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 (NWPCC'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 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. The IM specifies implementable measures 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 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

---

[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.

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, a Program Compliance Specialist (PCS) has provided pre-approval. All equipment installed must be new to qualify for payment using a unit energy savings (UES) 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 an ongoing process that includes planning, implementing, and using evaluation and oversight information to make improvements.

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

---

[3] Northwest Power Act language summarized.

[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.

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). BPA does not require that every measure or project be cost-effective, BPA uses a combination of cost-effectiveness thresholds and measure bundling to ensure overall cost-effectiveness at the portfolio level.

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 percent 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

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

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. BPA's willingness to pay is a cost cap designed not to exceed the total cost of implementation of the measure at the time payments are set.

1.5 Policy for Measure Changes or 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. BPA announces changes that require notice the preceding April in a separate changes document. BPA's change notice policy is as follows:

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		

Corrections are different from changes, BPA introduces corrections 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 BEETS). BPA may implement corrections 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 BPA Document Library and that do not affect payment, savings, or requirements. BPA documents off-cycle corrections

introduced outside of the April or October notice in the Mid-Cycle Corrections Summary in the IM appendix.

1.6 Official Interpretations

BPA's Energy Efficiency Contract Administration manager may issue interpretations, determinations, and findings related to the IM, unless delegated to other BPA staff. BPA provides such interpretations, determinations, and findings 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 Program Compliance Specialist Request and Acknowledgment Procedure

Under the PCS Request and Acknowledgment Procedure, customers must send a written request to their PCS to change participation in certain programs and processes. If the procedure is required, BPA lists it in the specific section and may also require the customer to include supporting information with their request. If approved, the PCS will confirm the request by written notice. A customer request is not effective until the PCS issues written approval.

Section 2. Funding

2.1 BPA Funding

Pursuant to section 6 of the ECA, BPA's Energy Efficiency Program will pay customers for the costs of energy savings from in-region projects.[1]

2.1.1 Budget Determination

At the beginning of the rate period, BPA establishes the Initial Implementation Budget, which is a portion of an Energy Efficiency Incentive (EEI) set up 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 (TOCA) 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. BPA may reallocate funds between years within a rate period as necessary to meet commitments in the ECA, the amount will not exceed that the rate period total.

2.1.2 Budget Changes

Customers may request 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.

EEI Allocation

After publishing the rate case final proposal, BPA calculates the EEI allocation for each customer and delivers this information in a letter or similar document. BPA revises 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 PCS 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, based IM requirements. EEI funds returned to BPA are added to the Unassigned Account, which captures unclaimed EEI funds and unspent BPA programmatic funds.

Inter Rate Period Budget Flexibility (Carryover)

Customers can request a transfer up to 10 percent 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

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

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 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.

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.

EEI Budget Reduction

Customers may reduce their implementation budget at any time by submitting a request through their EER. BPA will revise the customer's Available Implementation Budget to reflect the reduction, and the unallocated funds will be added to the Unassigned Account.

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 have 10 working days to request an implementation budget increase after BPA provides an accounting of available funds. Once BPA approves a customer's request, funds will be added to their Available Implementation Budget.

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

2.1.3 Implementation Budget Transfer

BPA may move implementation budget dollars between customers as an Implementation Budget Transfer per the ECA. Customers may use transferred funds for all BPA funded measures, unless otherwise specified in the IM or ECA. Budget transfers are administered through the customer's ECA and are referred to as the implementation budget (or, in certain instances, are administered through a supplemental budget in a separate exhibit).

2.1.4 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 funds 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.

2.1.5 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).

Performance payment 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 (i.e., six years). Availability of historical invoice details may be limited due to accessibility within the reporting system of record.

Deleted: s

SRR STATUS	DEFINITIONS	PAYMENT RATE $/KWH	TOTAL MAXIMUM PERFORMANCE PAYMENT EARNED AS A % OF EEI BUDGET
Small	The customer's total retail load is less than 10 aMW.	$0.08	30%

[2] BPA notifies customers of their rate period classification in the EEI allocation letter.

Rural	The customer has fewer than 12 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%

Customers earn performance payments from BPA-approved, EEI-funded savings at the rates in the table above. Performance payments for Strategic Energy Management (SEM) efforts are based on SEM Annual Savings achieved (i.e., incremental savings) and shall not be based on SEM Verified Savings. BPA does not allow a performance payment to be earned on self-funded activities (i.e., energy savings for which the customer chooses not to seek a payment from BPA).

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. All available earned performance payments must be claimed prior to the end of the rate period in which they were earned. Pooling organizations may claim performance payments up to the aggregate of each pool participant's allowance.

BPA may restrict the performance payment that can be claimed on the transferred funds[3] when redistributing funds among customers (e.g., via an Implementation Budget Transfer). 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. BPA will not allow additional performance payment requests for the remainder of the rate period unless the customer receives additional EEI funds.

[3] This restriction reduces the risk that BPA overpays 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 EEI 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	BEETS 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-Funded	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 to 100% of SEM Annual Savings Achieved for each reporting year (i.e., Year-1 of the SEM engagement and each subsequent reporting year). **Customers are allowed, but not required, to report non-reportable savings to BPA separately. BPA will not review the non-reportable data and customers will not be credited for the energy savings.		

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

BPA PAYMENT AMOUNT REQUESTED	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.	

2.2.1 Direct Fund

BPA may direct fund energy savings measures and projects proposed by customers. BPA will announce funding opportunities when they arise. Customer proposals will be evaluated, and those selected must comply with BPA's Implementation Manual program and reporting requirements. BPA does not allow a performance payment to be earned on direct fund activities. For applications funded through Direct Fund Distribution (DFD) agreements, customers are required to select DFD as a funding source in BEETS.

Section 3. General Requirements

3.1 Documentation Requirements

Measure-specific documentation requirements are listed in the corresponding IM section. Customers must retain all documentation in the customer's file, which may be in hard copy or electronic form. Customers must submit certain documentation to BPA. Whenever documentation is required to be submitted to BEETS, BPA-approved alternative tools such as Box can be used. For more details on how and where to upload documentation, see the BEETS Training Materials & Support Resources webpage.

Deleted: and

Deleted: using BEETS

Unless otherwise noted, utilities can substitute utility-created forms for BPA-provided forms to fulfill stated documentation requirements. All utility-created forms must contain at a minimum all of the information required in the BPA-provided form.

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

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.

Customers must provide cost documentation at the time of submission for all measures where implementation costs are incurred and EEI payment is requested. Cost documentation does not need to be provided at the time of submission for self-funded measures, but may still be requested as part of the oversight process. Individual reporting requirements are detailed in the documentation requirements for each measure.

BPA requests customers report at least once every six months. After receiving a customer reported measure, BPA will conduct a timely review to determine whether the measure submitted conforms to IM requirements. Once BPA conducts its review, which may include an oversight review, BPA will advance the application within BEETS to "Ready to Invoice" or will send it back to the customer for compliance or oversight correction. BPA will not accept measures that are not in compliance with the ECA or IM requirements. If there be a disagreement regarding a reported measure, BPA will work with the customer to correct any errors.

Deleted:

Customers must use BEETS to report EEI-funded, self-funded, and non-reportable energy efficiency savings. BPA requires customers to submit measures/projects within 180 calendar days of completion date. Once the measure has been marked "Ready to Invoice" customers must invoice BPA payment within 60 calendar days. Additionally, BPA requests, but does not require, customers invoice BPA at least once every six months. There are specific reporting requirements for Unit of Energy Savings (UES) measures and nonresidential lighting. If a UES measure expires, customers must submit the measure 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), customers must submit based on the current rate period reporting requirements. Customers 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. BPA decides the number, timing and extent of inspections and coordinates with the customer. BPA normally provides written notice not less than 30 days prior to a site inspection and site 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 adjust 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 determines 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 BPA initiates. 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 to avoid embedded realization rates. BPA's recommended best practice is to apply realization rates to the total.

3.5 Third-Party-Operated Programs

It is unlikely, but 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 work with customers to conclude or transition any work in progress.

Third-parties operate the following programs: Comfort Ready Home, Energy Smart Industrial (ESI), Trade Ally Network Northwest, Technical Service Providers (TSPs), and Smart Savings Retail Promotion.

3.6 Hemp and Marijuana

BPA allows hemp and hemp associated load for energy efficiency program participation in states where such activities have received USDA approval. As of Jan. 1, 2022, all states within the BPA service territory have USDA approval for hemp production. For more information, see Hemp in the Energy Efficiency Program and Hemp FAQ.

The cultivation, distribution, and sale of marijuana remains prohibited by federal law, federally owned, controlled or administered resources may not be purposely provided to facilitate the commission of a federal offense. As a federal entity, BPA follows the legal direction provided by the U.S. Department of Energy (DOE) and the U.S. Department of Justice (DOJ) as it pertains to marijuana-related business loads. Though BPA will not provide funding or support for measures or projects involving marijuana-related business load, BPA will allow customers to report self-funded activities that meet the rules and requirements of the Implementation Manual. For more information see, Clarification on BPA's Energy Efficiency Programs and Marijuana.

Section 4. Custom Projects

4.1 Custom Projects Payment Rate

All custom projects will be submitted using BEETS.

In most instances of site-specific calculations, including Option 1 Custom Projects, Option 2 Custom Projects, etc., the current site-to-busbar savings factor is 1.11183. However, the BPA lighting calculator uses 1.10816.

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

Customers may request less than BPA's willingness to pay, 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 BPA approves the custom project proposal, 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.

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

4.1 CUSTOM PROJECT PAYMENT RATE TABLE			
PROJECT TYPE	**MEASURE LIFE (YEARS)**	**SECTOR**	**PAYMENT RATE ($/KWH)**
Nonresidential Lighting	All	Agricultural Commercial Industrial	$0. 25

New or Retrofit Construction, Major Renovation (Excluding Nonresidential Lighting)	1	All	$0.025
	2-3	Agricultural Commercial Industrial Residential	$0.06
	4-19	Agricultural Commercial Industrial Residential Utility Distribution	$0.33
		Whole Building New Construction * Commercial Industrial	$0.35
New or Retrofit Construction, Major Renovation (Excluding Nonresidential Lighting)	20+	Agricultural Commercial Industrial Residential Utility Distribution	$0.38
New Construction	45+	Residential	$0.45
Income Qualified Retrofit	All	Residential	$5.00
*The Whole Building New Construction payment rate must include more than a single measure; otherwise, the single measure payment rate is $0.33/kWh.			

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

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 provides the information necessary and the 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 prior to the start of each rate period. They must submit/renew their application no later than July 1, preceding the new rate period. BPA completes 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 PCS Request and Acknowledgment Procedure (1) for any reason at the start of a new rate period, or (2) any time during the rate period, if customer circumstances change making them unable to meet the requirements identified in the Option 2 section below.

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., ESI) 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., ESI 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

Custom projects must not result in fuel switching, which BPA defines as moving from electric to nonelectric.

BPA limits custom projects to one sector per project.

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.

UES measures and calculated projects, including nonresidential lighting, may be included in custom projects independently 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 (note: nonresidential lighting must follow comprehensive M&V, not ECwV) and not use the BPA-approved 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.

Utilities pursuing a Income Qualified Retrofit Residential Custom Project must follow the same income-qualification guidelines as outlined in section 11.9 Energy Efficiency Income Qualified Measures.

Option 1 Custom Projects must meet the following benefit/cost (B/C) ratio requirements:

If the project busbar savings are 200,000 kWh or less (800,000 kWh or less for Utility Distribution measures) and the project has a BPA-approved custom project proposal, no

additional cost-effectiveness screen will be applied, regardless of the busbar savings in the completion report.

If the project busbar 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. No additional screen will be applied at the completion report.

If the project busbar 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.

Option 2 Custom Projects must meet the following B/C ratio requirements:

If the project busbar savings are 200,000 kWh or less (800,000 kWh or less for Utility Distribution measures), no cost-effectiveness screen is applied.

If the project busbar 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.

Option 1 and 2 Custom Projects must include incremental or total cost documentation, as referenced in the Custom Project Protocols.

The BPA M&V Protocol Selection Guide in the Custom Project Protocols 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.

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. At the time of proposal approval, BPA approves the incentive rate ($/kWh) and M&V Plan.

If the custom project is covered by a non-disclosure agreement, contact your 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, including operations and maintenance cost savings, 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 re-submittal, or (3) reject the submittal. BPA determination of acceptability of a proposal or 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., BPA implemented M&V 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 works with customers to adjust Completion Report savings where appropriate and feasible. If it is not possible to make appropriate adjustments, BPA will reject the project, making it ineligible for reporting.

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 BPA approves special funding, 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. If EEI payment is requested, cost documentation must be submitted at the time the project is submitted. Cost documentation does not need to be provided at the time of application for self-funded

measures, but may still be requested as part of the oversight process. The completion report and additional 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

Option 1: Custom Project Proposal must include, at a minimum, project baseline description, including appropriate nameplate information (pictures are acceptable), current operating conditions, etc.; proposed efficiency measure, project cost estimate, and M&V Plan.

Option 1 and 2: Completion Report must include project baseline description, completed measure description, including pre- and post-operating conditions and schedule, appropriate nameplate information (pictures are acceptable), completed M&V plan (with all supporting data and analysis), and project cost and operations and maintenance savings documentation.

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS	
	BEETS	CUSTOMER FILE
Option 1 Custom Projects		
Cost Documentation	X	X
Option 1 custom project supporting documentation	X	X
Option 2 Custom Projects		
Cost Documentation	X	X
Option 2 custom project supporting documentation		X

Formatted Table

Formatted Table

Section 5. Custom Programs

Deleted: Custom Programs

Custom Programs are a combination of similar projects, measures, and/or end-users that have the same evaluation plan or 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, and that may occur at one or more end-user sites. Customers may submit Custom Program pre-screening/proposals at any time of year but may experience delayed responses for submissions received July through October due to IM and conflicting year end activities.

Deleted: Custom Programs

Deleted: ,

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

Deleted: its

Customers may report savings from projects 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.

5.1 Custom Programs Payment Rate

Deleted: Custom Programs

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) 70 percent of the documented project cost.

Deleted: s

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 calculates payment rate 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. 25
New or Retrofit Construction (Excluding Nonresidential Lighting)	1	All	$0.025

	2-3	Agricultural Commercial Industrial Residential	$0.06
	4-19	Agricultural Commercial Industrial Residential Utility Distribution	$0.33
		Whole Building New Construction** Commercial Industrial	$0.35
	20+	Agricultural Commercial Industrial Residential Utility Distribution	$0.38
New Construction	45+	Residential	$0.45
Income Qualified Retrofit	All	Residential	$5.00

*Savings must be reported separately for each sector.

**The Whole Building New Construction payment rate must include more than a single measure, otherwise the single measure payment rate is $0.33 per kWh. 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

Deleted: Custom Programs

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 (e.g., when an impact evaluation is needed to estimate savings).

Deleted: c

Deleted: p

Custom Programs must meet the following criteria:

Deleted: Custom Programs

It does not result in fuel switching, which is defined as moving from electric to nonelectric.

Deleted: Not

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

Utilities pursuing an Income Qualified Retrofit Residential Custom Program must follow the same income-qualification guidelines as outlined in section 11.9 Energy Efficiency Income Qualified Measures.

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.

Deleted: custom programs

There are two types of Custom Programs:

Deleted: 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 TRC of 1.0 or greater based on verified costs and savings at the time of completion report and invoicing.

Deleted: Custom Programs

Deleted: Custom Programs

M&V Custom Programs: BPA determines savings 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 TRC of 1.0 or greater based on verified costs and savings at the time of completion report and invoicing.

Deleted: Custom Programs

Deleted: Custom Programs

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

Deleted: Custom Programs

5.3 Custom Programs Approval and Modification Process

Deleted: Custom Programs

Custom program approval requires a three-phase process:

Prescreening prior to submission of a utility custom program proposal

During this phase, customers must work with their 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.

Custom Programs Proposal

Deleted: Custom Programs

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

- Utility contact and any third-party contacts,
- Project name and short project description,
- Proposed date range for program to be implemented,
- Sector for the measures completed,
- Savings confirmation methodology to be used (Evaluated or M&V),
- Evaluation Plan (Evaluated),
- Who will perform the savings calculations (utility or third-party contractor to the utility),
- Estimated energy savings,
- Information about future measure viability including UES measure development or other incentive opportunity likelihood,
- Links to any available research or evaluation of included technologies to help substantiate the viability of the proposal, and
- Any substantive changes to proposal information after submission will require cancellation of the custom program and restarting from phase one.

Custom Programs Completion Report

Deleted: Custom Programs

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

- Start date and completion date of the program;
- Number of sites included in the program;
- Project cost;

Deleted: ;

Deleted: ;

- Total site energy savings and documentation of energy savings;
- Evaluated: Evaluation Report consistent with the previously approved evaluation plan in the proposal;
- 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;
- Estimated project-level cost-effectiveness; and
- Whether the utility is requesting EEI payment.

Deleted: reimbursement

5.4 Custom Programs Documentation and Reporting Requirements

Deleted: Custom Programs

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS	
	BEETS	CUSTOMER FILE
Optional Data Collection Tool - Custom Program Proposal	X	X
Optional Data Collection Tool - Custom Program Completion Report 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 PCS will direct the customer how to report the program savings to BPA with a custom program reporting tool.

Deleted: Custom Programs

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 defines M&V Custom Program completion report requirements at the proposal stage. Upon approval of the completion

Deleted: Custom Programs

report, the PCS 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 Summaries

Commented [JW1]: This section includes more than one sector summary.

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, shellfish, 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.

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 UES measures, Nonresidential Lighting, and Custom Projects: Central heating, ventilation, air conditioning (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.

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

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

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.

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.

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.

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.

Installations of high-intensity discharge lighting in residential settings must be reported as Commercial sector measures. See section 8.3 Nonresidential Lighting for more details.

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 described 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

DISTRIBUTION TYPE	DESCRIPTION
Retail	Retail distribution of eligible items provides pricing discounts on energy-saving technologies sold through a physical or digital retailer. 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.
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 a customer or their agent; or (2) installed by a third-party (e.g., an apartment complex maintenance manager) and witnessed by the customer or their agent; or (3) the customer or their agent visually inspects a representative sample after installation by a third-party. Direct Install measures may be fulfilled through a utility program or a BPA program. All 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.
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 the IM and will not have any distribution-specific designators in the UES Measure List.

Documentation Requirements By Channel

DISTRIBUTION TYPE	METHODOLOGY ALLOCATING SAVINGS	END-USER IDENTIFYING INFORMATION (REQUIRED IN BEETS)*	SALES REPORT	COST DOCUMENTATION (REQUIRED IN BEETS)*
Retail	X		X	
Direct Install		X		X
Coupon or Instant Rebate		X	X	
Standard Rebate Payment		X		X

Deleted: MAY BE

Deleted: EQUIPMENT/ CONTRACTOR INVOICE

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

DESCRIPTIONS 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 end-user receiving efficiency measure. This information can be delivered using the measure distribution log or document containing the same information, by entering end-user identifying information (unique site ID and address) into BEETS, or through record of distribution for bulk measures. Measure-specific restrictions may apply and will be listed in the body of the IM for each measure category.
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.
Cost Documentation	The 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), and cost. See the UES Cost Documentation FAQ located in the IM Document Library.

Commented [JW2]: Should the "Descriptions table" appear before the one prior to this?

Commented [AB3R2]: I think we'll keep this one here for now so we limit the mount of changes in April.

Deleted: Equipment/ Contractor Invoice

Deleted: E

Deleted: ; the order/purchase date;

Section 7. Agricultural Sector

Revisions to measures in this sector are listed in the changes and corrections summary in Appendix B.

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 table below provide a summary only. See the corresponding text of the IM for complete details of the payment levels and associated requirements.

