water Source Open Loop Heat Pump & Ground Source Closed Loop Heat Pump Installation Specifications

Residential HVAC Website

PTCS Ground Source Heat Pump Optional Data Collection Tool

Commissioned and Installed according to IGSHPA guidelines and PTCS Ground Water Source Open Loop Heat Pump & Ground Source Closed Loop Heat Pump Installation Specifications.

Eligible installations must be entered in the online site registry.

All system components must be newly installed. The replacement of an existing ground source heat pump thermal exchange loop does not qualify for an incentive.

Applicable home types in heating zones (HZ) 2 and 3 only:

New construction single-family

Existing construction single-family

Ground Source Heat Pump Upgrade applies to the following situations:

Replacing an existing air-source heat pump.

Replacing zonal electric.

Replacing a ductless heat pump (considered a zonal system).

Replacing a nonelectric heating system (e.g., gas, oil, or propane).

Replacing the compressor portion only (compressor portion includes the compressor, a heat exchanger, expansion and reversing valves, piping connections, and control connections) of an existing ground source heat pump system is eligible for an upgrade measure when the compressor portion is ENERGY STAR-Certified and the measure is claimed using the ground source heat pump compressor portion only upgrade measure in the UES Measure List.

Installing a ground source heat pump in a new construction single-family home.

Installing a ground source heat pump in an existing single-family home (HZ 2 & 3) without any previously existing primary heating system.

Ground Source Heat Pump Conversion applies to the following situations:

Replacing an electric furnace,

Replacing an electric boiler used for forced-air hydronic heating or zonal radiant heat.

Only one ground source heat pump per home qualifies for BPA payment, provided all other program requirements are met. Ground source heat pumps may be connected to hydronic heating systems in residential end-use applications if all PTCS and IGSHPA specifications are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| PTCS site registry Measure ID reflecting 'BPA Approved' status | X | X | |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Ground Source Heat Pump Upgrade (Compressor Only Replacement) | $500 |
| Ground Source Heat Pump Upgrade or Conversion without Desuperheater | $3,000 |
| Ground Source Heat Pump Upgrade or Conversion with Desuperheater | $3,500 |

**Additional Information**

The former "PTCS Ground Source Heat Pump Form" has been renamed "PTCS GSHP Optional Data Collection Tool" and is now optional. The following heat pump sizing documents are now also optional: a heat load/heat loss calculation, balance point worksheets (i.e. a calculator, graph, or chart), and loop-design documentation.

PTCS ground source heat pumps are subject to quality assurance inspection by a BPA-approved quality assurance inspector.

### 11.7.2.5 PTCS Duct Sealing

**Basis for Energy Savings**

Air leakage from ductwork can be lead to significant loss of energy. Performance Tested Comfort System (PTCS) Duct Sealing is duct sealing with performance testing to determine existing ductwork losses (baseline) vs. sealed ductwork losses (after leaks are fixed). Ducts must be connected to electric heat. PTCS duct sealing must be performed by qualified technicians. PTCS duct sealing is subject to quality assurance inspection by a BPA-approved quality assurance inspector. More information about the basis for savings can be found on the RTF website.

**PTCS Duct Sealing: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW (EXCEPT WA)* | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | Eligible | Not eligible | Eligible | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Eligible | | Eligible | | |
| Ductless Mini-Split Heat Pump | Eligible* | | Eligible* | | |
| Zonal (Electric) | Eligible | | Eligible | | |
| Wood | Not eligible | | Not eligible | | |
| Oil/Propane/ Gas | | | | | |
| None existing | | | | | |

*With ducts that are connected to electric heat

## Supporting Content

RTF UES Measures

PTCS Duct Sealing Specifications

PTCS Online Registry

PTCS Program Requirements

Residential HVAC Website

PTCS Duct Sealing Optional Data Collection Tool

**Requirements and Specifications**

Ducts must be connected to electric heat, and must be sealed according to the current PTCS Duct Sealing Specification.

Resealing of ducts is allowed at utility discretion (i.e., a second duct sealing only) provided that all other program requirements are met.

PTCS work must be performed by a PTCS technician listed in the online site registry and certified according to the PTCS Program Requirements.

Eligible installations must be entered in the online site registry.

Applicable home types:

Existing construction single-family;

Existing manufactured homes (including new manufactured homes once on site for occupancy);

Homes with two independent, electrically heated duct systems may claim up to two duct sealing measures provided that all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| PTCS site registry Measure ID reflecting 'BPA Approved' status | X | X | |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| PTCS Duct Sealing, Existing Manufactured Homes (including new manufactured homes once on site for occupancy) | $200 |
| PTCS Duct Sealing, Existing Single-Family Homes | $250 |

**Additional Information**

The former "PTCS Duct Sealing Form" has been renamed "PTCS Duct Sealing Optional Data Collection Tool" and is now optional.

PTCS duct sealing is subject to quality assurance inspection by a BPA-approved quality assurance inspector.

Refer to Section 11.7.3 for information about Prescriptive Duct Sealing.

### 11.7.3 Prescriptive Duct Sealing (BPA-Qualified)

**Basis for Energy Savings**

Air leakage from ductwork can lead to significant loss of energy. Prescriptive Duct Sealing is duct sealing that focuses on easily accessed ductwork air leaks. Ducts must be connected to electric heat. Energy savings are based on models that factor in location, type of residence, and type of heating. Work must be performed by a Prescriptive Duct Sealing technician. More information about the basis for savings can be found on the RTF website.

**Prescriptive Duct Sealing: Eligibility Table**

| PRIMARY | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | Eligible | Not eligible | Eligible | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Eligible | | Eligible | | |
| Ductless Mini-Split Heat Pump | Eligible* | | Eligible* | | |
| Zonal (Electric) | Eligible | | Eligible | | |
| Wood | Not eligible | | Not eligible | | |
| Oil/Propane/ Gas | | | | | |
| None existing | | | | | |

*With ducts that are connected to electric heat

**Requirements and Specifications**

Ducts must be connected to electric heat, and must be sealed according to the current Prescriptive Duct Sealing Specification.

Resealing of ducts is allowed at utility discretion (i.e. a second duct sealing only) provided that all other program requirements are met.

A Prescriptive Duct Sealing technician listed in the online site registry or in a pre-approved utility certification program must perform the work according to the Prescriptive Duct Sealing Program Requirements. Utilities must request pre-approval of their utility certification program through the COTR Request and Acknowledgement Procedure.

Applicable home types:

Existing construction single-family;

Existing manufactured homes (including new manufactured homes once on site for occupancy);

Homes with two independent, electrically heated duct systems may claim up to two duct sealing measures provided that all other program requirements are met.

**Supporting Content**

RTF UES Measures

PTCS Duct Sealing Specifications

COTR Request and Acknowledgement Procedure

PTCS Online Registry

Residential HVAC Website

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | | X |
| Primary Heating System Type | X | | |
| Installation Information, including **one** of the following:<br>1. Site Registry Measure ID reflecting 'BPA Approved' status (if the job was entered into the PTCS Site Registry), **OR**<br>2. Prescriptive Duct Sealing form (if job not entered into Registry, or if form supports a pre-approved utility certification program that does not use the Registry). | X | X | |
| | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Prescriptive Duct Sealing, Existing Manufactured Homes (including new manufactured homes once on site for occupancy) | $200 |
| Prescriptive Duct Sealing, Existing Single-Family Homes | $250 |

**Additional Information**

Prescriptive duct sealing is subject to quality assurance inspection by a BPA-approved quality assurance (QA) inspector.

The prescriptive duct sealing measure utilizes some of the PTCS infrastructure including training and QA inspections. See Section 11.7.2.5 for more information about PTCS Duct Sealing.

### 11.7.4 Duct Insulation

**Basis for Energy Savings**

Duct insulation must be insulated to a minimum thermal value of R-11 in a space heated with an electric forced-air furnace or centrally ducted air-source heat pump (ASHP) as the primary heating system. More information about the basis for savings can be found on the RTF website.

**Requirements and Specifications**

Insulation measures in single-family homes must be installed according to the BPA Residential Weatherization Specifications & Best Practices Guide. Final installed R-values must meet the required final R-value of R-11 at a minimum. Duct insulation can be professionally installed by a contractor or self-installed by the end-user.

## Supporting Content

RTF UES Measures

BPA Residential Weatherization Specifications & Best Practices Guide

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | | X |
| Materials or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost<br>3. Post-insulation R-value and linear footage of insulation installed | | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Duct Insulation | $0.60 per linear foot insulated |

**Additional Information**

Duct Insulation may be reported in addition to Prescriptive or PTCS Duct Sealing and other HVAC measures such as Air-Source Heat Pumps and Thermostats.

### 11.7.5 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump (without PTCS)

**Basis for Energy Savings**

Air-Source Heat Pump (ASHP) is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system. An ASHP is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are conversions from an electric forced-air furnace. More information about the basis for savings can be found on the RTF website.

**ASHP Conversion from Electric Forced-Air Furnace (without PTCS): Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | Conversion | Not eligible | Conversion | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Not eligible | | Not eligible | Not eligible | |
| Ductless Mini-Split Heat Pump | | | | | |
| Zonal (Electric) | | | | | |
| Wood | | | | | |
| Oil/Propane/ Gas | | | | | |
| None existing | | | | | |

**Required Documents**

AHRI Certificate

**Supporting Content**

RTF UES Measures

Accessing the AHRI Certificate: Quick Guide

**Requirements and Specifications**

This measure is available for existing single-family and existing manufactured homes with whole-home centrally ducted systems and must meet the following requirements (for ducted mini-splits, see Section 11.7.1.1)

This measure is a conversion from an electric forced-air furnace to a high-efficiency ducted air source heat pump without installing to PTCS specifications.

New air source heat pumps must be rated as having at least 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2. HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology.

Equipment must be AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Customers may not claim payments for this measure and PTCS ASHP for the same equipment.

At this time, VRF technologies (also known as VRV) do not qualify for the residential Conversion from Electric Forced-Air Furnace to ASHP (without PTCS) measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential Conversion from Electric Forced-Air Furnace to ASHP (without PTCS) configuration.

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump (DHP) but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two ASHP payments but no more, even if there are more than two duct systems;

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted ASHP (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area qualify for up to two heat pump measures and no more provided all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that product requirements have been met (manufacturer, model number, type, size and quantity of equipment or product installed or used) | | X |
| AHRI Certificate documenting a minimum of 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2 | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump | $800 |

**Additional Information**

This measure is for ASHP installations that do not follow the PTCS installation specification.

ASHP installed according to PTCS installation specifications and requirements qualify for higher energy savings and payments. Homes with zonal heating must utilize Section 11.7.2.1 for PTCS ASHP and Section 11.7.2.2 for PTCS variable-speed ASHP.

PTCS or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing is not required for completion of this measure.

### 11.7.6 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Variable-Speed Air-Source Heat Pump (without PTCS)

#### Basis for Energy Savings

A variable-speed air-source heat pump is an inverter compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system. It is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are conversions from an electric forced-air furnace. More information about the basis for savings can be found on the RTF website.

#### Variable-Speed Air-Source Heat Pump Conversion from Electric Forced-Air Furnace (without PTCS): Eligibility Table

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | Conversion | Not eligible | Conversion | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Not eligible | | Not eligible | Not eligible | |
| Ductless Mini-Split Heat Pump | | | | | |
| Zonal (Electric) | | | | | |
| Wood | | | | | |
| Oil/Propane/Gas | | | | | |
| None existing | | | | | |

#### Requirements and Specifications

This measure is available for existing single-family and existing manufactured homes with whole-home centrally ducted systems and must meet the following requirements (for ducted mini-splits, see Section 11.7.1.1):

This measure is a conversion from an electric forced-air furnace to a high-efficiency ducted variable-speed heat pump without installing to PTCS specifications.

New variable-speed heat pumps must be rated as having at least 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2. HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology.

Equipment must be AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

The outdoor compressor must be variable-speed or inverter-driven and documentation must be provided demonstrating that.

Customers may not claim payments for this measure and PTCS ASHP for the same equipment.

At this time, VRF technologies (also known as VRV) do not qualify for the residential Conversion from Electric Forced-Air Furnace to Variable-Speed ASHP (without PTCS) measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential Conversion from Electric Forced-Air Furnace to Variable-Speed ASHP (without PTCS) configuration.

**Required Documents**

AHRI Certificate

**Supporting Content**

RTF UES Measures

Identifying Variable-Speed Heat Pumps: Quick Guide

Accessing the AHRI Certificate: Quick Guide

NEEP Cold Climate ASHP List (neep.org)

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump (DHP), but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two air-source heat pump payments but no more, even if there are more than two duct systems.

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted air-source heat pump (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area qualify for up to two heat pump measures and no more provided all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that product requirements have been met (manufacturer, model number, type, size and quantity of equipment or product installed or used) | | X |
| AHRI Certificate documenting a minimum of 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2 | | X |
| Manufacturer documentation that the outdoor compressor includes variable-speed or inverter-driven technology (e.g., specification sheet or brochure that documents the model has a variable-speed or inverter-driven compressor) | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Heat Pump Conversion from Electric Forced-Air Furnace to Variable-Speed Heat Pump | $1,000 |

**Additional Information**

This measure is for variable-speed air-source heat pump installations that do not follow the PTCS installation specification. Variable-speed air-source heat pump installed according to PTCS installation specifications and requirements qualify for higher energy savings and payments. Please refer to Section 11.7.2.1 for PTCS ASHP and Section 11.7.2.2 for PTCS Variable-Speed ASHP.

Access is available to the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Specification List for ASHP (including ductless heat pumps). This is an optional resource. Utilities are not required to utilize models on this list for program implementation.

For installations without a variable-speed outdoor compressor or air-source heat pump where it cannot be confirmed that the outdoor compressor is variable-speed, please refer to Section 11.7.5, Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to ASHP (without PTCS).

PTCS or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing is not required for completion of this measure.

### 11.7.7 Air-Source Heat Pump Upgrade (without PTCS) (effective October 1, 2021)

**Basis for Energy Savings**

A heat pump is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system. An air-source heat pump is at least twice as efficient as an electric resistance forced-air furnace. BPA offers measures that are upgrades from less efficient heat pump, other less efficient heating systems, or residences without a heating system. Detailed information is available on the RTF website.

**Air-Source Heat Pump Upgrade (without PTCS): Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | See ASHP Conversion with or without PTCS | Upgrade | See ASHP Conversion with or without PTCS | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Upgrade | | Upgrade | | |
| Ductless Mini-Split Heat Pump | Upgrade | | Upgrade | | |
| Zonal (Electric) | Upgrade | | Upgrade | | |
| Wood | Upgrade | | Upgrade | | |
| Oil/Propane/ Gas | Upgrade | | Upgrade | | |
| None existing | Upgrade | | Upgrade | | |

**Requirements and Specifications**

New heat pumps must be AHRI rated as having at least 9.0 HSPF or 7.6HSPF2, and 14 SEER or 13.4 SEER2, HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's change to the national standard testing methodology. They must be:

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Installed by a licensed contractor.

Applicable home types:

- New construction single-family;
- Existing construction single-family;
- Existing manufactured homes (including new manufactured homes once on site for occupancy).

Heat Pump Upgrade applies to the following situations:

Replacing an existing heat pump.

Installing an ASHP in single-family new construction.

Installing an ASHP in an existing single-family or existing manufactured home without any previously existing primary heating system.

**Required Documents**

AHRI Certificate

**Supporting Content**

RTF UES Measures

Identifying Variable-Speed Heat Pumps: Quick Guide

Accessing the AHRI Certificate: Quick Guide

Adding a heat pump to a nonelectric heating system (e.g., gas, oil, propane, or wood).

Upgrading from zonal (including zonal hydronic systems that do not utilize a duct system for distribution) to ASHP.

Replacing a ductless mini-split heat pump.

Replacing a PTCS ASHP that is no longer functioning with a new PTCS-certified heat pump.

Customers may not claim payments for this measure and PTCS Air-Source Heat Pumps for the same equipment.

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump, but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two air-source heat pump payments but no more, even if there are more than two duct systems;

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted air-source heat pump (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area qualify for up to two heat pump measures and no more provided all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>Equipment order or purchase date<br>Installed cost | | X |
| Documentation that product requirements have been met (manufacturer, model number, type, size and quantity of equipment or product installed or used) | | X |
| AHRI Certificate documenting a minimum of 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2 | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Air-Source Heat Pump Upgrade without PTCS | $20 |

**Additional Information**

This measure is for ASHP installations that do not follow the PTCS installation specification. ASHPs installed according to PTCS installation specifications and requirements qualify for higher energy savings and payments. For PTCS ASHPs and PTCS Variable-Speed ASHPs, please refer to Sections 11.7.2.1 and 11.7.2.2.

Duct Insulation, PTCS, or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing or insulation is not required for completion of this measure.

At this time, VRF technologies (also known as VRV) do not qualify for the residential ASHP Upgrade (without PTCS) measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential ASHP (without PTCS) configuration.

Access is available to the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Specification List for air-source heat pumps. This is an optional resource. Utilities are not required to utilize models on this list for program implementation.

### 11.7.8 Variable-Speed Air-Source Heat Pump Upgrade (without PTCS)

**Basis for Energy Savings**

Variable-speed ASHP is a compressor-driven electric heating and cooling system that distributes conditioned air through a centralized duct system. A variable-speed ASHP is at least twice as efficient as an electric resistance forced-air furnace. Detailed information is available on the RTF website.

**Variable-Speed Air-Source Heat Pump Upgrade (without PTCS): Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | See VSHP Conversion with or without PTCS | Upgrade | See VSHP Conversion with or without PTCS | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | Upgrade | | Upgrade | | |
| Ductless Mini-Split Heat Pump | Upgrade | | Upgrade | | |
| Zonal (Electric) | Upgrade | | Upgrade | | |
| Wood | Upgrade | | Upgrade | | |
| Oil/Propane/ Gas | Upgrade | | Upgrade | | |
| None existing | Upgrade | | Upgrade | | |

**Requirements and Specifications**

New heat pumps must be AHRI rated as having at least 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2. HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology. They must be:

Inverter-driven (compressor) and documentation must be provided demonstrating that.

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Installed by a licensed contractor.

Customers may not claim payments for this measure and PTCS variable-speed ASHP for the same equipment.

Applicable home types:

New construction single-family;

Existing construction single-family;

Existing manufactured homes (including new manufactured homes once on site for occupancy).

Heat Pump Upgrade applies to the following situations:

Replacing an existing heat pump.

Installing a VSHP in single-family new construction.

Installing a VSHP in an existing single-family or existing manufactured home without any previously existing primary heating system.

Adding a heat pump to a nonelectric heating system (e.g., gas, oil, propane, or wood).

**Required Documents**

AHRI Certificate

**Supporting Content**

RTF UES Measures

Identifying Variable-Speed Heat Pumps: Quick Guide

Accessing the AHRI Certificate: Quick Guide

NEEP Cold Climate ASHP List (neep.org)

Upgrading from zonal (including zonal hydronic systems that do not utilize a duct system for distribution) to VSHP.

Replacing a ductless mini-split heat pump.

Replacing a PTCS ASHP that is no longer functioning with a new PTCS-certified heat pump.

Customers may not claim payments for this measure and PTCS Air-Source Heat Pumps for the same equipment.

Homes with less than 4,500 square feet of heated floor area may qualify for only one heat pump payment. This may be one ducted (PTCS or non-PTCS) or one ductless heat pump, but not both. There are two exceptions to this rule:

When the home has two entirely separate duct systems, the home is eligible for two air-source heat pump payments but no more, even if there are more than two duct systems.

When the home's ductwork has not been extended to an addition, a DHP may be installed to service the area of the home that does not contain ducts. In this scenario, the home may be eligible for a ducted air-source heat pump (PTCS or non-PTCS) and one DHP payment.

Homes with greater than 4,500 square feet of heated floor area qualify for up to two heat pump measures and no more provided all other program requirements are met.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that product requirements have been met (manufacturer, model number, type, size and quantity of equipment or product installed or used) | | X |
| AHRI Certificate documenting a minimum of 9.0 HSPF or 7.6 HSPF2, and 14 SEER or 13.4 SEER2 | | X |
| Manufacturer documentation that the outdoor compressor includes variable-speed or inverter-driven technology (i.e., specification sheet or brochure that documents the model has a variable-speed or inverter-driven compressor) | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Variable-Speed Heat Pump Upgrade without PTCS | $150 |

**Additional Information**

This measure is for variable-speed ASHP upgrade installations that do not follow the PTCS installation specification. Variable-speed ASHP installed according to PTCS installation specifications and requirements qualify for higher energy savings and payments. Please refer to Section 11.7.2.1 for PTCS ASHP and Section 11.7.2.2 for PTCS Variable-Speed ASHP.

At this time, VRF technologies (also known as VRV) do not qualify for the residential Variable-Speed ASHP Upgrade (without PTCS) measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential Variable-Speed ASHP Upgrade (without PTCS) configuration.

For installations without a variable-speed outdoor compressor or ASHP where it cannot be confirmed that the outdoor compressor is variable-speed, please refer to Section 11.7.5, Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to ASHP (without PTCS).

Duct Insulation, PTCS, or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing or insulation is not required for completion of this measure.

Access is available to the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Specification List for air-source heat pumps. This is an optional resource. Utilities are not required to utilize models on this list for program implementation.

### 11.7.9 Centrally Ducted Air Conditioners (Effective October 1, 2020)

**Basis for Energy Savings**

A new centrally ducted AHRI-certified air conditioner (SEER =>16, or => 15.2 SEER2) replacing current practice Air Conditioners (SEER 14.2 or below) results in energy savings. More detailed information is available on the RTF website.

**Centrally Ducted Air Conditioners: Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING | MANUFACTURED: NEW | MULTIFAMILY: NEW & EXISTING |
| Electric Forced-Air Furnace | Eligible if the home contains central duct work | Eligible if the home contains central duct work | Eligible if the home contains central duct work | Treat as manufactured existing once located on site for occupancy | Not eligible |
| Ducted Heat Pump | | | | | |
| Ductless Mini-Split Heat Pump | | | | | |
| Zonal (Electric) | | | | | |
| Wood | | | | | |
| Oil/Propane/ Gas | | | | | |
| None existing | | | | | |

**Requirements and Specifications**

This measure is available for new and existing single-family and manufactured homes with whole-home centrally ducted systems.

New centrally ducted air conditioners must be rated as having at least 16 SEER or at least 15.2 SEER2.

Equipment must be AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Applicable Home Types:

New construction single-family;

Existing construction single-family;

Existing manufactured homes (including new manufactured homes once on site for occupancy).

