2017-2019

Implementation Manual

This document is available online at www.bpa.gov/Energy/N/implementation.cfm.
Measure information effective April 1, 2019

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Changes and Corrections Summary for the 2019 Implementation Manual

The following changes are effective April. 1, 2019

EFFECTIVE DATE (POSTED DATE)	LOCATION	DESCRIPTION	RATIONALE
General			
April 2019	0.0	Page XIV Rate Period Implementation Manual Revision Timeline: The deadline for external feedback is now May 24, 2019	This deadline better aligns with the 2020-2021 Implementation Manual development timeline.
Agricultural Sector			
April 2019	6.3.1	Irrigation System Upgrades: equipment/ contractor invoices will no longer be required to list manufacturer, model number, or size of equipment/product installed. Type, quantity, cost, and order/purchase date are still required.	These data are not required to verify savings.
Commercial Sector			
April 2019	7.3	Nonresidential Lighting. References to payments have been updated throughout the section to reflect LC 4.0 and LC 5.0 payments.	Updated payment language to reflect current offerings.
April 2019	7.3	Nonresidential Lighting. *The section titled Lighting Calculator 4.0 was changed to Lighting Calculator 4.0 and 5.0 *Each Lighting Calculator 4.0 reference in this section was changed to 'Lighting Calculator 4.0 and 5.0'.	Lighting Calculator 4.0 and 5.0 share the same implementation requirements.
April 2019	7.3	Nonresidential Lighting. Calculator Effective Date/Retirement Date table updated as follows: LC 4.0 retirement date updated from 'TBD' to 'Dec. 31, 2019'. Added new calculator; LC 5.0, which will have an effective of April 1, 2019 and a planned retirement date of December 31, 2021. The table has been clarified that the expiration dates are planned.	Updated lighting calculator table to reflect current offering, including Effective dates and Planned Retirement dates.
April 2019	7.3	Nonresidential Lighting. Remove sentence that "Square footage figures for...new construction projects must be entered into Lighting Calculator 4.0".	LC 4.0 does not use square footage to calculate savings; this change reflects the functionality of the LC 4.0.

EFFECTIVE DATE (POSTED DATE)	LOCATION	DESCRIPTION	RATIONALE
Residential Sector			
April 2019	10.8.2	Residential Smart Thermostats. Removed requirement to collect the project information form when a smart thermostat is installed through a utility retail program including: a. Utility created kits provided to a customer b. Kits (including those fulfilled through Simple Steps) c. Customer receives an instant rebate through a coupon provided physically or digitally by their utility d. Through a traditional retail program (such as Simple Steps or other similar program) e. Through a utility run retail program (such as over the counter sales from utility facilities). BPA will still require the project information form if installed through other channels.	The information collected in the Smart Thermostat Project Information form is necessary for evaluation of the measure. However, collection of the data creates a significant obstacle to utility retail offerings. We are removing the form requirement for a subset of installation types to facilitate utility use of the measure.
April 2019	10.10.4	Exterior Insulated Doors (BPA-Qualified). BPA requires that documentation of the doors replaced and pre- and post- conditions be kept in the customer file.	Retroactive to October 1, 2018. BPA corrected the Required Documentation Table to clarify program requirements. This change was made in the October 2018 IM update but was not noticed at the time.
April 2019	10.10.7	Low-Income Weatherization, Ductless Heat Pumps and Duct Sealing. Home Type ""Manufactured"" was omitted in the Payment Table during the last Implementation Manual update. BPA is correcting the table to reflect measures and payments that are available in manufactured homes.	BPA is correcting the Payment Table to provide clarity and outline low-income measures and corresponding payments that are available for manufactured homes.
New Measures Section			
April 2019	13.2.1-3	VFD measures that use a deemed savings tool must submit the pump curve (available from pump manufacturer) to EE Docs and save it in the customer file.	This is already a requirement, as the deemed savings tool requires the pump curve. This correction prevents confusion.
April 2019	13.2.1.4	13.2.1.4 Thermostatically Controlled Outlets - Requirements corrected to remove language that belongs in the Basis for Energy Savings. This correction is retroactive to October 2018.	BPA will not be verifying the pre-condition for this measure.
April 2019	13.2.1.5	13.2.1.5 Themostatically Controlled Stock Tank Deicers - this section corrected to move some requirements to Basis for Savings. This correction is retroactive to October 2018.	BPA will not be verifying precondition.
April 2019	13.2.1.6	New Measure: Sprinkler Package Replacements for center pivots or linear move systems.	At the March 28, 2018 RTF meeting, the RTF approved significant updates to the Irrigation Hardware UES measure savings methodology, measure applications, savings, and costs. These changes, outlined in an RTF memo dated April 25, 2018, affected savings for most irrigation hardware measures.