7.1 PAYMENT SUMMARY	
MEASURE CATEGORY	**PAYMENT**
7.2 Freeze-Resistant Stock Water Tanks and/or Fountains	$140 per tank or fountain (Heating Zone 1) $165 per tank or fountain (Heating Zone 2) $225 per tank or fountain (Heating Zone 3)
7.3 Thermostatically Controlled Outlets	$14 per outlet
7.4 Transformer De-Energization	$0.03 per kWh
7.5 Irrigation Measures	
7.5.1 Irrigation System Conversion: LESA/LEPA/MDI	$26 per drop
7.5.2 Sprinkler Package Replacement	Varies, see the Payment section of this measure
7.5.3 Irrigation System Low-Pressure Conversion: High-Pressure to Low-Pressure	$23 per head per Wheel-line or Hand-line $23 per drop per Center-pivot or Lateral-move
7.5.4 Irrigation Hardware	Varies, see the Payment section of this measure
7.6 Agricultural Pumps and VFDs	
7.6.1 Irrigation Pump Testing and System Analysis (BPA-Qualified)	Varies, see the Payment section of this measure

Deleted: 3

Deleted: 6

7.6.2 Variable Frequency Drive for Agricultural Centrifugal Pump (BPA-Qualified)	$95 per VFD hp
7.6.3 Variable Frequency Drive for Agricultural Turbine Pumps (BPA-Qualified)	$135 per VFD hp
7.6.4 Variable Frequency Drive for New Agricultural Pump (BPA-Qualified)	$95 per VFD hp (new centrifugal pump) $135 per VFD hp (new turbine pump)
7.6.5 Agricultural New Pump Efficiency Upgrade (BPA-Qualified)	$95 per pump hp
7.7 Custom Projects	
7.7.1 New Agricultural Construction	See section 4.1: Custom Project Payment Rate Table
7.7.2 Other Agricultural Measures	See section 4.1: Custom Project Payment Rate Table
7.8 Agricultural Energy Audits	
7.8.1 Agricultural On-farm Energy Audit Screening	$150 per agricultural producer (e.g., farm, ranch, greenhouse, dairy, etc.)
7.8.2 Agricultural On-farm Energy Audit	Lesser of actual energy audit cost minus any funding provided by other federal, state or local agencies, or $15,000
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 and/or Fountains

Basis for Energy Savings

The baseline for freeze-resistant tanks and/or 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 heating degree days of each HZ. Visit the RTF webpage for more information.

Requirements and Specifications

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

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

- New (i.e., not home or kit-made),
- Enclosed and fully insulated, and
- Contain no electric heat.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Cost documentation	X	X
Proof of manufacturer defect warranty of at least one year		X
Documentation of the following: • Manufacturer • Model number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
Freeze-Resistant Stock Water Tanks/Fountains, HZ 1	$140 per tank/fountain
Freeze-Resistant Stock Water Tanks/Fountains, HZ 2	$165 per tank/fountain
Freeze-Resistant Stock Water Tanks/Fountains, HZ 3	$225 per tank/fountain

Deleted: Equipment or contractor invoice is to include

Deleted: m

Deleted: , m

Deleted: , t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Commented [JW1]: Measure titles are always included *along with* the specific category (i.e., heating zone or HZ, etc.)

7.3 THERMOSTATICALLY CONTROLLED OUTLETS

BASIS FOR ENERGY SAVINGS

A thermostatically controlled outlet or controller thermostatically controls the electrical heating equipment in a pump and water system utility building, utility room, or agriculture building (e.g., barn, livestock building, chicken house, storage shed, etc.) to provide heat to piping and other equipment. The base case for this measure is an electric-resistance heater operating without thermostatic control in a pump and water system utility building, utility room, or agriculture building (e.g., barn, livestock building, chicken house, storage shed, etc.) to provide heating to piping and other equipment. The more energy efficient case for this measure adds a thermostatically controlled outlet or controller that powers the electric-resistance heater in specific temperature bands. The thermostatically controlled outlet or controller will turn on the electric-resistance heater

when the building or room's ambient temperature is below 39° Fahrenheit (F), and will stop providing power to the electric-resistance heater at a temperature no higher than 50°F.

REQUIREMENTS AND SPECIFICATIONS

This measure is available to all sectors, but it must be reported under the Agricultural program. The thermostatically controlled outlet or controller should turn the electric-resistance heater on at approximately 39°F and turn off the electric-resistance heater at temperatures no higher than 50°F. Only one outlet or controller per pump and water system utility building, utility room, or agriculture building (e.g., barn, livestock building, chicken house, storage shed, etc.) is eligible.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
Thermostatically Controlled Outlet	$14 per outlet

7.4 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. Visit the RTF webpage for more information.

Requirements and Specifications

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

Deleted: Equipment or contractor invoice must include

Deleted: m

Deleted: , m

Deleted: , t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: an

Documentation Requirements		
Documentation Description	Retention/Submittal Locations	
	BEETS	Customer File
Complete the Transformer De-Energization Worksheet	X	X

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

7.5 Irrigation Measures

7.5.1 Irrigation System Conversion: LESA/LEPA/MDI

Basis for Energy Savings

The base case for this measure is for a new and existing center-pivot or linear-move system with high-pressure sprinklers on top or a Mid-Elevation Spray 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 Application (LEPA), Low Elevation Spray Application (LESA), or Mobile Drip Irrigation (MDI).

Requirements and Specifications

This measure requires conversion of a new and 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**	
	BEETS	**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
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model Number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
A system, or portion of system, converted to LEPA/LESA/MDI	$26 per drop

7.5.2 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**

Deleted: Equipment or contractor invoice must include

Deleted: t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: 3

Deleted: Documentation Requirements

Deleted: Payment

	BEETS	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
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model Number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
High-Pressure Sprinkler Package	$18 per package
MESA Sprinkler Package	$21 per package
LESA/LEPA/MDI Sprinkler Package	$10 per package

7.5.3 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 psi to the critical sprinkler. The efficient case for these measures converts:

- Center-pivot or linear-move system, or a portion of the system, to a MESA configuration.

OR

- 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.

Deleted: Equipment or contractor invoice must include

Deleted: t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: 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 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 MESA configuration or converts a wheel-line or hand-line system, or portion of the system, to a low-pressure package....

Deleted:

Formatted: Indent: First line: 0.29"

Deleted: 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, or a flow control nozzle and new rotating-type sprinkler. Conversion of wheel-line and hand-line systems to low-pressure may be combined with other irrigation hardware measures that are not included above....

OR

- Existing high-pressure impact sprinklers on wheel-line and hand-line systems to a low-pressure sprinkler package which must include:
  - Low-pressure regulator, rotating-type sprinkler with a new nozzle

  OR

  - Flow control nozzle and new rotating-type sprinkler

Conversion of wheel-line and hand-line systems to low-pressure may be combined with other irrigation hardware measures that are not included above.

Formatted: Indent: Left: 0.5", First line: 0"

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model Number • Type or size of equipment or product installed/used • Quantity		X

Deleted: Equipment or contractor invoice must include

Deleted: t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Payment	
MEASURE CATEGORY	**PAYMENT**
A center-pivot or linear-move irrigation system, or portion of a system, converted from high-pressure to MESA	$23 per drop
A wheel-line or hand-line irrigation system, or portion of a system, converted from high-pressure to low-pressure operation	$23 per head

Deleted: 6

7.5.4 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 UES offering. Visit the RTF webpage for more information.

Requirements and Specifications

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

- 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.
- Replace nozzle: Eligible systems include wheel-lines or hand-lines.
- Replace leaking drain gaskets with new gaskets: Eligible systems include wheel-lines, hand-lines, lateral-moves, and center-pivots.
- Replace Thunderbird wheel-line hubs: Eligible for wheel-line systems.
- Rebuild or replace leaking or malfunctioning leveler with new or rebuilt leveler: Eligible for wheel-line systems.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model Number • Type of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**

Deleted: Equipment or contractor invoice must include

Deleted: t

Deleted: , q

Deleted: , the order/purchase date, and cost

Formatted: List Paragraph, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

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

7.6 Agricultural Pumps and Variable Frequency Drives

7.6.1 Irrigation Pump Testing and System Analysis (BPA-Qualified)

Basis for Energy Savings

This BPA-Qualified measure is intended to help the irrigator determine irrigation system effectiveness and identify potential energy efficiency improvements. 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 payment.

Deleted: health

Deleted: Ideally, t

Deleted: reimbursement

Requirements and Specifications

This measure requires the following:

- The irrigation pump must be electrically powered, 20 horsepower (hp) or greater, and must not have been tested through BPA-sponsored pump testing services within the past five years.
- The irrigation pump must have been in operation for two of three previous years.
- The irrigation pump test must be performed by an individual possessing pump testing knowledge and experience.
- 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:

- Simple System Evaluation: Measure pump discharge pressure and evaluate the condition of the sprinkler nozzles.
- Simple System Irrigation Pump Test (e.g., open discharge): Perform irrigation pump test.
- Irrigation Pump Test and System Analysis: Perform irrigation pump test and evaluate main-lines and critical sprinklers.

Customers must deliver printed recommendation reports to the end-user.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Complete the "Agricultural Irrigation Pump Testing and System Analysis" tab in the BPA-Qualified and Provisional UES Input Sheet	X	X
Cost Documentation	X	X

Payment	
MEASURE CATEGORY	**PAYMENT**
Simple System Evaluation	$100 per evaluation
Simple System Irrigation Pump Test (e.g., open discharge)	$200 per test
Irrigation Pump Test and System Analysis, 400 acres or less	$400 per test and analysis
Irrigation Pump Test and System Analysis, over 400 acres	$600 per test and analysis
Irrigation Pump Test and System Analysis, Complex Pumping System (over more than 400 acres with multiple operating pumps)	$400 per main pump plus $100 per booster pump

7.6.2 Variable Frequency Drive for Agricultural Centrifugal Pumps (BPA-Qualified)

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 Institute of Electrical and Electronics Engineers (IEEE) 519 harmonics standard. This measure provides an annual energy savings of 10 percent of the calculated annual energy usage of the centrifugal pump.

Commented [JW2]: MARKETING: Formatting correction for InDesign version of RP IM - could you please keep this table together - rather than breaking out the third line item to continue on the subsequent page?

Deleted: Completed Irrigation Pump Testing and System Analysis Screening Tool, irrigation pump test, and recommendation reportElectronic or hard copies of the completed Irrigation Pump Testing and System Analysis BPA Screening Tool, irrigation pump test, and recommendation report
X…

Commented [JW4]: MARKETING: Formatting correction for InDesign version - can you make sure the sub-section font size is consistently the same throughout the entire IM?

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 hp. Eligible installations are limited to pumps with substantial variation in head pressure requirements (20 percent variation or more).

Customers must use the VFD for Existing Agricultural Centrifugal or Turbine Pump Energy Savings and Incentive Calculator to determine energy savings and total incentive.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Complete the VFD for Existing Agricultural Centrifugal or Turbine Pump Energy Savings and Incentive Calculator	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
VFD for Agricultural Centrifugal Pumps	$95 per VFD hp

7.6.3 Variable Frequency Drive for Agricultural Turbine Pumps (BPA-Qualified)

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

Commented [DJLee5]: Refresh file link

Deleted: Equipment or contractor invoice showing:

Deleted: , m

Deleted: , t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: Complete the VFD for Existing Agricultural Centrifugal or Turbine Pump Energy Savings and Incentive Calculator
X

savings of 20 percent 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 hp. Eligible installations are limited to turbine pumps with substantial variation in flow rates (20 percent variation or more) or discharge pressure requirements (10 percent variation or more).

Customers must use the VFD for Existing Agricultural Centrifugal or Turbine Pump Energy Savings and Incentive Calculator to determine energy savings total incentive.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Complete the VFD for Existing Agricultural Centrifugal or Turbine Pump Energy Savings and Incentive Calculator	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
VFD in Agricultural Turbine Pumps	$135 per VFD hp

7.6.4 Variable Frequency Drive for New Agricultural Pumps (BPA-Qualified)

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

Commented [DJLee6]: Refresh the file link

Deleted: Equipment or contractor invoice must include

Deleted: m

Deleted: , m

Deleted: , t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: Complete the VFD for Existing Agricultural Centrifugal or Turbine Pump Energy Savings and Incentive Calculator
X

Deleted: pump

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 annual energy savings of 20 percent of the estimated annual energy usage for turbine pumps and savings of 10 percent 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 hp.

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

Customers must use the VFD for New Agricultural Turbine Centrifugal or Turbine Pump Energy Savings and Incentive Calculator to determine energy savings and total incentive.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Complete the VFD for New Agricultural Turbine Centrifugal or Turbine Pump Energy Savings and Incentive Calculator	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Type or size of equipment or product installed/used • Quantity		X

Payment	
MEASURE CATEGORY	**PAYMENT**
VFD for New Agricultural Turbine Pump	$135 per VFD hp
VFD for New Agricultural Centrifugal Pump	$95 per VFD hp

Commented [DJLee7]: Refresh the link

Deleted: Equipment or contractor invoice must include

Deleted: m

Deleted: , m

Deleted: , t

Deleted: , q

Deleted: , order/purchase date, and cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: Complete the VFD for New Agricultural Turbine Centrifugal or Turbine Pump Energy Savings and Incentive Calculator
X

Additional Information

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

7.6.5 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 may be 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 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 hp. The existing pump being replaced must be centrifugal, turbine, or submersible turbine. The new replacement pump must have the same or lower hp 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 section 7.6.2 Variable Frequency Drive for Agricultural Centrifugal Pumps or section 7.6.3 Variable Frequency Drive for Agricultural Turbine Pumps. If there is no nameplate, contact your customer service engineer to help convert utility kilowatt readings to hp.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Complete the Agricultural New Irrigation Pump Efficiency Upgrade Project Information Form	X	X
Pump performance curve (available from the pump manufacturer)	X	X
Cost documentation	X	X
Documentation of the following:		X

Commented [DJLee8]: Need to refresh the file link

Deleted: Equipment or contractor invoice must include

Deleted: X

Commented [DJLee9]: Delete these 2 rows

• Manufacturer • Model number • Type or size of equipment or product installed/used • Quantity		

Payment	
MEASURE CATEGORY	**PAYMENT**
Agricultural New Pump Efficiency	$95 per pump hp

7.7 Custom Projects

7.7.1 New Agricultural Construction

Basis for Energy Savings

BPA determines the base case and efficient case through the custom project process.

Requirements and Specifications

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

Documentation Requirements

See section 4.6 Custom Projects Documentation Requirements.

Payment

See section 4.1 Custom Projects Payment Rate Table.

7.7.2 Other Agricultural Measures

Requirements and Specifications

The following measures must be submitted as custom projects:

- Low-pressure conversion with associated pump work.
- Change to 40-foot spacing on hand- and wheel-lines to enable conversion.
- 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.
- Nursery and greenhouse energy and water efficiency improvements in lighting, irrigation, air handling, and temperature and humidity controls.

Documentation Requirements

See section 4.6 Custom Projects Documentation Requirements.

Deleted: m

Deleted: , m

Deleted: <#>¶

, q

Deleted: , q

Deleted: , order/purchase date, and cost.

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single

Commented [DJLee9]: Delete these 2 rows

Deleted: Complete the Agricultural New Irrigation Pump Efficiency Upgrade Project Information Form

Payment

See section 4.1 Custom Projects Payment Rate Table.

7.8 Agricultural On-farm Energy Audits

7.8.1 Agricultural Energy Audit Screening

Basis for Energy Savings

The Agricultural Energy Audit Screening measure enables agricultural producers such as farmers, ranchers, dairies, greenhouse operations to provide high-level information about electrical energy-consuming equipment, as well as information about the farm type and agricultural production activities to inform participation in section 7.8.2 Agricultural On-farm Energy Audit measure. The agricultural producer will work independently, or with an experienced agricultural energy auditor, to complete the BPA Ag Energy Audit Screening Tool form, which will determine if a detailed on-farm energy audit is necessary. There are no energy savings associated with this payment.

Deleted: reimbursement

Requirements and Specifications

The following measures must be submitted as custom projects:

BPA Ag Energy Audit Screening Tool form completed by either:

- The agricultural producer independently; or
- The agricultural producer and their electric utility; or
- The agricultural producer and an experienced agricultural energy auditor who is an Association of Energy Engineers certified energy manager (CEM), U.S. Department of Agriculture Natural Resources Conservation Service Technical Service Provider (USDA NRCS TSP), state licensed professional engineer (P.E.), and/or an individual with several years of agricultural energy auditing experience. The BPA Agricultural Energy Audit Resources document and the ASABE 2022 Guide to Consultants document provides resources for identifying agricultural energy auditors.

The BPA Ag Energy Audit Screening Tool form must be filled out and submitted to BPA customer service engineer for review and approval, before the agricultural producer proceeds with an on-farm agricultural energy audit by the experienced agricultural energy auditor.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Completed BPA Ag Energy Audit Screening Tool Form	X	X

Deleted: Complete BPA Ag Energy Audit Screening Tool Form
X

Cost Documentation	X	X

Payment	
MEASURE CATEGORY	**PAYMENT**
Agricultural On-farm Energy Audit Screening	$150 per agricultural production site (e.g., farm, ranch, greenhouse, dairy, etc.)

7.8.2 Agricultural On-farm Energy Audit

Basis for Energy Savings

This measure enables agricultural producers to complete an agricultural on-farm energy audit that identifies potential energy efficiency improvements that include available BPA Agricultural Program UES measures and custom energy efficiency project opportunities. An experienced agricultural on-farm energy auditor will inspect buildings, equipment and processes, to identify and analyze energy efficiency improvements that could be implemented and result in energy savings. There are no energy savings associated with this payment.

Deleted: reimbursement

Requirements and Specifications

Agricultural producers must first complete the requirements for section 7.8.1 Agricultural Energy Audit Screening measure before completing the agricultural on-farm energy audit measure.

This measure requires the following:

- Agricultural On-farm Energy Audit and Report that meets the BPA On-farm Agricultural Energy Audit Measure Guidance.
- The Agricultural On-farm Energy Audit must be completed by an experienced agricultural energy auditor who is an Association of Energy Engineers CEM, USDA NRCS TSP, state licensed P.E. and/or an individual with several years of agricultural energy auditing experience. The BPA Agricultural Energy Audit Resources document and the ASABE 2022 Guide to Consultants document provides resources for identifying agricultural energy auditors.
- The Agricultural On-farm Energy Audit Report, provided by the energy auditor, must be submitted to the BPA customer service engineer for review and approval.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Completed Agriculture On-farm Energy Audit Report	X	X
Cost documentation	X	X

Payment	
MEASURE CATEGORY	**PAYMENT**
Agricultural On-farm Energy Audit	Lesser of actual energy audit cost minus any funding provided by other federal, state or local agencies, or $15,000

Additional Information

Visit the Agriculture section of the BPA Document Library for information about BPA's Agricultural On-farm Energy Audit Measure.

The American Society of Agricultural and Biological Engineers published this resource that established procedures for performing on-farm energy audits: Performing On-farm Energy Audit Standard ANSI/ASABE S612 JUL2009

The Agricultural On-farm Energy Audit measure may be combined with section 7.6.1 Irrigation Pump Testing and System Analysis (BPA-Qualified) measure.

An energy audit is required when applying for United States Department of Agriculture (USDA) grant and loan guarantee programs available to agricultural producers for energy efficiency and renewable energy projects, such as the Rural Energy for America Program (REAP) and various Natural Resources Conservation Service (NRCS) initiatives. BPA encourages agricultural producers to pursue USDA funding for additional financial incentives to support on-farm energy efficiency improvements.

Deleted: Completed Agricultural On-farm Energy Audit Report ...

Deleted: <#>Receipt or invoice showing the date and cost of the On-farm Energy Audit Report ...

Deleted: Ag

Section 8. Commercial

Revisions to measures in this sector are listed in the changes and corrections summary in Appendix B.