Homes with less than 4,500 square feet of conditioned floor area may qualify for only one payment for (a) a centrally ducted air conditioner, (b) a PTCS or non-PTCS ASHP, or (c) a ductless heat pump (DHP). Homes with greater than 4,500 square feet of conditioned floor area may qualify for up to two centrally ducted air conditioner measures or one centrally ducted air conditioner and either one DHP or one PTCS or non-PTCS ASHP and no more provided all other program requirements are met.

**Required Documents**

AHRI Certificate

**Supporting Content**

RTF UES Measures

Accessing the AHRI Certificate: Quick Guide

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that product requirements have been met:<br>• Manufacturer<br>• Model number<br>• Type<br>• Quantity of product installed or used | | X |
| AHRI Certificate documenting a minimum of 16 SEER or 15.2 SEER2 | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Centrally Ducted Air Conditioner | $60 |

**Additional Information**

PTCS or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however duct sealing is not required for completion of this measure.

All centrally ducted systems in single-family and manufactured homes qualify for this measure including homes where the primary heating fuel is not electricity.

### 11.7.10 Residential Packaged Terminal Heat Pump (BPA-Qualified)

**Basis for Energy Savings**

Residential packaged terminal heat pumps (PTHPs) are an HVAC equipment type commonly used in multifamily applications. A PTHP retrofit replaces a packaged terminal air conditioner (PTAC) or zonal electric-resistance heating.

Energy savings from PTHPs are primarily from a more efficient use of heating during the winter months of operation compared to a PTAC or zonal electric-resistance heating. Savings are calculated based on an analysis of annual heating requirements for a PTAC compared to a PTHP.

**Requirements and Specifications**

This measure is eligible to be installed in residential multifamily buildings.

This measure applies to both retrofits and new construction.

**Pre-condition for retrofit installations:** The space is conditioned by a PTAC or zonal electric-resistance heat as the primary heating source. No other heating sources are eligible.

**Post-condition:** The installed PTHP must have an AHRI certificate of product rating. All AHRI-certified PTHPs qualify for this incentive regardless of the rated COP.

**Required Documents**

AHRI Certificate

**Supporting Content**

Accessing the AHRI Certificate: Quick Guide

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| AHRI Certificate | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Packaged Terminal Heat Pump Retrofit | $200 per PTHP |
| Packaged Terminal Heat Pump New Construction | $125 per PTHP |

**Additional Information**

For any of the following building types, see the Commercial Packaged Terminal Heat Pump measure (Section 8.4.7):

- A lodging building type which, for the purposes of this measure, includes: hotel, motel, bed and breakfast, boarding/rooming house, apartment hotel, dormitory, and shelter; or
- In a residential care building type which, for the purposes of this measure, includes: nursing home, retirement home, and assisted living.

# 11.8 THERMOSTATS

## 11.8.1 Line-Voltage Thermostats

**Basis for Energy Savings**

Line-voltage thermostats save energy by maintaining temperatures closer to the set temperature verses older, bi-metal thermostats. More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure is claimed on a per-thermostat basis and is available for existing and new single-family and multifamily low-rise and mid-/high-rise homes. Customers must replace thermostats in existing, electrically heated single-family or multifamily homes with line-voltage electronic thermostats.

All thermostats must meet the following requirements:

Have a digital display;

Be electronically line-voltage type;

Have a thermistor temperature-sensing element that is accurate to within 1.5 degrees Fahrenheit or better;

Be UL- or CSA-listed for use with their application (e.g., fan-forced, baseboard, wall, or ceiling radiant).

In addition, line voltage thermostats that are programmable must maintain temperature and program settings during power failures and have a temporary override feature.

**Supporting Content**

RTF UES Measures

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation of model number and quantity of equipment | | X |

**Payment**

Payments are per thermostat unit as listed in the table below:

| MEASURE CATEGORY | PAYMENT |
|---|---|
| All Heating Zones: Existing single-family and multifamily | $18/unit |

### 11.8.2 Advanced Smart Thermostats (BPA-Qualified)

**Basis for Energy Savings**

Energy savings arise from advanced smart thermostats maintaining a temperature closer to the set temperature on the dial (smaller hysteresis) using a thermistor as a temperature-sensing element rather than a bi-metal temperature-sensing element. The base case used to calculate energy efficiency savings for advanced smart thermostats are single-family, manufactured, and multifamily homes with existing forced-air furnaces or air and ground source heat pumps. The calculation of energy efficiency savings for smart thermostats utilized multiple runs of the Simplified Energy Enthalpy Model (SEEM) simulation engine, calibrated with results from a study of the performance of advanced smart thermostats in actual homes. It was combined with prototype house weightings to generate heating energy use for baseline and efficient cases for each heating system type and heating zone within the analysis.

BPA does not recommend smart thermostats be installed to control variable-speed heat pumps as savings and compatibility are at this point uncertain.

BPA documentation requirements consider these factors. More detailed information is available on the RTF website.

**Requirements and Specifications**

Measures include smart thermostats for homes with electric forced-air furnaces, ASHP, and ground source heat pumps as their primary system.

Advanced smart thermostat measures are available through the following channels:

Retail;

By Request;

Coupon or Instant Discount;

Direct Install;

Standard Rebate Payment.

Please note: Items distributed in any distribution channel through a BPA program will have separate reference numbers from those used for utility run programs. Standard rebate measures will be blank in the Key Characteristic 4 column of the UES measure list.

## Supporting Content

RTF UES Measures

Smart Thermostat Qualified Products List

Measure Distribution Channels

These measures are available for existing and new construction single-family, manufactured, multifamily low-rise, and multifamily mid-/high-rise homes. Advanced smart thermostats (other than those claimed through the direct install distribution channel) can be installed by any individual. Advanced smart thermostats claimed through the direct install channel must meet installation requirements as listed in the Introduction to the Sectors Section.

Qualifying advanced smart thermostats must:

Be listed on BPA's Smart Thermostat Qualified Products List;

Have occupancy detection set to "on"; and

Be set to the geographic location where the thermostat is located.

In addition to the requirements above, thermostats controlling ASHPs must be programmed to recognize the existing heat pump system.

Thermostats that control cooling-only systems or dual-fuel heating systems (gas furnace and electric heat pump) are not eligible for an incentive.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| See Measure Distribution Process (Section 6.2) for documentation requirements for each channel listed above | | X |
| Documentation of thermostat make and model | X | |

**Payment**

One smart thermostat per qualifying heating system with a limit of two per household, as listed in the table below.

| MEASURE CATEGORY | RETAIL | BY REQUEST | COUPON OR INSTANT DISCOUNT | DIRECT INSTALL | STANDARD REBATE PAYMENT |
|---|---|---|---|---|---|
| | PAYMENT LEVELS FOR EACH DELIVERY CHANNEL APPLY TO BOTH BPA RUN PROGRAMS (SUCH AS SIMPLE STEPS) AND UTILITY OPERATED PROGRAMS. | | | | |
| Advanced Smart Thermostat | $140 | $140 | $140 | $165 | $140 |

### 11.8.3 Communicating Line Voltage Thermostats

**Basis for Energy Savings**

Energy savings arise from line-voltage thermostats maintaining a temperature closer to the set temperature on the dial (smaller hysteresis) using a thermistor as a temperature sensing element rather than a bi-metal temperature sensing element. Detailed information is available on the RTF website.

**Requirements and Specifications**

This measure is claimed on a per-thermostat basis and is available for existing single-family, existing manufactured, and existing multifamily homes with zonal electric heating. There is no limit to the number of thermostats per housing unit; all existing bi-metal thermostats in a housing unit should be replaced. The existing thermostat replaced must be bi-metal thermostats in existing electrically heated homes with resistance heat including baseboard, fan-forced wall heaters, or wall or ceiling radiant heat.

**Supporting Content**

RTF UES Measures

All thermostats must meet the following requirements:

Be Wi-Fi enabled (or via bridge) with remote access using a mobile device or computer.

Be informed by an outdoor air temperature sensor or internet weather data.

Are not bi-metal, or are not mechanical or mechanical switching or do not have a mechanical temperature sensing element.

Have a digital display.

Have 7-day programmable scheduling.

Have a temperature sensing element that is accurate to within 1.5 degrees Fahrenheit or better.

Have a thermistor temperature sensing element.

Be UL- or CSA-listed for use with their application (e.g., fan-forced, baseboard, wall, or ceiling radiant).

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation of model number and quantity of equipment | | X |

**Payment**

Payments are per thermostat unit as listed in the table below:

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Existing Single-Family and Existing Multifamily Homes with Zonal Electric Heating | $35 |

# 11.9 NEW CONSTRUCTION

## 11.9.1 New Northwest Energy Efficient Manufactured Housing (NEEM)

**Basis for Energy Savings**

The base case (pre-existing state) is a current manufactured home built in the Pacific Northwest which tends to be slightly better than HUD code. The base case considers individual components including envelope, HVAC, lighting, appliances, and water heating. Energy savings for a new NEEM home are based on multiple analyses using the Simplified Energy Enthalpy Model (SEEM) simulation engine for baseline and efficient cases for a weighted average of five cities (to represent the Northwest). This is based on a prototype and heating/cooling system type for single prototype square footage. The output of this analysis is then divided into three heating/cooling zones based on a weighted average of SEEM run results for the five locales. The SEEM model also accounts for interaction with the lighting power reduction of this measure.

BPA documentation requirements consider these factors. More detailed information is available on the RTF website.

**Supporting Content**

RTF UES Measures

Northwest Energy Efficient Manufactured Housing Website

**Requirements and Specifications**

Manufactured homes must be electrically heated, new, and certified by the Northwest Energy Efficient Manufactured Housing Program (NEEM).

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| NEEM 1.1 or 2.0 certificate of compliance. | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| NEEM 1.1 All Heating Zones | $1,200 per home |
| NEEM 2.0 All Heating Zones | $1,400 per home |

**Additional Information**

New NEEM 1.1 or 2.0 Home payments are available for NEEM 1.1 and 2.0 versions.

Beginning in 2018, NEEM marketing materials will be updated to refer to NEEM 1.1 as ENERGY STAR and NEEM 2.0 as ENERGY STAR with NEEM+. Certification documents for both efficiency levels will continue to display the NEEM 1.1 or NEEM 2.0 nomenclature necessary for BPA compliance and reporting. However, market-facing materials may use the ENERGY STAR or ENERGY STAR with NEEM+ designation.

NEEM has an online tracking and certification system operated by Northwest Energy Works. Contact Northwest Energy Works at (888) 370-3277, ext. 102, for current information.

### 11.9.2 Replacement of Pre-1976 Manufactured Home with NEEM Certified Home

**Basis for Energy Savings**

The base case (pre-existing state) is a manufactured home built before the 1976 HUD Manufactured Housing Code. Energy consumption estimates for the pre-1976 home are based on Residential Building Stock Assessment (RBSA) data and individual components including envelope, HVAC, lighting, appliances, and water heating. Energy savings for a New NEEM Manufactured Home are based on multiple analyses using the SEEM simulation engine for baseline and efficient cases for a weighted average of five cities (to represent the Northwest) based on prototype and heating/cooling system type for single prototype square footage. Output of this analysis is then divided into three heating/cooling zones based on a weighted average of SEEM-run results for the five locales. The SEEM model also accounts for interaction with the lighting power reduction of this measure. Total energy savings is based on the difference between the estimated energy use of the pre-1976 home and the new NEEM 1.1 or NEEM 2.0 home. BPA documentation requirements consider these factors. More detailed information is available on the RTF website.

**Requirements and Specifications**

Existing manufactured homes must have been built prior to 1976, be electrically heated, and be occupied as a residence. The existing pre-1976 home must be decommissioned and disposed of and cannot be used as a dwelling unit once the new NEEM home is sited.

Replacement manufactured homes must be electrically heated, new, and certified by the NEEM program as a New NEEM 1.1 or 2.0 Home. Customers may claim high efficiency heating and thermostat measures in addition to this measure but may not claim residential UES measures that could be found within the NEEM 1.1 or NEEM 2.0 specifications.

## Required Documents

Manufactured Home Project Information Form

## Supporting Content

RTF UES Measures

Northwest Energy Efficient Manufactured Housing Website (NEEM Homes)

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| NEEM 1.1 or 2.0 certificate of compliance. | | X |
| Completed BPA Manufactured Home Replacement Project Information Form. | | X |

**Payment**

BPA will pay for replacement of a pre-1976 manufactured home with a new NEEM-Certified Home on a per-replacement home basis.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Replacement of Pre-1976 Manufactured Home with an electrically heated new NEEM 1.1 Home. All heating zones. | $2,200 per home |
| Replacement of Pre-1976 Manufactured Home with an electrically heated new NEEM 2.0 Home. All heating zones. | $2,500 per home |

**Additional Information**

Manufactured home replacement often occurs through the collaborative efforts of many organizations and is often not directly led by utilities or their agents. Customers may replace Pre-1976 Manufactured Homes with a new NEEM-Certified Home themselves or through a third-party but must retain responsibility for compliance with measure requirements.

NEEM has an online tracking and certification system operated by Northwest Energy Works. Contact Northwest Energy Works (888) 370-3277, ext. 102, for current information.

In addition to NEEM 1.1 and 2.0, and Replacement of Pre-1976 Manufactured Home with a New NEEM-Certified Home, the following table shows available alternative stand-alone measures in new manufactured homes. For requirements, specifications and payment levels, see the referenced section.

| ADDITIONAL MEASURES AVAILABLE FOR NEW MANUFACTURED HOMES | LOCATION IN IMPLEMEMTATION MANUAL |
|---|---|
| Residential Lighting | 11.2 |
| Clothes Washers | 11.4 |
| Clothes Dryers | 11.4 |
| Thermostatic Shut-Off Valves | 11.6.1 |
| Split System Heat Pump Water Heaters | 11.6.4 |
| Ductless Heat Pumps | 11.7 |
| Air-Source Heat Pumps | 11.7 |
| Some Types of Thermostats (see thermostat section for details) | 11.8 |

### 11.9.3 Single-Family New Construction Performance Path

**Basis for Energy Savings**

The base case (pre-existing state) is a code minimum home for Idaho, Montana, Oregon, or Washington. Energy savings for the Single-Family New Construction Performance Path is based on RTF-approved New Homes Standard Protocol. BPA requirements also integrate the NW Modeling Requirements and RTF unit energy savings (UES) Measures through the AXIS Database.

When state energy codes are updated, base case homes for each state will be updated. This may result in a reduction in potential energy savings and payment.

The Single-Family New Construction Performance Path utilizes REM/Rate, RTF UES Measures, and the NEEA-maintained AXIS database to compare the modeled energy consumption of a new home to the modeled energy consumption of a typical code-built home. This will allow a customer to request a payment based on the energy savings of the new home, compared to the code home. Calculations are performed by the AXIS database, which provides a report with required documentation to customers.

**Requirements and Specifications**

Homes must be:

- New, single-family homes. Individual dwelling units in buildings that meet the BPA definition of single-family, which contain more than one dwelling unit, must be modeled separately and will receive a payment for each individual dwelling unit. This measure is available for all heating zones in all states.
- Modeled in REM/Rate according to the NW Modeling Requirements, and uploaded to the AXIS database for calculation and addition of energy savings from RTF UES measures.

To qualify for payment, the total combined energy savings of the home as reported in AXIS must be a minimum of 10% more efficient than the code-built reference home.

The AXIS-reported energy savings must be documented through the Performance Path Calculator Summary Report, and the savings and associated payment from the calculator must be entered manually into the BPA UES Measure Upload Template in the calculator results fields.

Customers may not request payments for individual UES Measures, or the Montana House Specification and the Single-Family New Construction Performance Path in the same new home.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information, including unique site ID and address | X | X |
| AXIS database-generated Performance Path Calculator Summary Report | | X |

**Payment**

BPA shall pay for Single-Family New Construction Performance Path on a kilowatt-hour-saved basis according to the table below.

**Required Documents**

Axisbase Performance Path Calculator Summary Report

**Supporting Content**

RTF UES Measures

RTF New Homes Standard Protocol

Performance Path website

Northwest Modeling Requirements

UES Measure Upload Template

| ENERGY SAVINGS CATEGORY | PAYMENT PER KWH SAVED |
|---|---|
| Shell Upgrades, including Windows | $0.45 |
| HVAC and Water Heating Upgrades | $0.27 |
| Appliance Upgrades | $0.27 |
| Lighting Upgrades, including Fixtures, Showerheads and Smart Thermostats | $0.10 |

**Additional Information**

For the Single-Family New Construction Performance Path, the permit date is the date to be used to determine code compliance for construction.

Single-Family New Construction Performance Path measures will expire October 1, 2023. NEEA no longer supports this measure.

The Performance Path Calculator Summary Report is generated by the AXIS database that has fields similar to the BPA UES Measure Upload Template and contains specific reporting information necessary for savings reliability as well as additional information necessary for measure evaluation. AXIS-generated energy savings must be entered manually into the "Calculator Results" columns within the BPA UES Measure Upload Template. Please contact NEEA for more information on accessing the Summary Report. For more information on how to access this report, visit betterbuiltnw.com.

This measure is supported by NEEA. For assistance or questions on REM/Rate, becoming a rater, or AXIS, visit betterbuiltnw.com.

### 11.9.4 Montana House (v 2.0)

**Basis for Energy Savings**

The base case (pre-existing state) is a code-minimum home for Montana. Energy savings for the Montana House is based on the upgrades over a code-minimum home based on the Montana House v 2.0 Program Specifications (RTF, 2015). It was modeled through multiple runs with the SEEM simulation engine for baseline and efficient cases for homes with and without basements. SEEM analysis was performed for each foundation type and takes into account the interaction with lighting and ventilation components. Upgrades to HVAC efficiency are additive for the Montana House new construction measures.

BPA documentation requirements consider these factors. More detailed information is available on the RTF website.

**Requirements and Specifications**

Homes must be new, electrically heated, and compliant with the Montana House v 2.0 specification. This measure is available only for single-family new construction homes built in Montana and Heating Zones 2 and 3 in Idaho, Wyoming, and Nevada.

Air-Source Heat Pump (ASHP), Variable-Speed Heat Pump, Ground Source Heat Pump (with or without desuperheater), and Commissioning, Controls, and Sizing measures may be combined with the shell upgrade measures for the Montana House. See the appropriate measure section for requirements. Please note: The Commissioning, Controls, and Sizing measures may not be claimed in combination with any other heat pump measure.

**Supporting Content**

RTF UES Measures

Montana House v2.0 Specifications

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information, including unique site ID and address | X | X |
| New Home Details including:<br>• HVAC system details (type of equipment, ventilation system, and specific measures installed including rated CFM)<br>• Foundation type<br>• Home square footage | | X |
| Documentation Report of inspections performed by the customer, including any substantial findings and documentation of any corrective actions taken | | X |
| Documentation requirements for HVAC options per the Ducted Systems section | | X |

**Payment**

BPA shall pay for the Montana House as indicated below. ASHP, Variable-Speed Heat Pump, Ground Source Heat Pumps (with or without desuperheaters), Commissioning, Controls, and Sizing payments can be combined with the shell upgrade payment. To report heating measures, use stand-alone measures and their associated measure reference numbers. Heating measures must follow the requirements and specifications in the appropriate section above.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Montana House Shell Upgrade | $1,500 |
| Montana House Shell Upgrade (with Ground Source Heat Pump). | $500 |

**Additional Information**

For the Montana House, the permit date is the date to be used to determine code compliance for construction.

Montana House measures will expire October 1, 2023. The RTF no longer supports this measure.

In addition to the Single-Family New Construction Performance Path and Montana House, the following measures are available as alternative stand-alone measures in new, single-family homes. For requirements and specifications and payment levels, see the referenced section.

| ADDITIONAL MEASURES AVAILABLE FOR NEW, SINGLE-FAMILY CONSTRUCTION | LOCATION IN IMPLEMENTATION MANUAL |
|---|---|
| Residential Lighting | 11.2 |
| Clothes Washers | 11.4 |
| Clothes Dryers | 11.4 |
| Thermostatic Shut-Off Valves | 11.6.1 |
| Split System Heat Pump Water Heaters | 11.6.4 |
| HVAC Ducted Systems (including Air-Source Heat Pumps and Ground Source Heat Pumps) | 11.7 |
| Some Types of Thermostats (see thermostat section for details) | 11.8 |

### 11.9.5 BPA Energy Efficient New Multifamily Construction (BPA-Qualified)

**Basis for Energy Savings**

The base case (pre-existing state) is a representative sample of dwelling units built to the 2015 Washington Energy Code. Energy savings for this measure is based on SEEM analysis of efficiency improvements needed to exceed the code by at least 10% resulting in a dwelling unit that is a minimum of 10% more efficient than code. Energy savings for each state is adjusted for the applicable state code and climate zones. This model takes into account interaction with lighting and ventilation components and whole house energy savings specific to electric components.

**Requirements and Specifications**

BPA maintains a Qualified Programs List of certification programs and pathways that qualify for BPA Energy Efficient New Multifamily Construction payments, which have been pre-approved by BPA as reliably achieving a minimum of 10% energy savings over the 2015 Washington Energy Code. When state energy codes are updated, certification programs that no longer achieve 10% energy savings over the new energy code will be removed from the Qualified Programs List. Programs and pathways must be on the Qualified Programs List in order to qualify for this payment, and remain a minimum of 10% above Washington Energy Code to remain on the List for any state.

This measure is for individual dwelling units in new, multifamily low-rise and mid-/high-rise construction in all states. Not all certifications and pathways on the BPA Energy Efficient New Multifamily Construction Qualified Programs List may be utilized for both low-rise and mid-/high-rise multifamily construction. Consult the individual certification program or pathway requirements to determine each program's eligibility. Customers may claim one incentive per dwelling unit. For BPA Energy Efficient New Multifamily Construction, the permit date is the date to be used to determine code compliance for construction.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address | X | X |
| Certificate documenting that the individual dwelling unit meets or exceeds the requirements of a certification listed on the BPA Energy Efficient New Multifamily Construction Qualified Programs List | | X |
| Completed New Multifamily Construction Project Information Form | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT PER DWELLING UNIT |
|---|---|
| BPA Energy Efficient New Multifamily Construction, all electric | Washington $350<br>All other states $450 |

**Additional Information**

BPA does not allow custom projects for new multifamily construction. Calculating the savings above code requires highly complex and specialized energy models to verify what the savings are above code. BPA does not have the resources to do this; it relies on the third-party implementation programs referenced in the UES measures to perform this modeling and determine the code trade-offs utilized.