EFFECTIVE DATE (POSTED DATE)	LOCATION	DESCRIPTION	RATIONALE
April 2019	13.2.1.7	New Measure: Irrigation System Conversion to LESA/LEPA/MDI Upgrade for center pivots or linear move irrigation systems.	At the March 28, 2018 RTF meeting, the RTF approved significant updates to the Irrigation Hardware UES measure savings methodology, measure applications, savings, and costs. These changes, outlined in an RTF memo dated April 25, 2018, affected savings for most irrigation hardware measures.
April 2019	13.2.1.8	New Measure: Irrigation System Conversion to MESA for high pressure center pivots or high pressure linear move systems.	At the March 28, 2018 RTF meeting, the RTF approved significant updates to the Irrigation Hardware UES measure savings methodology, measure applications, savings, and costs. These changes, outlined in an RTF memo dated April 25, 2018, affected savings for most irrigation hardware measures.
April 2019	13.2.1.9	New Measure: Tower/Span/Pivot Flex Gasket Replacement for center pivots or linear move systems.	At the March 28, 2018 RTF meeting, the RTF approved significant updates to the Irrigation Hardware UES measure savings methodology, measure applications, savings, and costs. These changes, outlined in an RTF memo dated April 25, 2018, affected savings for most irrigation hardware measures.
April 2019	13.2.3.4	Aerators. BPA is adding a new measure for faucet aerators, available April 1, 2019.	New measure
April 2019	13.2.3.5	Residential Load Sensing Advanced Power Strips. BPA is adding a new measure for Load Sensing Advanced Power Strips for Home Entertainment Centers, available April 1, 2019.	New measure
April 2019	13.2.3.6	Energy Saver Kits. BPA is adding new measures for bundled kits, available April 1, 2019.	New measure to provide more kit options to our customers.

Rate Period Implementation Manual Revision Timeline

MILESTONE	DUE DATE
Publish IM corrections, new measures, optional calculators, and removal of requirements.	April 1, 2018
Publish IM corrections, new measures, optional calculators, and removal of requirements.	October 1, 2018
Publish 6-month notice of changes to existing measures and list of new measures.	April 1, 2019
Publish draft IM for internal and external review.	May 13, 2019
All internal and external feedback due.	May 24, 2019
Publish IM and UES Measure List.	August 23, 2019
IM and UES Measure List effective.	October 1, 2019

[1] This column will be updated to reflect the dates of the upcoming publication. If the static due date falls on a weekend or holiday, the actual due date will be the following business day.