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 section 4.1 Custom Projects Payment Rate
8.3 Nonresidential Lighting	See section 8.3 Nonresidential Lighting Payment Table and Program Offerings section of Lighting Calculator
8.3.2 Midstream Lighting	Varies from $1-$50 per Unit, see Payment section for details
8.4 Commercial HVAC	
8.4.1 Advanced Rooftop Unit Control	$120 per Ton (ARC Retrofit - Lite) $250 per Ton (ARC Retrofit - Full)
8.4.2 Connected Thermostat	$300 per Connected Thermostat (Electric Heat) $150 per Connected Thermostat (Gas Heat)
8.4.3 Ductless Heat Pump Retrofit and Upgrade (BPA-Qualified)	$1,000 per Ton (Retrofit) $300 per Ton (Upgrade)
8.4.4 Air-Source Heat Pump Retrofit and Upgrade (BPA-Qualified)	$1,000 per Ton (Retrofit) $150 per Ton (Upgrade)
8.4.5 Variable Refrigerant Flow System Retrofit (BPA-Qualified)	$1,500 per Ton
8.4.6 Variable Frequency Drive on Air Handling Unit Fan (BPA-Qualified)	$500 per hp

Deleted: Lamp

8.4.7 Commercial Packaged Terminal Heat Pump (BPA-Qualified)	$150 per PTHP (Retrofit) $50 per PTHP (New Construction)
8.4.8 Demand-Controlled Kitchen Ventilation (BPA-Qualified)	$400 per Fan hp (One control sensor) $800 per Fan hp (Multiple control sensors)
8.4.9 Heat Recovery Ventilation Equipment (BPA-Qualified)	$2.50 per CFM (Tier 1) $4.00 per CFM (Tier 2)
8.5 Commercial Shell Measures	
8.5.1 Commercial Insulation	Varies from $1.80-$2.10 per square foot, see Payment section for details
8.5.2 Commercial Windows (BPA-Qualified)	$9 per square foot of Window Replaced (Heating Zone 1) $18 per square foot of Window Replaced (Heating Zone 2/3)
8.5.3 Secondary Windows	$3 per square foot of window
8.6 Commercial Refrigeration	
8.6.1 Anti-Sweat Heater Controls	$40 per linear foot of Case
8.6.2 Efficient Refrigeration Evaporator Fan Motor	$55 per Motor (ECM or PMSM on Display Case) $140 per Motor (ECM or PMSM on Walk-In Cooler or Freezer)
8.6.3 Evaporator ECM Fan Controller for Walk-In Coolers and Freezers	$60 per Motor, ≤23 Watts $120 per Motor, >23 Watts
8.6.4 Strip Curtains for Walk-In Coolers and Freezers	$9 per square foot of Doorway
8.6.5 Refrigeration Floating Pressure Controls (BPA-Qualified)	$20 per MBH (Floating Head Pressure) $10 per MBH (Floating Suction Pressure)
8.6.6 Refrigerated Display Case Door Retrofit	$300 per linear foot of Vertical Case $100 per linear foot of Horizontal Case
8.7 Additional UES Measures	
8.7.1 Generator Block Heaters (BPA-Qualified)	$400 per Unit (Size <3 kW)

Commented [JW1]: MARKETING: Please underline the 'less than' symbol to represent *less than or equal to* 23 Watts.

Formatted: Underline

Deleted: Linear

Deleted: Foot

Formatted: Highlight

Formatted: Highlight

	$2,000 per Unit (Size ≥3 kW)
8.7.2 Vehicle Engine Block Heater Controls	$200 per Unit
8.7.3 Consumer Heat Pump Water Heater in Commercial Applications	$1,600 per Water Heater (Tier 3) $1,800 per Water Heater (Tier 4) $2,200 per Water Heater (Split-System)
8.7.4 Commercial Unitary Heat Pump Water Heater	$2,000 per Water Heater
8.7.5 Efficient Pumps (BPA-Qualified)	$0.33 per kWh
8.7.6 Variable Frequency Drive for Pumps (BPA-Qualified)	$180 per hp
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

Commented [JW2]: MARKETING: Formatting correction for the InDesign version - please ensure this section title appears on ONE row/line - like all of the other measures throughout the IM. Thanks!

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, SEM, and, in rare circumstances, lighting projects.

REQUIREMENTS AND SPECIFICATIONS

Custom projects must follow all requirements per section 4. Custom Projects.

DOCUMENTATION REQUIREMENTS

See section 4.6 Custom Projects.

PAYMENT

See section 4.1 Custom Projects Payment Rate.

8.3 Nonresidential Lighting

8.3.1 Lighting Calculators

BASIS FOR ENERGY SAVINGS

BPA uses site-specific calculators 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 Nonresidential Lighting Protocol around such factors as baseline determination, control savings fractions and HVAC interactive effects. BPA built these factors 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. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

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

- Retrofit lighting projects and new construction projects.
- 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 Online Lighting Calculator implements changes to program offerings (e.g., to add or remove measures, changes to measure-level incentives, and changes to project level caps) through an Allocation designation. The table below shows the effective dates for each allocation. New projects may not be created under an Allocation after the designated end date. Projects created under a previous Allocation may be reported to BPA up to two years after the identified end date.

LIGHTING CALCULATOR SERIES NAME	ALLOCATION	EFFECTIVE DATE	END DATE
Online Lighting Calculator	RP FY 24 FY 25	April 1, 2025	September 30, 2025
Online Lighting Calculator	RP FY 26 FY 27	October 1, 2025	September 30, 2027

B. Measure Types and Approval Procedures

The lighting calculator includes two types of measures, deemed (per fixture) and calculated (per kWh), that are submitted as projects as outlined below:

- 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.
- Calculated Lighting Measures: If a proposed measure is not on the Deemed Measure List within the lighting calculator, 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 percent per measure, as determined by the lighting calculator. The lighting calculator offers four types of calculated lighting measures, defined as follows:

- Decommissioning: The number of proposed fixtures is less than the number of existing fixtures.
- Fixture Increase: The number of proposed fixtures is greater than the number of existing fixtures.
- Auto-Calculated: The lighting calculator offers Signage and LED Linear measures with an auto-calculated incentive.
- Non-standard: The measure is not deemed, decommissioning, fixture increase, or auto-calculated. Projects with these measures are approved by customers using the following procedure:
    - To request a non-standard measure, the user should select the "non-standard" option from the Measure Type drop-down menu.
    - The lighting calculator will indicate the measure is non-standard and requires customer approval before invoicing.
    - The customer reviews supporting project documentation and approves or rejects the nonstandard measure by changing the status in the Project Approval menu in the Online Lighting Calculator. If a measure qualifies as a deemed measure, it may not be submitted as a non-standard measure to receive a higher incentive 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:

- 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
- Select the "non-standard" option in the Measure Type drop-down menu and manually enter the exact wattage.

C. PROJECT TYPES AND REQUIREMENTS

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

New Construction Projects: Eligibility

BPA considers a nonresidential lighting project new construction under any of the following conditions:

- The facility or exterior lighting system is newly constructed.

- The facility is a newly constructed addition to an existing facility.
- 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.).
- The project is considered a major renovation for reasons other than lighting. BPA considers a project 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.
- Replacement lamps for the facility's existing lighting fixtures are no longer available due to federal or state restrictions (e.g., the ban on the sale of fluorescent lamps in Oregon).

REQUIREMENTS AND SPECIFICATIONS

New construction projects must achieve at least a 10 percent kWh reduction from the lighting power allowance, as determined by the lighting calculator.

Customers with new construction projects with hours of operation differing from what is available in the lighting calculator may update the specific hours of operation and supply supporting documentation to BPA upon request.

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.

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.

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. 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 percent of the cost of the installed lighting project materials; or

- For commercial projects, the incremental cost may be calculated as 2.86 percent of the whole building construction costs.
- Cost documentation that supports the incremental measure cost calculation used must be uploaded to the Online Lighting Calculator at the time of submittal to BEETS.

Retrofit Projects for Existing Buildings: 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.

REQUIREMENTS AND SPECIFICATIONS

Project must achieve at least a 10 percent 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 percent per measure. Projects saving 200,000 kWh or more, as determined by the lighting calculator, may, at the customer's discretion be converted to a 100 percent calculated incentive.

Cost documentation must be uploaded to the Online Lighting Calculator at the time of submittal to BEETS.

Projects reporting a Luminaire Level Lighting Control measure have the following additional requirements:

- The control product must be listed on the Design Lights Consortium Networked Lighting Control Qualified Products List as meeting Technical Requirements for NLC5.0 or later, and
- The control product model number must be included in the "Notes" section of each Measure within the lighting calculator.

For batch retrofit projects, 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 each Measure within the 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; or
- 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	
	RETENTION/SUBMITTAL LOCATIONS

DOCUMENTATION DESCRIPTION	BEETS	CUSTOMER FILE	Online Lighting Calculator
New Construction Lighting Projects			
Completed lighting calculator	X		X
Cost documentation			X
One of the following documents: • 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
Cost documentation			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	

Deleted: X

Deleted: Product or contractor invoice showing:¶ Product order or purchase date¶ Installed cost…

Deleted: X

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: X

Deleted: Product or contractor invoice showing:¶ Product order or purchase date¶ Installed cost…

Deleted: X

PAYMENT	
LIGHTING CALCULATOR SERIES NAME	**PAYMENT**
Online Lighting Calculator	See Program Offerings section of Lighting Calculator

8.3.2 Midstream Lighting

BASIS FOR ENERGY SAVINGS

This measure is for efficient lamps, linear retrofit kits, fixtures and integrated controls sold through distributors and installed at nonresidential sites. As they are delivered via a point-of-sale channel, no pre-

Deleted: and

conditions apply. Incentives and savings vary by product type (e.g., linear TLED lamps, HID replacement lamps, troffer fixtures, etc), wattage bin (e.g. >25W, <25W, etc.) and whether or not the fixture includes integrated controls (e.g. + Luminaire Level Lighting Controls). This efficient equipment is compared to a current practice baseline which is determined from regional market analysis. Utilities should avoid reporting the same projects via midstream nonresidential lighting measures and the nonresidential lighting calculator. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

Customers will use the UES Measure Upload Template to report midstream lighting measures. Customers must report the installation site address for each type and quantity of lamps or fixtures.

Light-emitting diode (LED) tube and linear replacement lamp, downlight fixture, high/low bay fixture, linear ambient fixture, and troffer fixture measures are not eligible in Oregon.

Projects reporting a measure with the + Luminaire Level Lighting Control identifier have the following additional requirements:

- The control product must be listed on the Design Lights Consortium Networked Lighting Control Qualified Products List as meeting Technical Requirements for NLC5.0 or later

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following:		X
• Manufacturer • Model number		

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER UNIT**
LAMPS	
T8 Replacement - 2ft, Type A	$1
T8 Replacement - 2ft, Type A+B, Type B, Type C, Linear Kit	$2

Deleted: lamp

Deleted: and

Deleted: ,

Deleted: or controls

Deleted: product

Formatted: List Paragraph, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: Equipment invoice or receipt showing:

Deleted: <#>Equipment order or purchase date¶ Equipment cost¶

Formatted Table

Deleted: lampLAMP, FIXTURE OR CONTROL

T8 Replacement - 4ft or 8ft, Type A	$2
T8 Replacement - 4ft or 8ft, Type A+B, Type B, Type C, Linear Kit	$4
T8 HO Replacement - 8ft, Type A	$6
T8 HO Replacement - 8ft, Type A+B, Type B, Type C, Linear Kit	$8
T5 Replacement - 4ft	$4
T5 HO Replacement - 4ft	$6
HID Replacement - <60W	$20
HID Replacement - ≥60W	$50
FIXTURES	
Downlight Fixture <25 Watts	**$15.00**
Downlight Fixture <25 Watts + Luminaire Level Lighting Controls	$30.00
Downlight Fixture ≥25 Watts	$30.00
Downlight Fixture ≥25 Watts + Luminaire Level Lighting Controls	$60.00
Exterior Fixture <15 Watts	$20.00
Exterior Fixture ≥15 and <30 Watts	$40.00
Exterior Fixture ≥30 and <40 Watts	$60.00
Exterior Fixture ≥40 and <50 Watts	$80.00
Exterior Fixture ≥50 and <90 Watts	$100.00
Exterior Fixture ≥90 and <105 Watts	$120.00
Exterior Fixture ≥105 and <155 Watts	$180.00
Exterior Fixture ≥155 Watts	$250.00
High/Low Bay Fixture <50 Watts	$30.00
High/Low Bay Fixture <50 Watts + Luminaire Level Lighting Controls	$70.00
High/Low Bay Fixture ≥50 and <125 Watts	$70.00
High/Low Bay Fixture ≥50 and <125 Watts + Luminaire Level Lighting Controls	$140.00
High/Low Bay Fixture ≥125 Watts	$150.00
High/Low Bay Fixture ≥125 Watts + Luminaire Level Lighting Controls	$220.00
Linear Ambient Fixture <40 Watts	$20.00
Linear Ambient Fixture <40 Watts + Luminaire Level Lighting Controls	$45.00
Linear Ambient Fixture ≥40 Watts	$40.00

Formatted
Formatted
Formatted
Formatted
Formatted Table
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted Table
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted Table
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted Table
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted Table
Formatted
Formatted
Moved (insertion)[3]
Formatted Table
Formatted
Formatted
Formatted
Formatted
Formatted Table
Moved (insertion)[4]
Formatted
Formatted
Formatted
Formatted
Moved (insertion)[5]
Formatted
Formatted

Linear Ambient Fixture ≥40 Watts + Luminaire Level Lighting Controls	$90.00
Troffer Fixture <40 Watts	$25.00
Troffer Fixture <40 Watts + Luminaire Level Lighting Controls	$50.00
Troffer Fixture ≥40 Watts	$40.00
Troffer Fixture ≥40 Watts + Luminaire Level Lighting Controls	$75.00

Formatted: Font: +Body (Aptos)
Formatted: Font: +Body (Aptos), Not Bold
Formatted: Font: +Body (Aptos), 11 pt
Formatted: Font: +Body (Aptos)
Formatted: Font: +Body (Aptos), 11 pt
Formatted Table
Moved (insertion)[8]
Formatted: Font: +Body (Aptos)
Formatted: Font: +Body (Aptos), Not Bold
Formatted: Font: +Body (Aptos), 11 pt
Formatted: Font: +Body (Aptos)
Formatted: Font: +Body (Aptos), 11 pt
Moved (insertion)[9]
Formatted: Font: +Body (Aptos)
Formatted: Font: +Body (Aptos), Not Bold
Formatted: Font: +Body (Aptos), 11 pt
Formatted: Font: +Body (Aptos)
Formatted: Font: +Body (Aptos), 11 pt

8.4 Commercial HVAC

8.4.1 Advanced Rooftop Unit Control

BASIS FOR ENERGY SAVINGS

Advanced Rooftop Control (ARC) retrofits add a 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

For 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 multi-speed motor and controller for multi-speed fan operation.

ARC Retrofit – Full

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

- A VFD and controller for variable-speed fan operation, or
- A multi-speed motor and controller for multi-speed fan operation.
- ARC-Full 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 CO2 sensor reading.

Visit the RTF webpage for more information.

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 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 Advanced Rooftop Control 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 QPL, use the PCS Request and Acknowledgment Procedure for approval to use the product.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • ARC manufacturer • ARC model	X*	X
**Only in UES Measure Upload Template*		

PAYMENT

Project reporting to BPA is based on whole tons of the Air Conditioning Heating Refrigeration Institute (AHRI) rated outdoor cooling capacity and must be calculated at a project level using one of the following two methods:

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

BPA provides these two methods to accommodate different types of equipment configurations and capacities.

MEASURE CATEGORY	**PAYMENT PER TON**
ARC Retrofit – Lite	$120

Deleted: Product or contractor invoice showing:¶ Product order or purchase date¶ Installed cost

Formatted: Font: Italic

Deleted: ,

Deleted: , installed cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: -

ARC Retrofit – Full	$250

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.

Visit the RTF webpage for more information.

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:

- The installed thermostat controls an existing HVAC supply fan and serves a single zone. “Invisible zones” are permitted (e.g., separate RTUs 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 remotely accessible through internet or local network.
  - Temperature setback is used for unoccupied hours (heating and/or cooling, as applicable).
  - 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 setpoints and schedules with appropriate dead-bands, or through having network-coordinated controls).

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
Initial Install		
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model	X*	X
**Only in UES Measure Upload Template*		

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER CONNECTED THERMOSTAT**
Connected Thermostat (Electric Heat)	$300
Connected Thermostat (Gas Heat)	$150

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost

Deleted: , m

Deleted: , and installed cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

An income qualified payment is available for installations in shared common areas only of income qualifying multifamily buildings. See section 11.9 Energy Efficiency Income Qualified Measures for available payment and income qualification guidelines.

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 applies to any project that meets the post-conditions requirements, including new construction/major renovation projects, retrofits replacing existing heat pumps, retrofits replacing equipment using a fuel source other than electric, and retrofits that qualify for the DHP Retrofit measure.

For the purposes of this measure, BPA defines DHP equipment types 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.

BPA calculates energy savings based on analysis of a sampling of heat pump projects completed in BPA territory with the BPA heat pump calculator tool, and which includes 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.
- For DHP Upgrades, the base case aligns with Federal heat pump equipment standards 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.

REQUIREMENTS AND SPECIFICATIONS

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

Pre-conditions – DHP Retrofit:

- The space is conditioned by a permanently installed system with 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-conditions – DHP Upgrade:

- No pre-conditions exist. This may be used for any project where the post-condition requirements are met including new construction/major renovation projects, retrofits replacing existing heat pumps, retrofits replacing equipment using a fuel source other than electric, and retrofits that qualify for the DHP Retrofit measure.
- The DHP Upgrade measure can be claimed for a project that also claims the DHP Retrofit measure, as long as all applicable pre- and post-conditions are met.

Post-condition – DHP Retrofit:

- The DHP must have an Air Conditioning, Heating, and Refrigeration Institute (AHRI) certificate of product rating.

Post-conditions – DHP Upgrade:

- The DHP must have an AHRI certificate of product rating documenting the DHP outdoor condenser meets BPA's efficiency requirements per the table below:

Indoor Unit Type	Efficiency Requirement
Non-Ducted	10.4 HSPF2 or 11.0 HSPF
Ducted or Mixed	9.4 HSPF2 or 10.0 HSPF

- The efficiency requirements apply to both single and multi-head systems.

This measure utilizes the Ductless Heat Pump 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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

Documentation of the following: • Manufacturer • Model number		X
AHRI Certificate		X

PAYMENT

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

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

BPA provides two methods to accommodate different types of equipment configurations and capacities.

MEASURE CATEGORY	PAYMENT PER TON
Ductless Heat Pump – Retrofit	$1,000
Ductless Heat Pump – Upgrade	$300

An income qualified payment is available for installations in shared common areas only of income qualifying multifamily buildings. See section 11.9 Energy Efficiency Income Qualified Measures for available payment and income qualification guidelines.

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 ASHP to a system where one did not previously exist).

An ASHP Upgrade either (1) replaces an existing electric 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.

BPA calculates energy savings based on an engineering model.

- For Heat Pump Retrofits, the base case heating system is an electric-resistance heating system. The efficient case is current federal equipment standards applicable to commercial ASHP.
- For Heat Pump Upgrades, the base case is current federal equipment standards applicable to commercial ASHPs for both the cooling and heating savings analysis. BPA defines the efficient case by the post-conditions requirement table.

REQUIREMENTS AND SPECIFICATIONS

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

Pre-condition – ASHP Retrofit:

Deleted: that the reported equipment was in-stalled. Installation documentation could include an in-voice and/or a signed attestation with the following elements

Deleted: <#>Installation address¶ Equipment order, purchase, or installation date¶ Equipment make

Deleted: and m

Deleted: ¶ Contact information for the signatory

Formatted: Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: air-source heat pump

Deleted: air-source heat pump

Deleted: air-source heat pump

- The space is conditioned by a permanently installed system with zonal or forced-air, electric-resistance heat as the primary heating source.
- No other heating sources are eligible.

Pre-conditions – ASHP Upgrade:

- No pre-conditions exist. The ASHP Upgrade measure may be used for any project where the post-condition requirements are met including: new construction/major renovation projects, retrofits replacing existing heat pumps, retrofits replacing equipment using a fuel source other than electric, and retrofits that qualify for the ASHP Retrofit measure.
- The ASHP Upgrade measure can be claimed for a project that also claims the ASHP Retrofit measure, as long as all applicable pre- and post-conditions are met.