**Required Documents**

New Multifamily Construction Project Information Form

**Supporting Content**

New Multifamily Construction Qualified Programs List

Requirements for Inclusion on Multifamily Qualified Programs List

### 11.9.6 BPA Zero Energy Ready New Multifamily Construction (BPA-Qualified)

**Basis for Energy Savings**

The base case (pre-existing state) is a representative sample of dwelling units built to the 2015 Washington Energy Code. Energy savings for this measure is based on SEEM analysis of efficiency improvements needed to exceed the code by at least 25%, resulting in a dwelling unit that is a minimum of 25% more efficient than code. Energy savings for each state is adjusted for the applicable state code and climate zones. This model takes into account interaction with lighting and ventilation components and whole house energy savings specific to electric components.

**Requirements and Specifications**

BPA maintains a Qualified Programs List of certification programs and pathways that qualify for BPA Zero Energy Ready New Multifamily Construction payments, which have been pre-approved by BPA as reliably achieving a minimum of 25% energy savings over the 2015 Washington Energy Code. When state energy codes are updated, certification programs that no longer achieve 25% energy savings over the new energy code will be removed from the Qualified Programs List. Programs and pathways must be on the Qualified Programs List in order to qualify for this payment and remain a minimum of 25% above Washington Energy Code to remain on the List for any state.

This measure is for individual dwelling units in new, multifamily low-rise and mid-/high-rise construction in all states. Not all certifications and pathways on the BPA Zero Energy Ready New Multifamily Construction Qualified Programs List may be utilized for both low-rise and mid-/high-rise multifamily construction. Consult the individual certification program or pathway requirements to determine each program's eligibility. Customers may claim one incentive per dwelling unit. For BPA Zero Energy Ready Multifamily Construction, the permit date is the date to be used to determine code compliance for construction.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Certificate documenting that the individual dwelling unit meets or exceeds the requirements of a certification listed on the BPA Zero Energy Ready New Multifamily Construction Qualified Programs List | | X |
| Completed New Multifamily Construction Project Information Form | | X |

**Payment**

| MEASURE CATEGORY | PAYMENT PER DWELLING UNIT |
|---|---|
| BPA Zero Energy Ready, Multifamily Construction, all electric | Washington $900;<br>All other states $1,100 |

**Additional Information**

BPA does not allow custom projects for new multifamily construction. Calculating the savings above code requires highly complex and specialized energy models to verify what the savings are above code. BPA does not have the resources to do this; it relies on the third party implementation programs referenced in the UES measures to perform this modeling and determine the code trade-offs utilized.

In addition to the Energy Efficient New Multifamily Construction and BPA Zero Energy Ready New Multifamily Construction measures, the following are available as alternate stand-alone measures in New, Multifamily Construction. For requirements, specifications and payment levels, see the referenced section.

**Required Documents**

New Multifamily Construction Project Information Form

**Supporting Content**

New Multifamily Construction Qualified Programs List

Requirements for Inclusion on Multifamily Qualified Programs List

| ADDITIONAL MEASURES AVAILABLE FOR NEW, MULTIFAMILY CONSTRUCTION | LOCATION IN IMPLEMENTATION MANUAL |
|---|---|
| Residential Lighting | 11.2 |
| Clothes Washers | 11.4 |
| Clothes Dryers | 11.4 |
| Thermostatic Shut-Off Valves | 11.6.1 |

## 11.10 WEATHERIZATION (STANDARD INCOME)

**Weatherization Eligibility Table**

| PRIMARY RESIDENTIAL HEATING SYSTEM | HOME TYPE | | | | |
|---|---|---|---|---|---|
| | SINGLE-FAMILY: EXISTING | SINGLE-FAMILY: NEW | MANUFACTURED: EXISTING* | MANUFACTURED: NEW | MULTIFAMILY: EXISTING* |
| Electric Forced-Air Furnace | Eligible | Not eligible | Eligible | Not eligible | Eligible |
| Ducted Heat Pump | Eligible | | Eligible | | Eligible |
| Ductless Mini-Split Heat Pump | Eligible | | Eligible | | Eligible |
| Zonal (Electric) | Eligible | | Eligible | | Eligible |
| Wood or Pellet | Eligible when accompanied by any electric heating system | | Eligible when accompanied by any electric heating system | | Eligible when accompanied by any electric heating system |
| Oil/Gas/ Propane | Eligible as supplementary heat for a heat pump system.<br><br>Eligible if accompanied by an electric heat system, however, the nonelectric heating system must be decommissioned | | Eligible as supplementary heat for a heat pump system.<br><br>Eligible if accompanied by an electric heat system, however, the nonelectric heating system must be decommissioned | | Eligible as supplementary heat for a heat pump system.<br><br>Eligible if accompanied by an electric heat system, however, the nonelectric heating system must be decommissioned |
| None existing | Not eligible | | Not eligible | | Not eligible |

*Not all weatherization measures are available in manufactured homes and/or both low-rise and mid-/high-rise multifamily housing. Refer to individual measure sections for more detail.

Weatherization measures in this section include Insulation, Prime Window and Patio Door Replacements, Low-E Storm Windows, Exterior Insulated Doors, and Whole House and Prescriptive Air Sealing. All weatherization measures in single-family and manufactured homes must be installed according to the BPA Residential Weatherization Specifications & Best Practices Guide. Refer to individual measures to confirm which are eligible for existing single-family, manufactured, and multifamily low-, mid-, and high-rise buildings.

### Supporting Content

BPA Weatherization Specifications & Best Practices Guide

Optional Weatherization Data Collection Tool

RTF Unit Energy Savings (UES) Measures

**Home Heating System Eligibility**

For the purposes of this section and associated low-income weatherization measures, an electric heating system includes an air-source heat pump (ASHP), ground source heat pump, electric forced-air furnace, ductless or ducted mini-split heat pump, zonal electric-resistance heat, or plug-in space heaters.

For a home to be eligible for weatherization measures, it must be heated with either a primary electric heating system (serving 50% or more of the conditioned living area of a residence) or must have one of the following as an existing heating system:

1. A permanently installed electric heating system with either a wood stove, pellet stove, fireplace, fireplace insert (wood or pellet), or wood furnace.
2. A wood or pellet stove without any other nonelectric space heating system, accompanied by the current usage of plug-in electric space heaters.
3. An electric heat pump system integrated with a nonelectric heating system (e.g., natural gas, propane, or wood supplementary/backup system).
4. An electric heat system with a separate and entirely decommissioned nonelectric space heating system (e.g., oil, natural gas, or propane furnace). The entire functional or nonfunctional nonelectric space heating system must be decommissioned:
    - All nonelectric system equipment removed, all penetrations sealed, and all fuel (electric, gas, or oil) connections to the decommissioned heating system disconnected. System equipment includes the furnace, air-handler, fuel lines, and fuel tanks (abated in compliance with local code).
    - If construction limits prevents removal of the entire nonelectric system (or other portions of the space heating equipment), then the remainder of the system must be decommissioned, removed, all penetrations sealed, and all fuel (electric, gas, or oil) connections to the decommissioned heating system disconnected.

BPA offers and maintains an Optional Weatherization Data Collection Tool that technicians and utilities can use to gather weatherization data more easily. This optional form is not required in the customer file.

Information about Low-Income Weatherization measures is outlined in Section 11.11.

### 11.10.1 Insulation

**Basis for Energy Savings**

Attic, wall, and floor insulation can improve the thermal performance of an existing home. If properly installed, insulation will help maintain more constant and comfortable temperatures while preventing build-up of moisture and condensation. Always insulate to the maximum level achievable within the available space to meet the minimum required insulation R-value. Consider pairing with air sealing when possible to achieve maximum savings. More information about the basis for savings can be found on the RTF website.

**Requirements and Specifications**

Insulation measures in single-family and manufactured homes must be installed according to the BPA Residential Weatherization Specifications & Best Practices Guide.

**Pre-conditions:** See "Observed Existing Insulation Range" in the table below.

**Post-conditions:** See "Measure Ending R-Value" in the table below.

Final installed R-values for a reportable measure must meet the required final R-value at a minimum. However, if a physical barrier prevents the full depth of insulation from being installed, then the R-value shall meet the maximum achievable within the available space.

**Supporting Content**

RTF UES Measures

BPA Weatherization Specifications & Best Practices Guide

UES Measure List

Optional Weatherization Data Collection Tool

Note: The requirement to round the project square footage will not be required until BEETS goes live.

| HOME TYPE | INSULATION | OBSERVED EXISTING INSULATION RANGE | MEASURE STARTING R-VALUE | MEASURE ENDING R-VALUE |
|---|---|---|---|---|
| Single-Family | Attic | R-0 to R-7 | R-0 | R-38 or R-49 |
| | | R-8 to R-11 | R-11 | R-38 or R-49 |
| | | R-12 to R-19 | R-19 | R-38 or R-49 |
| | | R-20 to R-30 | R-30 | R-38 or R-49 |
| | Floor | R-0 to R-11* | R-0 | R-19, R-25, or R-30 |
| | | R-12* to R-19 | R-19 | R-30 |
| | Wall | No insulation present | R-0 | R-11 |
| Manufactured Home | Attic | R-0 to R-7 | R-0 | R-22 or maximum possible |
| | | R-0 to R-11 | R-0 | R-30 or maximum possible |
| | | R-12 to R-17 | R-11 | R-30 or maximum possible |
| | Floor | R-0 to R-7 | R-0 | R-22 or maximum possible |
| | | R-8 to R-11 | R-11 | R-22 or maximum possible |
| Multifamily Low-Rise | Attic | R-0 to R-11* | R-0 | R-19, R-38, or R-49 |
| | | R-12* to R-19 | R-19 | R-38 or R-49 |
| | | R-20 to R-38 | R-38 | R-49 |
| | Floor | R-0 to R-11* | R-0 | R-19 or R-30 |
| | | R-12* to R-19 | R-19 | R-30 |
| | Wall | No insulation present | R-0 | R-11 |
| Multifamily Mid-/ High-Rise | Roof | R-0 to R-5 | R-0 | R-19 |
| | | R-0 to R-5 | R-0 | R-49 |
| | Wall | R-0 to R-5 | R-0 | R-11 |
| | | R-0 to R-5 | R-0 | R-19 |

*Pre-condition definitions were modified for consistency across building types, where possible.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed or used) | | X |
| Documentation of pre- and post-insulation R-values | | X |
| Description of primary heating type *(only required in BPA Energy Efficiency Tracking System if claiming an "Any Electric" measure) | *X | X |

**Payment**

Payments and busbar energy savings for specific measures are available in the UES Measure List. Payments are available for HVAC-specific primary heat types or by reporting Any Electric Heat.

**Additional Information**

The "Any Electric Heat" measures are a weighted average of savings of homes with an electric furnace, electric zonal, or a heat pump. Savings are reduced by the percentage of heat supplied by supplemental fuels for an average home, but they qualify for higher payments than those reported with granular heating types.

Project reporting to BPA is based on the square footage of installed insulation rounded to the nearest whole number.

Please note: The sloped surface of an A-frame home (the entire roof structure) must be insulated and invoiced as a sloped roof in a finished attic (see Section 4.6 Sloped Roof Cavities in Finished Attics in the BPA Residential Weatherization Specifications & Best Practices Guide.

Knee walls should be insulated and invoiced as wall insulation, not attic insulation (see Section 8 Wall Insulation: Site-Built Homes in the BPA Residential Weatherization Specifications & Best Practices Guide.

Roof insulation on a manufactured home that includes both blown-in attic and rigid insulation covered by an EPDM roof system should be claimed as one roof insulation measure and is based on total insulation value.

### 11.10.2 Prime Window and Patio Door Replacement

**Basis for Energy Savings**

Upgrading to windows and patio doors with insulated, Low-E glass is recommended when home occupants experience high energy bills, problems with window operation, noticeable leakage and/or damaged and decayed frame(s), and/or condensation. Savings come from replacing existing single-pane windows or patio doors with any frame type, or replacing double-pane windows or patio doors with a metal frame. Patio doors include sliding or French glass doors. More detailed information is available on the RTF website.

**Requirements and Specifications**

Window and patio door measures in single-family and manufactured homes must be installed according to the BPA Residential Weatherization Specifications & Best Practices Guide.



**Supporting Content**

RTF UES Measures

BPA Weatherization Specifications & Best Practices Guide

UES Measure List

Optional Windows Calculator

Optional Weatherization Data Collection Tool

NFRC Directory Search

Note: The requirement to round the project square footage will not be required until BEETS goes live.

**Pre-conditions:** Pre-existing windows and patio doors must be:

1. Single-pane with/without storms, any frame type (e.g., metal, wood, or vinyl), or
2. Double-pane, metal frame only.

**Post-condition:** The weighted average of replacement windows must have a National Fenestration Rating Council (NFRC) minimum U-value of 0.30 or 0.22 for windows and 0.35 or 0.30 for patio doors.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed or used) | | X |
| NFRC stickers or other verification of U-value for each window | | X |
| Documentation of:<br>• Number of windows or patio doors replaced<br>• Pre-condition (frame type, i.e., wood, metal, single or double-pane)<br>• Post-condition U-value | | X |
| Documentation of square footage of windows or patio doors replaced | X | X |
| Description of primary heating type *(only required in BPA Energy Efficiency Tracking System if claiming an "Any Electric" measure) | *X | X |

**Payment**

| HOUSING TYPE | RETROFIT TYPE | U-VALUE | PRIMARY HEATING TYPE | PAYMENT PER SQ. FT. |
|---|---|---|---|---|
| Single-Family | Single-pane window, any frame type or double-pane window, metal frame type. | 0.30 | Any Electric | $6 |
| | | | EFAF | $4 |
| | | | Zonal/DHP | $3 |
| | | | Ducted HP | $2 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type. | 0.35 | Any Electric | $6 |
| | | | EFAF | $4 |
| | | | Zonal/DHP | $3 |
| | | | Ducted HP | $2 |
| | Single-pane window, any frame type or double-pane window, metal frame type. | 0.22 | Any Electric | $8 |
| | | | EFAF | $5 |
| | | | Zonal/DHP | $4 |
| | | | Ducted HP | $3 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type. | 0.30 | Any Electric | $8 |
| | | | EFAF | $5 |
| | | | Zonal/DHP | $4 |
| | | | Ducted HP | $3 |
| Manufactured | Single-pane window, any frame type or double-pane window, metal frame type. | 0.30 | Any Electric | $6 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type. | 0.35 | Any Electric | $6 |
| | Single-pane window, any frame type or double-pane window, metal frame type. | 0.22 | Any Electric | $8 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type. | 0.30 | Any Electric | $8 |
| Multifamily | Single-pane window, any frame type or double-pane window, metal frame type. | 0.30 | Any Electric | $12 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type. | 0.35 | Any Electric | $12 |
| | Single-pane window, any frame type or double-pane window, metal frame type. | 0.22 | Any Electric | $16 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type. | 0.30 | Any Electric | $16 |
| Multifamily Mid-/High-Rise | Single-pane window, any frame type or double-pane window, metal frame type. | 0.30 | Ducted HP | $6–$12 |
| | | | Zonal/Electric FAF | $6–$12 |
| | Single-pane patio door, any frame type or double-pane patio door, metal frame type | 0.35 | Ducted HP | $6–$12 |
| | | | Zonal/Electric FAF | $6–$12 |

**Additional Information**

The "Any Electric Heat" measures are a weighted average of savings of homes with an electric furnace, electric zonal, or a heat pump. Savings are reduced by the percentage of heat supplied by supplemental fuels for an average home, but they qualify for higher payments than those reported with HVAC-specific heating types.

Project reporting to BPA is based on whole square footage and shall be calculated at a project level using one of the following methods:

1. Sum the square footage of each prime window or patio door replacement, then round to the nearest whole square footage; or
2. Round each individual prime window or patio door replacement to the nearest whole square footage, then sum all the rounded areas.

The two methods are provided to accommodate different types of installation configurations.

Rough opening sizes (used for the purposes of estimates) for windows and patio doors are often 105-110% of actual window order dimensions. As a result, the square footage provided by contractors for cost estimates may overestimate the actual window square footage. BPA allows up to 10% variance between rough opening sizes and total final invoiced window dimensions to account for variability. For assistance calculating window measurements, please utilize the Optional Windows Calculator or Windows Worksheet in the Optional Weatherization Data Collection Tool.

Prime windows and patio doors should be reported on the invoice using the reference number that reflects the pre-existing pane count. If single and double-pane windows were replaced, the square footage of each type should be reported separately.

### 11.10.3 Low-E Storm Windows

**Basis for Energy Savings**

A storm window is an additional window placed on the exterior or interior of an existing framed window to provide an additional barrier from outdoor elements. A window with Low-E coating reduces heat loss when it is cold, and Low-E coatings with a low solar transmittance (TSOL) can block excessive solar heat during summer months. BPA offers a measure for installing Low-E storm windows on single-pane windows with any frame type, or double-pane windows with a metal frame without existing storm windows. More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure is not available for mid-/high-rise multifamily buildings.

**Pre-conditions:** Pre-existing windows must be either:

- Single-pane, any frame type (e.g., metal, wood, or vinyl) without existing storm windows, or
- Double-pane, metal frame only without existing storm windows.

**Post-conditions:** The new Low-E storm window must:

- Be an ENERGY STAR-Certified product.
- Have the same opening type as the existing prime window (i.e., single/double hung, casement, slider, etc.) to facilitate summertime ventilation and egress.
- Be installed per manufacturer's specifications, fastened by screws, not designed for seasonal removal, and with the Low-E coating facing toward the home's interior.
- If installed with an existing metal frame window, the storm window frame must not be in direct contact with the metal frame (attach using framing lumber or furring strips).

**Supporting Content**

RTF UES Measures

ENERGY STAR-Certified Storm Windows

Optional Weatherization Data Collection Tool

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that the product requirements have been met (e.g., manufacturer, model number, type, size, and quantity of equipment or product installed or used) | | X |
| A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo. (In the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured.) | | X |
| Documentation of:<br>• Number of storm windows installed<br>• Pre-condition (frame type, i.e., wood, metal, single or double pane) | | X |
| Documentation of square footage of storm windows installed | X | X |
| Description of primary heating type *(only required in BPA Energy Efficiency Tracking System if claiming an "Any Electric" measure) | *X | X |

### Payment

| MEASURE CATEGORY | PAYMENT |
|---|---|
| ENERGY STAR-Certified Low-E Storm Window single-pane any frame type, or double-pane metal frame | $2 per Square Foot |

### Additional Information

Installing Low-E storm windows with windows of the same opening type can be difficult when the prime window is a casement or awning style. For these prime window types, installation of a new prime window may be preferable over the addition of a Low-E storm window.

## 11.10.4 Exterior Insulated Doors (BPA-Qualified)

### Basis for Energy Savings

New exterior insulated doors are solid doors, which may contain windows, and are not full-light glass doors such as patio sliders. The base case for eligibility is a substandard exterior door, including one without insulating material or where the weather stripping has degraded by at least 50%. More detailed information is available on the RTF website.

### Requirements and Specifications

This measure is not available for multifamily mid- or high-rise.

**Pre-condition:** An uninsulated or otherwise thermally substandard exterior door.

**Post-conditions:** The door must be a pre-hung door with a threshold. The door must either be ENERGY STAR-Certified or be NFRC-rated and meet the U-factor and solar heat gain coefficient requirements listed in the table below based on glazing levels.

- The glazing level refers to the distinction of whether the replacement door is ≤ ½-Lite, which refers to the proportion of the door that is taken up by a window.
- BPA will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured even if the ENERGY STAR specifications change.

If the door is not ENERGY STAR-Certified or NFRC-rated, or the ENERGY STAR list is not accessible, utilities may comply by documenting that the door meets ENERGY STAR specifications.

| EXTERIOR INSULATED DOORS | | |
|---|---|---|
| **GLAZING LEVEL** | **U-FACTOR** | **SOLAR HEAT GAIN COEFFICIENT** |
| Opaque | ≤ 0.17 | No Rating |
| ≤ ½-Lite | ≤ 0.25 | ≤ 0.25 |
| >½-Lite | ≤ 0.30 | ≤ 0.40 |

### Documentation Requirements

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |
| Documentation that the product requirements have been met (e.g., manufacturer, model number, type, size, and quantity of equipment or product installed or used) | | X |
| Documentation the door is either ENERGY STAR-Certified or NFRC-rated and meets the U-factor and solar heat gain co-efficient specifications (e.g. a copy of the ENERGY STAR product list showing the product, the product information insert, packaging that includes the ENERGY STAR logo, or a copy of the NFRC sticker). If the door is not ENERGY STAR-Certified or NFRC-rated, or the ENERGY STAR list is not accessible, utilities may comply by documenting that the door meets ENERGY STAR specifications. | | X |

### Supporting Content

RTF UES Measures

ENERGY STAR Residential Door Criteria

Optional Weatherization Data Collection Tool

NFRC Directory Search

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Documentation of the pre- and post-conditions | | X |
| Documentation of the number of doors replaced | X | X |
| Description of primary heating type | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Exterior Insulated Doors | $40 per door |

### 11.10.5 Whole House Air Sealing and Testing

**Basis for Energy Savings**

Whole House Air Sealing and Testing is an incremental reduction in air infiltration of a home, measured by a blower door test. Air Sealing improves the thermal performance, indoor air quality, and longevity of the building. More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure is not available in low-, mid-, or high-rise multifamily homes.

Work under this measure must be performed according to the BPA Residential Weatherization Specifications & Best Practices Guide.

Whole house air sealing requires the use of a blower door to measure and identify air leakage locations in the home. Mechanical ventilation may be required.

If Performance Tested Comfort System (PTCS) duct sealing is performed at the same time as air sealing, the baseline blower door CFM 50 reading for the Whole House Air Sealing and Testing measure must be taken with all the supply and return duct registers temporarily sealed off, so that house air leakage can be measured independently from duct leakage.

If combustion appliances are present (e.g., fireplace, wood, or gas stove, gas range, gas water heater), a UL- or CUL-approved carbon monoxide detector must be present or be installed. See the BPA Residential Weatherization Specifications & Best Practices Guide for other unique safety precautions when air sealing.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |

## Supporting Content

RTF UES Measures

BPA Weatherization Specifications & Best Practices Guide

UES Measure List

Optional Weatherization Data Collection Tool

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Documentation that the measure requirements have been met (e.g., manufacturer, model number, type, size, and quantity of equipment or product installed or used) | | X |
| Documentation of the following conditions are required:<br>• Pre- and post-sealing CFM leakage (CFM at 50 Pascals)<br>• Building volume<br>• Notes on mechanical ventilation requirement | | X |
| Documentation of the total square footage of the pressure zone tested and sealed (typically the conditioned, interior space heated floor area of the home) | X | X |

**Payment**

BPA payment is based on the reduction in air infiltration per reduction in CFM 50, rounded to the nearest whole number. Payments and busbar energy savings are available in the UES Measure List.