Definitions

DEFINITIONS AND ACRONYMS	
AHRI	Air-Conditioning Heating and Refrigeration Institute is 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 1 year – 8,760,000 kilowatt-hours per year.
ANSI	American National Standards Institute administers, coordinates and promotes the United States public sectors' cooperative efforts to develop a consensus of standards and conformity assessment systems. ANSI accreditation signifies the procedures used by the standards' body — in connection with the development of American National Standards — meet the Institute's essential requirements for openness, balance, consensus and due process.
Available Implementation Budget	The amount available for BPA to purchase energy savings from a specific program participant at a given point in time, equal to the program participant's initial implementation budget, plus any applicable rollover amount, plus or minus any applicable implementation budget transfers, minus any applicable approved invoice payment amounts, as defined in the ECA.
B/C	The B/C ratio equals the total benefits over the life of the project, divided by the installation costs.
Basis for Energy Savings	Detail of inputs, interactive effects and analysis to describe how the energy efficiency savings is estimated for Unit Energy Savings (UES) measures that are currently active on the BPA UES Measure List. (Note: Measures on the BPA Measure List may not yet reflect updated savings and assumptions from the RTF, due to our notice requirements. They are provided to help readers understand how savings for UES measures are estimated or modeled. The Basis of Energy Savings supports, but does not replace or supersede, the BPA Requirements and Specifications.)
Bilateral Transfer	The transfer of implementation budget between customers.
BPA	Bonneville Power Administration is a non-profit 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 non-RTF approved measure that BPA is collecting data and performing analysis on, with the eventual goal of securing RTF approval.
BPA Willingness to Pay	The maximum amount BPA will pay for a measure.
BTU	British thermal unit: A unit of energy equal to about 1055 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. The site energy savings, plus any transmission and distribution losses, that would have occurred had the energy been generated. The site and busbar relationship depends upon the particular measure being implemented and its associated load shape. For UES Measures, the site-to-busbar savings factor varies by measure. For site-specific calculators, the site-to-busbar savings factor currently in use is 1.09056. BPA provides payment for energy savings calculated from the busbar.
CEE	Consortium for Energy Efficiency is 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.

DEFINITIONS AND ACRONYMS	
CBSA	Commercial Building Stock Assessment is 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.
Completed Unit	Properly installed and operating measures that have met the specifications and requirements set forth in the IM.
Conditioned Space (Residential)	Any residential building cavity or space that is directly heated and/or cooled by an HVAC system that provides conditioned air. It is typically a space inside the residence's thermal shell.
Conservation	Any reduction in electric power consumption as a result of increases in the efficiency of energy use, production or distribution, as defined in section 3(3) of the Northwest Power Act, and includes actual and planned conservation, as defined in the ECA.
COTR	Contracting Officer's Technical Representative
Customer	A utility or other regional entity that purchases power from BPA.
Custom Program	Energy-savings work performed under the IM's Custom Program section.
Custom Project	Energy-savings work performed under the IM's Custom Project section.
Custom Project Completion Report	A document submitted at the completion of a custom project (under Custom Project Process, Option 1) that includes information on project costs, verified energy savings, and information on changes to the approved measurement and verification (M&V) plan.
Custom Project Proposal	A proposal for energy savings work made under the IM's Custom Project section (under Custom Project Process, Option 1).
CZ	Cooling Zone
Deemed Measure	This definition has been changed to Unit Energy Savings (UES). Please see the definition below.
Desuperheater	A heat exchanger inside the geothermal heat pump that heats the home's hot water (this is in addition to water being heated with the home's hot water heater). The desuperheater, like a heat pump water heater, reduces the energy used to heat water.
DHP	Ductless Heat Pump – a UES measure performed under the IM's Commercial and Residential sections.
Dollar-for-Dollar Payment up to	A payment for the total cost of the installed measure, as long as the cost is less than the indicated cap.
DSM	Demand-Side Management, the strategies that focus on influencing when and how customers use electricity, with an emphasis on reducing or leveling load peaks, such as 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., is 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
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