Post-conditions – ASHP Retrofit:

Each installed ASHP must:

- Be an air-to-air heat pump, and
- Have an AHRI certificate of product rating.

Post-conditions – ASHP Upgrade:

Each installed ASHP must:

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

EQUIPMENT SIZE (COOLING CAPACITY; BTU/H)	MODE	SUB-CATEGORY OR RATING CONDITION	EFFICIENCY REQUIREMENT
<65,000	Heating	Split-System	8.1 HSPF2 or 9.6 HSPF
		Single Package	7.0 HSPF2 OR 8.3 HSPF
≥65,000 and <135,000	Heating	47°F db/43°F wb Out-door Air	3.5 COP
≥135,000 and <240,000	Heating	47°F db/43°F wb Out-door Air	3.4 COP
≥240,000	Heating	47°F db/43°F wb Out-door Air	3.4 COP

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following:		X

Deleted: that the reported equipment was installed. Installation documentation should include an invoice and/or a signed attestation with the following elements

• Manufacturer • Model number • Equipment quantity		
AHRI Certificate		X

Deleted: <#>Installation address; ¶
Equipment order, purchase or installation date;¶
Equipment make...

Deleted: and m

Deleted: ;

Deleted: ; and¶
Contact information for the signatory.

PAYMENT

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

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

BPA provides the two methods to accommodate different types of equipment configurations and capacities.

MEASURE CATEGORY	PAYMENT PER TON
Air-Source Heat Pump – Retrofit	$1,000
Air-Source Heat Pump – Upgrade	$150

An income qualified payment is available for installations in shared common areas only of income qualifying multifamily buildings. See section 11.9 Energy Efficiency Income Qualified Measures for available payment and income qualification guidelines.

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.

BPA calculates energy savings based on analysis of a sampling of heat pump projects completed in BPA territory with the BPA heat pump calculator tool, and which include 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 VRF equipment per the AHRI as of January 2019.

REQUIREMENTS AND SPECIFICATIONS

This measure applies to retrofits only.

Pre-conditions:

- 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 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	Heating	VRF Multi-split System	11.0 HSPF
≥65,000 and <135,000	Heating	VRF Multi-split System 47°F db/43°F wb Outdoor Air	3.7 COP
≥135,000 and <240,000	Heating	VRF Multi-split System 47°F db/43°F wb Outdoor Air	3.5 COP
≥240,000	Heating	VRF Multi-split System 47°F db/43°F wb Outdoor Air	3.5 COP

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

Deleted: Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost…

Documentation of the following: • Manufacturer • Model		X
AHRI Certificate documenting the efficiency requirements have been met		X

PAYMENT

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

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

BPA provides BPA provides these two methods to accommodate different types of equipment configurations and capacities.

Measure Category	Payment PER TON
VRF System Retrofit (BPA-Qualified)	$1,500

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

BASIS FOR ENERGY SAVINGS

A 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 an existing AHU single-speed fan.

Deleted: X

Deleted: , m

Deleted: , and installed cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: -

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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model	X*	X
**Only in UES Measure Upload Template*		

PAYMENT

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

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

BPA provides these two methods to accommodate different types of equipment configurations and capacities.

MEASURE CATEGORY	PAYMENT PER FAN HP
VFD on Air Handling Unit Fan (BPA-Qualified)	$500

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

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost

Deleted: , m

Deleted: , and installed cost

Formatted: Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Moved (insertion)[10]

Deleted: ¶

Moved up [10]: **Only in UES Measure Upload Template*

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, extended-stay 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.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Equipment quantity		X
AHRI Certificate		X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER PTHP**
PTHP Retrofit	$150
PTHP New Construction	$50

Deleted: that the reported equipment was installed. Installation documentation should include an invoice and/or a signed attestation with the following elements

Deleted: <#>Installation address ¶ Equipment order, purchase, or installation date¶ Equipment make

Deleted: and m

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: Contact information for the signatory.

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single

8.4.8 Demand-Controlled Kitchen Ventilation (BPA-Qualified)

BASIS FOR ENERGY SAVINGS

Demand-controlled kitchen ventilation 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 where not otherwise required by code.

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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Equipment quantity		X

PAYMENT	

Deleted: that the reported equipment was installed. Installation documentation should include an invoice and/or a signed attestation with the following elements

Deleted: <#>Installation address; ¶ Equipment order, purchase, or installation date;¶ Equipment make

Deleted: and m

Deleted: ;

Deleted: ; and¶ Contact information for the signatory.

MEASURE CATEGORY	PAYMENT PER FAN HP
Demand-Controlled Kitchen Ventilation-New or Retrofit, One Control Sensor	$400
Demand-Controlled Kitchen Ventilation-New or Retrofit, Multiple Control Sensors	$800

8.4.9 Heat Recovery Ventilation Equipment (BPA-Qualified)

BASIS FOR ENERGY SAVINGS

Heat Recovery is a method often employed on commercial buildings to recover heat from building exhaust and use it to pre-heat incoming supply air. Heat Recovery units can be a stand-alone device or integrated directly into HVAC equipment and are commonly located on rooftops or in mechanical penthouses. They utilize a heat exchanger media, typically a rotary wheel or fixed plate to exchange heat between building exhaust air and supply air and capturing the majority of the heat that would otherwise be lost to the outside.

The primary sources of energy savings from heat recovery units are:

- Reduced fan load on the primary heating/cooling system;
- Ability to preheat incoming supply air using building exhaust air; and
- Deliver ventilation air at room neutral temperatures rather than at the heating or cooling setpoints.

The base case is a commercial building with its primary heating source being either an operational or failed heat pump, or electric-resistance heater with no recovery equipment present or having been installed. The efficient case used is based on a primary heating source with a heat recovery unit. Simulated models were created using an 8,760 hour analysis tool for select building types (i.e., medium-sized office, school, lodging and retail buildings across the 9 regional climate zones) with varying occupancy schedules to calculate energy savings for heat recovery retrofits and upgrades. Savings were found to be the difference between buildings with heat recovery units and those without, on a per 1,000 CFM basis. Building characteristics data from Commercial building Stock Assessment (CBSA) were used to derive savings across the building types which were weighted to develop a representative savings value per CFM.

REQUIREMENTS AND SPECIFICATIONS

This measure applies to retrofit, new construction, and major renovation (with the exception to HRV Upgrade projects in Washington State, due to code requirements).

Either Heat Recovery or Energy Recovery units are applicable so long as the sensible heat recovery portion of the equipment meets or exceeds the Sensible Rated Effectiveness (SRE) of the specified tier.

Pre-conditions – HRV Retrofit:

- The space is conditioned by an operational or failed heat pump, or electric-resistance heater as the primary heating source. No other heating sources are eligible.
- The existing system does not have a heat recovery device installed.
- The existing system is designed to provide ventilation air currently.

Pre-conditions – HRV Upgrade:

- The space is part of a building addition, new construction or major renovation (i.e., baseboard electric-resistance heating to VRF with ventilation, etc.) project.
- Projects completed in Washington State are not eligible, due to code requirements.

Post-condition:

- The installed heat recovery unit must utilize manufacturer selection software and demonstrate a minimum 70 percent SRE at 75 percent of rated airflow for Tier 1, or a minimum 82 percent SRE at 75 percent of rated airflow for Tier 2.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Equipment quantity		X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER CFM**
Heat Recovery Ventilation Equipment, Tier 1 unit with ≥70 percent SRE	$2.50
Heat Recovery Ventilation Equipment, Tier 2 unit with ≥82 percent SRE	$4.00

Deleted: that the reported equipment was installed. Installation documentation should include an invoice and/or a signed attestation with the following elements

Deleted: <#>Installation address ¶ Equipment order, purchase, or installation date¶ Equipment make

Deleted: and m

Deleted: ¶ Contact information for the signatory

Deleted: %

Deleted: %

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-condition:

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

Post-conditions:

- The installation of insulation in wall or attic/roof spaces will meet or exceed the levels shown in the Payment table below.
- Installation of insulation in floor or crawl spaces is not eligible.

Deleted: be per

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

Deleted: Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

PAYMENT		
MEASURE CATEGORY	**PAYMENT**	
Location and R Value	**HEATING ZONE 1**	**HEATING ZONE 2/3**
Attic/roof insulation payment per square foot:		
≤R-5 to R-19	$1.80	$2.10
Wall insulation payment per square foot:		
≤R-5 to R-11	$0.80	$1.10

Deleted: and Above

≤R-5 to R-19	$1.10	$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 commercial buildings. Energy savings vary by heating zone (HZ) 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 storm windows, or double-paned metal-frame windows.

Post-condition:

- Installation of replacement window assemblies that have a National Fenestration Rating Council (NFRC) -rated U-value of 0.30 or lower.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER REPLACED WINDOW SQUARE FOOT**
Commercial Windows, HZ 1	$9
Commercial Windows, HZ 2/3	$18

Deleted: Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Deleted: eating

Deleted: one

Deleted: eating

Deleted: one

8.5.3 Secondary Windows

BASIS FOR ENERGY SAVINGS

Secondary windows are sometimes referred to window inserts, secondary glazing systems, or window retrofit panels. The base case used to calculate energy efficiency savings for secondary windows is a commercial building with single-pane, clear glass, low-performance windows. The efficient case used to calculate savings requires the installation of laminated or insulated glass interior window attachments with low-E coating on double-lite (IGU) glass. This measure doesn't require replacing the existing glass or window frames and generally does not alter the existing window aesthetics (i.e., historic buildings) or the exterior appearance of the building.

Energy savings result from reduced load on the building's heating and cooling systems and vary by heating zone and heating system type. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

Pre-conditions:

- Existing windows must be single-pane glass
- The building's primary heat source must be electric (e.g., zonal, VAV with electric reheat, or heat pump)

Post-conditions:

Installed products must:

- Have one or more low-E coatings resulting in an overall solar heat gain coefficient (SHGC Overall) of 0.55 or less, and
- Have a center-of-glass U-factor (UCOG) less than or equal to 0.20.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Product Specification Sheet (also referred to as cut sheet) that documents SHGC and U-factor		X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER SQUARE FOOT**
Secondary Windows	$3

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost…

Deleted: ¶

Formatted: Font: +Body (Aptos), 12 pt

Formatted: Font: +Body (Aptos)

8.6 COMMERCIAL REFRIGERATION

8.6.1 Anti-Sweat Heater Controls

BASIS FOR ENERGY SAVINGS

Anti-sweat heater (ASH) controls reduce the energy consumption of ASHs 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 ASHs based on sensing humidity. It does not apply to doors equipped with low/no anti-sweat heat. Visit the RTF webpage for more information.

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

Post-conditions:

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

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Product Specification Sheet (also referred to as cut sheet) that documents product name and model number		X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER LINEAR FOOT OF CASE**
Anti-Sweat Heater Controls – Cooler	$40
Anti-Sweat Heater Controls – Freezer	$40

8.6.2 Efficient Refrigeration Evaporator Fan Motors

BASIS FOR ENERGY SAVINGS

Deleted: anti-sweat heater

Deleted: anti-sweat heater

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost

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

REQUIREMENTS AND SPECIFICATIONS

This measure applies to retrofits only.

- 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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

Deleted: Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER MOTOR**
ECM or PMSM on Display Case	$55
ECM or PMSM on Walk-In Cooler or Freezer, ≤23 Watts	$140
ECM or PMSM on Walk-In Cooler or Freezer, >23 Watts	$140

8.6.3 Evaporator ECM Fan Controller for Walk-In Coolers and Freezers

BASIS FOR ENERGY SAVINGS

This measure is for walk-in coolers and freezers with evaporator systems already equipped with an electronically commutated motor (ECM).

ECM controllers sense the operation status of the cooling system and controls the speed of the evaporator fans. When the thermostat is satisfied and the compressor cycles off, the controller will sense the compressor off cycle and will switch the motors to a slower speed. ECM energy savings occur from (a) direct motor wattage reduction due to full speed runtime hours reduction, and (b) waste heat reduction to the refrigeration system. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

This measure applies to both retrofits and new construction. The unit of measure is the number of motors being controlled.

Pre-conditions:

- Walk-in (medium temperature or MT) cooler and (low temperature or LT) freezer evaporator refrigeration systems with motor input power category of either: ≤23 Watts or >23 Watts.
- The controlled motor(s) did not previously have a motor speed controller installed.

Post-condition:

- Install an ECM controller that reduces motor speed and wattage.
- The controller cycles the motor between "Hi/Lo" speeds or powering "On/Off" when there is no call for cooling.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
Consumer identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Equipment quantity		X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER MOTOR**
Evaporator ECM Fan Controller for Walk-In Coolers and Freezers-New or Retrofit, ≤23 Watts	$60
Evaporator ECM Fan Controller for Walk-In Coolers and Freezers-New or Retrofit, >23 Watts	$120

8.6.4 Strip Curtains for Walk-In Coolers and Freezers

Commented [JW3]: MARKETING: Please underline this 'less than' symbol because it represents *less than or equal to* 23 Watts.

Formatted: Underline

Deleted: that the reported equipment was installed. Installation documentation should include an invoice and/or a signed attestation with the following elements

Deleted: <#>Installation address ¶ Equipment order, purchase, or installation date¶ Equipment make

Deleted: and m

Deleted: ¶ Contact information for the signatory

Deleted: SQUARE FOOT

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. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

This measure applies to retrofits only.

Pre-conditions:

- Eligible applications include grocery walk-in freezers and coolers, convenience store walk-in 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 in restaurants, drug, or convenience stores; replacement of existing strip curtains; or strip curtains on display cases.

Post-condition:

- 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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Product Specification Sheet (also referred to as cut sheet) that documents product name and model number		X

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost…

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER Square Foot**
Strip Curtains for Walk-in Cooler and Freezer Doorways	$9

8.6.5 Refrigeration Floating Pressure Controls (BPA-Qualified)

BASIS FOR ENERGY SAVINGS

Refrigeration controls for commercial refrigeration systems save energy when they reduce the lift across the compressors when either cool ambient conditions permit a lower compressor head pressure (also known as condensing temperature), or when the load on the refrigeration system is low enough to permit a higher suction pressure (also known as suction temperature). These control approaches are known as floating head pressure control, and floating suction pressure control, respectively, and both can be implemented as an efficiency measure if the refrigeration energy management system permits. The energy savings is estimated with a simple site-specific calculator developed by BPA that aligns with the RTF's Floating Pressure Controls for Multiplex Systems Standard Protocol.

REQUIREMENTS AND SPECIFICATIONS

- This measure is available for retrofits only.
- This measure applies to multiplex refrigeration systems (i.e., compressors operating in parallel) only.
- This measure is available for the Commercial sector only.
- The measure unit is evaporator design load in thousand BTUs per hour (MBH).
- Implementation of this measure requires use of the BPA Refrigeration Controls Calculator, and the MBH in the submitted calculator must match the highlighted or circled MBH in the submitted refrigeration schedule. The end-user can apply for either the Floating Head Pressure Control Measure, the Floating Suction Pressure Control Measure, or both, as indicated in the calculator.

Pre-condition – Floating Head Pressure Control:

- If the end-user is applying for the Floating Head Pressure Control incentive, the minimum head pressure temperature setpoint must be fixed and have exceeded or been equal to 80°F.

Pre-condition – Floating Suction Pressure Control:

- If the end-user is applying for the Floating Suction Pressure Control incentive, the base case must be a fixed suction pressure or temperature setpoint, as noted in the calculator.

Post-conditions - Floating Head Pressure Control:

- The post-project minimum head pressure control setpoint must be 70°F or lower.
- The system will be enabled to float the head pressure setpoint based on ambient temperature.

Post-condition – Floating Suction Pressure Control:

- The post project suction pressure shall be enabled to float, as indicated in the BPA Refrigeration Controls Calculator, based on input from a temperature sensor in a critical case on the appropriate suction group.

DOCUMENTATION REQUIREMENTS	
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**

	BEETS	CUSTOMER FILE
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: Refrigeration Energy Management System manufacturer and model number, or labor to modify control setpoints	X	X
Refrigeration Schedule with clear indication of the evaporator design load of impacted suction groups	X	
Completed BPA Refrigeration Controls Calculator	X	

Deleted: Equipment or contractor invoice showing

Deleted: ¶
Order or purchase date¶
Installed cost¶
Any of the following:

Formatted: Normal, No bullets or numbering

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER MBH**
Floating Head Pressure Control	$20
Floating Suction Pressure Control	$10

Deleted: LINEAR foot of CASE

8.6.6 Refrigerated Display Case Door Retrofit

BASIS FOR ENERGY SAVINGS

Retrofitting doors to existing open refrigerated display cases saves energy by reducing infiltration of warm air into the case. This measure reduces the total refrigeration load by 50 percent or more and also reduces the heating load on the store's HVAC system. Adjustments to the stores refrigeration system may be required to optimize performance with a significantly reduced load. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

- Existing display case must be open (i.e., not have doors).
- Existing display case must be served by a remote refrigeration system (i.e., not self-contained).
- The vertical case measure is available for medium temperature display cases.
- The horizontal case measure is available for either medium or low temperature cases. Dual temperature cases should be reported as medium temperature.

Post-conditions:

- Display case must have double- or triple-pane glass doors.
- Replacing an open case with a new case with double- or triple-pane glass doors is eligible.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Product Specification Sheet (also referred to as cut sheet) that documents product name and model number		X

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER LINEAR FOOT OF CASE**
Vertical Display Case Door Retrofit	$300
Horizontal Display Case Door Retrofit	$100

Commented [EM4]: Confirm this in In Design file. Current IM PDF shows incorrect units in this table. The word document shows the correct units.

8.7 ADDITIONAL UES OFFERINGS

Formatted: Font: 15 pt

8.7.1 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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER UNIT**
Generator Engine Block Heater – Size <3 kW	$400
Generator Engine Block Heater – Size ≥3 kW	$2,000

8.7.2 Vehicle Engine Block Heater Controls

BASIS FOR ENERGY SAVINGS

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 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. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

Retrofit of existing installations and new equipment are both eligible.

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost

Deleted: Manufacturer, model, and installed cost

Deleted: X

Deleted: setting, and

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**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

Deleted: Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost…

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER UNIT**
Vehicle Engine Block Heater Controls	$200

8.7.3 Consumer Heat Pump Water Heater in Commercial Applications

BASIS FOR ENERGY SAVINGS

Consumer heat pump water heaters (HPWHs) used in commercial applications 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 HPWHs combine the tank and compressor in a single unit, while split-system HPWHs have interior storage tanks and outdoor compressors installed outside the building.

Reported savings vary by equipment tier, building type, and whether the unit is installed with ducting or not. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

This measure is available for retrofits only.

Post-condition:

The installed HPWH must be listed on the Heat Pump Water Heater Qualified Products List (QPL).

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

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address.	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number		X

Deleted: Equipment or contractor invoice showing

Deleted: <#>Equipment order or purchase date¶ Installed cost ¶

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER HPWH**
Unitary HPWH Tier 3 - Any size tank	$1,600
Unitary HPWH Tier 4 - Any size tank	$1,800
Split-System HPWH– Any size tank	$2,200

8.7.4 Commercial Unitary Heat Pump Water Heater

BASIS FOR ENERGY SAVINGS

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

This measure applies to units classified by federal regulations as unitary, commercial water heaters. Section 8.7.3 Consumer Heat Pump Water Heater in Commercial Applications applies to units classified by federal regulations as consumer water heaters. Reported savings vary by building type. Visit the RTF webpage for more information.

REQUIREMENTS AND SPECIFICATIONS

This measure is available for either retrofit or new construction, except:

- Areas where building energy code requires an HPWH for electric water heating, which currently includes:
  - All commercial buildings subject to the Seattle Energy Code, and
  - All non R1 and R2 commercial buildings in Washington state with a combined water heating input rate of 1 million BTU/h or greater.