- Total Payment = Quantity X Payment
- Quantity = Difference between pre-and-post CFM50

### 11.10.6 Prescriptive Air Sealing

**Basis for Energy Savings**

Prescriptive Air Sealing is an incremental reduction in air infiltration of a home's attic or crawlspace. Air Sealing improves the thermal performance, indoor air quality, and longevity of the building. More detailed information is available on the RTF website.

**Requirements and Specifications**

This measure is not available for low-, mid-, or high-rise multifamily or manufactured homes.

Work under this measure must be performed according to the BPA Residential Weatherization Specifications & Best Practices Guide.

If combustion appliances are present (e.g., fireplace, wood or gas stove, gas range, gas water heater), a UL- or CUL-approved carbon monoxide detector must be present or be installed. See the BPA Residential Weatherization Specifications & Best Practices Guide for other unique safety precautions when air sealing.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| End-user identifying information including unique site ID and address. | X | X |
| Equipment or contractor invoice showing:<br>1. Equipment order or purchase date<br>2. Installed cost | | X |

**Supporting Content**

RTF UES Measures

BPA Weatherization Specifications & Best Practices Guide

UES Measure List

Optional Weatherization Data Collection Tool

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Documentation that the measure requirements have been met (e.g., manufacturer, model number, type, size, and quantity of product installed or used) | | X |
| Documentation of square footage of area air sealed (attic and/or crawlspace) | X | X |

**Payment**

Payment and busbar energy savings are available in the UES Measure List. Both are based on the square footage of the area where prescriptive air sealing is performed.

**Additional Information**

If prescriptive air sealing is completed in both the attic and crawlspace in the same home, the home is eligible for two payments. Both payments can be claimed separately and must follow the same documentation requirements.

## 11.11 LOW-INCOME ENERGY EFFICIENCY MEASURES

Measures for qualifying low-income homes include:

Heat Pump Water Heaters (Section 11.6)

HVAC (Section 11.7: Ductless and PTCS Ducted Heat Pumps, PTCS and Prescriptive Duct Sealing, Duct Insulation, and Smart Thermostats)

Weatherization (Section 11.10: Insulation, Prime Windows and Patio Doors, Low-E Storm Windows, Exterior Insulated Doors, and Whole House and Prescriptive Air Sealing)

**Income Qualification Guidelines & Documentation**

Low-income household eligibility is based on gross income and is defined in the Federal Weatherization Assistance Program (WAP) as 200% of the poverty income levels. Alternatively, approved statewide or tribal eligibility definitions may substitute for federally established qualifying low-income levels, if provided.

For multi-unit properties, 50% or more of the households must income qualify in order for the weatherization of the entire building or complex to qualify for low-income payments. Utilities may set more stringent requirements at their discretion, however;

Two-, three-, and four-unit dwellings: A minimum of 50% of households can be one household in a two-unit dwelling, two households in a three-unit dwelling, or two households in a four-unit dwelling.

Five or more units: A minimum of 50% of households.

Utility customers shall retain documentation of the total number of individuals in the household and proof that the end-user's income eligibility was reviewed from a verifiable source. "Verifiable" refers to any documentation that can be verified by another source, including but not limited to a pay stub, copies of IRS form 1040, Section 8 eligibility, certification by a Community Action Agency (CAA), and certification by a Low Income Home Energy Assistance Program (LIHEAP) administrator. Please review the Low-Income Energy Efficiency New Opportunities Guide listed on the Low-Income Energy Efficiency webpage for more information.

Utility customers may use the eligible low-income measures to implement low-income programs themselves through an implementation firm or CAA but must retain responsibility for and control over the program. For more information about the Low-Income Program, review the Low-Income Energy Efficiency New Opportunities Guide.

### Supporting Content

Low-Income Energy Effieciency Webpage

Low-Income New Opportunities Guide

UES Measure List

For additional required and supporting content, refer to related Standard Income Measure Sections.

**Basis for Energy Savings**

Refer to individual corresponding "standard income" measure sections for more information.

**Requirements and Specifications**

All existing housing types (single-family, manufactured and multifamily) are eligible for low-income measures although not all measures are applicable to each housing type. See the Low-Income Payment Table in this section for available measures by housing type.

Homes must be income-qualified in BPA's service territory.

For any measure with a required BPA Qualified Products List (QPL), the technology must be on the QPL to qualify for payment.

Refer to individual corresponding residential measure sections for qualifying heating types, required installation specifications, QPLs, contractor certifications, forms, and additional measure clarification. Please see the Residential Table of Contents at the beginning of Section 11 for additional reference.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| End-user identifying information, including unique site ID and address | X | | X |
| Documentation of total number of individuals in the household, and documentation that the end user's income eligibility was reviewed from a verifiable source (e.g., paystub, Section 8 voucher, etc.). | | | X |
| Equipment or contractor invoice showing:<br>• Equipment order or purchase date<br>• Cost of installed measures<br>• Cost of any related repairs | | | X |
| Documentation that the measure requirements have been met (e.g., manufacturer, model number, type, size, and quantity of equipment or product installed or used) | | | X |
| Description of primary heating type *(only required in BPA Energy Efficiency Tracking System if claiming an "Any Electric" measure and Prescriptive Duct Sealing) | *X | | X |
| Insulation: Documentation of pre- and post-insulation R-value | | | X |
| Insulation: Documentation of square footage of area insulated | X | | X |
| Prime windows or patio doors:<br>• Number of windows or patio doors replaced<br>• Pre-condition (frame type, i.e., wood, metal, single or double-pane)<br>• NFRC stickers or other verification of U-values | | | X |
| Prime windows or patio doors: square footage of windows or patio doors replaced | X | | X |

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | | |
|---|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | PTCS SITE REGISTRY | CUSTOMER FILE |
| Exterior insulated doors: Documentation of pre- and post-conditions | | | X |
| Exterior insulated doors: Documentation of number of doors | X | | X |
| Low-E storm windows: A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo | | | X |
| Low-E storm windows: Documentation of square footage of storm windows installed | X | | X |
| Ductless heat pumps: Documentation of the manufacturer, model number, and total installation cost for the outdoor unit | X | | X |
| Ductless heat pumps: AHRI Certificate demonstrating an HSPF of 9 or 7.6 HSPF2 or greater | | | X |
| Prescriptive duct sealing installation information, including one of the following:<br>*"Site Registry Measure ID reflecting 'BPA-Approved' status" (if the job was entered into the PTCS site registry), or<br>Prescriptive Duct Sealing Form (if job not entered into Registry, or if form supports a pre-approved utility certification program that does not utilize the Registry). | *X | *X | X |
| PTCS duct sealing/PTCS heat pumps: PTCS site registry Measure ID reflecting a "BPA Approved" status | X | X | X |
| Contractor-Installed Smart Thermostat: Documentation of make and model | X | | |

**Payment**

Customers may combine funding sources within a residence but may not combine funding from multiple BPA sources for the same measure.

BPA allows customers to report costs directly attributable to the installation of the measure as eligible for dollar-for-dollar payment except as noted in the table below, not to exceed 100% of the actual cost. This includes any cost incurred for meeting requirements and specifications (e.g.,verification of income, attic and crawl space ventilation, removal of knob and tube wiring, and underfloor moisture barriers).

Customers may also report costs related to repair work that is directly associated with the installation of the measure required for health and safety reasons or to ensure the efficacy of the measure (e.g., replace rotting wood in window frame or repair a hole in the roof). Repair costs must be documented on contractor invoices and reported separately.

To determine accurate payment levels for low-income weatherization measures, please reference the Low-Income Payment Table below. The UES Measure List and IM "standard income" measure sections may not accurately reflect the overall per-unit reimbursement totals for some low-income weatherization measures. If invoicing BPA for low-income weatherization measure payments, please disregard the UES measure list payment rates and instead reference the contractor invoice and report the total low-income measure cost and total cost of eligible repairs.

| HOME TYPE | LOW-INCOME QUALIFYING MEASURE | INSTALLED MEASURE COST PAYMENT - DOLLAR-FOR-DOLLAR (EXCEPT AS NOTED) | REPAIR COST PAYMENT - DOLLAR-FOR-DOLLAR (EXAMPLES PROVIDED) |
|---|---|---|---|
| Single-Family | Attic Insulation (up to R-49) | Dollar-for-dollar | Examples include: Repair roof leak, rebuild external entrance covering, and fix hole in siding |
| | Floor Insulation (up to R-30) | Dollar-for-dollar | |
| | Wall Insulation (up to R-11) | Dollar-for-dollar | |
| | Prime Window | Dollar-for-dollar, not to exceed $20/ sq. ft. | Examples include: Address dry rot in window framing, replace rotten threshold, and repair cracked header |
| | Low-E Storm Window | Dollar-for-dollar, not to exceed $10/ sq. ft. | |
| | Patio Door | Dollar-for-dollar, not to exceed $20/ sq. ft. | |
| | Exterior Insulated Door | Dollar-for-dollar, not to exceed $400/ door | |
| | Whole House Air Sealing | Dollar-for-dollar | Examples include: Reframe attic access hatch and repair pull-down stairs |
| | Prescriptive Air Sealing | Dollar-for-dollar | |
| | PTCS or Prescriptive Duct Sealing | Dollar-for-dollar, not to exceed $500 | Examples include: Replace rusted duct work and repair broken filter slot |
| | Ductless or Ducted Mini-Split Heat Pump(s) or Ductless Heat Pump (DHP) Upgrade | Dollar-for-dollar, not to exceed $4,400/ DHP | Examples include: Improve structural support for interior head |
| | PTCS Heat Pump Upgrade or ~~PTCS Heat Pump~~ Conversion* | Dollar-for-dollar, not to exceed $6,200 | Examples include: Repair to damaged siding at connection point |
| | Duct Insulation | Dollar-for-dollar | Examples include: Replace severely rusted, corroded, or disconnected ductwork |
| | 40-Gallon Tank Size Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | Examples include: Replacement of plumbing connections at water heater, relocating to ensure adequate ventilation |
| | Tier 1 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | |
| | Tier 2 or 3 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | Tier 4 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | BPA Approved Contractor-Installed Smart Thermostat | Dollar-for-dollar, not to exceed $400 | No repair costs allowed for this measure |

| HOME TYPE | LOW-INCOME QUALIFYING MEASURE | INSTALLED MEASURE COST PAYMENT - DOLLAR-FOR-DOLLAR (EXCEPT AS NOTED) | REPAIR COST PAYMENT - DOLLAR-FOR-DOLLAR (EXAMPLES PROVIDED) |
|---|---|---|---|
| Multifamily Low-Rise | Attic Insulation (up to R-49) | Dollar-for-dollar | Examples include: Repair roof leak, rebuild external entrance covering, and fix hole in siding |
| | Floor Insulation (up to R-30) | Dollar-for-dollar | |
| | Wall Insulation (up to R-19) | Dollar-for-dollar | |
| | Prime Window | Dollar-for-dollar, not to exceed $20/ sq. ft. | Examples include: Address dry rot in window framing, replace rotten threshold and repair cracked header |
| | Low-E Storm Window | Dollar-for-dollar, not to exceed $10/ sq. ft. | |
| | Patio Door | Dollar-for-dollar, not to exceed $20/ sq. ft. | |
| | Exterior Insulated Door | Dollar-for-dollar, not to exceed $400/ door | |
| | 40-Gallon Tank Size Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | Examples include: Replacement of plumbing connections at water heater, relocating to ensure adequate ventilation |
| | Tier 1 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | |
| | Tier 2 or 3 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | Tier 4 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | BPA Approved Contractor-Installed Smart Thermostat | Dollar-for-dollar, not to exceed $400 | No repair costs allowed for this measure |
| Multifamily Mid-/High-Rise | Attic Insulation (up to R-49) | Dollar-for-dollar | Examples include: Repair roof leak, rebuild external entrance covering, and fix hole in siding |
| | Wall Insulation (up to R-19) | Dollar-for-dollar | Examples include: Repair roof leak, rebuild external entrance covering, and fix hole in siding |
| | Prime Window | Dollar-for-dollar, not to exceed $20/ sq. ft. | Examples include: Address dry rot in window framing, replace rotten threshold, and repair cracked header |
| | Patio Door | Dollar-for-dollar, not to exceed $20/ sq. ft. | |
| | 40 Gallon Tank Size Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | Examples include: Replacement of plumbing connections at water heater, relocating to ensure adequate ventilation |
| | Tier 1 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | |
| | Tier 2 or 3 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | Tier 4 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | BPA Approved Contractor-Installed Smart Thermostat | Dollar-for-dollar, not to exceed $400 | No repair costs allowed for this measure |

| HOME TYPE | LOW-INCOME QUALIFYING MEASURE | INSTALLED MEASURE COST PAYMENT - DOLLAR-FOR-DOLLAR (EXCEPT AS NOTED) | REPAIR COST PAYMENT - DOLLAR-FOR-DOLLAR (EXAMPLES PROVIDED) |
|---|---|---|---|
| Manufac-tured | Attic Insulation (up to R-30) | Dollar-for-dollar | Examples include: Repair roof leak, rebuild external entrance covering |
| | Floor Insulation (up to R-22) | Dollar-for-dollar | |
| | Prime Window | Dollar-for-dollar, not to exceed $20/ sq. ft. | Examples include: Address dry rot in window framing, replace rotten threshold, and repair cracked header |
| | Low-E Storm Window | Dollar-for-dollar, not to exceed $10/ sq. ft. | |
| | Patio Door | Dollar-for-dollar, not to exceed $20/ sq. ft. | |
| | Exterior Insulated Door | Dollar-for-dollar, not to exceed $400/ door | |
| | Whole House Air Sealing | Dollar-for-dollar | Examples include: Install whole house ventilation fan |
| | PTCS or Prescriptive Duct Sealing | Dollar-for-dollar, not to exceed $500 | Examples include: Replace rusted ductwork and repair broken filter slot |
| | Ductless or Ducted Mini-Split Heat Pump(s) or Ductless Heat Pump Upgrade | Dollar-for-dollar, not to exceed $4,400/ DHP | Examples include: Improve structural support for interior head |
| | PTCS Heat Pump Upgrade or Conversion* | Dollar-for-dollar, not to exceed $6,200 | Examples include: repair to damaged siding at connection point, replacement of circuit breaker |
| | 40 Gallon Tank Size Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | Examples include: Replacement of plumbing connections at water heater, relocating to ensure adequate ventilation |
| | Tier 1 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $1,850 | |
| | Tier 2 or 3 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | Tier 4 Unitary Heat Pump Water Heater | Dollar-for-dollar, not to exceed $2,000 | |
| | BPA Approved Contractor-Installed Smart Thermostat | Dollar-for-dollar, not to exceed $400 | No repair costs allowed for this measure |

*PTCS Heat Pump upgrades and conversions include both non-variable speed and variable speed heat pumps. When claiming a Low-Income PTCS Variable Speed Heat Pump, utilities should use the RefNo for a Low-Income PTCS Air Source Heat Pump.

## 11.12 BEHAVIORAL

### 11.12.1 Behavioral Home Energy Reports (BPA-Qualified) (Effective April 1, 2020)

#### Basis for Energy Savings

The base case (pre-existing state) used to calculate energy efficiency savings for Behavioral Home Energy Reports in existing homes is a single-family, multifamily, or manufactured home that does not receive home energy reports from their utility or other third-party vendor. The efficient case is an end-use household that regularly receives a Behavioral Home Energy Report from their utility or participating third-party vendor. Energy savings are derived from a weighted average of evaluated Northwest behavioral home energy report programs. BPA documentation requirements consider these factors.

**Supporting Content**

Behavioral Home Energy Reports Qualified Programs List

COTR Request and Acknowledgement Procedure

**Requirements and Specifications**

Behavioral Home Energy Reports must include:

Seasonal household energy consumption information;

A normative comparison of household energy consumption to similar households;

Tips and strategies to reduce home energy consumption.

Behavioral Home Energy Reports must be delivered to end-use residential customers on a quarterly basis at a minimum. Programs that provide reports more frequently are allowed.

Households must be enrolled to receive Behavioral Home Energy Reports for one continuous year; this constitutes a cohort or program year. Utilities may invoice BPA after the conclusion of the program year. The IM rules in effect at the beginning date of the cohort or program year are the rules that will govern payment and eligibility. ~~Payment is made at the conclusion of the year.~~

Behavioral Home Energy Reports must be provided by a vendor that is listed on BPA's Behavioral Home Energy Reports Qualified Programs List. If a customer believes a program vendor should be on BPA's Qualified Programs List, and it is not the customer should use the COTR Request and Acknowledgment Procedure.

**Documentation Requirements**

Utilities must document:

Summary energy saving reports (of the Behavioral Home Energy Report program) that are provided to utilities by qualified third-party vendors.

A sample copy or redacted version (to protect personally identifiable information) of a Behavioral Home Energy Report that is sent to end-use customers.

All third-party vendor invoice(s) for the cohort/program year in order to receive payment from BPA.

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Summary Energy Savings Report showing frequency of report delivery. | X | X |
| Total number of households enrolled and receiving Behavioral Home Energy Reports. | X | X |
| Documentation that the measure requirements have been met (e.g., sample copy of end-use Behavioral Home Energy Report). | X | X |
| All vendor invoices showing:<br>Service period for Behavioral Home Energy Report delivery.<br>Total cost of Behavioral Home Energy Report delivery. | | X |

**Payment**

Utilities may request payment for each household that remains enrolled to receive Behavioral Home Energy Reports for the duration of one continuous cohort or program year. Households that opt out, move, and/or do not complete one year of Behavioral Home Energy Reports are not eligible for payment.

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Behavioral Home Energy Reports | $12 per household |

**Additional Information**

Utilities deciding to implement Behavioral Home Energy Reports for the first time are encouraged to contact BPA energy efficiency representatives (EERs) or BPA Program Staff with questions or for assistance.

## 11.13 RESIDENTIAL CUSTOM PROJECTS

**Requirements and Specifications**

Residential custom projects may be submitted using the custom projects process.

**Documentation Requirements**

See the Custom Projects Documentation Requirements (Section 4.6).

**Payment**

See the Custom Projects Payment Table (Section 4.1).

BPA does not allow custom projects for new multifamily construction. Calculating the savings above code requires highly complex and specialized energy models to verify what the savings are above code. BPA does not have the resources to do this and therefore relies on the third party implementation programs referenced in the UES measures to perform this modeling and determine the code trade-offs utilized.

### Supporting Content

Custom Projects Documentation Requirements

Custom Projects Payment Table

# Section 12: Utility Distribution Sector



Common utility distribution system measures include feeder conductor replacements and substation power-transformer replacements. Other energy saving measures include, but are not limited to lower-loss distribution transformers, particularly those with an amorphous core; voltage-class increases; power-factor corrections; adding a parallel feeder; and phase current balancing. A different kind of measure is Conservation Voltage Reduction (CVR) also referred to as voltage optimization (VO), which is a technique for improving the overall efficiency of a given feeder by reducing voltage on the feeder. The majority of the savings from VO projects occur at retail loads. Some retail load equipment saves more than others; motors without variable frequency drive (VFD) controls provide the best savings. Resistance heaters with thermostats do not save energy but reduce capacity.

All customers may submit Utility Distribution measures as a Custom Project Program; Option 1 customers may choose to instead use the Re-conductor and Transformer (RT) Program to report the savings. For technical questions or support, contact your BPA customer service engineer or energy efficiency representative.

**Utility Distribution Measures**

| MEASURE | UTILITY REPORTING METHOD | |
|---|---|---|
| | CUSTOM PROJECT PROGRAM (OPTION 1 OR OPTION 2) | RE-CONDUCTOR & TRANSFORMER PROGRAM |
| CVR or VO | X | |
| Power Transformer Replacement | X | X |
| Service Conductor Replacement | X | X |
| Higher Distribution Primary Voltage, including insulator additions and replacement | X | |
| Transformer Load Management (replacement of improperly sized transformers for loss improvements) | X | X |
| Balancing Loads and Phases | X | |
| Adding Parallel Feeders | X | |
| Operation Improvement (recognition and phase balancing) | X | |
| Power Factor Improvement to Reduce Line Losses | X | |
| Volt-Amperes-Reactive, or VAR (reactive power) management | X | |
| Fixed and Switched Capacitors | X | |
| Lower Loss Service Distribution Transformer; Single- or Three-Phase, Pole or Pad Mounted | X | X |

## 12.1 UTILITY DISTRIBUTION CUSTOM PROJECT PROGRAM

**Requirements and Specifications**

Customers that submit Utility Disitribution measures as a custom project program shall follow the Option 1 or Option 2 custom project program requirements. See Sections 4.4 Option 1 Custom Project Program and 4.5 Option 2 Custom Project Program.

### Supporting Content

Option 1 Custom Project Program

Option 2 Custom Project Program

Simplified Voltage Optimization Measurement & Verification Protocol

Custom Project Program Documentation

Please note: BPA developed the Simplified Voltage Optimization Measurement & Verification (Simplified M&V) Protocol, to assist utilities with implementing VO projects. Utilities implementing CVR and VO projects may use the Simplified M&V Protocol. However, it requires analytics from load flow studies which is based on the Regional Technical Forum's (RTF) guidelines and focuses on residential and/or small commercial end-use loads. It requires specific system stability thresholds be met prior to lowering service voltages.

**Documentation Requirements**

See Section 4.6 Custom Project Program Documentation Requirements.

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Utility Distribution Custom Project Program, (Retrofit, New Construction, and Major Renovation, 4-19 year measure life) | Lesser of $0.25 per kWh or 70% of project cost |
| Utility Distribution Custom Project Program (Retrofit, New Construction, and Major Renovation, 20+ year measure life) | Lesser of $0.35 per kWh or 70% of project cost |

## 12.2 RE-CONDUCTOR & TRANSFORMER (RT) PROGRAM

**Basis for Energy Savings**

Utility system improvements can reduce energy use in the electrical distribution system. The Re-Conductor & Transformer (RT) Program provides utilities an alternative to submitting a Custom Project program for retrofit re-conductor measures and new and retrofit transformer replacement measures (i.e., substation power and distribution transformers of all sizes and both single- and three-phase types) when reporting purchased and installed measures. The RT Program includes input data fields, technical calculations, and M&V selections that are similar to Option 1 custom project program; however, it offers simplified data entry, automation of some technical calculations, and reduced administrative tasks.