DEFINITIONS AND ACRONYMS	
EM&V	Evaluation, measurement and verification
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 Program Manager, which is a component of the Energy Smart Industrial Program. It can be an end-user employee or contractor who manages energy efficiency custom projects at an industrial facility.
ESI	Energy Smart Industrial – BPA's regional industrial program. Customers enroll via the COTR Request and Acknowledgment procedure, as outlined in the IM's Multisector section.
ESIP	Energy Smart Industrial Partner, a technical expert assigned to participating customers who is the single point-of-contact for coordinating ESI components and resources. They also assist with the development and implementation of industrial projects.
ESUE	Energy Smart Utility Efficiency program includes voltage optimization, a technique that improves the efficiency of the electrical grid by reducing voltage on the feeder lines running from substations to retail loads; and electrical distribution system improvements, which improve energy efficiency of the overall electrical distribution system.
Evaluation	Evaluation involves real-time and/or retrospective assessments of the performance and implementation of a program or measure.
Fiscal Year (FY)	BPA's fiscal year is from October 1 through September 30.
Fuel Switching	As determined by BPA, it is the switching from electric to nonelectric. Fuel switching is not eligible under BPA programs.
GPM	Gallons per minute, as in the flow-rate of showerheads.
HDD	Heating degree days – a measurement designed to reflect the demand for energy needed to prevent agricultural livestock watering tanks and fountains from freezing. It is derived from measurements of outside air temperature.
Horsepower (hp)	A unit of power measurement, 1 hp = 746 watts of electrical power.
HP	Heat pump
HPWH	Heat pump water heater – a water heater manufactured with an integrated heat pump that heats water by transferring heat from ambient air via a refrigeration cycle. It does not include add-on units that modify an existing water heater.
HSPF	Heating seasonal performance factor – an air source heat pump efficiency term. HSPF is specifically used to measure the efficiency of air source heat pumps. The higher the HSPF, the higher the efficiency.
HVAC	Heating, ventilation and air conditioning
HZ	Heating zone
Implementation Period	The period of time covered by a customer's Energy Conservation Agreement.

DEFINITIONS AND ACRONYMS	
Improper Payment	Congress has defined an "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 and recover an improper payment.
Incremental Cost	Energy efficiency costs for work beyond that required by standard practice or code (may be the full cost of measures, especially in retrofit situations).
Initial Implementation Budget	The portion of an EEI established by BPA and effective at the beginning of a rate period to purchase energy savings from a specific program participant during that rate period, as defined in the ECA.
Invoice	A report of measures claimed and/or savings achieved under the IM. It may or may not include a request for payment.
kW	Kilowatt – 1,000 watts (units of electric power)
kWh	Kilowatt-hour –1,000 watts of electric power supplied to or taken from an electric circuit over 1 hour.
LED	Light-emitting diode
LEPA	Low-Energy Precision Agriculture – The low-energy precision agriculture for center pivot and linear move irrigation systems use hoses that drag on the surface of the soil. This application reduces water evaporation, can provide more uniform water application, lower pressure requirements and reduce energy use.
LESA	Low-Elevation Sprinkler Application – The low-elevation sprinkler application for center pivot and lateral move irrigation systems place the sprinkler within three feet of the soil surface.
Limited Changes	A limited change refers to a type of correction made to Energy Efficiency's programmatic forms and calculators. These are changes that do not affect payment, savings, or requirements. Examples include: administrative changes (e.g., language corrections, minor edits, fixing typos) and BPA's Energy Efficiency Management Team-approved changes. Such edits to the applicable documentation can be made at any time.
Low-Income	Low-income household eligibility is defined in the Federal Weatherization Assistance Program as 200 percent of poverty income levels. Approved statewide definitions substitute for federally established, low-income levels, if provided.
M&V	Measurement and verification – the process for quantifying savings delivered by an energy conservation measure (ECM) to demonstrate how much energy use was avoided. It enables the savings to be isolated and fairly evaluated.
Major Renovation	A renovation to an existing structure that requires a building permit, and where multiple systems are impacted while a structure is repurposed, expanded or repositioned.
Manufactured Home	A dwelling that is transportable in one or more sections, is built on a permanent chassis (with or without a permanent foundation), and its wheels are removed when it is set up on-site. This definition does not include travel trailers or park models. Homes manufactured after 1983 must be constructed to the U.S. Department of Housing and Urban Development code.
Market Transformation	Working in a market to improve products and behaviors. For example, BPA collaborates with the Northwest Energy Efficiency Alliance (NEEA) for the achievement of market transformation, which entails working with manufacturers.