Post-conditions:

The installed HPWH must:

- Be ENERGY STAR certified as per requirements in the Commercial Water Heaters v2.0 list or later,
- Have an integrated tank, and
- Be installed indoors in a conditioned or buffered space.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address.	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number		X

Deleted: Equipment or contractor invoice showing

Deleted: <#>Equipment order or purchase date ¶ Installed cost ¶

PAYMENT	
MEASURE CATEGORY	**PAYMENT PER UNIT**
Commercial Unitary HPWH	$2,000

8.7.5 Efficient Pumps

BASIS FOR ENERGY SAVINGS

The base case or current practice, as defined by the RTF, for pump energy index (PEI) ranges of constant load or variable load pumps is between 0.88-0.99 and 0.44-0.61, respectively; whereas, the constant or variable load for a commercial or industrial efficient pump's PEI range is lower than the "current practice" baseline. BPA defines the PEI by a pump's energy rating divided by an established baseline energy rating. The lower the PEI for a particular pump the more energy efficient it is.

There are five allowable pump types, in both 1,800 rpm and 3,600 rpm speeds:

- End suction, frame mount
- End suction, close-coupled
- In-line
- Radially split, multistage, vertical, in-line diffuser casing
- Submersible turbine

Energy savings are based on the BPA Efficient Pumps Calculator which uses key assumptions and values from the RTF Efficient Pump Workbook v3.0, and which produces the same energy savings values as the approved RTF UES measures.

REQUIREMENTS AND SPECIFICATIONS

This measure applies to both retrofit and new construction projects in the Commercial and Industrial sectors.

Each efficient pump must be submitted as an individual project (i.e., pumps may not be combined or divided).

- Customers must use the current version of the BPA Efficient Pumps Calculator to calculate savings and associated incentives.
- Pump motor size must be less than or equal to 200 hp.

DOCUMENTATION REQUIREMENTS		
DOCUMENTATION DESCRIPTION	**RETENTION/SUBMITTAL LOCATIONS**	
	BEETS	**CUSTOMER FILE**
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPA co-ordinates, etc.)	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Equipment quantity	X	X
Completed BPA Efficient Pumps Calculator	X	X
Specification sheet with a rated PEI number	X	X

PAYMENT	

Deleted: HP

Deleted: that the reported equipment was installed should include an invoice and/or a signed attestation with the following elements

Formatted Table

Deleted: <#>Installation address; ¶ Equipment order, purchase, or installation date;¶ Equipment make...

Deleted: and m

Deleted: ;

Deleted: ; and¶ Contact information for the signatory.

MEASURE CATEGORY	PAYMENT PER KWH
Efficient Pumps	$0.33

Additional Information

Use the Industrial sector UES measure reference numbers for projects implemented at industrial sites.

8.7.6 Variable Frequency Drive for Pumps (BPA-Qualified)

BASIS FOR ENERGY SAVINGS

A VFD on a commercial or industrial pump motor that is less than 100 hp, adds a VFD on a single speed pump in a system that has either a constant or variable load. The pump may be used for a variety of systems, such as, but not limited to: chilled water, condenser water, heating hot water, domestic hot water, municipal water or wastewater, etc. These systems are typically located in the building's mechanical room.

Deleted: HP

With this technology, the VFD varies the speed of the pump to meet the conditions of the system. As the pump motor slows down, it draws less power than at constant speed, resulting in energy savings. Energy savings are based on BPA-developed calculations.

REQUIREMENTS AND SPECIFICATIONS

This measure applies to both commercial and industrial retrofit and new construction. Utilities will report this measure to the applicable sector when reporting to BPA. Multiple pumps may be included in a single submittal with no limit on the total VFD hp installed.

Pre-conditions:

- Building or facility heating fuel source may be either electric or gas.
- Controlled pump motor must be less than or equal to 100 hp.
- For retrofits, the existing pump must be single-speed.
- For new construction projects, the application must not require variable speed control for code compliance.
- The system can be either a constant or variable load.

Deleted: HP

Post-conditions:

- The retrofit adds a VFD to control the pump with variable-speed operation.
- Any existing pump throttling (i.e., flow control valve, etc.) or bypass devices (i.e., 3-way valves, etc.) must be removed or permanently disabled.

DOCUMENTATION REQUIREMENTS	
Documentation Description	**Retention/Submittal Locations**

	BEETS	Customer File
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Equipment quantity		X

PAYMENT

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

1. Sum the pump motors' nameplate hp for all VFDs installed, then round the summed value to the nearest whole hp; or
2. Round the pump motor's nameplate hp for each individual VFD to the nearest whole hp, then sum all rounded hp amounts.

BPA provides these two methods to accommodate different types of equipment configurations and capacities.

MEASURE CATEGORY	PAYMENT PER HP
VFD for Pumps	$180

Additional Information

Use the Industrial sector UES measure reference numbers for projects implemented at industrial sites.

Deleted: that the reported equipment was installed. Installation documentation should include an invoice and/or a signed attestation with the following elements

Deleted: <#>Installation address; ¶ Equipment order, purchase, or installation date;¶ Equipment make

Deleted: and m

Deleted: ;

Deleted: ; and¶ Contact information for the signatory.

Formatted: Tab stops: 2.96", Left

Section 9. Federal Sector

The Federal Sector, unlike other sectors, does not have a unique set of measures. 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; or
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

Revisions to measures in this sector are listed in the changes and corrections summary in Appendix B.

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.

Deleted: Test

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	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, $150,000 per site, or utility-specified cap, per rate period
10.3.2 Multiyear Strategic Energy Management	Lesser of $0.04 per kWh of SEM Annual Busbar Savings or utility-specified cap (Industrial), per two-year performance period Lesser of $0.08 per kWh of SEM Annual Busbar Savings or utility-specified cap (Commercial), per two-year performance period
10.3.3 Performance Tracking System	Lesser of PTS costs, $25,000, or utility-specified cap, per two-year performance period
10.4 Other Industrial Measures	
10.4.1 Variable Frequency Drives for Fans in Potato and Onion Storage Facilities	$200 per hp

10.4.2 Small Compressed Air Systems	Lesser of $0.33 per kWh or 70% of project cost
10.4.3 Water System Leak Abatement (BPA-Qualified)	Lesser of $0.33 per kWh or 70% of project cost
Additional Multisector Opportunities	
Some Commercial and Agricultural Sector measures may be applicable to Industrial projects. 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

Enrollment: A customer must request enrollment in ESI using the PCS 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 virtually) 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.

Energy Smart Industrial Partner (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:

- Performs and deliver lighting audits,
- Reviews lighting design and installation proposals,
- Offers guidance on the best lighting technology for an industry's specific application, and
- Completes the BPA Online 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.

See 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.

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 400,000 kWh.

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

Projects of this size justify a simple, streamlined analytical approach including 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)

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

TSP consultants can be utilized for scoping studies, project assessments, M&V studies, completion reports, and SEM delivery.

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.
- The designated 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 multiyear plan.

- Is a “living” document, meaning subsequent versions (i.e., Updated Plan) that reflect both the completed projects and any newly identified projects supersede the version submitted as part of the EPM enrollment process (i.e., Initial 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 the following 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: EPM (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 BPA approves the initial EPM enrollment, 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; and
  - 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, and
    - Estimated cost.

- The sum of identified energy savings must exceed 200,000 kWh, and
- 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; and
  - 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, and
    - Estimated cost.
  - Completed project names and details for which an EPM payment is being requested:
    - Project description,
    - Verified energy savings,
    - Site ID, and
    - BPA project approval date.
  - Completed project names and details for which an EPM payment was previously paid:
    - Project description,
    - Verified energy savings,
    - Site ID, and
    - BPA project approval date.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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 LESSER OF PER RATE PERIOD**
EPM	$0.025 per kWh of Verified Busbar Savings, $150,000 per site, or utility-specified cap

Formatted Table

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 Multiyear Strategic Energy Management

Basis for Energy Savings

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 will not be included with SEM project savings.

Requirements and Specifications

This measure is available for the Commercial and Industrial sectors. Eligible loads may be at the system or process level, consist of a single building, facility or municipality, or it may include multiple contiguous buildings (e.g., a medical or educational campus). All loads associated with a multifamily building can report savings using the Commercial SEM measure.

Deleted:

Eligibility and Enrollment

Deleted: An Other eligible sites may consist of a single building, facility or municipality, or it may include multiple contiguous buildings (e.g., a medical or educational campus).¶

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; and
- Estimated performance period start date.

M&V Requirements:

SEM Annual Savings must be calculated following an M&V option described in the BPA Commercial and Industrial SEM M&V Reference Guide.

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

SEM Annual Savings for Year-1 reporting are relative to the SEM baseline, for Year-2 reporting and beyond (if re-enrolled in a subsequent engagement), the savings achieved is the year-to-year change in SEM Cumulative Verified savings reported to BPA from the previous year's energy savings.

The initial SEM performance period start 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.

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 Annual SEM Report must include at a minimum:

- SEM Annual Savings;
- Site-specific written summary describing SEM systems and practices implemented, including persistence strategies;
- Documentation of M&V compliance with BPA Commercial and Industrial SEM M&V Reference Guide; and
- Opportunity register that documents individual energy efficiency measures implemented, including subsystem, measure name and description, and when it was implemented.

Customers are required to document the verified SEM Annual Savings as defined in the BPA Commercial and Industrial SEM M&V Reference Guide.

Projects reporting Year-1 performance must report Year-2 performance, including projects with no SEM Annual Savings achieved.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
Enrollment Application	X	
Annual SEM Report	X	X

Payment	
MEASURE CATEGORY	**PAYMENT LESSER OF PER TWO-YEAR PERFORMANCE PERIOD**
Multiyear SEM*	$0.04 per kWh of SEM Annual Busbar Savings or utility-specified cap (Industrial)

Deleted: RATE

	$0.08 per kWh of SEM Annual Busbar Savings or utility-specified cap (Commercial)
*SEM Annual Busbar Savings is used to determine the allowable Performance Payment.	

ADDITIONAL INFORMATION

There is an Annual SEM Report template, use of it is optional.

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.

The BPA Commercial and Industrial SEM M&V Reference Guide provides definitions for SEM Annual Savings Achieved, SEM Baseline, SEM Cumulative Verified Savings, SEM Participant Payment, and SEM Verified Savings.

10.3.3 Performance Tracking System

Basis for Energy Savings

The Performance Tracking System (PTS) measure provides payments to help overcome data barriers. PTS payments are associated with the verified installation and setup 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 result in verified energy savings.

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

PTS installation may occur prior to starting a SEM performance period or may be done during the two-year performance period. Multiple PTS measures may be submitted in the two-year performance period to cover additional installations or maintenance. Maintenance costs may include annual services and other hardware/software to overcome data barriers identified over the course of the SEM engagement. Customers must submit PTS payments manually by entering the incentive and project cost amounts into the BPA UES Measure Upload Template and uploaded into BEETS.

Pre-condition:

- Site's current enrollment in SEM is approved by BPA.

Post-conditions:

Deleted: s

Moved down [1]: PTS hardware/software is used to measure baselines, determine energy savings, or help establish cause and effect. ¶

Deleted: PTS is installed and owned by the end-user.¶

PTS hardware/software is used to measure baselines, determine energy savings, or help establish cause and effect and is documented through a PTS Verification Report which includes all the following, at a minimum:

- Site name and SEM measure affiliation;
- Description of PTS hardware/software;
- Verification of installation through photos and/or data (for new hardware/software); and
- Documentation demonstrating the PTS data is valid, if applicable; and
- Cost documentation.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
PTS Verification Report	X	X

Payment	
MEASURE CATEGORY	**PAYMENT LESSER OF PER TWO-YEAR PERFORMANCE PERIOD**
PTS	PTS costs, $25,000, or utility-specified cap

Additional Information

The PTS Calculator is located in the BPA Document Library and can be used to help customers (1) track multiple PTS payments within the two-year performance period, and (2) reference the specific UES Measure Upload Template fields/columns that must be completed. Use of this calculator is optional and not required.

10.4 Other Industrial Measures

10.4.1 Variable Frequency Drives 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 percent 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

Moved (insertion)[1]

Deleted: . ¶
PTS hardware/software

Deleted: that

Formatted Table

Deleted:

This measure applies to retrofits only. The maximum threshold for qualifying fan VFD hp is equal to or less than 250. Ventilation fan VFD installations in potato and onion storage facilities have a UES of 1,193 kWh per hp. BPA recommends that all new VFD installations meet the IEEE 519 standard.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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
Cost documentation	X	X
Documentation of the following: • Equipment manufacturer • Equipment model number • Size (hp) and quantity installed or used		X

Deleted: Equipment or contractor invoice showing

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: ¶
Order or purchase date ¶
Installed cost

Payment

To calculate the payment, the customer adds the total fan VFD hp installed on a per-building basis. The payment and busbar energy savings for this measure is based on the total fan VFD hp multiplied by 1,193 (kilowatt-hour per hp).

Payment	
MEASURE CATEGORY	**PAYMENT PER HP**
VFD for Fans in Potato and Onion Storage Facilities	$200

Deleted: Hp

10.4.2 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 and/or a non-heated desiccant air dryer. The efficient case would have a VFD to better match compressor performance to compressed air system requirements and/or an air dryer that is refrigerated cycling or desiccant with heat or blower purging.

Requirements and Specifications

For a single air compressor of 150 hp or less, upgrade to an air compressor VFD or stand-alone dryer upgrade (refrigerated desiccant) must use the Small Compressed Air Calculator. Other eligible compressed air (retrofit or upgrade) project measures may include:

- VFD compressor (rotary screw oil flooded or part of a single compressor system)
- Permanent demand reduction (excludes leaks)
- Permanent pressure reduction
- New receiver (minimum volume 3 gallons/scfm)
- New efficient air dryer (refrigerator cycling or desiccant dryer that is heat or blower purged)

Additional requirements include:

- Each VFD compressor must be submitted as an individual project (i.e., compressors may not be combined or divided). The Small Compressed Air Calculator will determine energy savings.
- Energy savings and incentive amounts must be entered manually into the Small 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**	
	BEETS	**Customer File**
Cost documentation	X	X
Documentation of the following: • Equipment manufacturer • Equipment model number • Size (hp) and quantity installed or used		X
Completed Small Compressed Air Calculator	X	X

Payment	
MEASURE CATEGORY	**PAYMENT LESSER OF**
Small Compressed Air Systems	$0.33 per kWh or 70% of project cost

10.4.3 Water System Leak Abatement (BPA-Qualified)

Basis for Energy Savings

Deleted: Equipment or contractor invoice showing

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: ¶
Order or purchase date ¶
Installed cost

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 collects 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).
- 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**	
	BEETS	**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
Cost documentation	X	X
Completed Leak Abatement Tool	X	

Deleted: Equipment or contractor invoice showing:¶
Order or purchase date ¶
Installed cost

Payment	
MEASURE CATEGORY	**PAYMENT LESSER OF**
Water System Leak Abatement	$0.33 per kWh or 70% of project cost

Section 11. Residential Sector

Revisions to measures in this sector are listed in the changes and corrections summary in Appendix B.

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.

Commented [JB1]: Insert hyperlink

11.1 Payment Summary

Program Component or Measure	Payment
11.2 Appliances	
11.2.1 for both ENERGY STAR Clothes Washers and ENERGY STAR Clothes Dryers	$36-$125/washer $50-$175/dryer
11.3 EV Chargers	
11.3.1 ENERGY STAR Level 2 Networked EV Chargers	$20/unit
11.4 Electric Water Heating	
11.4.1 Thermostatic Shut-Off Valves (TSV)	$14-$20/unit
11.4.2–11.4.3 Unitary Heat Pump Water Heaters (BPA-Qualified)	$1,400-$1,800/water heater
11.4.4 Split-System Heat Pump Water Heaters	$2,200/water heater
11.5 Heating, Ventilation, Air Conditioning Measures	
11.5.1 Ductless and Ducted Mini-Split Heat Pumps	See the Payment section of this measure.
11.5.2 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump	$1,250
11.5.3 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Variable-Speed Air-Source Heat Pump	$1,560
11.5.4 Variable-Speed Air-Source Heat Pump Upgrade	$600
11.5.5 Centrally Ducted Air Conditioners	$60
11.5.6 Packaged Terminal Heat Pump	$125-$200
11.5.7 Ground Source Heat Pump (BPA-Qualified)	See the Payment section of this measure.

11.5.8 Prescriptive Duct Sealing (BPA-Qualified)	$200-$250
11.5.9 Duct Insulation	$0.60 per linear foot insulated
11.6 Thermostats	
11.6.1 Line Voltage Thermostats	$18
11.6.2 Communicating Line Voltage Thermostats	$35
11.6.3 Advanced Smart Thermostats	$140-$165
11.7 New Construction	
11.7.1 New Northwest Energy Efficient Manufactured Housing	$1,200-$1,400/home
11.7.2 Replacement of Pre-1976 Manufactured Home with NEEM Certified Home	$2,200-$2,500/home
11.7.3 Single family New Construction Performance Path	Varies based on measures installed.
11.7.4 Energy Efficient New Multifamily Construction	See the Payment section of this measure.
11.7.5 Zero Energy Ready New Multifamily Construction	See the Payment section of this measure.
11.8 Weatherization	
11.8.1 Insulation	See the UES Measure List.
11.8.2 Prime Window and Patio Door Replacement	$8–$20/square foot
11.8.3 Low-E Storm Windows	$2/square foot
11.8.4 Exterior Insulated Doors	$40/door
11.8.5 Whole House Air Sealing and Testing	See the UES Measure List.
11.8.6 Prescriptive Air Sealing	See the UES Measure List.
11.8.7 Door Sweeps	$25/each
11.9 Energy Efficiency Income Qualified Measures	
Weatherization, Heat Pump Technology, Prescriptive Duct Sealing, Duct Insulation, Thermostat Technology, HPWHs, Clothes Washers and Dryers, and some Commercial Multifamily Heating Technology	See the Income Qualified Payment section for these measures.
11.10 Behavioral	

11.10.1 Behavioral Home Energy Reports (BPA-Qualified)	See the Payment section of this measure.

11.2 Appliances

11.2.1 Clothes Washers and Clothes Dryers

Basis for Energy Savings

About 80 percent 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 percent 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). BPA included a slight deduction of dryer savings for the very small percentage of more efficient electric dryers 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. BPA discounts the savings for dryers by the portion of savings assigned to clothes washers. BPA documentation requirements consider these factors. Visit the RTF webpage for more information.

Deleted: -

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.

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.

Commented [JB2]: All underlined, bold items should have hyperlink.

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 of manufacture. 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 are available 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.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process *for documentation requirements for each channel listed above.*	*See section 6.2*	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
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 of manufacture, or a copy of the BPA-Qualified Product List showing the product if applicable.*		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)	$44

Deleted: End-user identifying information including unique site ID and address

Formatted: Font: Italic

Deleted: X

Deleted: Installed cost

Any Top-Load ENERGY STAR Clothes Washer (gas water heater/electric dryer, electric water heater/electric or gas dryer, any water heater/any dryer)	$38
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)	$125
ENERGY STAR Clothes Washer Multifamily Common Area (electric water heater/gas dryer)	$63
ENERGY STAR Clothes Washer Multifamily Common Area (gas water heater/gas dryer)	$36
ENERGY STAR Clothes Washer Multifamily Common Area (gas water heater/electric dryer)	$63

11.3 Electric Vehicle Chargers

11.3.1 Energy Star Level 2 Networked Electric Vehicle Chargers

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. Visit the RTF webpage for more information.

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.
- 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 of manufacture. 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**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process *for documentation requirements for each channel listed above.*	*See section 6.2*	X
Documentation of the following: • Model number • Type • Quantity of equipment purchased	X	X
A copy of the qualified product list showing the product		X

Payment	
MEASURE CATEGORY	**PAYMENT**
ENERGY STAR Level 2 Networked Electric Vehicle Charger	$20 per unit

11.4 Electric Water Heating

11.4.1 Thermostatic Shut-Off Valves

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. Visit the RTF webpage for more information.