**Requirements and Specifications**

Option 1 utility customers may submit up to six Re-conductor and six Transformer measures in one RT Program. Customers will upload the RT Program and project cost documentation (e.g., receipts) for each measure into the BPA Energy Efficiency Tracking System (BEETS). For transformer-only projects, loss-test reports for the existing system and proposed system will also be uploaded. Option 2 customers will use the Option 2 Custom Project program.

**Documentation Requirements**

| DOCUMENTATION DESCRIPTION | RETENTION/SUBMITTAL LOCATIONS | |
|---|---|---|
| | BPA ENERGY EFFICIENCY TRACKING SYSTEM | CUSTOMER FILE |
| Completed Re-Conductor & Transformer Program | X | X |
| Project cost (e.g., receipts) per measure | X | X |
| Loss-test reports (transformer projects only) for existing and proposed systems | X | X |

**Payment**

| MEASURE CATEGORY | PAYMENT |
|---|---|
| Utility Distribution Custom Project Program, (Retrofit, New Construction, and Major Renovation, 4-19 year measure life) | Lesser of $0.25 per kWh or 70% of project cost |
| Utility Distribution Custom Project Program (Retrofit, New Construction, and Major Renovation, 20+ year measure life) | Lesser of $0.35 per kWh or 70% of project cost |

# Appendices

## APPENDIX A-DEFINITIONS & ACRONYMS

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Accessory Dwelling Unit (ADU) | Accessory dwelling units are defined by local permitting authorities. BPA requires, at minimum, that they are structures built for housing residency that include heating and plumbing systems. |
| AHRI | Air-Conditioning Heating and Refrigeration Institute: A North American trade association of manufacturers of air conditioning, heating, and commercial refrigeration equipment. AHRI performs political advocacy on behalf of its member industries, maintains technical standards, certifies products, shares data, conducts research, and awards scholarships. |
| aMW | Average megawatt of electricity or the average measure of the total energy delivered in one year; 8,760,000 kilowatt-hours per year. |
| ANSI | American National Standards Institute: An organization that administers, coordinates, and promotes the United States public sectors' cooperative efforts to develop a consensus of standards and conformity assessment systems. ANSI accreditation signifies the procedures used by the standards' body — in connection with the development of American National Standards — meet the Institute's essential requirements for openness, balance, consensus, and due process. |
| Available Implementation Budget | The amount available for BPA to purchase energy savings from a specific program participant at a given time, equal to the program participant's initial implementation budget, plus any applicable rollover amount, plus or minus any applicable implementation budget transfers, minus any applicable approved invoice payment amounts, as defined in the ECA. |
| B/C | Benefit/cost ratio: A ratio that equals the total benefits over the life of the project, divided by the installation costs. |
| Basis for Energy Savings | Detail of inputs, interactive effects, and analysis to describe how the energy efficiency savings is estimated for unit energy savings (UES) measures that are currently active on the BPA UES Measure List.<br>(Please note: Measures on the BPA UES Measure List may not yet reflect updated savings and assumptions from the RTF, due to BPA's notice requirements. They are provided to help readers understand how savings for UES measures are estimated or modeled. The Basis for Energy Savings supports, but does not replace or supersede, the BPA Requirements and Specifications.) |
| ~~Bilateral Transfer~~ | ~~The transfer of implementation budget between customers.~~ |
| Bonneville Energy Efficiency Tracking System | Bonneville Energy Efficiency Tracking System or "BEETS" is the reporting system established by BPA and intended to supersede BPA's IS2.O reporting system |
| BPA | Bonneville Power Administration: A nonprofit federal power marketing administration based in the Pacific Northwest. Although part of the U.S. Department of Energy, BPA is self-funding and covers its costs by selling its products and services. BPA markets wholesale electrical power from 31 federal hydroelectric projects in the Northwest, one nonfederal nuclear plant, and several small, non-federal power plants. BPA also operates and maintains about three-fourths of the high-voltage transmission in its service territory. |
| BPA-Qualified | A measure not approved by the RTF on which BPA is collecting data and performing analysis, with the eventual goal of securing RTF approval. |
| BPA Willingness to Pay | The maximum amount BPA will pay for a measure. |
| BTU | British thermal unit: A unit of energy equal to about 1,055 joules, which is the amount of energy needed to cool or heat one pound of water by 1 degree Fahrenheit. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Busbar Energy Savings | Energy that did not have to be produced at the generator (e.g., the site energy savings, plus any transmission and distribution losses that would have occurred had the energy been generated). The site and busbar relationship depends upon the particular measure being implemented and its associated load shape. For UES measures, the site-to-busbar savings factor varies by measure. For site-specific calculators, the site-to-busbar savings factor currently in use is 1.09056 with the exception of all current versions of the BPA lighting calculator (see 8.3 Nonresidential Lighting) which use 1.07478. BPA provides payment for energy savings calculated from the busbar. |
| Business Day | Monday, Tuesday, Wednesday, Thursday, and Friday, excluding federal holidays or other days federally designated to be nonworking days. |
| Carryover Amount | An amount of a Program Participant's budget remaining at the end of a given Rate Period that may carry forward to increase the amount of that Program Participant's Available Implementation Budget for the following Rate Period. Referred to as rollover amount in the prior IM. |
| CEE | Consortium for Energy Efficiency: An EPA Climate Protection award-winning consortium of efficiency program administrators from the United States and Canada. Members work to unify program approaches across jurisdictions to increase the success of efficiency in markets. |
| CBSA | Commercial Building Stock Assessment: A comprehensive assessment of energy efficiency that provides critical information about energy use in the Northwest's commercial buildings. The CBSA database includes more than 250 variables for each site, including building type and functional use, building size, building envelope details, fenestration, lighting, and HVAC equipment. |
| Completion Date | For unit energy savings (UES) and site-specific calculated measures, Completion Date is determined by the utility and is defined as one of the following:<br>A) A date within 6 months of equipment purchase; or<br>B) A date within 6 months of the measure installation; or<br>C) Utility's measure approval date (e.g. when a utility pays their end-user, when a utility completes a post-installation inspection, when a utility completes a measure distribution form, etc.)<br><br>For Option 1 custom projects and measures that follow a similar process, Completion Date is defined as the date that a COTR approves the Custom Project Completion Report.<br>For Option 2 custom projects , Completion Date is defined as the date identified in the customer's approved Measurement and Verification Plan. |
| Completed Unit | Properly installed and operating measures that have met the specifications and requirements set forth in the IM. |
| Conditioned Space (Residential) | Any residential building cavity or space that is directly heated and/or cooled by an HVAC system that provides conditioned air. It is typically a space inside the residence's thermal shell. |
| Conservation | Any reduction in electric power consumption as a result of increases in the efficiency of energy use, production, or distribution, as defined in Section 3(3) of the Northwest Power Act, and includes actual and planned conservation, as defined in the ECA. |
| COP | Coefficient of Performance: A ratio of useful heating or cooling provided to work required by a heat pump, refrigerator, or air-conditioning system. |
| COTR | Contracting Officer's Technical Representative: A BPA employee who performs the management/oversight of the Energy Conservation Agreement (BPA/utility contract). |
| Customer | A utility or other regional entity that purchases power from BPA. |
| Custom Program | Energy savings work performed under the IM's Custom Program section. |
| Custom Project | Energy savings work performed under the IM's Custom Project section. |
| Custom Project Completion Report | A document submitted at the completion of a custom project (under Custom Project Process, Option 1) that includes information on project costs, verified energy savings, and information on changes to the approved measurement and verification (M&V) plan. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Custom Project Proposal | A proposal for energy savings work made under the IM's Custom Project section (under Custom Project Process, Option 1). |
| Deemed Measure | This definition has been changed to unit energy savings (UES). Please see the definition below. |
| Desuperheater | A heat exchanger inside a geothermal heat pump that heats a home's hot water (this is in addition to water being heated with the home's water heater). The desuperheater, like a heat pump water heater, reduces the energy used to heat water. |
| DHP | Ductless Heat Pump: A UES measure performed under the IM's Commercial and Residential sections. |
| Dollar-for-Dollar Payment up to | A payment for the total cost of the installed measure, as long as the cost is less than the indicated cap. |
| DSM | Demand-Side Management: The strategies that focus on influencing when and how customers use electricity, with an emphasis on reducing or leveling load peaks. These include conservation measures and rate incentives for shifting peak loads and energy storage schemes for reducing, redistributing, shifting, or shaping electrical loads. |
| EASA | Electrical Apparatus Service Association, Inc.: An international trade organization of more than 1,900 electromechanical sales and service firms in 62 countries. Through its many engineering and educational programs, EASA provides members with a measure of keeping up-to-date materials, equipment, and state-of-the-art technology. |
| ECA | Energy Conservation Agreement: The contractual mechanism for BPA to meet its statutory obligations. Customers may request an ECA by writing to their energy efficiency representative (EER). BPA shall review the request and, if accepted, will develop a draft ECA. BPA generally provides an opportunity for customer review. Once the ECA is final, the customer will receive a copy electronically. |
| EEI | Energy Efficiency Incentive: The aggregate program cost established by BPA for purchasing energy savings from all program participants within a rate period, as defined in the ECA. |
| EER | Energy Efficiency Representative: A BPA employee who is accountable for building and maintaining customer relationships and supports EE's communication with utilities. EERs lead the Customer Service Team—composed of the EER, field engineer, and the contracting officer's technical representative—for each utility. EERs work with all BPA staff, third-party staff, and contract support to provide oversight, coordination, and execution of communication to and from utilities. |
| End-User | The ultimate consumer of electricity. |
| Energy Savings | The amounts of conservation that BPA has determined to be attributable to measures implemented in a manner consistent with the ECA. |
| ENERGY STAR® | The registered name for a joint national energy efficiency program of the U.S. Environmental Protection Agency and the U.S. Department of Energy. |
| EPM | Energy Project Manager: A component of the Energy Smart Industrial Program. It can be an end-user employee or contractor who manages energy efficiency custom projects at an industrial facility. |
| ESI | Energy Smart Industrial: BPA's regional industrial program. Customers enroll via the COTR Request and Acknowledgment Procedure, as outlined in the IM's Industrial Sector, Section 10.2. |
| ESIP | Energy Smart Industrial Partner: A technical expert assigned to participating customers who is the single point of contact for coordinating ESI components and resources. They also assist with the development and implementation of industrial projects. |
| ESUE | Energy Smart Utility Efficiency: A program that includes voltage optimization, a technique that improves the efficiency of the electrical grid by reducing voltage on the feeder lines running from substations to retail loads, and electrical distribution system improvements, which improve energy efficiency of the overall electrical distribution system. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Evaluation | Evaluation involves real-time and/or retrospective assessments of the performance and implementation of a program or measure. |
| Fiscal Year (FY) | BPA's fiscal year is from October 1 through September 30. |
| Fuel Switching | Fuel-switching is not allowed under BPA programs. As determined by BPA, fuel switching is defined as moving from electric to nonelectric. |
| GPM | Gallons per minute: the flow-rate measure of showerheads. |
| HDD | Heating Degree Days: A measurement designed to reflect the demand for energy needed to prevent agricultural livestock watering tanks and fountains from freezing. It is derived from measurements of outside air temperature. |
| Horsepower (hp) | A unit of power measurement; 1 hp = 746 watts of electrical power. |
| HP | Heat Pump: A pump that uses electricity to transfer heat from a cool space to a warm space, making the cools space cooler and the warm space warmer. |
| HPWH | Heat Pump Water Heater: A water heater manufactured with an integrated heat pump that heats water by transferring heat from ambient air via a refrigeration cycle. It does not include add-on units that modify an existing water heater. |
| HSPF | Heating Seasonal Performance Factor: An air-source heat pump efficiency term. HSPF is specifically used to measure the efficiency of air-source heat pumps. The higher the HSPF, the higher the efficiency. |
| HVAC | Heating, Ventilation, and Air Conditioning: The different technology and systems used for moving air between indoor and outdoor areas to provide building heating and cooling. |
| IEER | Integrated Energy Efficiency Ratio: A value that expresses cooling part-load energy efficiency ratio (EER) for commercial unitary air-conditioning and heat pump equipment. |
| Implementation Budget Transfer | An increase or decrease in a Program Participant's Available Implementation Budget as a result of a method of transferring funds to other Program Participants as defined and allowed under the Energy Conservation Agreement. Referred to as "bilateral transfer" in the prior IM. |
| Implementation Period | The period of time covered by a customer's Energy Conservation Agreement. |
| Improper Payment | Congress has defined "improper payment" to mean any payment made for an incorrect amount (including overpayments and underpayments) under statutory, contractual, administrative, or other legally applicable requirements. It also includes any payment to an ineligible recipient, any payment for an ineligible good or service, any duplicate payment, any payment for a good or service not received (except for such payments where authorized by law), and any payment that does not account for credit for applicable discounts. BPA has an obligation to try recovering an improper payment. |
| Incremental Cost | Energy efficiency costs for work beyond that required by standard practice or code. May be the full cost of measures, especially in retrofit situations. |
| Initial Implementation Budget | The portion of an EEI established by BPA and effective at the beginning of a rate period to purchase energy savings from a specific program participant during that rate period, as defined in the ECA. |
| Invoice | A report of measures claimed and/or savings achieved under the IM. It may or may not include a request for payment. |
| kW | Kilowatt: 1,000 watts (units of electric power). |
| kWh | Kilowatt-hour: 1,000 watts of electric power supplied to or taken from an electric circuit over one hour. |
| LED | Light-Emitting Diode: A semiconductor device that emits light when an electric current passes through it. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| LEPA | Low-Energy Precision Agricultural: A type of irrigation application for center pivot and linear move irrigation systems that uses hoses that drag on the surface of the soil. This application reduces water evaporation, can provide more uniform water application, lower pressure requirements, and reduce energy use. |
| LESA | Low-Elevation Sprinkler Application: A type of sprinkler application for center pivot and lateral-move irrigation systems that places the sprinkler within 3 feet of the soil surface. |
| Limited Change | A limited change refers to a type of correction made to Energy Efficiency's programmatic forms and calculators. These are changes that do not affect payment, savings, or requirements. Examples include: administrative changes (e.g., language corrections, minor edits, fixing typos) and BPA's Energy Efficiency Management Team-approved changes. Such edits to the applicable documentation can be made at any time. |
| Low-Income | Low-income household eligibility is defined in the Federal Weatherization Assistance Program as 200% of poverty income levels. Approved statewide definitions substitute for federally established, low-income levels, if provided. |
| M&V | Measurement and Verification: The process for quantifying savings delivered by an energy conservation measure (ECM) to demonstrate how much energy use was avoided. It enables the savings to be isolated and fairly evaluated. |
| Major Renovation | A renovation to an existing structure that requires a building permit and where multiple systems are impacted while a structure is repurposed, expanded, or repositioned. |
| Manufactured Home | A dwelling that is transportable in one or more sections, is built on a permanent chassis (with or without a permanent foundation), and its wheels are removed when it is set up on site. This definition does not include travel trailers. A new manufactured home once sited with an occupancy permit qualifies for existing manufactured home incentives, but also qualifies for new manufactured home incentives (see NEEM 10.9.1) if the occupant is the first home occupant. |
| Market Transformation | Working in a market to improve products and behaviors. For example, BPA collaborates with the Northwest Energy Efficiency Alliance (NEEA) for the achievement of market transformation, which entails working with manufacturers. |
| Measure | Any material, equipment, or activity identified in the IM that a program participant may install or implement within its service area to achieve conservation, as defined in the ECA.<br><br>The term is used broadly in this document to mean one or more changes in system configuration, equipment specifications, or operating practices to reduce electric power consumption. The reduction can be a result of increases in the efficiency of energy use, production, or distribution. "Measure" covers all savings types, such as unit energy savings, calculators, or custom projects. |
| Measurement | Readings taken to establish energy use or improvements in energy use, such as testing duct leakage or measuring loading factors and run time in factories. Large end users often measure to make sure that they are getting what they pay for or to better understand their system operations. BPA requires some level of measurement and verification for projects in which the payment is established by the energy savings achieved. |
| MESA | Mid Elevation Spray Application: A type of sprinkler application for center pivots and lateral move irrigation systems that place the sprinkler below the top of the span, generally between 5 and 7 feet off the soil surface. |
| Modular Home | A sectional, factory-built dwelling in the single-family home category, which is designed to be transported to the building site and affixed to a permanent foundation, with no chassis. |
| Momentum Savings | Cost-effective energy savings resulting from energy efficiency measures, which are above the Northwest Power and Conservation Council baseline and are not included in program savings. |
| MT&R | Monitoring, Targeting, and Reporting: A technique (based on statistical process control) to monitor and control a system. For the purpose of the Energy Smart Industrial Program, "system" may be a whole facility or a subsystem within an industrial facility. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Multifamily Low-Rise | Five or more dwelling units within the same structure that is no more than three stories high. |
| Multifamily Mid-/High-rise | Five or more dwelling units within the same structure that is more than three stories high. |
| MW | Megawatt: 1,000,000 watts (units of electric power). |
| MWh | Megawatt-hour: 1 megawatt over the period of 1 hour. |
| NEEA | Northwest Energy Efficiency Alliance: An alliance of more than 140 Northwest utilities and energy efficiency organizations working on behalf of more than 13 million energy consumers. NEEA works to mobilize the market to view energy efficiency as the most cost-effective way to meet the region's future energy needs. Through collaboration and pooling of resources, the region's utilities and stakeholders have harnessed their collective influence to drive market adoption of energy efficiency products, services, and practices for the benefit of utilities, consumers, and the region. |
| NFRC | National Fenestration Rating Council: A nonprofit organization that establishes objective window, door, and skylight energy-performance ratings to help consumers compare products and make informed purchase decisions in multiple ways. |
| NWPCC | Northwest Power and Conservation Council: A nonprofit entity authorized through the Northwest Power Act to develop and maintain a regional power plan, and a fish and wildlife program, in order to balance the Northwest's environmental and energy needs. The Northwest Power and Conservation Council develops a 20-year regional power plan that is updated no less than every five years. BPA leverages the findings of the Power Plan to determine its energy savings goals. Also known as the Council. |
| Oversight | A contract management activity, designed to ensure that the government is getting what it pays for with some level of certainty. |
| Payment | A term representing monetary incentive levels for the installation of energy efficiency measures. |
| Performance Payment | The application of funds to cover internal customer administrative costs incurred in support of energy savings activities described in this IM. All performance payments are intended to help cover the customer expenses associated with achieving conservation savings. These include paying for conservation staff, printing marketing and education materials, providing end-user rebates, performing audits, assessing conservation potential, and other activities. |
| Primary Residential Heating System | A heating system that serves 50% or more of the conditioned living area of a residence. |
| Programmatic Savings | Energy savings paid for and directly attributed to BPA, utility, and NEEA programs. |
| Program Participant | BPA customer that has an Energy Conservation Agreement in effect. |
| PTCS® | Performance Tested Comfort Systems: A certification for duct sealing and heat pump commissioning. |
| PTCS Commissioning, Controls, and Sizing | Refers to the PTCS installation procedures of commissioning an air-source heat pump or a variable-speed heat pump. It guides the proper sizing of the unit, the refrigerant charge, the control of auxiliary heat, thermostat, and air flow to ensure that the system is installed to operate efficiently. Also refers to the PTCS Commissioning, Controls, and Sizing measure (CC&S), which includes heat pumps that meet federal minimum standards but not the other remaining PTCS air-source heat pump efficiency requirements. See PTCS in the Residential section. |
| PTAC | Packaged Terminal Air Conditioner: Self-contained units typically installed through a wall. PTACs can provide electric resistance heat as well as air conditioning. |
| PTHP | Packaged Terminal Heat Pump: Decentralized HVAC equipment that can be used to heat and cool spaces in residential multifamily buildings. PTHPs are an air-source heat pump technology and have commercial applications. |
| PTS | Performance Tracking System: An online tracking of real-time energy use (kW) to document the baseline and post tune-up energy use for the ESI Program's Strategic Energy Management projects. It is also used to track any number of key variables to develop a meaningful, normalized energy use profile. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Qualified Applications List | A list of BPA installation applications for a specific technology that clarifies whether the installation application is approved for a BPA payment. For example, the commercial and residential DHP measures use this approach. |
| Qualified Product List | A list of products, such as equipment and appliances, that meet a specification for qualification. |
| Rate Period | A period of time during which a specific set of rates established by BPA pursuant to a rate-case process are in effect (currently two-year periods). Defined in BPA's Tiered Rate Methodology, as amended. |
| RTF | Regional Technical Forum: An advisory committee established in 1999 to develop standards to verify and evaluate energy conservation. Its committee members are experienced in conservation program planning, implementation and evaluation, and are appointed by the NWPCC. |
| RBSA | Residential Building Stock Assessment: A comprehensive survey of more than 1,850 sites across the Northwest, including more than 1,400 single-family homes. The RBSA was designed to develop a characterization of the residential sector that takes into account the diverse climates, building practices, and fuel choices across the region. |
| RESNET | Residential Energy Services Network of Certified Raters: This network uses the Home Energy Rating System (HERS) Index. The HERS Index score can be used to measure the energy efficiency performance of residential, single-family new construction. It is one of the means of certifying if a single-family home meets the Northwest ENERGY STAR-Certified Homes standards. |
| Retail Program Delivery Mechanisms | Residential retail delivery mechanisms and program models include downstream incentives delivered directly to the end user, usually through a rebate, midstream incentives that go through the retailer, and upstream program activity that goes through the manufacturer. |
| RSAT | Retail Sales Allocation Tool: A tool for use in residential retail midstream and upstream programs where site information (e.g., home address) is not available. This tool provides evaluated, research-based percentage allocations for all Northwest utilities (public and investor-owned) for a select list of energy efficiency products in an easy-to-use, Excel-based tool. |
| ROC | Refrigerator Operator Coaching: An Industrial Strategic Energy Management feature that provides classroom and webinar training and on-site technical support. ROC is designed to help industrial sites with ammonia refrigeration systems generate electrical energy savings, while getting the most out of their systems. The energy savings are calculated by site-specific energy models, following the M&V requirements addressed in the ESI MT&R Reference Guide. |
| ~~Rollover Amount~~ | ~~The calculated amount of a program participant's remaining budget at the end of a given rate period that may carry forward to increase the amount of that program participant's available Implementation Budget for the following rate period. Rollover is calculated as up to 10% of their initial Implementation Budget or $50,000, whichever is greater.~~ |
| SEEM | Simplified Energy Enthalpy Model: A tool used by the RTF to model residential building energy use. |
| SEM | Strategic Energy Management: A program to help industries reduce energy intensity by providing organizational training, technical support for operations and maintenance (O&M) improvements, and energy monitoring and reporting tools. |
| SEM Annual Savings Achieved | The verified incremental savings measured in each year of a two-year performance period.<br>• In Year 1 of the first performance period, or after the re-establishment of the SEM Baseline, it is measured as all savings achieved above the SEM Baseline.<br>• In Year 2 of any performance period, it is measured as the savings achieved over the savings achieved in Year 1 of the performance period.<br>• In Year 1 of subsequent performance periods (as a result of re-enrollment), it is measured as all savings achieved above Year 2 of the previous performance period.<br>• Should there be zero or negative savings verified from prior year, SEM Annual Savings Achieved is zero.<br>SEM Annual Savings Achieved is used to determine allowable Performance Payment. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| SEM Baseline | Energy use established prior to enrollment in a SEM program. SEM Baseline can be reestablished after a significant operational change or at customer request as outlined in the ESI MT&R Reference Guide. Re-enrollment in additional two-year performance periods resets the reference point for the purposes of calculating savings and payment, but does not change the SEM Baseline. |
| SEM Cumulative Verified Savings | Verified annual energy savings measured from establishment of SEM Baseline to current performance period year. SEM Cumulative Verified Savings is not used by BPA to calculate reportable savings or any payment, but will be provided to customers for their own reporting purposes. |
| SEM Participation Payment | EEI payment made during each year of an SEM Performance Period. Payment is based on SEM Verified Savings. |
| SEM Verified Savings | Verified total energy savings measured from the start of the current performance period. SEM Verified Savings are calculated at the end of Year 1 and at the end of Year 2.<br>• In Year 1 of the first performance period, it is measured as all savings achieved above the SEM Baseline.<br>• In Year 2 of any performance period, it is measured as the savings achieved in Year 1 and adjusted for any additional savings achieved in Year 2.<br>• In Year 1 of subsequent performance periods (as a result of re-enrollment), it is measured as all savings achieved above Year 2 of the previous performance period.<br>• Should there be zero or negative savings verified from the start of the performance period, SEM Verified Savings achieved is zero.<br>SEM Verified Savings is used to determine EEI incentive payments. |
| SEER | Seasonal Energy Efficiency Rating: A measurement of air conditioning and heat pump cooling efficiency, which is calculated by the cooling output for a typical cooling season divided by the total electric energy input during the same time frame. A SEER rating is a maximum efficiency rating. |
| Self-Funded | Energy savings for which a utility chooses not to seek a payment from BPA. |
| SEM | Strategic Energy Management: As defined by CEE's Minimum SEM Elements, a holistic approach to managing energy use to continuously improve energy performance by achieving persistent energy and cost savings over the long term. |
| Single-Family | Fewer than five dwelling units within the same structure, including duplexes, triplexes, accessory dwelling units, and modular homes. Townhouse homes that share walls, but do not vertically overlap, may be considered single-family, regardless of the number of units connected side by side. Accessory dwelling units with separate plumbing systems or separate HVAC systems qualify for applicable measures even if they are on the same electrical meter. |
| Site Energy Savings | The ascribed, deemed, calculated, estimated, evaluated, or verified conservation in first-year, kilowatt-hours attributable to completed units. |
| Thermostats – Connected | Thermostats that have Wi-Fi or wireless capabilities to connect to the internet. These allow users to control HVAC functions to maintain zone temperatures using the internet and offer online alerts, monitoring, programming, and control from a remote location. |
| Thermostats – Line-Voltage | Line-voltage thermostats are most commonly used for electric space heaters such as a baseboard or wall heater. If a line-voltage thermostat is used, system power (120 or 240 volts) is directly switched by the thermostat. |
| Thermostats – Smart | Thermostats that can be Wi-Fi enabled with remote access, have programmable and/or learning-based scheduling, and can detect occupancy resulting in automatic HVAC reduction when a space is unoccupied. |
| Third-Party Implementer | Third-party implementers are companies that BPA has contracted with to support acquisition of energy efficiency services and savings for BPA and BPA Customers. Third-party implementers are sometimes referred to as program vendors, program contractors, or program partners. |
| TOCA | Tier One Cost Allocation: As prescribed by Tiered Rate Methodology, a billing determinant for applicable customer charges that is based annually on the lesser of the customer's Rate Period High Water Mark (RHWM) or the customer's forecast net requirement, which is calculated as a percentage of the total of RHWMs for all customers. |