DEFINITIONS AND ACRONYMS	
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 measurement and verification for projects in which the payment is established by the energy savings achieved.
Modular Home	A sectional, factory-built dwelling in the single-family home category, which is designed to be transported to the building site and affixed to a permanent foundation, with no chassis.
Momentum Savings	Cost-effective energy savings resulting from energy efficiency measures, which are above the Northwest Power and Conservation Council baseline and are not included in program savings.
MT&R	Monitoring, targeting and reporting, a technique (based on statistical process control) to monitor and control a system. For the purpose of the Energy Smart Industrial Program, "system" may be a whole facility or a subsystem within an industrial facility.
Multifamily Low-Rise	Five or more dwelling units within the same structure and no more than three stories high.
Multifamily Mid/High-Rise	Five or more dwelling units within the same structure and more than three stories high.
MW	Megawatt – 1,000,000 watts (units of electric power).
MWh	Megawatt-hour – 1 megawatt over the period of 1 hour.
NEEA	Northwest Energy Efficiency Alliance – an alliance of more than 140 Northwest utilities and energy efficiency organizations working on behalf of more than 13 million energy consumers. NEEA works to mobilize the market to view energy efficiency as the most cost-effective way to meet the region's future energy needs. Through collaboration and pooling of resources, the region's utilities and stakeholders have harnessed their collective influence to drive market adoption of energy efficiency products, services and practices for the benefit of utilities, consumers and the region.
NFRC	National Fenestration Rating Council – a non-profit 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 non-profit entity authorized through the Northwest Power Act to develop and maintain a regional Power Plan, and a Fish and Wildlife program, to balance the Northwest's environmental and energy needs. The Council develops a 20-year, regional Power Plan that has been updated five times. BPA adjusts its energy savings targets based on its current Power Plan. Also known as "the Council."
Oversight	A contract management activity, designed to ensure that the government is getting what it pays for with some level of certainty.
Payment	A term representing monetary incentive levels for the installation of energy efficiency measures.
Performance Payment	The application of funds to cover internal customer administrative costs incurred in support of energy-savings activities described in this IM. All performance payments are intended to help cover the customer expenses associated with achieving conservation savings. This includes 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 percent 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.

DEFINITIONS AND ACRONYMS	
PTCS®	Performance Tested Comfort Systems (a certification for duct sealing and heat pump commissioning).
PTCS Commissioning, Controls and Sizing	Refers to the PTCS installation procedures of commissioning an air source heat pump or a variable speed heat pump. It guides the proper sizing of the unit, the refrigerant charge, the control of auxiliary heat, thermostat and air flow to ensure that the system is installed to operate efficiently. Also refers to the PTCS Commissioning, Controls and Sizing measure (CC&S), which includes heat pumps that meet federal minimum standards, but not the other remaining PTCS air source heat pump efficiency requirements. See PTCS in the Residential Section.
PTS	Performance Tracking System, an online tracking of real-time energy use (kW) to document the baseline and post tune-up energy use for ESI Program's Strategic Energy Management projects. It is also used to track any number of key variables in order 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 or disapproved for a BPA payment. For example, the commercial and residential Ductless Heat Pumps (DHP) measure uses 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 Northwest Power and Conservation Council.
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 – It 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 Homes standards.
Retail Program Delivery Mechanisms	Residential retail delivery mechanisms/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/upstream programs where site information (i.e., 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. This tool is used by the Simple Steps, Smart Savings program and is available from an Energy Efficiency Representative (EER).
ROC	Refrigerator Operator Coaching – an Industrial Strategic Energy Management feature that provides classroom and webinar training, and on-site technical support. ROC is designed to help industrial sites with ammonia refrigeration systems general electrical energy savings, while getting the most out of their systems. The energy savings are calculated by site-specific energy models, following the M&V requirements addressed in the ESI MT&R Reference Guide.
Rollover Amount	The calculated amount of a program participant's remaining budget at the end of a given rate period that may carry forward to increase the amount of that program participant's Available Implementation Budget for the following rate period. Rollover is calculated as up to 10 percent of their Initial Implementation Budget or $50,000, whichever is greater.
SEEM	Simplified Energy Enthalpy Model – A tool used by the RTF to model residential building energy use.