Requirements and Specifications

Deleted: End-user identifying information including unique site ID and address, *s*

Formatted: Font: Italic

Formatted: Font: Italic

Deleted: Installed Cost

Deleted: Equipment or contractor invoice showing:¶ Equipment order or purchase date¶ Installed cost¶

Deleted: ,

Deleted: t

Deleted: , and q

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

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

- TSV measures are available through the following channels:
  - Retail.
  - Direct Install.

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

See section 6.2 Measure Distribution Channels, for verification requirements. (Only eligible in homes with electric water heaters.)

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process for documentation requirements for each channel listed above.	*See section 6.2*	X
Fuel source documentation (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

Payment		
TYPE	**RETAIL**	**DIRECT INSTALL**
TSV — valve only	$14	$20
TSV — valve with efficient showerhead (Use the valve only reference number)	$14	$20

Additional Information

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.

Deleted: End-user identifying information including unique site ID and address, s

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

Deleted: Installed cost

11.4.2 Unitary Heat Pump Water Heater – 40 gallon (BPA-Qualified)

Basis for Energy Savings

Unitary 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. 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 laboratory test results, and 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.

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 PCS Request and Acknowledgment Procedure to request approval to use the product.

Unitary HPWHs – 40 Gallon are eligible for payment in new construction projects in the following states: Montana, Wyoming, Idaho, California, Utah, and Nevada. They are ineligible for new construction in Washington and Oregon.

Unitary HPWH measures are available through the following channels:

- Retail;
- Standard Rebate.

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**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process for documentation requirements for each channel listed above.	*See section 6.2*	X

Deleted: ;

Deleted: End-user identifying information including unique site ID and address, s

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

Deleted: Installed cost

Payment	
Measure category	**PAYMENT (ALL DISTRIBUTION CHANNELS)**
Unitary HPWH All tiers — 40 gallon tank	$1,400

11.4.3 Unitary Heat Pump Water Heater – 50 gallon and above

Basis for Energy Savings

Unitary 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. Visit the RTF webpage for more information.

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.

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 HPWH Qualified Products List. If a customer believes a product should be on the list and it is not, the customer should use the PCS Request and Acknowledgment Procedure to request approval to use the product.

Unitary HPWHs – 50 Gallon and above are eligible for payment in new construction projects in the following states: Montana, Wyoming, Idaho, California, Utah, and Nevada. They are ineligible for new construction in Washington and Oregon.

Unitary HPWH measures are available through the following channels:

- Retail.
- Standard Rebate.

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**

	BEETS	Customer File
See section 6.2 Measure Distribution Process *for documentation requirements for each channel listed above.*	*See section 6.2*	X

Payment	
Measure category	**PAYMENT (ALL DISTRIBUTION CHANNELS)**
Unitary HPWH Tier 3 — 50 gallon and above	$1,600
Unitary HPWH Tier 4 — 50 gallon and above	$1,800

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.

11.4.4 Split-System Heat Pump Water Heater

Basis for Energy Savings

Split-system 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. Visit the RTF webpage for more information.

Split-system HPWHs must be installed according to manufacturer's specifications.

Requirements and Specifications

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

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 HPWH Qualified Products List. If a customer believes a product should be on the list and it is not, the customer should use the PCS Request and Acknowledgment Procedure to request approval to use the product.

Split-system HPWH measures are available through the following channels:

- Retail.
- Standard Rebate.

Deleted: End-user identifying information including unique site ID and address, *s*

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

Deleted: Installed cost

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**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process *for documentation requirements for each channel listed above.*	*See section 6.2*	X

Payment	
TANK SIZE	**PAYMENT (ALL DISTRIBUTION CHANNELS)**
Split-System HPWH — Any size tank	$2,200

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).
- 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.

11.5 HEATING, VENTILATION, AIR CONDITIONING

11.5.1 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 conversions from zonal electric heating. Visit the RTF webpage for more information.

For the purposes of this measure, BPA defines DHP equipment types as follows:

Deleted: End-user identifying information including unique site ID and address, *s*

Formatted: Font: Italic

Formatted: Font: Italic

Deleted: Installed cost

Deleted: ;

Deleted: ;

Deleted: ; and

Commented [JB3]: Should this be a hyperlink?

- 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.

Ductless and Ducted Mini-Split Heat Pump: Eligibility Table

PRIMARY RESIDENTIAL HEATING SYSTEM	**HOME TYPE**					
	Single family:	Single family:	MANUFACTURED:	MANUFACTURED:	MULTIFAMILY:	MULTIFAMILY:
Electric Forced-Air Furnace	Eligible	Not Eligible	Eligible	Treat as manufactured existing once located on site for occupancy	Not eligible	Not eligible
Ducted Heat Pump	Not eligible**		Not eligible			
Ductless Mini-Split Heat Pump	Not eligible**		Not eligible			
Zonal (Electric)*	Eligible		Eligible		Eligible	
Wood	Not eligible**		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. 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 11.5.2 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump and 11.5.3 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Variable-Speed Air-Source Heat Pump for ASHP and VSHP conversions 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.
- 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 (HSPF2): 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 HSPF2 rating that meets federal minimum requirements by the AHRI. HSPF2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology. If a unit was manufactured before January 1, 2023, it must meet the equivalent federal minimum efficiency standard for HSPF per the AHRI certificate.
- DHPs must be installed on a dedicated electrical circuit according to the manufacturer's specifications.
- Only one DHP may be claimed per Single Family or Manufactured 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 an ASHP incentive.
- *The DHP or Ducted Mini-Split must be AHRI-tested and certified and meet all other measure requirements.*.
- For Existing Multifamily homes, one ductless heat pump shall be one outdoor unit. Each outdoor unit is eligible for savings and incentive.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following for the outdoor unit: • Manufacturer • Model number	X*	X
AHRI Certificate demonstrating an HSPF2 that meets or exceeds federal minimum standards		X

Deleted: All components of the heat pump, including indoor and outdoor components, must be AHRI-tested and certified and meet all other measure requirements

Deleted: m

Deleted: and m

Deleted: for the outdoor unit

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Deleted: Installed Cost:¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

*Only in UES Measure Upload Template

Payment	
MEASURE CATEGORY	**PAYMENT**
Existing single family homes: Zonal electric heat pre-condition	$920
Existing single family homes: Electric forced-air furnace pre-condition	$920
Existing manufactured homes: Zonal electric heat pre-condition, including new manufactured homes once on site for occupancy	$920
Existing manufactured homes: Electric forced-air furnace pre-condition, including new manufactured homes once on site for occupancy	$920
Existing multifamily homes: Zonal electric heat pre-condition	$920

Additional Information

At this time 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 Prescriptive Duct Sealing.

The Northeast Energy Efficiency Partnership (NEEP) Cold Climate Specification List is an optional resource for air-source heat pumps, including ductless heat pumps. Utilities are not required to utilize models on this list for program implementation.

Visit the BPA Document Library for DHP supporting documentation, such as Best Practices for Installing Ductless Heating and Cooling Systems and an Optional Ductless Heat Pump Project Information Form.

11.5.2 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump

Basis for Energy Savings

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. Visit the RTF webpage for more information.

Air-Source Heat Pump Conversion: 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	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 a conversion from an electric forced-air furnace to a high-efficiency ducted air-source heat pump.

At this time, VRF technologies (also known as VRV) do not qualify for the residential Conversion from Electric Forced- Air Furnace to ASHP 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 configuration.

The new air-source heat pumps must be:

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Rated as having a HSPF2 and a Seasonal Energy Efficiency Ratio (SEER2) that meets federal minimum standards according to the AHRI certificate. HSPF2 and SEER2 apply to units manufactured after January 1, 2023 based on DOE's change to the national standard testing methodology. If a unit was manufactured before January 1, 2023, it must meet the current federal minimum efficiency standard for HSPF and SEER per the AHRI certificate.

Applicable home types with whole-home centrally ducted systems (for ducted mini-splits, see section 11.5.1 Ductless and Ducted Mini-Split Heat Pumps):

- 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 heated floor area may qualify for only one heat pump payment. This may be one ducted 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 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**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 HSPF2 and SEER2 that meets or exceeds federal minimum standards		X

Payment	
MEASURE CATEGORY	**PAYMENT**
Heat Pump Conversion from Electric Forced-Air Furnace to Air-Source Heat Pump	$1,250

Deleted: Installed

Deleted: :

Deleted: ¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Additional Information

Duct Insulation and/or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing and/or insulation is not required for completion of this measure.

The NEEP Cold Climate Specification List is an optional resource for air-source heat pumps, Utilities are not required to utilize models on this list for program implementation.

Refer to the BPA Document Library for ASHP supporting documentation, such as the ASHP and VSHP Specifications and Best Practices and an optional ducted air-source heat pump data collection tool.

11.5.3 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to Variable-Speed Air-Source Heat Pump

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. Visit the RTF webpage for more information.

Variable-Speed Heat Pump Conversion: 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	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 a conversion from an electric forced-air furnace to a high-efficiency ducted variable-speed heat pump (VSHP).

At this time, VRF technologies (also known as VRV) do not qualify for the residential Conversion from Electric Forced- Air Furnace to ASHP 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 configuration.

The new variable-speed air-source heat pumps must be:

AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.

Rated as having a HSPF2 and a SEER2 efficiency rating that meets federal minimum standards according to the AHRI certificate. HSPF2 and SEER2 apply to units manufactured after January 1, 2023, based on DOE's change to the national standard testing methodology. If a unit was manufactured before January 1, 2023, it must meet the current federal minimum efficiency standard for HSPF and SEER per the AHRI certificate.

Must provide documentation demonstrating that the outdoor compressor is variable-speed or inverter-driven. 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, refer to section 11.5.2 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to ASHP.

Applicable home types with whole-home centrally ducted systems (for ducted mini-splits, see section 11.5.1 Ductless and Ducted Mini-Split Heat Pumps):

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 heated floor area may qualify for only one heat pump payment. This may be one ducted 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 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**

	BEETS	Customer File
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 unit meets current federal minimum efficiency standards		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

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Payment	
MEASURE CATEGORY	**PAYMENT**
Heat Pump Conversion from Electric Forced-Air Furnace to Variable-Speed Heat Pump	$1,560

Deleted:

Additional Information

The NEEP Cold Climate Specification List is an optional resource for ASHP, including ductless heat pumps. Utilities are not required to utilize models on this list for program implementation.

Duct Insulation and/or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing and/or insulation is not required for completion of this measure.

Visit the BPA Document Library for VSHP supporting documentation, such as the ASHP and VSHP Specifications and Best Practices and an optional ducted air-source heat pump data collection tool.

11.5.4 Variable-Speed Air-Source Heat Pump Upgrade

Basis for Energy Savings

A 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. Visit the RTF webpage for more information.

Variable-Speed Air-Source Heat Pump Upgrade: Eligibility Table					
PRIMARY RESIDENTIAL HEATING SYSTEM	**HOME TYPE**				
	Single family:	**Single family:**	**MANUFACTURED: EXISTING**	**MANUFACTURED: NEW**	**MULTIFAMILY: EXISTING**
Electric Forced-Air Furnace	See VSHP Conversion	Upgrade	See VSHP Conversion	Treat as manufactured existing once located on site for occupancy	Not eligible
Ducted Heat Pump	Upgrade		Upgrade		
Ductless Mini-Split Heat Pump					
Zonal (Electric)					
Wood					
Oil/Propane/Gas					
None existing					

Requirements and Specifications

The new variable-speed heat pumps must be:

- AHRI-tested and certified; manufacturer claims of "equivalent to AHRI-certified equipment" will not be accepted.
- Rated as having a HSPF2 and a SEER2 efficiency rating that meets federal minimum standards according to the AHRI certificate. HSPF2 and SEER2 apply to units manufactured after Jan. 1, 2023, based on DOE's change to the national standard testing methodology. If a unit was manufactured before Jan. 1, 2023, it must meet the current federal minimum efficiency standard for HSPF and SEER per the AHRI certificate.

Must provide documentation demonstrating that the outdoor compressor is variable-speed or inverter-driven. 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, refer to section 11.5.2 Air-Source Heat Pump Conversion from Electric Forced-Air Furnace to ASHP.

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).
- 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.

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 or one ductless heat pump, but not both. There are two exceptions to this rule:

1. 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.
2. 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 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**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 unit meets current federal minimum efficiency standards		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

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Payment	
Measure category	**Payment**
Variable-Speed Heat Pump Upgrade	$600

Additional Information

At this time, VRF technologies (also known as VRV) do not qualify for the residential Variable-Speed ASHP Upgrade measure. BPA understands that the cost and energy savings for VRFs differ significantly from a standard residential Variable-Speed ASHP Upgrade configuration.

Duct Insulation and/or Prescriptive Duct Sealing may be completed and claimed in addition to this measure; however, duct sealing and/or insulation is not required for completion of this measure.

The NEEP Cold Climate Specification List is an optional resource for air-source heat pumps. Utilities are not required to utilize models on this list for program implementation.

Visit the BPA Document Library for VSHP supporting documentation, such as the ASHP and VSHP Specifications and Best Practices and an optional ducted air-source heat pump data collection tool.

11.5.5 Centrally Ducted Air Conditioners

Basis for Energy Savings

A new centrally ducted AHRI-certified air conditioner (15.2 SEER2) replacing current practice Air Conditioners (SEER2 13.4 or below) results in energy savings. Visit the RTF webpage for more information.

Centrally Ducted Air Conditioners: 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, 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 15.2 SEER2. SEER2 applies to units manufactured after January 1, 2023, based on DOE's change to the national standard testing methodology. If a unit was manufactured before January 1, 2023, it must meet the current federal minimum efficiency standard for SEER per the AHRI certificate.

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) an 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 ASHP and no more provided all other program requirements are met.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Manufacturer • Model number • Type		X

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Deleted: that product requirements have been met:

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

AHRI Certificate documenting a minimum of 15.2 SEER2		X

Payment	
Measure category	**Payment**
Centrally Ducted Air Conditioner	$60 per unit

Additional Information

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.

11.5.6 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 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 for installation 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.

Formatted: List Paragraph, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

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.

Formatted: List Paragraph, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Documentation Requirements	
Documentation Description	**Retention/Submittal Locations**

	BEETS	Customer File
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
AHRI Certificate		X

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Payment	
Measure category	**Payment**
PTHP Retrofit	$200 per PTHP
PTHP New Construction	$125 per PTHP

Additional Information

For any of the following building types, see section 8.4.7 Commercial Packaged Terminal Heat Pump measure:

- 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.

Formatted: List Paragraph, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

11.5.7 Ground Source Heat Pump (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. Ground source heat pumps include savings from efficient installation practices and controls. Visit the RTF webpage for more information.

Ground-Source Heat Pumps*: Eligibility Table	
	HOME TYPE

PRIMARY RESIDENTIAL HEATING SYSTEM	Single family: EXISTING HZ 2 and 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 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 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.
- Systems must be installed by a licensed contractor certified by the International Ground Source Heat Pump Association (IGSHPA). Multiple technicians may be employed to meet these certification requirements, but they must have been present during the installation to qualify.
- Systems must be installed according to IGSHPA guidelines.

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 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 and 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 IGSHPA specifications are met.

DOCUMENTATION REQUIREMENTS		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X

Payment	
Measure category	**Payment**
Ground Source Heat Pump Upgrade (Compressor Only Replacement)	$500 per unit
Ground Source Heat Pump Upgrade or Conversion without Desuperheater	$3,000 per unit
Ground Source Heat Pump Upgrade or Conversion with Desuperheater	$3,500 per unit

ADDITIONAL INFORMATION

The former "PTCS Ground Source Heat Pump Form" has been renamed "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.

11.5.8 Prescriptive Duct Sealing (BPA-Qualified)

Commented [JB4]: Should this have a hyperlink?

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Commented [JB5]: Hyperlink

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. Visit the RTF webpage for more information.

Commented [JB6]: Hyperlink

Prescriptive Duct Sealing: Eligibility Table					
PRIMARY RESIDENTIAL HEATING SYSTEM	**HOME TYPE**				
	Single family: EXISTING	**Single family: NEW**	**MANUFACTURED: EXISTING**	**MANUFACTURED: NEW**	**MULTIFAMILY: NEW and 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. Contractors must complete Prescriptive Duct Sealing Form and return it to utility.

Deleted: ,

Commented [JB7]: Hyperlink

Commented [JB8]: Hyperlink

Resealing of ducts is allowed at utility discretion (i.e., a second duct sealing only) provided that all other program requirements are met.

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	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Primary Heating System Type	X*	X
Prescriptive Duct Sealing Form		X
*Only in UES Measure Upload Template		

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

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

Visit the BPA Document Library Residential sector resources for prescriptive duct sealing resources, including best practices.

11.5.9 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. Visit the RTF webpage for more information.

Requirements and Specifications

Insulation measures in single family homes must be installed according to the BPA Residential Weatherization Specifications and 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.

Pre-condition:

Existing ducts may not already be insulated.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following: • Post-insulation R-value • Linear footage of insulation installed	X*	X
**Only in UES Measure Upload Template*		

Payment	
Measure category	**Payment**
Duct Insulation	$0.60 per linear foot insulated

Additional Information

Duct Insulation may be reported in addition to Prescriptive Duct Sealing and other HVAC measures such as Air-Source Heat Pumps and Thermostats.

11.6 Thermostats

11.6.1 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. Visit the RTF webpage for more information.

Requirements and Specifications

This measure is claimed on a per-thermostat basis and is available for existing and new single family and multifamily low-, mid-, and high-rise homes. Customers must replace thermostats in existing, electrically heated single family or multifamily homes with line-voltage electronic thermostats.

Deleted: Installed Cost:¶

Deleted: Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost¶

Deleted: and l

Formatted

Formatted: Font: 10 pt, Italic

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.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following for the installed thermostat: • Manufacturer • Model number • Quantity of equipment	X*	X
*Only in UES Measure Upload Template		

Payment	
MEASURE CATEGORY	**Payment**
All heating zones: Existing single family and multifamily	$18 per unit

11.6.2 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. Visit the RTF webpage for more information.

Requirements and Specifications

Deleted: ;

Deleted: ;

Deleted: ;

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost¶
Model number of installed unit

Deleted: thermostat

Deleted: make,

Deleted: model

Deleted: and q

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

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.

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**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
Documentation of the following for the installed thermostat: • Manufacturer • Model number • Quantity of equipment	X*	X
*Only in UES Measure Upload Template		

Payment	
MEASURE CATEGORY	**Payment**
Existing Single family and Existing Multifamily Homes with Zonal Electric Heating	$35 per unit

Deleted: ;

Deleted: ;

Deleted: ;

Deleted: ;

Deleted: ;

Deleted: ;

Deleted: ; and

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost¶
Model number of installed unit

Deleted: thermostat m

Deleted: ake

Deleted: , m

Deleted:

Deleted: and q

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

11.6.3 Advanced Smart Thermostats

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. Visit the RTF webpage for more information.

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
- Coupon or Instant Discount
- Direct Install
- Standard Rebate Payment

See section 6.2 Measure Distribution Channels, for verification requirements.

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.

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 and verification 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 on-board occupancy detection set to "on" (if applicable to device).

Deleted: ;

Deleted: ;

- Have external occupancy sensor plugged in and configured per manufacturer settings (if applicable to device).
- 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**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process *for documentation requirements for each channel listed above.*	*See section 6.2*	X
Documentation of the following for the installed thermostat: • Manufacturer • Model number • Quantity of equipment	X*	X
**Only in UES Measure Upload Template*		

One smart thermostat per qualifying heating system with a limit of two per household, as listed in the table below.

Payment				
MEASURE CATEGORY	**RETAIL**	**COUPON OR INSTANT DISCOUNT**	**DIRECT INSTALL**	**STANDARD REBATE PAYMENT**
	PAYMENT LEVELS FOR EACH DELIVERY CHANNEL APPLY TO BOTH BPA RUN PROGRAMS (e.g., SIMPLE STEPS) AND UTILITY OPERATED PROGRAMS			
Advanced Smart Thermostat	$140	$140	$165	$140

Additional Information

Visit the BPA Document Library Residential sector resources for Advanced Smart Thermostat resources, such as the optional smart thermostat project information form.