| DEFINITIONS AND ACRONYMS | |
|---|---|
| Ton | A ton is a measure of the cooling or heating capacity of an HVAC system. One ton is equal to 12,000 Btu per hour. |
| TRC | Total Resource Cost: A perspective of cost-effectiveness testing that includes all costs and benefits of a measure, regardless of who pays for or receives them. BPA uses the definition of the TRC test consistent with the Council. |
| Townhouse | Townhouse homes that share walls but do not vertically overlap (side-by-side and not stacked vertically) may be considered single-family homes. |
| TSP | Technical Service Provider: Consultants who perform technical services required to advance custom projects. They may include efficiency firms (whose core business relates to supporting DSM), design/build firms (who provide design/build engineering services in addition to DSM support), or vendor firms. |
| Unassigned Account | The repository for unallocated funds and returned Energy Efficiency Incentive funds. |
| UES | Unit Energy Savings: Measures where savings are estimated on a per-unit basis (e.g., savings per light bulb) for a typical baseline case to an efficient case scenario. UES measures have relatively small variations in savings that can be reliably forecast, formerly known as a Deemed Measure |
| Unique (Site) ID | An end user's unique identifier that may include an address, a field location, meter number, GPS coordinates, or legal property description. |
| Unconditioned Space (Residential) | Any residential building cavity or space that is intentionally vented to the outside or is not heated and/or cooled by an HVAC system. |
| Unheated Buffer Space (Residential) | Any residential building cavity or space that is adjacent to the thermal boundary of the house and that has no positive heat supply under thermostatic control, such as garages and basements. |
| Utility | A public customer that purchases power from BPA. |
| VSHP | Variable-Speed Heat Pump: A ducted heat pump manufactured with an inverter-driven motor that is capable of adjusting its output to meet the requested heating load (with performance similar to a DHP). |
| Verification | A process or procedure designed to produce evidence confirming the accuracy or truth of claims made to BPA, which may minimally involve obtaining and retaining documentation, or may require site inspection(s) of the measure(s). |
| VFD | Variable Frequency Drive: A type of adjustable-speed drive used in electromechanical drive systems. It controls AC motor speed and torque by varying the motor input frequency and voltage. |
| VRF | Variable Refrigeration Flow: Most often used in the Commercial Sector, this is typically an all-electric system that uses heat pumps to provide space heating and cooling to building spaces. They are capable of serving multiple zones in a building, each with different heating and cooling requirements. These systems have the ability to modulate the amount of refrigerant sent to each zone in accordance with conditioning requirements. In contrast, conventional HVAC systems deliver air or water and operate on a full-on or full-off schedule., |
| WEC | Wastewater Energy Coaching cohort: An Industrial Strategic Energy Management feature that provides on-site support and technical training focused on energy efficiency for municipal and industrial wastewater treatment facilities. It equips them with the tools to help them achieve measureable energy savings through low-cost operations and maintenance improvements. |
| Whole Building Cost | As-built contracted cost including labor, design, measurement and verification, excluding land costs. |
| Zonal Electric Heating System | Nonducted, electric heating systems using thermostats to control individual heating units or groups of heaters (e.g., zones). They include radiant ceiling cable, fan-forced electric-resistance (wall, toe-kick, ceiling and exhaust fan combinations), electric baseboard, and electric boiler/hot water (e.g., zonal electric hydronic) radiant systems. |