DEFINITIONS AND ACRONYMS	
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 in order to continuously improve energy performance, by achieving persistent energy and cost savings over the long term.
Single-Family	Fewer than five dwelling units within the same structure (including duplexes, triplexes, accessory dwelling units and modular homes). Townhouse homes that share walls, but do not vertically overlap, may be considered single-family, regardless of the number of units connected side-by-side.
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. They allow users to control HVAC functions to maintain zone temperatures using the internet, and offer online alerts, monitoring and programming/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.
TOCA	Tier One Cost Allocator – as prescribed by Tiered Rate Methodology, a billing determinant for applicable customer charges that is based annually on the lesser of the customer's rate period high-water mark (RHWM), or the customer's forecast net requirement, which is calculated as a percentage of the total of RHWMs for all customers.
Ton	A ton is a measure of the cooling or heating capacity of an HVAC system. 1 ton is equal to 12,000 Btu per hour.
TRC	Total Resource Cost – a perspective of cost-effectiveness testing that includes all cost and benefits of a measure, regardless of who pays for or receives them. BPA uses the definition of the TRC test consistent with the Council.
Townhouse	Townhouse homes that share walls but do not vertically overlap (side-by-side and not stacked vertically) may be considered single-family.
TSP	Technical Service Provider – consultants who perform technical services required to advance custom projects. Their expertise may include: efficiency firms (whose core business relates to supporting DSM), design/build firms (who provide design/build engineering services in addition to DSM support), or vendor firms.
Unassigned Account	The repository for unallocated funds and returned Energy Efficiency Incentive funds.
UES	Unit of 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 variation in savings that can be reliably forecasted (formerly known as a Deemed Measure).
Unique (Site) ID	It is 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.

DEFINITIONS AND ACRONYMS	
Unheated Buffer Space (Residential)	Any residential building cavity or space that is adjacent to the thermal boundary of the house and that has no positive heat supply under thermostatic control (such as garages and basements).
Utility	A public customer that purchases power from BPA.
VSHP	Variable Speed Heat Pump – a ducted heat pump manufactured with an inverter-driven motor that is capable of adjusting its output to meet the requested heating load (with performance similar to a DHP).
Verification	A process or procedure designed to produce evidence confirming the accuracy or truth of claims made to BPA, which may minimally involve obtaining and retaining documentation, or may require site inspection(s) of the measure(s).
VFD	Variable Frequency Drive – a type of adjustable-speed drive used in electromechanical drive systems. It controls AC motor speed and torque by varying the motor input frequency and voltage.
VRF	Variable Refrigeration Flow – most often used in the Commercial Sector.
WEC	Wastewater Energy Coaching cohort, an Industrial Strategic Energy Management feature that provides on-site support and technical training focused on energy efficiency for municipal and industrial wastewater treatment facilities. It equips them with the tools to help them achieve measureable energy savings through low-cost operations and maintenance (O&M) improvements.
Whole Building Cost	As-built contracted cost including labor, design, measurement and verification, excluding land costs.
Working Day	Monday, Tuesday, Wednesday, Thursday and Friday, excluding federal holidays or other days federally designated to be nonworking days.
Zonal Electric Heating System	Nonducted, electric heating systems using thermostats to control individual heating units or groups of heaters (e.g., zones). They include radiant ceiling cable, fan-forced electric resistance (wall, toe-kick, ceiling and exhaust fan combinations), electric baseboard, and electric boiler/hot water (e.g., zonal electric hydronic) radiant systems.