Deleted: ; and

Deleted: End-user identifying information including unique site ID and address, s

Deleted:

Deleted: *X*

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

Deleted:

Formatted: Font: Italic

Deleted: of thermostat

Deleted: make

Deleted: , m

Deleted: , q

Deleted: and installed cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.28" + Indent at: 0.53"

11.7 New Construction

11.7.1 New Northwest Energy Efficient Manufactured Housing

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 Northwest Energy Efficient Manufactured (NEEM) 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). 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. Visit the RTF webpage for more information.

Requirements and Specifications

Manufactured homes must be electrically heated, new, and certified by the NEEM Housing Program.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**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.

Commented [JB9]: Are we keeping Installed Costs? Are we keeping the Guidance for Reporting Residential Costs in BEETS document?

Commented [AB10R9]: Deleted.

Deleted: Installed cost (See Guidance for Reporting Residential Costs in BEETS)

NEEM marketing materials have been 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 for current information.

11.7.2 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 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. Visit the RTF webpage for more information.

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.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X

Commented [JB11]: Are we keeping Installed Costs? Are we keeping the Guidance for Reporting Residential Costs in BEETS document?

Commented [AB12R11]: Deleted.

Deleted: Installed cost (See Guidance for Reporting Residential Costs in BEETS)

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.

Payment	
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 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 IMPLEMENTATION MANUAL**
Clothes Washers	11.2
Clothes Dryers	11.2
Thermostatic Shut-Off Valves	11.4.1
Split System HPWHs	11.4.4
Ductless Heat Pumps	11.5.1
Air-Source Heat Pumps	11.5.2

Some Types of Thermostats (see thermostat section for details)	11.6

11.7.3 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 UES Measures through the AXIS Database.

Commented [JB13]: Hyperlinks?

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 Northwest Energy Efficiency Alliance (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. The AXIS database performs calculations and 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 percent 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.

Commented [JB14]: Hyperlink

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**

	BEETS	Customer File
End-user identifying information, including unique site ID and address	X	X
AXIS database-generated Performance Path Calculator Summary Report		X

Deleted: Installed cost (See Guidance for Reporting Residential Costs in BEETS)

Payment

BPA shall pay for Single Family New Construction Performance Path on a kilowatt-hour-saved basis according to the table below.

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 used to determine code compliance for construction.

Single family New Construction Performance Path measures expires September 30, 2028.

The Axis database generates the Performance Path Calculator Summary Report 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. Contact NEEA for more information on accessing the Summary Report. Visit BetterBuiltNW for more information on how to access this report.

This measure is supported by NEEA. Visit BetterBuiltNW for assistance or questions on REM/Rate, becoming a rater, or AXIS.

In addition to the Single Family New Construction Performance Path, the following measures are available as alternative stand-alone measures in single family new construction homes. See the referenced section for requirements and specifications or payment levels.

ADDITIONAL MEASURES AVAILABLE FOR NEW, Single family CONSTRUCTION	LOCATION IN IMPLEMENTATION MANUAL
Clothes Washers	11.2
Clothes Dryers	11.2
Thermostatic Shut-Off Valves	11.4.1
Split System HPWHs	11.4.4
HVAC Ducted Systems, including Air-Source Heat Pumps and Ground Source Heat Pumps	11.5.1
Some Types of Thermostats (see thermostat section for details)	11.5.2

11.7.4 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 2025 Energy Code cycle by state. Energy savings for this measure is based on analysis of efficiency improvements needed to exceed state code by at least 10 percent resulting in a dwelling unit that is a minimum of 10 percent more efficient than code. Energy savings for each state is adjusted for the applicable state code and climate zones. Analysis 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 percent energy savings over the 2025 Energy Code cycle by state. When state energy codes are updated, certification programs that no longer achieve 10 percent 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 percent above state energy code to remain on the Qualified Programs 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 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	
	BEETS	**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

Deleted: Installed cost (See Guidance for Reporting Residential Costs in BEETS)

Payment	
MEASURE CATEGORY	**PAYMENT**
BPA Energy Efficient New Multifamily Construction, all electric	Washington $350 All other states $450

Additional Information

BPA does not develop energy savings estimates for new multifamily construction custom projects that address multiple end uses or whole building measures. BPA may develop energy savings estimates for custom projects that address a single targeted end use, for example, central HPWHs. For the whole-building analysis, customers may either leverage the UES measure BPA Energy Efficient New Multifamily Construction or develop and submit a custom project per section 4 of the Implementation Manual using their own resources.

11.7.5 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 2025 Energy Code cycle by state. Energy savings for this measure is based on analysis of efficiency improvements needed to exceed the code by at least 25 percent, resulting in a dwelling unit that is a minimum of 25 percent more efficient than code. Energy savings for each state is adjusted for the applicable state code and climate zones. Analysis 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 percent energy savings over the 2025 Energy Code cycle by state. When state energy codes are updated, certification programs that no longer achieve 25 percent 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 percent above state 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 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**	
	BEETS	**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**
BPA Zero Energy Ready, Multifamily Construction, all electric	Washington $900 All other states $1,100

Additional Information

BPA does not develop energy savings estimates for new multifamily construction custom projects that address multiple end uses or whole building measures. BPA may develop energy savings estimates for

Deleted: Installed cost (See Guidance for Reporting Residential Costs in BEETS)

custom projects that address a single targeted end use, for example, central HPWHs. For the whole-building analysis, customers may either leverage the UES measure BPA Energy Efficient New Multifamily Construction or develop and submit a custom project per section 4 of the Implementation Manual using their own resources.

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.

ADDITIONAL MEASURES AVAILABLE FOR NEW, MULTI-FAMILY CONSTRUCTION	**LOCATION IN Implementation manual**
Clothes Dryers	11.2
Thermostatic Shut-Off Valves	11.4.1

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					
Ductless Mini-Split Heat Pump					
Zonal (Electric)					
Wood or Pellet	Eligible when accompanied by any electric heating system		Eligible when accompanied by any electric		Eligible when accompanied by any electric heating system

			heating system		
Oil/Gas/Propane	Eligible as supplementary heat for a heat pump system 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 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 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 in low-, mid-, and 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, Whole House, and Prescriptive Air Sealing, and Door Sweeps. All weatherization measures in single family and manufactured homes must be installed according to the BPA Residential Weatherization Specifications and 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.

Home Heating System Eligibility

For the purposes of this section and associated income qualified 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 percent or more of the conditioned living area of a residence) or must have one of the following as an existing heating system:

- A permanently installed electric heating system with either a wood stove, pellet stove, fireplace, fireplace insert (wood or pellet), or wood furnace.
- A wood or pellet stove without any other nonelectric space heating system, accompanied by the current usage of plug-in electric space heaters.
- An electric heat pump system integrated with a nonelectric heating system (e.g., natural gas, propane, or wood supplementary/backup system).
- 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.

Section 11.9 Energy Efficiency Income Qualified Measures outlines information about Income qualified Weatherization measures.

11.8.1 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. Visit the RTF webpage for more information.

Requirements and Specifications

Insulation measures in single family and manufactured homes must be installed according to the BPA Residential Weatherization Specifications and 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.

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**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 system type	X	X

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Payment

See the UES Measure List for payments and busbar energy savings for specific measures.

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.

Project reporting to BPA is based on the square footage of installed insulation rounded to the nearest whole number.

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 and 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 and 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.

Insulation products must be rated by material R-values to qualify. Products that potentially achieve an R-value based on assembled requirements, reflectivity and/or emissivity do not qualify.

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.

11.8.2 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, double-pane windows or patio doors with any frame type. Patio doors include sliding or French glass doors. Prime windows include skylights, provided they meet all pre and post condition requirements. Visit the RTF webpage for more information.

Requirements and Specifications

Window and patio door measures in single family and manufactured homes must be installed according to the BPA Residential Weatherization Specifications and Best Practices Guide.

Pre-conditions:

Pre-existing windows and patio doors must be:

- Single-pane with/without storms, or double-pane, any frame type (e.g., metal, wood, vinyl, etc.).

Post-condition:

The weighted average of replacement windows must have a 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**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 the following: • Number of windows or patio doors replaced • Pre-condition (frame type, i.e., wood, metal, single- or double-pane) • Post-condition U-value		X
Documentation of square footage of windows or patio doors replaced	X*	X
Description of primary heating system type	X*	X
*Only in UES Measure Upload Template		

Deleted: Installed

Deleted: :

Deleted: ¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

Payment				
HOUSING TYPE	**RETROFIT TYPE**	**U-VALUE**	**PRIMARY HEATING TYPE**	**PAYMENT PER SQ. FT.**
Single family	Single-pane window, double-pane window, any frame type.	0.30	Any Electric	$8
	Single-pane patio door, double-pane patio door, any frame type.	0.35	Any Electric	$8
	Single-pane window, double-pane window, any frame type.	0.22	Any Electric	$10

	Single-pane patio door, double-pane patio door, any frame type.	0.30	Any Electric	$10
Manufactured	Single-pane window, double-pane window, any frame type.	0.30	Any Electric	$8
	Single-pane patio door, double-pane patio door, any frame type.	0.35	Any Electric	$8
	Single-pane window, double-pane window, any frame type.	0.22	Any Electric	$10
	Single-pane patio door, double-pane patio door, any frame type.	0.30	Any Electric	$10
Multifamily Low-Rise	Single-pane window, double-pane window, any frame type.	0.30	Any Electric	$15
	Single-pane patio door, double-pane patio door, any frame type.	0.35	Any Electric	$15
	Single-pane window, double-pane window, any frame type.	0.22	Any Electric	$20
	Single-pane patio door, double-pane patio door, any frame type.	0.30	Any Electric	$20
Multifamily Mid-/High-Rise	Single-pane window, double-pane window, any frame type	0.30	Any Electric	$8–$15
	Single-pane patio door, double-pane patio door, any frame type	0.35	Any Electric	$8–$15

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.

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 percent 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 percent variance between rough opening sizes and total final invoiced window dimensions to account for variability. Utilize the Optional Windows Calculator or Windows Worksheet in the Optional Weatherization Data Collection Tool for assistance calculating window measurements.

All BPA prime window and patio door replacements shall consist of new, fully factory-assembled units, which are rated by the NFRC for performance as a package. Partial replacements are not allowed.

Commented [SP18]: Adding in the clarification to avoid confusion surrounding partial replacements.

Prime windows and patio doors should be reported on the invoice using the reference number that reflects the pre-existing pane count. If replacing single and double-pane windows, the square footage of each type should be reported separately.

11.8.3 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 added 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. Visit the RTF webpage for more information.

Requirements and Specifications

This measure is not available for mid- or 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).

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 of manufacture.)		X
Documentation of the following: • Number of storm windows installed • 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 system type	X*	X
*Only in UES Measure Upload Template		

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Formatted: Normal, No bullets or numbering

Payment	
MEASURE CATEGORY	**PAYMENT per square foot**
ENERGY STAR-Certified Low-E Storm Window single-pane any frame type, or double-pane metal frame	$2

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.

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.

11.8.4 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 percent. Visit the RTF webpage for more information.

Requirements and Specifications

This measure is not available for mid- or high-rise multifamily.

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 of manufacture 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	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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
Documentation of the pre- and post-conditions		X
Documentation of the number of doors replaced	X*	X
Description of primary heating system type	X*	X
**Only in UES Measure Upload Template*		

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Payment	
MEASURE CATEGORY	**PAYMENT per door**
Exterior Insulated Doors	$40

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.

11.8.5 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. Visit the RTF webpage for more information.

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 and 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 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 and Best Practices Guide for other unique safety precautions when air sealing.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	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 the following conditions: • Pre- and post-sealing CFM leakage (CFM at 50 Pascals) • Building volume • 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
**Only in UES Measure Upload Template*		

Payment

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

Deleted: are required

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

BPA payment is based on the reduction in air infiltration per reduction in CFM 50, rounded to the nearest whole number. See the UES Measure List for payments and busbar energy savings.

Total Payment = Quantity X Payment

Quantity = Difference between pre- and post-CFM 50

Additional Information

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.

11.8.6 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. Visit the RTF webpage for more information.

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 and 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 and Best Practices Guide for other unique safety precautions when air sealing.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
End-user identifying information including unique site ID and address	X	X
Cost documentation	X	X
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

Deleted: Installed

Deleted: :¶
Equipment or contractor invoice showing:¶
Equipment order or purchase date¶
Installed cost

*Only in UES Measure Upload Template

Payment

See the UES Measure List for payment and busbar energy savings. 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.

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.

11.8.7 Door Sweep

Basis for Energy Savings

Installing a strip of flexible material at the bottom of an exterior door reduces air infiltration, saving energy by reducing heating and cooling losses by air sealing the gap under the door. Available for electrically-heated homes. Visit the RTF webpage for more information.

Requirements and Specifications

Pre-condition:

- No existing door sweep.

Post-condition:

Installed on a door opening from conditioned space to unconditioned space and fully covers gap between the bottom of the door and threshold and floor.

Door sweeps are available through the following channels:

- Direct Install: See section 6.2 Measure Distribution Channels, for "Direct Install" verification requirements.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**
See section 6.2 Measure Distribution Process for documentation requirements for each channel listed above.	*See section 6.2*	X

Deleted: *
Formatted: Font: Italic
Formatted: Thick underline
Formatted: Font: Italic
Formatted: Font: Italic
Deleted: Installed cost

Payment	
MEASURE CATEGORY	**DIRECT INSTALL**
Door Sweep	$25

Additional Information

"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.

11.9 Energy Efficiency Income Qualified Measures

Measures for income qualified homes include:

- Commercial HVAC for Multifamily Shared Common Areas (sections 8.4.2 – 8.4.4): Commercial Connected Thermostat, Commercial Ductless Heat Pump Retrofit and Upgrade, and Air-Source Heat Pump Retrofit and Upgrade;
- Consumer Products (section 11.2): Clothes Washer and Clothes Dryer;
- HPWHs (section 11.4.2 – 11.4.4);
- HVAC (section 11.5: Ductless Heat Pump, Ducted Non-Variable Speed and Variable-Speed Heat Pumps, PTHP, Prescriptive Duct Sealing, Duct Insulation, Line Voltage Thermostat, Contractor-Installed Smart Thermostat, and Communicating Line Voltage Thermostat); and
- Weatherization (section 11.8: Insulation, Prime Window and Patio Door, Low-E Storm Windows, Exterior Insulated Door, Whole House and Prescriptive Air Sealing, and Door Sweep).

Income Qualification Guidelines and Documentation

Household eligibility is based on gross income and is defined in the Federal Weatherization Assistance Program (WAP) as 200 percent of the federal poverty guideline levels. Alternatively, approved statewide or tribal eligibility definitions may substitute for federally established income qualified levels, if available.

For multifamily properties, qualified individual units may receive income qualified incentives. To income qualify the entire building or complex, 50 percent or more of the households must income-qualify. Utilities may set more stringent requirements at their discretion, however;

- Two-, three-, and four-unit dwellings: A minimum of 50 percent 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 percent of households.

For income eligibility, utility customers shall retain documentation of either of the following options:

- Proof or an attestation 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, which

Deleted: .;

Deleted: .;

Deleted: .;

Deleted: -unit

may include but is not limited to a pay stub, copies of IRS form 1040, section 8 eligibility, certification by a Community Action Agency (CAA), certification by a Low-Income Home Energy Assistance Program (LIHEAP) administrator, HUD eligibility, proof of current assistance from a state health and human services agency, current Temporary Assistance for Needy Families (TANF) benefits, or Supplemental Security Income (SSI). Customer utilities do not need to keep the "verifiable" documents on file for BPA review, only the proof or attestation that they have been reviewed.

- Proof that the end-user's signed self-attestation of income was reviewed: Self-attestation of income must be signed by the end-user. Suggested guidance on what information can be collected by utilities and CAAs is located on the optional Income Qualified Project Information and Income Verification Form.

Utility customers may use eligible income qualified measures to implement income qualified programs themselves through an implementation firm or Community Action Agency (CAA), but must retain responsibility for and control over the program.

Review the Energy Efficiency Income Qualified New Opportunities Guide listed on the Energy Efficiency Income Qualified webpage or the Income Qualified Resource Page for Utilities for more information. Utilities can use and customize the optional Income Qualified Project Information and Income Verification Form to help implement this program.

Basis for Energy Savings

Refer to individual corresponding non-income qualified measure sections for more information.

Requirements and Specifications

All existing housing types (single family, manufactured and multifamily) are eligible for income qualified measures although not all measures are applicable to each housing type. See the Income qualified 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 non-income qualified residential measure sections for qualifying heating system types, pre-qualification requirements, required installation specifications, QPLs, contractor certifications, documentation, and additional measure details. See the table of contents at the beginning of section 11. Residential Sector for additional reference.

Documentation Requirements		
Documentation Description	**Retention/Submittal Locations**	
	BEETS	**Customer File**

Proof or an attestation that the end user's income eligibility was reviewed from a verifiable source (e.g., paystub, section 8 voucher, etc.) or documentation that a self-attestations of income signed by the end-user was reviewed		X
Cost documentation showing: • Income qualified measure cost • Related repair cost (if applicable)	X	X
Reference the Documentation Requirements tables in the corresponding "non-income qualified" measure sections when claiming income qualified measures:	**Location in Implementation Manual**	
Clothes Washer – ENERGY STAR	11.2	
Clothes Dryer – ENERGY STAR or BPA Tiers 1 – 3	11.2	
Unitary Heat Pump Water Heater – 40 gallon	11.4.2	
Unitary Heat Pump Water Heater – 50 gallon and above	11.4.3	
Split-System Heat Pump Water Heater	11.4.4	
Ductless and Ducted Mini-Split Heat Pump	11.5.1	
Air-Source Heat Pump Conversion	11.5.2	
Air-Source Heat Pump Conversion to Variable-Speed Air-Source Heat Pump	11.5.3	
Variable-Speed Air-Source Heat Pump Upgrade	11.5.4	
Packaged Terminal Heat Pump	11.5.6	
Prescriptive Duct Sealing	11.5.8	
Duct Insulation	11.5.9	
Line Voltage Thermostat	11.6.1	
Communicating Line Voltage Thermostat	11.6.2	
Advanced Smart Thermostat (Direct-Installed)	11.6.3	
Insulation	11.8.1	
Prime Window or Patio Door Replacement	11.8.2	
Low-E Storm Windows	11.8.3	
Exterior Insulated Door	11.8.4	

Deleted: <#>Income Qualified measure cost¶
Repair cost (if applicable)

Deleted: <#>Equipment order or purchase date¶

Whole House Air Sealing and Testing	11.8.5
Prescriptive Air Sealing	11.8.6
Door Sweep	11.8.7
Commercial Connected Thermostat (Multifamily Shared Common Areas Only)	8.4.2
Commercial Ductless Heat Pump Retrofit and Upgrade (Multifamily Shared Common Areas Only)	8.4.3
Commercial Air-Source Heat Pump Retrofit and Upgrade (Multifamily Shared Common Areas Only)	8.4.4

Payment

Customers may combine funding sources within a residence, but may not combine funding from multiple BPA sources for the same measure installation.

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 percent of the actual cost. This includes any cost incurred for meeting requirements and specifications (e.g., equipment, labor, verification of income, attic and crawl space ventilation, removal of knob and tube wiring, and underfloor moisture barriers). For income-qualified measures, customers are required to provide detailed cost documentation for all claimed measure and repair costs at the time of application. Payment for income qualified measure costs will be limited to the lesser of documented measure costs or any applicable cost cap.

Commented [AB19]: Per Moody

Repair Costs:

- Additionally, customers may separately 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.
- Payment for repair costs will be limited to documented costs.
- For income qualified projects with a measure cost of $1,000 or higher, related repair costs will be paid for up to a limit of 300 percent of the reported income qualified measure cost.
- See the payment table to determine which income qualified measures are eligible for additional repair costs. See the Income Qualified Repair Cost Reference Table for more information on what are and are not allowed repair costs.

Commented [AB20]: Per Moody

Deleted: reimbursed

Full roof replacements, full roof tear-offs or extended equipment warranties are not eligible for payment within the income qualified payment cost cap or as a related repair cost.