# APPENDIX B- APRIL 1, 2022 CHANGE NOTICE SUMMARY

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 1.0 | Introduction:<br>BPA updated the introductory language to reflect the role of the IM as outlined in the ECA. | More clearly defines the role of the IM relative to the ECA. |
| 1.7 | BPA moved the COTR Request and Acknowledgement Procedure from the Multi Sector Section 12 to Section 1.7. | The procedure is referenced throughout the IM and is an administrative requirement that aligns well with Section 1. |
| 2.0 | BPA has made updates to formatting throughout the section to remove extraneous hyperlinks found within the section itself. | Funding: BPA removed extraneous hyperlinks found throughout this section. |
| 2.1.1 | BPA added Funding Terminology as a new subsection. This consolidates definitions for BPA funding terms which were previously located in the Definitions section or in other areas of Section 2. These terms includes: Available Implementation Budget, Bilateral Transfer, Initial Implementation Budget, Tier One Cost Allocation, and Unassigned Account. | Incorporates terms and definitions only used in Section 2 into one subsection, so they can be easily referenced |
| 2.1.1.2 | Bilateral Funding: BPA updated this section to reflect BEETS reporting and invoicing processes. This includes the removal of ""eedocs@bpa.gov"" as a method to submit reporting and invoicing-related documents. | Align with BEETS implementation plans. |
| 2.1.1.2 | BPA clarified Inter-Rate Period Budget Flexibility (Rollover) to reflect that customers may transfer up to 10% of their initial implementation budget from one rate period to the next or up to $50,000 of their available implementation budget, whichever is greater. | Clarifies rollover amounts. |
| 2.1.4 | Performance Payments: BPA incorporated language associated with capping performance payments for shorter measure lives to reflect how BEETS is configured. | Align with BEETS implementation plans. |
| 2.1.4 | Performance Payments: BPA adjusted the language regarding Performance Payments from "BPA highly recommends that customers use performance payments…"" to ""BPA allows customers to claim performance payments…" | Reflects performance payment eligibility rather than subjective best practices. |
| 2.1.4 | Performance Payments: Effective April 1, 2022, the performance payment rate is now based on measure or project Completion Date. | Aligns the Performance Payment to when the measure was implemented. |
| 2.1.4 | With the implementation of BEETS, customers may now opt-in to receive performance payments during the invoicing process. | Align with BEETS implementation plans. In former reporting system, customers opted-out of performance payments. |
| 2.2 | Funding Sources and Savings Allocation:<br>In the Funding Sources table, BPA updated the Implementation Budget description from "BPA payment in the form of EEI funding; ECA funded activities that are accepted by BPA" to "BPA payment in the form of EEI funding according to the terms of the ECA." | Previous language reflecting "ECA-funded activities" is inaccurate |
| 3.2 | BPA fully updated the Reporting Requirements section to reflect BEETS reporting requirements. | Aligns with BEETS implementation plans. |
| 3.2 | Reporting Requirements: Non-Reportable now has a separate reporting methodology in BEETS for achieved energy savings. | Aligns with BEETS implementation. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 3.3 | BPA removed references to Evaluation from the Oversight section and now treat each as its own, separate section. Additionally BPA slightly updated language to reflect BEETS implementation. | Oversight and Evaluation will become each their own section in Section 3. For Oversight, language will be slightly updated to reflect BEETS implementation. |
| 3.5 | Third-Party Operated Programs:<br>BPA updated this section to reflect current BPA third-party offerings. | Updated to reflect BPA offerings. |
| 4.0 | Custom Projects: BPA updated the language throughout section 4 to align with other IM sections and to clarify custom project requirements. | A number of instances have been identified throughout section 4 of inconsistent language and vague requirements. The update has made section 4 consistent with other IM requirements and has clarified custom project submittal requirements. It doesl not change option 1 or option 2 custom project requirements. |
| 4.1 | Custom Projects Payment Rate:<br>BPA reformatted the table to show the measure incentives in a low-to-high rate per measure life. | Brings clarity to readers. |
| 4.1 | Custom Projects Payment Table:<br>BPA increased the incentive rate for New Construction and Major Renovation for Utility Distribution sector measures with 20+ measure life to $0.35 per kWh. | Brings consistency to incentive rates between the sectors (excluding Commercial HVAC). |
| 4.2.1 | Limited Availability Emerging Technology Field Test Projects: BPA retired Progress Payments and the Progress Payment Calculator effective April 1, 2022. | Aligns with BPA's timing for publishing the 2022-2023 Rate Period Implementation Manual. |
| 4.2.1 | Limited Availability Emerging Technology Field Test Projects::<br>BPA moved this to the Custom Projects section from the former Multi-Sector section 12.3.3. | The former Section 12.3.3 Limited Availability Emerging Technology Field Test Projects has been moved to Section 4 due to the Multi-Sector section being eliminated. Test projects are a type of custom project and are required to be submitted as custom projects. |
| 4.3.2 | Custom Projects General Requirements:<br>BPA added B/C ratio requirements specific to Utility Distribution measures; specifically savings exceeding 800,000kWh. | Improved and clarified the requirements for utility-owned system improvements. |
| 4.3.2 | Custom Project General Requirements:<br>BPA moved the Simplified Voltage Optimization M&V Protocol and description to the Option 1 and Option 2 Custom Projects BPA M&V options available. | Brings clarity for utilities. |
| 4.3.2 | Upon implementation of BEETS, Option 2 custom projects must meet the following B/C ratio requirements:<br>• If the project savings are 200,000 kWh or less, no cost-effectiveness screen is applied.<br>• If the project savings are >200,00 kWh, the completed project must have a B/C ratio ≥ 0.5.<br>BPA has removed the requirement of a minimum B/C ratio of 1.0 at the invoice level for custom projects. | The Option 2 rule requires a more complex and costly configuration to manage in BEETS. |
| 5.0 | Custom Programs: BPA reinstated Custom Programs as of April 1, 2022, with a revised process. The new process includes three required phases: 1. Prescreening, 2. Custom Program Proposal, and 3. Custom Program Completion. The new process also includes pre-determined documentation and submission requirements. | The addition of a prescreening phase and documentation requirements will streamline workflow and allow BPA to better meet customers needs. |
| 6.0 | Introduction to the Sectors: BPA consolidated and moved the sector introduction/definitions to this new IM section as well as updated the language to provide additional clarity. | Clarified the language to provide increased certainty around measure applicability. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 7.6 | Irrigation System Upgrades: BPA increased the savings and payments for the following offerings:Sprinkler Upgrade Irrigation System Conversion to MESA from high pressure Center Pivot or Lateral Move SystemSprinkler Package Replacements LESA/LEPA/MDI Sprinkler Package Center Pivot or Lateral Move SystemSprinkler Package Replacements MESA Sprinkler Package Center Pivot or Lateral Move SystemSprinkler Package Replacements High Pressure Sprinkler Package Center Pivot or Lateral Move SystemSprinkler Upgrade Irrigation System Conversion to LESA/LEPA/MDI from high pressure, Lateral Move or Center Pivot Systems. | At the March 16, 2021 RTF meeting, the RTF approved updates to the Irrigation Hardware UES measure savings justifying a higher incentive than was previously offered. |
| 7.6.1 | Irrigation System Conversion: LESA/LEPA/MDI: BPA removed the Irrigation System Conversion: LESA/ LEPA/MDI Project Information Form (PIF) documentation requirement. | Data collection complete; form is no longer required |
| 7.6.3 | Irrigation System Conversion: High Pressure to Low Pressure: BPA renamed the measure "Irrigation System Conversion: MESA" to "Irrigation System Conversion: High Pressure to Low Pressure". | Updating the name of the section to encompass both the existing measure and the new measure added. |
| 7.6.3 | Irrigation System Conversion: High Pressure to Low Pressure: BPA added a new measure for a wheel line or hand line irrigation system or a portion of a system, converted from high pressure to low pressure operation. | In response to utility inquiries, BPA staff created a new qualified measure to allow the conversion of an existing wheel line or hand line irrigation system from a high-pressure impact sprinkler system to low-pressure sprinkler system, using low pressure regulators, replacing impact sprinklers with rotating type sprinklers, and new nozzles for the new low-pressure sprinklers. The resulting energy savings for this High-pressure conversion measure, whether on a center pivot or a wheel and hand line are similar. |
| 7.6.4 | Irrigation Hardware: BPA expired the following offerings:Gasket Replacement Replace Leaking Base Boot Gasket with New Gasket Center Pivot or Lateral Move SystemGasket Replacement Replace Tower/Span/Pivot-Flex Gasket Center Pivot or Lateral Move SystemPipe Repair Repair Leaking Pipes Wheel-line, Hand-line, or Portable Main-Line System; Sprinkler Replacements Upgrade Low Pressure Sprinklers to Rotating Type Sprinklers Center Pivot or Lateral Move SystemSprinkler Replacements Upgrade Impact Sprinkler to Rotating Type Sprinkler Wheel-lines, Hand-lines, Center Pivots or Lateral Move systems | Deactivated by the RTF at the March 16, 2021 RTF meeting. |
| 7.6.4 | Irrigation Hardware Upgrades: BPA decreased the savings and payments for the following offering: Hub Replacement Replace Thunderbird Wheel Line Hubs Wheel Line System. | At the March 16, 2021 RTF meeting, the RTF approved updates to the Irrigation Hardware UES measure savings effectively decreasing the incentive previously offered. |
| 7.7.2 | THIS CHANGE ALSO AFFECTS 7.7.3 AND 7.7.4 The change is to expand the eligible HP range for the VFD for Pumps UES measure from 20hp, down to 7.5 hp, and raise the upper end from 500hp to 1000hp. | The change would expand application of existing VFD/ Pump measures in a time of expiring sprinkler hardware measures and saturation of the existing VFD/pump market under the current horse power range. Furthermore, we felt the UES measure change would allow both small and larger farms to easily access the UES measures and would help meet our kWh and access/equity goals. It would also increase marketability of the program to the irrigators and trade allies. |
| 8.3 | Nonresidential Lighting: BPA added an additional method to calculate incremental cost for commercial new construction projects. Customers now may choose to use 2.86% of the total construction project cost. | Aligns with Custom Project requirements and improves the ease of implementation. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 8.3 | Nonresidential Lighting: BPA removed Lighting Calculator 4.0 and 5.0 from the Effective Date/Retirement Date table and Lighting Calculator 4 series from the Payment table. | BPA retired Lighting Calculators 4.0 and 5.0. |
| 8.4.1 | Advanced Rooftop Unit Controls: BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information is now entered directly into BEETS or via the UES measures upload template. | Required information is captured in BEETS. |
| 8.4.2 | Connected Thermostat: BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information is now entered directly into BEETS or via the UES measures upload template. | Required information is captured in BEETS. |
| 8.4.3 | Ductless Heat Pump (DHP) Retrofit and Upgrade (BPA-Qualified): BPA added the AHRI Certificate as a documentation requirement and removed it from the DHP Qualified Product List. | Improved consistency with other Commercial heat pump measures. DHP efficiency requirements are listed in section 8.4.3. |
| 8.4.3 | Ductless Heat Pump (DHP) Retrofit and Upgrade (BPA-Qualified): BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information is now entered directly into BEETS or via the UES measure upload template. | Required information is captured in BEETS. |
| 8.4.3 | Ductless Heat Pump (DHP) Retrofit and Upgrade (BPA-Qualified): BPA updated the DHP Upgrade pre-conditions to allow for the space to be conditioned by an operational or failed air-source heat pump. | Expanded the preconditions to account for the air-source heat pump baseline. |
| 8.4.4 | Air-Source Heat Pump Retrofit and Upgrade (BPA-Qualified). Removed the Project Information Form (PIF) documentation requirement. Required project information is captured via the BPA Energy Efficiency Tracking System (BEETS) or UES measure BEETS upload template. | Required information is captured in BEETS. |
| 8.4.4 | Air-Source Heat Pump Upgrade and Retrofit (BPA-Qualified): BPA provided clarification language within the "Requirements and Specifications" section. | Improved clarity. |
| 8.4.4 | Variable Refrigerant Flow System Retrofit (BPA-Qualified): The efficiency requirements have been updated. | An error was found in the measure analysis. |
| 8.4.5 | Variable Refrigerant Flow Systems (BPA-Qualified): BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information is now entered directly into BEETS or via the UES measure upload template. | Required information is captured in BEETS. |
| 8.4.6 | Variable Frequency Drive on Air Handling Unit Fan (BPA-Qualified): BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information is now entered directly into BEETS or via the UES measure upload template. | Required information is captured in BEETS. |
| 8.5.1 | Commercial Insulation: BPA updated the preconditions to clarify that the building's primary heating system must be electric. | Improved clarity |
| 8.5.1 | Commercial Insulation: BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information will be entered directly into BEETS or via the UES measure upload template. | Required information is captured in BEETS. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 8.5.1 | Commercial Insulation: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.5.2 | Commercial Windows (BPA-Qualified): BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information will be entered directly into BEETS or via the UES measure upload template. | Required information is captured in BEETS. |
| 8.5.2 | Commercial Windows (BPA-Qualified): BPA updated preconditions to clarify that the building's primary heating source must be electric. | Improved clarity. |
| 8.6.1 | Anti-Sweat Heater (ASH) Controls: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.6.2 | Efficient Refrigeration Evaporator Fan Motors: BPA updated the measure name and post-condition requirements to allow payments for Permanent Magnetic Synchronous Motors. Electronically Commutated Motors are still eligible. There was no change to payment levels. | Expanded this measure to provide additional opportunities for uptake. |
| 8.6.2 | Efficient Refrigeration Evaporator Fan Motors: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated energy savings. |
| 8.6.3 | Strip Curtains for Walk-in Coolers and Freezers: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.7 | Commercial Kitchen and Food Service Equipment: Commercial Electric Fryers: BPA retired this measure on March 31, 2022 (previously section 8.7.6) | The Regional Technical Forum updates to this measure left limited opportunity for uptake. |
| 8.7.1 | Demand Controlled Kitchen Ventilation (BPA-Qualified): BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information will be entered directly into BEETS or via the UES measure upload template. | Required information is captured in BEETS. |
| 8.7.2 | Commercial Steam Cookers: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.7.2 | Commercial Steam Cookers: BPA updated the date after which it will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. This date changed from October 2019 to April 2022. | Updated to align with the release of the April 2022 IM. |
| 8.7.3 | Hot Food Holding Cabinets: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.7.3 | Hot Food Holding Cabinets: BPA updated the date after which it will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. This date changed from October 2019 to April 2022. | Updated to align with the release of the April 2022 IM. |
| 8.7.4 | Electric Combination Ovens: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 8.7.4 | Electric Combination Ovens: BPA updated the date after which it will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. This date changed from October 2019 to April 2022. | Updated to align with the release of the April 2022 IM. |
| 8.7.5 | Electric Convection Ovens: BPA updated the date after which it will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. This date changed from October 2019 to April 2022. | Updated to align with the release of the April 2022 IM. |
| 8.7.5 | Electric Convection Ovens: BPA updated the ENERGY STAR-Certification requirement from a minimum of version 2.2 to a minimum of version 3.0. | Updated to be consistent with the Regional Technical Forum. |
| 8.7.5 | Electric Convection Ovens: BAP updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.7.6 | Pre-Rinse Spray Valves: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.8 | Additional UES Offerings - Commercial Showerheads: BPA retired this measure. (previously 7.8.3) | This measure was deactivated by the Regional Technical Forum. Removed for consistency. |
| 8.8.1 | Generator Block Heaters (BPA-Qualified): BPA removed the Project Information Form (PIF) documentation requirement for this measure. Required project information will be entered directly into BEETS or via the UES measure BEETS upload template. | Required information is captured in BEETS. |
| 8.8.3 | Vehicle Engine Block Heater Controls: BPA updated the energy savings. See UES Measure List for specific changes. There were no changes to incentive levels. | Updated to be consistent with the Regional Technical Forum's revised savings. |
| 8.8.4 | Commercial Heat Pump Water Heaters: BPA removed language regarding the option to use the Residential Sector 10.5.4 Unitary Heat Pump Water Heater and 10.5.5 Split-System Heat Pump Water Heater measures for Commercial installations through March 31, 2022. | As of April 1, 2022, HPWHs installed in Commercial applications must use the Commercial Heat Pump Water Heater measure. |
| 8.8.5 | Commercial Clothes Washers: BPA updated the date after which it will accept pre-existing models that were ENERGY STAR-Certified at the time they were manufactured. This date changed from October 2019 to April 2022. | Updated to align with the release of the April 2022 IM. |
| 10.0 | Energy Management: Energy Project Manager (Optional ESI component): BPA retired this offering and the Energy Project Manager Calculator, effective March 31, 2022. | Retired the measure to allow for a comprehensive overhaul. |
| 10.0 | Strategic Energy Management: SEM Projects (Optional ESI component): BPA retired this measure and the Strategic Energy Management Calculator effective March 31, 2022. | Retired the measure to allow for a comprehensive overhaul. |
| 10.3.2 | Strategic Energy Management: BPA added a new measure applicable in both Commercial and Industrial sectors. The new SEM performance period begins on April 1, 2022 or later, unless participant is actively enrolled in SEM Projects (Optional ESI Component) as of March 31, 2022. The incentive payment is $0.025 per kWh of SEM Verified Savings. | Simplified and enhanced the measure. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 10.3.3 | Performance Tracking System: BPA added a new measure to overcome electric-energy data collection barriers for commercial and industrial sector participants currently enrolled in SEM engagements. Incentive payments for PTS initial installation: is the lesser of PTS costs or $15,000; and, PTS maintenance: is the lesser of PTS costs or $10,000 per two-year performance period. | Simplified and enhanced the measure. |
| 10.7.1.1 | Ductless Heat Pumps are no longer be available in new residential single family applications. | The RTF no longer supports Ductless Heat Pumps in new construction |
| 10.9 | Green Motors: BPA moved Green Motors to the Industrial Sector section. | The majority of energy savings is industrial and aligns the initiative with other measures that apply to multiple sectors. |
| 11.0 | BPA removed all Simple Steps language from section 11. | The Simple Steps program ended. |
| 11.2 | Residential Lighting: BPA moved the RBSA room table from the "Requirements and Specifications" section and added it to the "Additional Information" section for LED Lamps/ Fixtures and TLEDS | Room type is no longer a specification, but implementation guidance. |
| 11.2.1 | Residential Lighting: BPA changed savings and payments for Residential Lighting. Most savings decreased with a few increasing. Payments all either decreased or stayed the same. | The savings and payments have been updated due to RTF savings and incremental cost changes. |
| 11.2.1 | Residential Lighting: BPA eliminated the retail delivery channel for both LED lamps and LED fixtures. | WA - Due to newly adopted lighting standards in Washington, the baseline is the efficient case.<br><br>OR/ID/MT - As a result of the updated RTF savings, key lamps in the retail portfolio no longer have an incremental cost. As a result the retail delivery channel is no longer feasible. |
| 11.2.1 | Residential Lighting: BPA eliminated the Mailed Non-Request delivery channel for both LED lamps and LED fixtures. | The RTF no longer supports the offering. |
| 11.2.1 | Residential Lighting: BPA removed LED fixture offerings from the Direct Install delivery channel. | As a result of the updated RTF savings, BPA found the measures no longer cost effective |
| 11.2.1 | Residential Lighting: BPA eliminated By Request LED Bulbs for the state of Washington. | Due to newly adopted lighting standards in Washington, the baseline is the efficient case for LED bulbs - they will be omitted from the By Request offering in Washington state. |
| 11.2.2 | Residential Lighting: BPA eliminated the retail delivery channel for TLEDs. | As a result of the updated RTF savings, BPA found the measures no longer a viable option for retail programs. |
| 11.3 | Residential Advanced Power Strips: BPA removed the "Advanced Power Strips — Infrared Sensing (Home Entertainment Centers)" and "Advanced Power Strips — PC Interaction Sensing (Personal Desktop Computers)" offerings. | As a result of the updated RTF savings, BPA found the measures no longer cost effective. |
| 11.3.1 | Residential Advanced Power Strips:<br>BPA moved the Home Entertainment application from the "Requirements and Specifications" section and added it to the "Additional Information" section. | Installation location is no longer a specification, but implementation guidance. |
| 11.3.1 | Residential Advanced Power Strips: BPA reduced By Request payments for residential advanced power strips. | Align payments with the current value of the energy savings. |
| 11.3.2 | Energy Saver Kits: BPA deactivated Energy Saver Kits and replaced them with new measures, changing the savings and payments. | Kit component measures are no longer RTF approved; new kits developed. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.3.2 | Residential Energy Saver Kits: BPA omitted kit configuration offerings that include LED bulbs available for the state of Washington as they are no longer eligible. | Due to newly adopted lighting standards in Washington, the baseline is the efficient case for LED bulbs - they have been omitted from kits available in Washington State. |
| 11.4 | Residential Appliances: BPA removed the verbiage "and top loaders must be rated CEE Tier 1 or above." from the Requirements and Specifications section. | BPA is offering a separate measure for ENERGY STAR rated top loading clothes washers. |
| 11.4 | Residential Appliances: BPA removed all CEE Tier Clothes Washer Measures. | Deactivated by the RTF; Only ENERGY STAR products are supported |
| 11.4 | Residential Appliances: BPA removed the "By Request" and "Direct Install" delivery channels. | BPA does not offer measures for By Request or Direct Install appliances |
| 11.4 | Residential Appliances: BPA changed clothes washer payments. Some increased while others decreased. See measure list for details. BPA also levelized payments by load configuration. | Updated RTF information and BPA Q analysis allowed for updated payment information. |
| 11.5 | The 'By Request' delivery channel has been added to the EV Charger offering. | Allows utilities to submit sales from online portals. |
| 11.5.1 | Residential Electric Vehicle Chargers: BPA decreased the savings for Level 2 EV chargers. | The savings are being updated due to RTF savings changes. |
| 11.5.1 | Residential Electric Vehicle Chargers: EV chargers have a Qualified Products List in the IM document library instead of linking to the Energy Star website list. | Energy Star frequently changes the product specification outside of the BPA IM rate period. |
| 11.6 | Unitary HPWH and Split-System HPWH: BPA moved the text requiring Heat Pump Water Heaters (unitary and split) to be on the Qualified Products List from Basis for Energy Savings to Requirements and Specifications | Not currently a requirement due to incorrect location. Moved to the correct location. |
| 11.6.1 | Residential Showerheads: BPA removed Section 10.5.1 Showerheads as the measure has expired. | Deactivated by the RTF |
| 11.6.1 | Residential Showerheads: BPA removed combination TSV and showerheads measures. BPA still allows combination units in the TSV measures, but savings and payments are based on the TSV savings only. | Deactivated by the RTF. |
| 11.6.1 | Residential Thermostatic Shut-Off Valves (TSV): BPA decreased the savings for stand alone TSVs. | The savings are being updated due to RTF savings changes. |
| 11.6.1 | Residential Thermostatic Shut-Off Valves: BPA updated fuel source documentation to include the absence of natural gas within a service territory to claim electric measures without verification of fuel type. | Updating for continuity with other sections of the IM that have the same requirement |
| 11.6.1 | Residential Thermostatic Shut-Off Valves (TSV): BPA reduced By Request payments for Residential Thermostatic Shut-Off Valves (TSV). | Align payments with the current value of the energy savings. |
| 11.6.2 | Unitary Heat Pump Water Heater - 50 gallons and above: BPA changed the HPWH measure name to now include the "50 gallons and above" qualifier. | Structural change due to introduction of 40 gallon HPWH measure |
| 11.6.2 | Unitary Heat Pump Water Heater - 40 gallon: BPA created a new measure for 40 gallon unitary HPWH units, no longer allowing them to be claimed on the 50 gallon measure, formerly used for any size HPWH. | Accuracy in savings reporting |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.6.3 | Residential Aerators: BPA removed Section 10.5.3 Aerators as the measure has expired. | Deactivated by the RTF |
| 11.6.3 | Unitary Heat Pump Water Heater - 50 gallon and above: BPA changed the savings on unitary HPWHs, with some savings increasing and some decreasing. | Updated savings from the RTF |
| 11.6.3 | Unitary Heat Pump Water Heater - 50 gallons and above: Unitary HPWH measures are no longer eligible for new construction. | The RTF has not approved HPWHs for new construction |
| 11.6.3 | Unitary Heat Pump Water Heater - 50 gallons and above: Unitary HPWH measures are now eligible for multifamily housing. | The RTF measures allow for mutlifamily housing |
| 11.6.3 | Unitary Heat Pump Water Heater - 50 gallon and above: BPA deleted language regarding one-to-one replacement for unitary HPWHs. | This requirement is covered by the "A maximum of one Unitary HPWH measure may be claimed per home. Accessory dwelling units with separate plumbing systems qualify for this measure even if they are on the same electrical meter." language |
| 11.6.3 | Unitary Heat Pump Water Heater - 50 gallons and above: Unitary Tier 1-3 heat pump water heater measures no longer have state-level measure identifiers in the measure list. | Not needed now that new construction is not eligible |
| 11.6.3 | Unitary Heat Pump Water Heater - 50 gallons and above: BPA moved the text requiring a HPWH unit be on the Qualified Products List from "Basis of Energy Savings" to "Requirements and Specifications". | Clarify this is a requirement. |
| 11.6.3 | Unitary HPWH - 50 gallon and above: Commercial Heat Pump Water Heater installations are no longer eligible for reporting using Residential Unitary measures. | The new Commercial Heat Pump Water Heater measures may be used (sec. 8.8.4). |
| 11.6.4 | Split system Heat Pump Water Heater: Split system HPWH measures are now eligible for multifamily housing. | The RTF measures allow for multifamily housing |
| 11.6.4 | Split System Heat Pump Water Heater: BPA moved the detailed qualifications for split system water heaters from "Basis for Energy Savings" to ""Additional Information"". | These items are manufacturer recommendations rather than BPA requirements. |
| 11.6.4 | Split-System HPWH: Commercial Heat Pump Water Heater installations are no longer eligible for reporting using Residential Split system measures. | The new Commercial Heat Pump Water Heater measures may be used (see sec 8.8.3) |
| 11.7.1.1 | Ductless Heat Pumps: BPA no longer maintains a Qualified Products List (QPL) for ductless heat pumps. BPA requires not only that Ductless Heat Pumps be certified by the Air-Conditioning, Heating, & Refrigeration Institute (AHRI) as meeting our specification but also that the customer file contains a copy of the AHRI certificate. | Program simplification |
| 11.7.1.1 | Ductless Heat Pumps: BPA decreased the savings for Ductless Heat Pumps in zonal single family and manufactured homes. | Savings updated due to RTF savings changes |
| 11.7.1.1 | Ductless Heat Pump: BPA removed the Ductless Heat Pump Project Information Form (PIF) documentation requirement. The make, model and manufacturer must now be entered into BEETS. | Program simplification |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.7.2 | HVAC Performance Tested Comfort Systems (PTCS) - PTCS Specifications redesigned: BPA made numerous changes to update program specifications for Air Source Heat Pumps, VSHPs, GSHPs, and PTCS Duct Sealing and Prescriptive Duct Sealing. For more information see the PTCS Change Notice Summary. | A regional PTCS Workgroup reviewed the program and worked to update numerous specifications to streamline and improve the program. |
| 11.7.2 | HVAC Performance Tested Comfort Systems (PTCS): BPA made multiple changes to PTCS participation requirements that were not reflected in the Implementation Manual language. For more information see the PTCS Change Notice Summary. | A regional PTCS Workgroup reviewed the program and worked to update several requirements to streamline and improve the program. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: BPA renamed the PTCS ASHP Form to "PTCS ASHP optional data collection tool", removed it from Required Documentation, and listed it as optional under Additional Information. | All PTCS forms are optional and only used for data collection purposes. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: The kWh savings decreased per the RTF. There was no change to payments. | RTF changed the kWh savings. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: BPA changed the section header to add the term: "(BPA-qualified)." | Measure changed from RTF to BPA-Qualified basis. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: BPA removed the Documentation Requirement to store the following installation and sizing information in Customer File and instead listed it as optional under Additional Information:<br>• PTCS Air Source Heat Pump Form (handwritten form located in the IM Document Library); or<br>• CheckMe!® Heat Pump Protocol Data Entry Form for PTCS Summer and Winter and<br>• PTCS Heat Pump and Central Air Conditioner Sizing Calculator available in the IM Document Library, or;<br>• A heat load/heat loss calculation and associated balance point worksheet (i.e. a calculator, graph, or chart) | To streamline recordkeeping requirements. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: BPA removed the following Documentation Requirements from Documentation Requirements Table and removed the associated check mark in Customer File - A) “Documentation that measure requirements have been met (manufacturer, model number, type, size, quantity of equipment of product installed or used"), B) “Proof that the required forms for the claimed measures have been accepted in the PTCS Site Registry of certified systems”, and C) “Registry Installation Report." | To remove duplicative recordkeeping requirements by eliminating required documents from Customer File, as requested in East HUB Roundtable. The Registry already captures and stores this information, which can be accessed electronically from the Registry using the Measure ID. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: In Documentation Requirements table, BPA replaced reference to “PTCS Site Registry Measure ID” with “PTCS Site Registry Measure ID reflecting ‘BPA Approved’ status", and check marked the boxes for BEETS, and Site Registry. | For PTCS measures to be claimed, we require the PTCS Site Registry Measure ID show 'BPA-Approved' status, which reflects full compliance with PTCS specifications. |
| 11.7.2.2 | PTCS Variable Speed Air Source Heat Pumps: BPA renamed the PTCS ASHP Form to "PTCS ASHP optional data collection tool", removed it from Required Documentation, and listed it as optional under Additional Information. | All PTCS forms are optional and only used for data collection purposes. |
| 11.7.2.2 | PTCS Variable Speed Air Source Heat Pumps: The kWh savings decreased per the RTF. There was no change to payments. | RTF changed the kWh savings. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.7.2.2 | PTCS Variable Speed Air Source Heat Pumps:<br>BPA changed the section header to add the term: "(BPA-qualified)." | Measure changed from RTF to BPA-Qualified basis. |
| 11.7.2.2 | PTCS Variable Speed Air Source Heat Pumps:<br>BPA removed the Documentation Requirement to store the following installation and sizing information in Customer File and instead listed it as optional under Additional Information:<br>• PTCS Air Source Heat Pump Form (handwritten form located in the IM Document Library); or<br>• CheckMe!® Heat Pump Protocol Data Entry Form for PTCS Summer and Winter and<br>• PTCS Heat Pump and Central Air Conditioner Sizing Calculator available in the IM Document Library, or;<br>• A heat load/heat loss calculation and associated balance point worksheet (i.e. a calculator, graph, or chart) | To streamline recordkeeping requirements. |
| 11.7.2.2 | PTCS Variable Speed Air Source Heat Pumps: In Documentation Requirements table, BPA replaced reference to “PTCS Site Registry Measure ID” with “PTCS Site Registry Measure ID reflecting ‘BPA Approved’ status", and check marked the boxes for BEETS, and Site Registry. | For PTCS measures to be claimed, we require the PTCS Site Registry Measure ID show 'BPA-Approved' status, which reflects full compliance with PTCS specifications. |
| 11.7.2.2 | PTCS Variable Speed Air Source Heat Pumps: BPA removed the following Documentation Requirements from Documentation Requirements Table and removed the associated check mark in Customer File - A) “Documentation that measure requirements have been met (manufacturer, model number, type, size, quantity of equipment of product installed or used"), B) “Proof that the required forms for the claimed measures have been accepted in the PTCS Site Registry of certified systems”, and C) “Registry Installation Report." | To remove duplicative recordkeeping requirements by eliminating required documents from Customer File, as requested in East HUB Roundtable. The Registry already captures and stores this information, which can be accessed electronically from the Registry using the Measure ID. |
| 11.7.2.3 | PTCS Commissioning Controls and Sizing measure:<br>BPA renamed the PTCS ASHP Form to ""PTCS ASHP optional data collection tool"", removed it from Required Documentation, and listed it as optional under Additional Information. | All PTCS forms are optional and only used for data collection purposes. |
| 11.7.2.3 | PTCS Commissioning Controls and Sizing measure:<br>BPA changed the section header to add the term: "(BPA-qualified)." | Measure changed from RTF to BPA-Qualified basis. |
| 11.7.2.3 | PTCS Commissioning Controls and Sizing Measure:<br>BPA removed the Documentation Requirement to store the following installation and sizing information in Customer File and instead listed it as optional under Additional Information:<br>• PTCS Air Source Heat Pump Form (handwritten form located in the IM Document Library); or<br>• CheckMe!® Heat Pump Protocol Data Entry Form for PTCS Summer and Winter and<br>• PTCS Heat Pump and Central Air Conditioner Sizing Calculator available in the IM Document Library, or;<br>• A heat load/heat loss calculation and associated balance point worksheet (i.e. a calculator, graph, or chart) | To Streamline recordkeeping requirements. |
| 11.7.2.3 | PTCS Commissioning, Controls & Sizing measure (CC&S):<br>In Documentation Requirements table, BPA replaced reference to “PTCS Site Registry Measure ID” with “PTCS Site Registry Measure ID reflecting ‘PTCS Certified Only’ status", and check marked the boxes for BEETS, and Site Registry. | For PTCS measures to be claimed, we require the PTCS Site Registry Measure ID show 'BPA-Approved' status, which reflects full compliance with PTCS specifications. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.7.2.3 | PTCS Commissioning Controls and Sizing measure (CC&S): BPA removed the following Documentation Requirements from Documentation Requirements Table and removed the associated check mark in Customer File - A) “Documentation that measure requirements have been met (manufacturer, model number, type, size, quantity of equipment of product installed or used"), B) “Proof that the required forms for the claimed measures have been accepted in the PTCS Site Registry of certified systems”, and C) “Registry Installation Report." | To remove duplicative recordkeeping requirements by eliminating required documents from Customer File, as requested in East HUB Roundtable. The Registry already captures and stores this information, which can be accessed electronically from the Registry using the Measure ID. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps: BPA renamed the PTCS ASHP Form to ""PTCS ASHP optional data collection tool"", removed it from Required Documentation, and listed it as optional under Additional Information. | All PTCS forms are optional and only used for data collection purposes. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps: The kWh savings decreased per the RTF. There was no change to payments. | RTF changed the kWh savings. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps: BPA changed the section header to add the term: "(BPA-qualified). | Measure changed from RTF to BPA-Qualified basis. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps: BPA combined PTCS Ground Water Source Open Loop Installation Specifications and Regional Technical Forum Residential Ground Source Heat Pump System Installation Standards into one spec. It also updated the form to accommodate this change and removed unused checklists from the form. | Streamlined and shortened documents as per PTCS Redesign. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps:<br>BPA removed the Documentation Requirement to store the following sizing information in Customer File and instead listed it as optional under Additional Information:<br>• Heat load/heat loss calculation; and<br>• Balance point worksheet (i.e. a calculator, graph or chart); and<br>• Loop-design documentation | To streamline and simplify recordkeeping requirements. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps: In Documentation Requirements table, BPA replaced reference to “PTCS Site Registry Measure ID” with “PTCS Site Registry Measure ID reflecting ‘BPA Approved’ status", and check marked the boxes for BEETS, and Site Registry. | For PTCS measures to be claimed, we require the PTCS Site Registry Measure ID show 'BPA-Approved' status, which reflects full compliance with PTCS specifications. |
| 11.7.2.4 | PTCS Ground Source Heat Pumps: BPA removed the following Documentation Requirements from Documentation Requirements Table and removed the associated check mark in Customer File - A) “Documentation that measure requirements have been met (manufacturer, model number, type, size, quantity of equipment of product installed or used"), B) “Proof that the required forms for the claimed measures have been accepted in the PTCS Site Registry of certified systems”, and C) “Registry Installation Report." | To remove duplicative recordkeeping requirements by eliminating required documents from Customer File, as requested in East HUB Roundtable. The Registry already captures and stores this information, which can be accessed electronically from the Registry using the Measure ID. |
| 11.7.2.5 | PTCS Duct Sealing: BPA renamed the PTCS Duct Sealing Form to "PTCS Duct Sealing optional data collection tool", removed it from Required Documentation, and listed it as optional under Additional Information. | All PTCS forms are optional and only used for data collection purposes. |
| 11.7.2.5 | PTCS Duct Sealing - Previously Sealed Ducts:<br>BPA now allows the resealing of ducts at utility discretion (i.e. a second duct sealing only), provided all other program requirements are met. | Additional flexibility was requested by utilities and COTRs. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.7.2.5 | PTCS Duct Sealing: In Documentation Requirements table, BPA replaced reference to “PTCS Site Registry Measure ID” with “PTCS Site Registry Measure ID reflecting ‘BPA Approved’ status", and check marked the boxes for BEETS, and Site Registry. | For PTCS measures to be claimed, we require the PTCS Site Registry Measure ID show 'BPA-Approved' status, which reflects full compliance with PTCS specifications. |
| 11.7.2.5 | PTCS Duct Sealing: BPA removed the following Documentation Requirements from Documentation Requirements Table and removed the associated check mark in Customer File - A) “Proof that the required forms for the claimed measures have been accepted in the PTCS Site Registry of certified systems”, and B) “Registry Installation Report." | To remove duplicative recordkeeping requirements by eliminating required documents from Customer File, as requested in East HUB Roundtable. The Registry already captures and stores this information, which can be accessed electronically from the Registry using the Measure ID. |
| 11.7.3 | Prescriptive Duct Sealing: BPA changed the section header to add the term: "(BPA-qualified)." | Prescriptive Duct Sealing was always BPA-Qualified, but this was not noted in the IM, so we added that clarification in the section header. |
| 11.7.3 | Prescriptive Duct Sealing - Previously Sealed Ducts: Resealing of ducts is allowed at utility discretion (i.e. a second duct sealing only), provided all other program requirements are met. | Additional flexibility was requested by utilities and COTRs. |
| 11.7.3 | Prescriptive Duct Sealing: BPA removed the "Registry Installation Report" from the Documentation Requirements Table - Customer File, and replaced the requirement with the following:<br>"Installation Information, including one of the following:<br>1) “Site Registry Measure ID reflecting ‘BPA-Approved’ status” (if the job was entered into the PTCS Site Registry; NOTE - check mark only BEETS and Site Registry boxes), or<br>2) Prescriptive Duct Sealing form (if job was not entered into Registry, or if the form supports a pre-approved utility certification program that does not utilize the Registry; NOTE: check mark only the Customer File box)." | To further streamline requirements, and better clarify what is needed in Customer File regardless of whether the Registry is used, or the Prescriptive Duct Sealing form is used. |
| 11.7.3 | Prescriptive Duct Sealing: Primary Heating System Type was added as a new requirement listed in the Documentation Requirements table, and check marked in BEETS column only. | To improve data collection for purpose of assisting future evaluation of measure cost effectiveness. |
| 11.8.1 | Line Voltage Thermostats: BPA increased the savings for Line Voltage Thermostats in Single and Multifamily homes with no change to payment." | RTF Update. |
| 11.8.2 | Advanced Smart Thermostats: BPA removed the Advanced Smart Thermostats Project Information Form (PIF) documentation requirement. The thermostat make and model must now be entered into BEETS. | Simplification. |
| 11.8.2 | Advanced Smart Thermostats: BPA increased payments for Advanced Smart Thermostats to $140 for Retail, By Request, Coupon/Instant Discount and Standard Rebate and to $165 for Direct Install. | Additional implementation support. |
| 11.9.1 | Northwest Energy Efficient Manufactured Home (NEEM): BPA decreased savings for NEEM measures. | RTF measure update. |
| 11.9.2 | Deleted "Stand-alone measures may not be claimed in addition to NEEM 1.1 or 2.0 with the exception of high efficiency heating and thermostat measures" from Addiational Information. | Correcting a contradiction |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.9.4 | Montana House: BPA is providing advanced notice that the Montana House measure will no longer be available beginning October 1, 2023 to ensure that utilities are aware the projects permitted prior to that date but not completed until afterward will not be eligible for payment. | The RTF no longer supports this measure. |
| 11.9.4 | Deleting "Stand-alone measures may not be claimed in addition to the Single Family New Construction Performance Path or Montana House" from Additional Information | Correcting a contradiction |
| 11.9.5 | BPA Energy Efficient New Multifamily Construction: BPA no longer allows custom projects for new multifamily construction. | Calculating the savings above code requires highly complex and specialized energy models to verify what the savings are above code. BPA does not have the resources to do this, we rely on the third party implementation programs referenced in the UES measures to perform this modeling and determine the code trade-offs utilized. |
| 11.9.6 | BPA Zero Energy Ready New Multifamily Construction: BPA does not allow custom projects for new multifamily construction. | Calculating the savings above code requires highly complex and specialized energy models to verify what the savings are above code. BPA does not have the resources to do this, we rely on the third party implementation programs referenced in the UES measures to perform this modeling and determine the code trade-offs utilized. |
| 11.10 | Weatherization: When claiming an "Any Electric Heat" option for Residential Weatherization measures, BPA requires that the primary heating type be reported. This excludes Whole House and Prescriptive Air Sealing. | Change was made to align with BEETS and IM reporting requirements. |
| 11.10 | Weatherization: BPA changed the savings for many single family, manufactured home, and some multifamily weatherization measures, including air sealing, insulation, prime windows, and storm windows. No change to incentive levels. See UES Measure list for specific changes. | Changes were made to be consistent with the RTF. |
| 11.10 | Weatherization: BPA updated this section name from Weatherization (Standard Income) to just Weatherization. | Changed the section title since Low-Income measures moved into a stand-alone section. |
| 11.10.1 | Insulation: BPA corrected the language that the sloped surface of an A-frame home must be insulated and invoiced per Weatherization Specification section 4.7: Sloped Roofs and Finished Attics. | Correcting language to align with current Weatherization Specifications. |
| 11.10.1 | Insulation: BPA clarified that knee walls should be invoiced as wall insulation and not attic insulation per Weatherization Specification section 8: Wall Insulation: Site Built Homes. | Clarification was made to reflect current weatherization specifications. |
| 11.10.1 | Insulation: BPA clarified that manufactured roof insulation with blown-in attic and rigid insulation covered by an EPDM roof can be claimed as one roof insulation measure and be based on total insulation value. | Clarification made to reflect current weatherization specifications. |
| 11.10.1 | Insulation: BPA expired the measure option for Existing Single Family Attic Insulation from R38 to R49. All other attic insulation measures remain. Please now use the measure for Single Family Attic Insulation R30 to R49 instead. | Expired this measure to be consistent with the RTF. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.10.1 | Insulation: Deleting the language that "Utilities may claim multiple existing single family insulation projects on the same invoice, but should use either the “Any Electric Heat” measures or HVAC-specific heating type measures and not both. Utilities may switch to claiming “Any Electric Heat” measures if reporting using the HVAC-specific heating measures delivers little benefit or they would like to claim higher payments." | With the new BEETS reporting system, utilities may claim single family insulation measures on the same invoice using any primary heating type. |
| 11.10.1 | Insulation. NOTE: This clarification will not be required until BEETS is operational. Adding clarification that project reporting to BPA will be based on the square footage of installed insulation rounded to the nearest whole number. | Clarifying how to report measure quantity in BEETS and to align guidance across sectors that will be |
| 11.10.2 | Prime Window and Patio Door Replacement: Deleting the language that "Utilities may claim multiple existing single family prime window and patio door replacements on the same invoice, but should use either the “Any Electric Heat” measures or HVAC-specific heating type measures and not both. Utilities may switch to claiming “Any Electric Heat” measures if reporting using the HVAC-specific heating measures delivers little benefit or they would like to claim higher payments." | With the new BEETS reporting system, utilities may claim multiple existing single family prime window and patio door replacements on the same invoice using any primary heating type. |
| 11.10.2 | Prime Windows and Patio Doors. Adding the language "Prime windows and patio doors should be reported on the invoice using the reference number that reflects the pre-existing pane count. If single and double-pane windows were replaced, the square footage of each type should be reported separately." | To clarify that utilities must invoice prime windows and patio doors to accurately reflect what the pre-existing window count is. |
| 11.10.2 | Window and Patio Door Replacements. NOTE: This clarification will not be required until BEETS is operational. Adding clarification that the reported project square footage shall be rounded up to the nearest whole number. Guidance on two different calculation methods are available to account for different types of installations. | Clarifying how to report measure quantity in BEETS and to align guidance across sectors. |
| 11.10.4 | Exterior Insulated Doors (BPA-Qualified): Additional path to qualification: In addition to being ENERGY STAR-rated, BPA now also accepts NFRC-rated doors that meet specific U-factor and solar heat gain coefficient requirements based on glazing levels. | Allowing an additional path to certify qualification. |
| 11.10.4 | Exterior Insulated Doors (BPA-Qualified): BPA clarified that the glazing level refers to the distinction of whether the replacement door is ≤ ½-Lite, which refers to the proportion of the door that is taken up by a window. | Clarifying to address previous utility confusion. |
| 11.10.4 | Exterior Insulated Doors (BPA-Qualified): BPA accepts pre-existing models that were ENERGY STAR-Qualified at the time they were manufactured even if ENERGY STAR specifications have changed. | Allows previously ENERGY STAR models to address how to qualify older exterior insulated doors. |
| 11.10.4 | Exterior Insulated Doors (BPA-Qualified). BPA accepts a copy of the NFRC sticker to demonstrate qualification. | Allowing an additional path to certify qualification. |
| 11.10.5 | Whole House Air Sealing and Testing: BPA removed the requirement to document the age of the home. | Simplifying documentation requirements. |
| 11.10.6 | Prescriptive Air Sealing: BPA removed the requirement to document the age of the home. | Simplifying documentation requirements. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.11 | Low-Income Energy Efficiency Measures: BPA expired the retail distribution option for the low-income smart thermostat measure. Only contractor-installed smart thermostats qualify for a low-income payment. | Change made to ensure low-income installation costs are accounted for. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA clarified that payment rates listed for low-income measures in the UES measure list may not reflect the overall reimbursement totals for some low-income weatherization measures. See the low-income section for total installation and repair cost reimbursement amounts. | Clarification added to address confusion about how to invoice low-income weatherization projects. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA clarified additional examples for qualifying repair costs for heat pump water heaters. | Qualifying repair costs added. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA clarified that gross income is to be used to calculate income qualification. | Clarification made to be consistent with WAP income qualification guidelines. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA added a new low-income measure for the 40 Gallon Heat Pump Water Heater with an installed payment of dollar-for-dollar up to $1,850. | Adding measure to be consistent with the new standard income measure. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA increased low-income deemed measure installed payment cost caps for Ductless Heat Pumps up to $4,400, PTCS Ducted Air Source Heat Pumps up to $6,200, Tier 1 Heat Pump Water Heaters up to $1,850, and Tier 2 or 3 Heat Pump Water Heaters up to $2,000. | Updated some low-income payment cost caps to reflect recent RTF measure installation cost analysis. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA added a new low-income measure for a Tier 4 Heat Pump Water Heater with an installed payment of dollar-for-dollar up to $2,000 effective October 2021. | Adding measure to be consistent with the new standard income measure. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA determined that Low-Income Heat Pump Water Heater Measures are eligible for all multifamily housing types (low, mid, and high-rise). | Aligning the IM and UES measure list. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA removed the Ductless Heat Pump Project Information Form (PIF) documentation requirement for low-income. The make, model, and total project cost will now be collected in BEETS. | Simplifying documentation requirements. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA no longer requires the Smart Thermostat Project Information Form (PIF) for low-income. The make and model number will now be collected in BEETS. | Simplifying documentation requirements. |
| 11.11 | Low-Income Energy Efficiency Measures: BPA no longer requires the PTCS Heat Pump and Duct Sealing Forms for low-income. Utilities only need to keep the Registry Installation Report on file. | Simplifying documentation requirements. |
| 11.11 | Low-Income Energy Efficiency: BPA clarified that Duct Insulation in Single Family Homes and Patio Door Replacements in Multifamily Mid/High-Rise Homes are eligible Low-Income measures. | Based on two previous 2020 change notices, clarifying qualifying low-income measures in the Low-Income Payment Table. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.11 | Low-Income Energy Efficiency Measures. Clarifying that any changes noticed for documentation, specification, and qualification requirements for a standard-income measure will be reflected in the equivalent Low-Income measure requirements. | Standard-Income and equivalent Low-Income measure implementation requirements should align, with the exception of a few additional documentation requirements for income qualifying Low-Income measures. |
| 12.0 | Utility Distribution Sector: BPA refreshed the overall chapter, reorganized the text, removed the utility distribution measures list from the Requirements and Specifications section (was the incorrect location as they are not requirements), and restructured the measures into a table. | Refreshed and streamlined this chapter to bring greater clarity to utility customers. |
| 12.1 | Utility Distribution Custom Projects: BPA renamed this section and clarified the ""Requirements and Specifications"" section. BPA also included reference to the Option 1 and Option 2 custom project sections and information about the Simplified Voltage Optimization M&V Protocol option. | Brings more clarity for utility customers. |
| 12.1 | Utility Distribution Custom Project Programs: BPA increased the incentive rate for New Construction and Major Renovation for Utility Distribution sector measures with 20+ measure life to $0.35 per kWh. | Brings consistency to incentive rates between the sectors (excludes Commercial HVAC End Users) for New Construction and Major Renovation measures. |
| 12.2 | Re-Conductor & Transformer Calculator Option: BPA refreshed the opening paragraph and reformatted the "Requirements and Specifications" and "Documentation Requirements" sections. BPA also included additional information about the customer submission and review process and added reference to the Bonneville Energy Efficiency Tracking System, or BEETS. | Brings more clarity to this section. |
| 12.2 | Re-Conductor & Transformer Program: BPA increased the incentives for New Construction and Major Renovation for Utility Distribution measures with 20+ measure life to the lesser of $0.35 per kWh or 70% of project cost. | Brings consistency to incentive rates between the sectors (excludes Commercial HVAC End Users) for New Construction and Major Renovation measures. |

# APPENDIX C- OCTOBER 1, 2022 CHANGE NOTICE SUMMARY

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 1 | Section updated to reflect reporting in BEETS. | Transition to BEETS. |
| 2 | Section updated to reflect reporting in BEETS. | To support BEETS transition. |
| 2.1.1 | Updated the term "Rollover" to "Carryover". | To align the IM terms and definitions with the new ECA. |
| 2.1.2 | The term "Bilateral Funding" and "Bilateral Transfers" has been changed to "Implementation Budget Transfer". | To align the language in the IM with the terms and definition in the new ECA. |
| 2.1.2.3 | Removed requirement for customers to submit a form for Implementation Budget Transfers and for authorization third-parties to request transfers on the customers behalf. | Transfer requests will be submitted in BEETS and the authorization for third-parties will be included the customers authorization for third-parties representing them in BEETS. |
| 2.2 | Updated table to reflect that utilities can report partial self-funding for all available applications. | To align with BEETS reporting requirements. |
| 3 | Section updated to reflect reporting in BEETS. | Support transition to BEETS. |
| 4 | Section updated to reflect reporting in BEETS. | Support transition to BEETS. |
| 4.3.2.7 | Edited the second sentence - to be consistent with Section 8.3.C.5, regarding the method to calculate the incremental commercial new construction costs. | Ensure IM language is consistent. |
| 6.2 | Measure distribution tables with description of documentation requirements says addresses are required in BEETs. Actually the data is optional in BEETs and can be provided through a distribution log or other document. | Clarifying that this data can be entered into BEETs but can also be contained in a distribution log or other format. |
| 8.3 | Item C.1.b Requirements and Specifications, Item 5: Corrected the third bullet - to be consistent with Section 4.3.2, item 7 regarding the method to calculate the incremental costs for commercial new construction projects without cost data. | Ensure the IM language is consistent. |
| 8.4.3 | Requirements and Specifications, Post-conditions table: Indoor Unit Types: Non-Ducted, Efficiency Requirement added 'or 10.4 HSPF2' rating option. Ducted or Mixed, Efficiency Requirement added 'or 9.4 HSPF2' rating option. | The table did not reference the new HSPF2 ratings which will be the only ratings available for equipment manufactured after January 1, 2023. |
| 8.4.4 | Requirements and Specifications, Post-conditions table: Equipment Size: < 65,000 Btu/H, Mode: Cooling, Efficiency Requirement added 'or 14.3 SEER2' rating optionHeating, Efficiency Requirement added 'or 7.2 HSPF2' rating option. | The table did not reference the new SEER2 or HSPF2 ratings which will be the only ratings available for equipment manufactured after January 1, 2023. |
| 8.5.1 | Documentation Requirements table, removed the last requirement for customers to retain in their files the AHRI Certificate that documents efficiency requirements have been met. | AHRI does not create certificates for insulation products and this requirement was never intended for the insulation measure. |
| 10.3.1 | Requirements and Specifications, added school districts to the list of eligible EPM sites. | Clarifies intent to allow a school district to qualify as a site for the purposes of tracking and reporting Energy Project Manager activities. |
| 11.7.1 | Updated the section number in the eligibility table for manufactured existing with a ductless mini split heat pump baseline to reflect the correct section in the IM. | Removed old information and added correct information. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.7.1 | Added verbiage that a failed heat pump system operating with electric resistance back-up heat is not considered electric-resistance for the purposes of meeting pre-condition requirements. Included the measure, Ductless Heat Pump Upgrade section 11.7.1.2, that should be utilized. | Added clarifying verbiage to address ongoing confusion. |
| 11.7.1 | Added the HSPF2 to the requirements and specification and document description table. | Added the equivalent HSPF2 value in preparation for the DOEs new ratings starting January 2023. Current HSPF values remain active for equipment manufactured before January 2023. |
| 11.7.1 | Updated language that DHP must be installed by a licensed contractor. | Updated requirements for clarity and to avoid installs that did not meet BPA's qualifications. |
| 11.7.1.2 | Added the HSPF2 to the requirements and specification and document description table. | Added the equivalent HSPF2 value in preparation for the DOEs new ratings starting January 2023. Current HSPF values remain active for equipment manufactured before January 2023. |
| 11.7.1.2 | Updated the eligibility table to include all eligible applications. | The change was missed in a previous update and is being fixed. |
| 11.7.1.2 | Updated the language that a DHP must be installed by a licensed contractor. | Updated requirements for clarity and to avoid installs that did not meet BPA's qualifications. |
| 11.7.2.1 | PTCS Air Source Heat Pumps: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 and SEER2 are equivalent to BPA's prior HSPF and SEER metrics, so do not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. |
| 11.7.2.2 | PTCS Variable Source Heat Pumps: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 and SEER2 are equivalent to BPA's prior HSPF and SEER metrics, so do not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. |
| 11.7.2.3 | PTCS Commissioning, Controls & Sizing: Correct error in CC&S Documentation Requirements table so the table reads: PTCS Site Registry Measure ID reflecting "PTCS Certified Only" status. | The Registry does not provide a "BPA-Approved" status for the CC&S measure. Rather, it provides only a "PTCS Certified Only" status (claimable by utilities), or a Rejected status (not claimable by utilities). |
| 11.7.2.3 | PTCS Commissioning, Controls and Sizing: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 is equivalent to BPA's current HSPF metric, so does not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. The IM does not contain a SEER requirement for the CC&S measure. |
| 11.7.5 | Non PTCS Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 and SEER2 are equivalent to BPA's prior HSPF and SEER metrics, so do not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. |
| 11.7.5 | Non PTCS Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump: Added the HSPF2 and SEER2 values to the requirements and specification and document description table. | Added the equivalent HSPF2 and SEER2 values in preparation for the DOEs new ratings starting January 2023. Current HSPF and SEER values remain active for equipment manufactured before January 2023. |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| 11.7.6 | Non PTCS Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Variable Speed Air-Source Heat Pump: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 and SEER2 are equivalent to BPA's prior HSPF and SEER metrics, so do not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. |
| 11.7.6 | Non PTCS Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Variable Speed Air-Source Heat Pump: Added the HSPF2 and SEER2 values to the requirements and specification and document description table. | Added the equivalent HSPF2 and SEER2 values in preparation for the DOEs new ratings starting January 2023. Current HSPF and SEER values remain active for equipment manufactured before January 2023. |
| 11.7.7 | Non PTCS Air-Source Heat Pump Upgrade: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 and SEER2 are equivalent to BPA's prior HSPF and SEER metrics, so do not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. |
| 11.7.7 | Non PTCS Air-Source Heat Pump Upgrade:Added the HSPF2 and SEER2 values to the requirements and specification and document description table. | Added the equivalent HSPF2 and SEER2 values in preparation for the DOEs new ratings starting January 2023. Current HSPF and SEER values remain active for equipment manufactured before January 2023. |
| 11.7.8 | Non PTCS Variable-Speed Air-Source Heat Pump Upgrade: Added new designation of HSPF2 and SEER2 to efficiency requirements. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new HSPF2 and SEER2 are equivalent to BPA's prior HSPF and SEER metrics, so do not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new HSPF2 and SEER2 values reflected in the new Rate Period IM for October 2023. |
| 11.7.8 | Non PTCS Variable-Speed Air-Source Heat Pump Upgrade: Added the HSPF2 and SEER2 values to the requirements and specification and document description table. | Added the equivalent HSPF2 and SEER2 values in preparation for the DOEs new ratings starting January 2023. Current HSPF and SEER values remain active for equipment manufactured before January 2023. |
| 11.7.9 | Centrally Ducted Air Conditioners: Added new designation of SEER2 to efficiency requirements. SEER2 applies to units manufactured after January 1, 2023, based on DOE's recent change to national standard testing methodology. | The new SEER2 requirement is equivalent to BPA's prior SEER metric, so does not reflect the boost in energy efficiency found in the new national standard. That boost will be incorporated into new SEER2 value reflected in the new Rate Period IM for October 2023. |
| 11.7.9 | Centrally Ducted Air Conditioners: Added the SEER2 values to the requirements and specification and document description table. | Added the equivalent SEER2 value in preparation for the DOEs new ratings starting January 2023. Current HSPF and SEER values remain active for equipment manufactured before January 2023. |
| 11.11 | Low-Income Energy Efficiency. Clarification added in the Low-Income Payment Table that a PTCS Heat Pump Upgrade or Conversion includes both non-variable and variable speed heat pumps. When claiming a low-income PTCS Variable Speed Heat Pump, utilities should use the RefNo for a Low-Income PTCS Air Source Heat Pump. | Clarification added that Variable Speed Heat Pumps are considered an Air Source Heat Pump and are also eligible for a Low-Income payment. |
| 11.11 | Low-Income Energy Efficiency. Updated the Documentation Requirements Table for Low-Income Ductless Heat Pumps to reflect the new HSPF2 efficiency rating. | Added the new designation of HSPF2 to accommodate DOE's change to national standard testing methodology effective for units manufactured beginning January 1, 2023. |
| 11.12 | Updating invoicing instruction for clarity. | Changing verbiage to communicate when utilities can invoice BPA for the measure. |
| 12 | Clarified on page 1, ability for all customers to submit but option 1 customers have an additional pathway | Updated for additional clarification |

| SECTION NUMBER | DESCRIPTION | RATIONALE |
|---|---|---|
| Appendix A | Added Program Participant to Definitions section | Added for clarity in definitions and terms used, to define Program Participant as a BPA customer with an ECA agreement in effect. |
| Appendix A | Removed Bilateral Transfer from Definitions section. | No longer using this terminology. |
| Appendix A | Added Implementation Budget Transfer to definitions section. | Replaces the term Bilateral Transfer. |
| Appendix A | Removed Rollover Amount from definitions section. | No longer using this terminology. |
| Appendix A | Added Carryover Amount to Definitions section. | Replaces the term Rollover Amount. |
| **Changes Effective October 2023** | | |
| 11.9.3 | Single-Family New Construction Performance Path will expire October 1, 2023. | NEEA no longer supports these measures. |
| 11.9.4 | Montana House measures will expire October 1, 2023. | The RTF no longer supports these measures. |