Deleted: reimbursable

To determine accurate payment levels for income qualified weatherization measures, reference the Income Qualified Payment Table below. The UES Measure List and corresponding IM non-income qualified measure sections may not accurately reflect the overall per-unit payment totals for some income qualified weatherization measures. If invoicing BPA for income qualified weatherization measure payments, disregard the UES Measure List payment rates and instead reference the contractor invoice and report the total income qualified measure cost and total cost of eligible repairs.

Payment			
HOME TYPE	**Income Qualified measure**	**Measure Cost Payment**	**Repair Cost Examples provided**
Single family	Attic Insulation (up to R-49)	Dollar-for-dollar	Examples include repair of roof leak, rebuild of external entrance covering, and fixing 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 $45/sq. ft.	Examples include addressing dry rot in window framing, replacement of rotten threshold, and repair of cracked header.
	Patio Door	Dollar-for-dollar, not to exceed $45/sq. ft.	
	Low-E Storm Window	Dollar-for-dollar, not to exceed $10/sq. ft.	
	Exterior Insulated Door	Dollar-for-dollar, not to exceed $700/door	
	Whole House Air Sealing	Dollar-for-dollar	Examples include reframe of attic access hatch, repair of pull-down stairs, and install of whole-house ventilation fan.
	Prescriptive Air Sealing	Dollar-for-dollar	
	Door Sweep	Dollar-for-dollar, not to exceed $35	Not eligible.
	Clothes Washer – ENERGY STAR Front Load or Top Load	Dollar for-dollar, not-to-exceed $800	Not eligible.
	Clothes Dryer – ENERGY STAR or BPA Tiers 1 – 3	Dollar for-dollar, not-to-exceed $800	Not eligible.

Deleted: reimbursement

Deleted: QUALIFYING

Deleted: Installed

Deleted: dollar-for-dollar (except as noted)

Commented [AB21]: Link to IQ Repair Cost: Repair-Cost-Reference-Table.pdf

Deleted: Payment dollar-for-dollar (e

Deleted:)

Deleted: No repair costs allowed for this measure

Deleted: No repair costs allowed for this measure.

Deleted: No repair costs allowed for this measure.

	Unitary HPWH - 40 gallon	Dollar-for-dollar, not to exceed $2,800	Examples include replacement of plumbing connections at water heater, relocating to ensure adequate ventilation.
	Unitary HPWH – 50 gallon and above – Tiers 3 and 4	Dollar-for-dollar, not to exceed $3,000	
	Split-System HPWH	Dollar-for-dollar, not to exceed $3,000	
	Ductless or Ducted Mini-Split Heat Pump(s) or Ductless Heat Pump (DHP) Conversion	Dollar-for-dollar, not to exceed $6,000/DHP	Examples include improvement of structural support for interior head or repair to damaged siding at connection point.
	Ducted Air Source Heat Pump Conversion (non-Variable Speed)	Dollar-for-dollar, not to exceed $9,000	Examples include repair to damaged siding at connection point.
Single family	Ducted Variable-Speed Heat Pump Conversion or Upgrade	Dollar-for-dollar, not to exceed $9,000	Examples include repair to damaged siding at connection point.
	Prescriptive Duct Sealing	Dollar-for-dollar, not to exceed $750	Examples include replacement of rusted duct work and repair broken filter slot.
	Duct Insulation	Dollar-for-dollar	Examples include replacement of severely rusted, corroded, or disconnected ductwork.
	Line-Voltage Thermostat	Dollar-for-dollar, not to exceed $85	Not eligible.
	Communicating Line Voltage Thermostat	Dollar-for-dollar, not to exceed $225	

Deleted: No repair costs allowed for these measures.

	Advanced Smart Thermostat (Direct-Installed)	Dollar-for-dollar, not to exceed $400	
Multifamily Low-Rise	Attic Insulation (up to R-49)	Dollar-for-dollar	Examples include repair of roof leak, rebuild of external entrance covering, and fixing 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 $45/sq. ft.	Examples include addressing dry rot in window framing, replacement of rotten threshold and repair of cracked header.
	Patio Door	Dollar-for-dollar, not to exceed $45/sq. ft.	
	Low-E Storm Window	Dollar-for-dollar, not to exceed $10/sq. ft.	
	Exterior Insulated Door	Dollar-for-dollar, not to exceed $700/door	
	Door Sweep	Dollar-for-dollar, not to exceed $35	Not eligible.
	Clothes Washer – ENERGY STAR	Dollar for-dollar, not-to-exceed $800	Not eligible.
	Clothes Dryer – ENERGY STAR or BPA Tiers 1 – 3	Dollar for-dollar, not-to-exceed $800	
	Unitary HPWH - 40 gallon	Dollar-for-dollar, not to exceed $2,800	Examples include replacement of plumbing connections at water heater, relocating to ensure adequate ventilation.
	Unitary HPWH – 50 gallon and above – Tiers 3 and 4	Dollar-for-dollar, not to exceed $3,000	
	Split-System HPWH	Dollar-for-dollar, not to exceed $3,000	
	Ductless or Ducted Mini-Split Heat Pump(s) or Ductless Heat Pump (DHP) Conversion (Zonal Electric Heat Pre-Condition)	Dollar-for-dollar, not to exceed $6,000	Examples include improvement of structural support for interior head or repair to damaged

Deleted: No repair costs allowed for this measure.

Deleted: No repair costs allowed for these measures.

			siding at connection point.
Multifamily Low-Rise	Residential PTHP	Dollar-for-dollar, not to exceed $1,600	Examples include improvement of structural support for interior unit or repair to damaged siding at connection point.
	Line Voltage Thermostat	Dollar-for-dollar, not to exceed $85	Not eligible.
	Communicating Line Voltage Thermostat	Dollar-for-dollar, not to exceed $225	
	Advanced Smart Thermostat (Direct-Installed)	Dollar-for-dollar, not to exceed $400	
	Commercial Connected Thermostat (Multifamily Shared Common Areas Only)	Dollar-for-dollar, not to exceed $400	Not eligible.
	Commercial Ductless Heat Pump Retrofit and Upgrade (Retrofit Multifamily Shared Common Areas Only)	Dollar-for-dollar, not to exceed $2,000/ton	Examples include improvement of structural support for interior head.
	Commercial Air-Source Heat Pump Retrofit and Upgrade (Retrofit Multifamily Shared Common Areas Only)	Dollar-for-dollar, not to exceed $1,400/ton	Examples include repair to damaged siding at connection point.
Multifamily Mid- or High-Rise	Attic Insulation (up to R-49)	Dollar-for-dollar	Examples include repair of roof leak, rebuild of external entrance covering, and fixing hole in siding.
	Wall Insulation (up to R-19)	Dollar-for-dollar	
	Prime Window	Dollar-for-dollar, not to exceed $45/sq. ft.	Examples include addressing dry rot in window framing, replacement of rotten threshold,
	Patio Door	Dollar-for-dollar, not to exceed $45/sq. ft.	

Deleted: No repair costs allowed for these measures.

Deleted: No repair costs allowed for this measure.

			and repair to cracked header.
	Door Sweep	Dollar-for-dollar, not to exceed $35	Not eligible.
	Clothes Washer – ENERGY STAR	Dollar for-dollar, not-to-exceed $800	Not eligible.
	Clothes Dryer – ENERGY STAR or BPA Tiers 1 – 3	Dollar for-dollar, not-to-exceed $800	
	Unitary HPWH - 40 gallon	Dollar-for-dollar, not to exceed $2,800	Examples include replacement of plumbing connections at water heater, relocating to ensure adequate ventilation.
	Unitary HPWH – 50 gallon and above – Tiers 3 and 4	Dollar-for-dollar, not to exceed $3,000	
	Split-System HPWH	Dollar-for-dollar, not to exceed $3,000	
Multifamily Mid- or High-Rise	Ductless or Ducted Mini-Split Heat Pump(s) or Ductless Heat Pump (DHP) Conversion (Zonal Electric Heat Pre-Condition)	Dollar-for-dollar, not to exceed $6,000	Examples include improvement of structural support for interior head or repair to damaged siding at connection point.
	Residential PTHP	Dollar-for-dollar, not to exceed $1,600	Examples include improvement of structural support for interior unit or repair to damaged siding at connection point.
	Line Voltage Thermostat	Dollar-for-dollar, not to exceed $85	Not eligible.
	Communicating Line Voltage Thermostat	Dollar-for-dollar, not to exceed $400	
	Advanced Smart Thermostat (Direct-Installed)	Dollar-for-dollar, not to exceed $400	

Deleted: No repair costs allowed for this measure.

Deleted: No repair costs allowed for these measures.

Deleted: No repair costs allowed for these measures.

	Commercial Connected Thermostat (Multifamily Shared Common Areas Only)	Dollar-for-dollar, not to exceed $400	Not eligible.
	Commercial Ductless Heat Pump Retrofit and Upgrade (Retrofit Multifamily Shared Common Areas Only)	Dollar-for-dollar, not to exceed $2,000/ton	Examples include improvement of structural support for interior head.
	Commercial Air-Source Heat Pump Retrofit and Upgrade (Retrofit Multifamily Shared Common Areas Only)	Dollar-for-dollar, not to exceed $1,400/ton	Examples include repair to damaged siding at connection point.
Manufactured	Attic Insulation (up to R-30)	Dollar-for-dollar	Examples include repair of roof leak, rebuild of external entrance covering.
	Floor Insulation (up to R-22)	Dollar-for-dollar	
	Prime Window	Dollar-for-dollar, not to exceed $45/sq. ft.	Examples include addressing dry rot in window framing, replacement of rotten threshold, and repair to cracked header.
	Patio Door	Dollar-for-dollar, not to exceed $45/sq. ft.	
	Low-E Storm Window	Dollar-for-dollar, not to exceed $10/sq. ft.	
	Exterior Insulated Door	Dollar-for-dollar, not to exceed $700/door	
	Whole House Air Sealing	Dollar-for-dollar	Examples include install of whole house ventilation fan.
	Door Sweep	Dollar-for-dollar, not to exceed $35	Not eligible.
Manufactured	Clothes Washer – ENERGY STAR Front Load or Top Load	Dollar for-dollar, not-to-exceed $800	Not eligible.
	Clothes Dryer – ENERGY STAR or BPA Tiers 1 – 3	Dollar for-dollar, not-to-exceed $800	
	Unitary HPWH - 40 gallon	Dollar-for-dollar, not to exceed $2,800	Examples include replacement of

Deleted: No repair costs allowed for this measure.

Deleted: No repair costs allowed for this measure.

Deleted: No repair costs allowed for these measures.

	Unitary HPWH – 50 gallon and above – Tiers 3 and 4	Dollar-for-dollar, not to exceed $3,000	plumbing connections at water heater or relocating to ensure adequate ventilation.
	Split-System HPWH	Dollar-for-dollar, not to exceed $3,000	
	Ductless or Ducted Mini-Split Heat Pump(s) or Ductless Heat Pump Conversion	Dollar-for-dollar, not to exceed $6,000/DHP	Examples include improvement of structural support for interior head or repair to damaged siding at connection point.
	Ducted Heat Pump Conversion (Non-Variable Speed)	Dollar-for-dollar, not to exceed $9,000	Examples include repair to damaged siding at connection point, replacement of circuit breaker.
	Ducted Variable-Speed Heat Pump Conversion or Upgrade	Dollar-for-dollar, not to exceed $9,000	Examples include repair to damaged siding at connection point, replacement of circuit breaker.
	Prescriptive Duct Sealing	Dollar-for-dollar, not to exceed $750	Examples include replacement of rusted ductwork and repair of broken filter slot.
	Communicating Line Voltage Thermostat	Dollar-for-dollar, not to exceed $225	No repair costs allowed for these measures.
	Advanced Smart Thermostat (Direct-Installed)	Dollar-for-dollar, not to exceed $400	

11.10 Behavioral

11.10.1 Behavioral Home Energy Reports (BPA-Qualified)

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 behavioral home energy report programs. BPA documentation requirements consider these factors.

Requirements and Specifications

Behavioral Home Energy Reports must include:

- Seasonal household energy consumption information,
- A normative comparison of household energy consumption to similar households, and
- 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 will 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.

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 PCS Request and Acknowledgment Procedure.

Documentation Requirements

Utilities must provide the following documentation:

- A sample copy or redacted version (to protect personally identifiable information) of a Behavioral Home Energy Report that is sent to end-use customers. Utility will provide sample report to BPA Programs Team at the beginning of a utility program year.
- Summary energy saving reports (of the Behavioral Home Energy Report program) that are provided to utilities by qualified third-party vendors. All reports must be provided when the utility invoices BPA at the conclusion of the program year.
- All third-party vendor invoice(s) for the cohort/program year in order to receive payment from BPA.

Documentation Description	Retention/Submittal Locations

	BEETS	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). This is sent to BPA Programs at the beginning of a utility Behavior Home Energy Report Program.		X
Cost documentation - all vendor invoices showing: • Service period for Behavioral Home Energy Report delivery • Total cost of Behavioral Home Energy Report delivery	X	X

Deleted: A

Formatted: List Paragraph, Space After: 0 pt, Line spacing: single, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5"

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	
	First program year	Second program year and beyond
Behavioral Home Energy Reports – Paper	$14 per household	$7 per household
Behavioral Home Energy Reports – Digital	$12 per household	$5 per household

Additional Information

Utilities deciding to implement Behavioral Home Energy Reports for the first time are encouraged to contact BPA EERs or BPA Program Staff with questions or for assistance.

11.11 Residential Custom Projects

Requirements and Specifications

Residential custom projects may be submitted using the custom projects process.

Documentation Requirements

See the section 4.6 Custom Projects Documentation Requirements.

Payment

See the section 4.1 Custom Projects Payment Table.

BPA allows for multifamily new construction custom projects for single systems only. 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.

Section 12. Utility Distribution Sector

Revisions to measures in this sector are listed in the changes and corrections summary in Appendix B.

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. Most of the savings from VO projects occur at retail loads. Some retail load equipment saves more than others; motors without 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 EER.

Utility Distribution Measures		
Measure	**UTILITY REPORTING METHOD**	
	CUSTOM PROJECT PROGRAM (OPTION 1 OR OPTION 2)	**RE-CONDUCTOR and 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 Distribution 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.

BPA developed the Simplified Voltage Optimization 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 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 (4-19 year measure life)	$0.33 per kWh or 70% of project cost
Utility Distribution Custom Project Program (20+ year measure life)	$0.38 per kWh or 70% of project cost

12.2 Re-Conductor and Transformer (RT) Program

Basis for Energy Savings

Utility system improvements can reduce energy use in the electrical distribution system. The Re-Conductor and 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 Calculator. Customers will upload the RT Calculator and project cost documentation (e.g., receipts) for each measure into 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**	
	BEETS	**Customer File**
Completed Re-Conductor and Transformer Calculator	X	X
Cost documentation per measure	X	X
Loss-test reports (transformer projects only) for existing and proposed systems	X	X

Deleted: Project cost (e.g., receipts)

Payment	
MEASURE CATEGORY	**PAYMENT**
Re-Conductor and Transformer Program (4-19 year measure life)	$0.33 per kWh or 70% of project cost
Re-Conductor and Transformer Program (20+ year measure life)	$0.38 per kWh or 70% of project cost

Appendix A. Definitions and Acronyms

Definitions and Acronyms	
ADU	Accessory Dwelling Units: Defined by local permitting authorities. BPA requires, at minimum, that they are structures built for housing residency that include heating and plumbing systems.
Agent	A person or entity designated to work on behalf of the customer utility.
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 sector's 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 carryover 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 UES measures that are currently active on the BPA UES Measure List. (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.)
BEETS	BPA Energy Efficiency Tracking System: The reporting system established by BPA 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 pays 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.
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 and is reflected in the current BPA UES Measures List. For site-specific calculators, the site-to-busbar savings factor currently in use is 1.11183 with the exception of all current versions of the BPA lighting calculator (see 8.3.1 Lighting Calculators) which use 1.10816. 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 carryover 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 UES and site-specific calculated measures, Completion Date is determined by the utility and is defined as one of the following: A date within 6 months of equipment purchase; or A date within 6 months of the measure installation; or 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.). For Option 1 custom projects and measures that follow a similar process, Completion Date is defined as the date that a PCS approves the Custom Project Completion Report. For Option 2 custom projects, Completion Date is defined as the date identified in the customer's approved M&V 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 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.
Cost Documentation	Documentation that reflects eligible project costs incurred to implement the project. Please reference the "UES Cost Documentation FAQ" located in the IM Document Library for more detail.

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 M&V plan.
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 was changed 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 HPWH, 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 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 PCS (PCS)—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 PCS 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.
Evaluation	Evaluation involves real-time and/or retrospective assessments of the performance and implementation of a program or measure.
FY	Fiscal Year: 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.

hp	Horsepower: 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, 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 ECA. Referred to as "bilateral transfer" in the prior IM.
Implementation Period	The period of time covered by a customer's ECA.
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.
Income Qualified	Income qualified household eligibility is defined in the Federal Weatherization Assistance Program as 200% of poverty income levels. Approved statewide definitions substitute for federally established, income qualified levels, if provided.

Commented [AB1]: Moved this up in order - no change to content, just that it was in the wrong spot.

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.
LEPA	Low Energy Precision Application: 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 Spray Application: A type of sprinkler application for center-pivot and lateral-move irrigation systems that places the sprinkler within three 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 (e.g., administrative changes (i.e., 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.
M&V	Measurement and Verification: The process for quantifying savings delivered by an 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

Deleted: Income Qualified

Deleted: Income qualified household eligibility is defined in the Federal Weatherization Assistance Program as 200% of poverty income levels. Approved statewide definitions substitute for federally established, income qualified levels, if provided.

	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 11.7.1) if the occupant is the first home occupant.
Market Transformation	Working in a market to improve products and behaviors. For example, BPA collaborates NEEA for the achievement of market transformation, which entails working with manufacturers.
MBH	Thousand BTUs per hour: MBH is a unit of measurement equivalent to 1,000 BTU per hour and is used to calculate the heating/cooling capacity of air conditioning and refrigeration equipment.
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. 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 M&V 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 NWPCC 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

	ESI Program, "system" may be a whole facility or a subsystem within an industrial facility.
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: One megawatt over the period of one 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 NWPCC 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.
PCS	Program Compliance Specialist: A BPA employee that reviews utility applications and conducts oversight to ensure submissions comply with program requirements

PEI	Pump Energy Index: It is defined in US DOE standards for clean water pump efficiency.
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 BEETS in effect.
Project Start Date	The date equipment was ordered, purchased or installed, as determined by the reporting utility.
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 SEM projects. It is also used to track any number of key variables to develop a meaningful, normalized energy use profile.
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 SEM 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 BPA Commercial & Industrial SEM M&V Reference Guide.
SEEM	Simplified Energy Enthalpy Model: A tool used by the RTF to model residential building energy use.

SEER	Seasonal Energy Efficiency Ratio: 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. SEM may include organizational training, technical support for operations and maintenance improvements, energy monitoring and reporting tools.
Single family	Fewer than five dwelling units within the same structure, including duplexes, triplexes, ADUs, and modular homes. Houses that share walls, but do not share doors, windows, or other provisions for human passage or visibility and do not vertically overlap, may be considered single family, regardless of the number of units connected side-by-side. ADUs 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.

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.
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.
UCOG	U-factor: This is the U-factor as measured at Center of Glass, excluding other components of the fenestration product. Fenestration products may have multiple U-factor ratings and this is one.
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
Unassigned Account	The repository for unallocated funds and returned EEI funds.
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 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 Refrigerant 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 SEM 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 measurable energy savings through low-cost operations and maintenance improvements.
Whole Building Construction Cost	As-built contracted cost including labor, design, M&V, and 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 (e.g., wall, toe-kick, ceiling and exhaust fan combinations), electric baseboard, portable (i.e., plug-in) electric-resistance heaters, and electric boiler/hot water (e.g., zonal electric hydronic) radiant systems.