Section 1: Introduction

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

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

The ECA, the Energy Efficiency Implementation Manual (IM) and BPA's Energy Efficiency Reporting System (currently Interim System 2.0 (IS2.0)) provide the implementation requirements for reporting measures to BPA.

The IM relies on the framework specified in the Long-Term Regional Dialogue Final Policy[2] and the BPA Energy Efficiency Post-2011 Implementation Program. For additional guidance on the Post-2011 program, see BPA's website.

1.1 OVERVIEW

Based on BPA's Regional Dialogue policy, BPA commits to achieving the share of the Power Plan's regional energy efficiency target that represents BPA's public power customer load. BPA reports savings to its target from three major categories: programmatic, momentum and market transformation. The IM covers only programmatic savings that are reportable to BPA's targets.

Prior to inclusion in this IM, BPA conducts planning efforts to ensure that funds expended on the offerings and programs are prudent and are expected to meet stated objectives and outcomes. Programmatic offerings are considered reportable when they are reliable, cost-effective and meet eligibility and documentation requirements. Reportable measures are eligible for the BPA payments outlined in this document.

1.2 RELIABILITY

BPA has a responsibility to ensure the reliability of its energy savings achievements. The 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 Department (EE), ensuring reliability is not a single action at a single point in time. Instead it is an ongoing process that includes planning, implementing, and using evaluation and oversight to make improvements.

Reliability varies by savings type: unit energy savings (UES), custom projects and calculators. Custom projects require site-specific measurement and verification (M&V) to support reliable savings estimates. BPA M&V Protocols[4] direct M&V activities and are the reference documents for reliable M&V. For UES measures and calculators, measure specification and savings estimates must be RTF-approved or BPA-Qualified.

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

Organization of the IM

Section 1 contains general information about the IM.

Section 2 contains information specific to funding.

Section 3 contains general requirements for customers using BPA funding.

Section 4 contains information on the custom project process.

Section 5 contains information on the custom program processes.

Sections 6 through 12 contain information about specific sectors (Agricultural, Commercial, Federal, Industrial, Residential, Utility Distribution, and Multisector).

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Supporting Content

Regional Dialogue Policy

BPA Energy Efficiency Post-2011 Implementation Program

NW Council Website

The Regional Technical Forum (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 makes decisions on whether to adopt the measures 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 conduct a review and to 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 is known as "BPA-Qualified." It may only be used for structural purposes (e.g., adjust specifications or granularity for a gap in offerings) or research purposes (e.g., 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 the 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 achievements, as mandated in the Northwest Power Act.[5]

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

1.4 PAYMENT

When BPA determines the appropriate payments, it assesses cost characteristics relative to established metrics, and considers other factors.

The cost metrics reviewed for payment are: the incremental cost, the first-year cost and the levelized cost of the measure. First, 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). Next, BPA reviews the first-year cost[6] with the goal of keeping each offering at or below the sector average cost goals. Finally, BPA compares the levelized cost of the payment against the Power Plan's avoided costs to ensure that BPA's payment does not exceed the resource value of the savings.

Other factors considered include: programmatic considerations, market maturity or conditions, payment influence and free ridership, TRC cost-effectiveness and regional benefits.

[5]Power Act language summarized
[6]First-year cost is calculated as the ratio of the payment and first year savings.

1.5 POLICY FOR MEASURE CHANGES/ ADDITIONS

BPA reserves the right to make changes to policies, procedures, measure eligibility, specifications and requirements.

On October 1, 2015, the Change Notice Policy was changed to reflect the "Revised Energy Efficiency Post-2011 Implementation Program." BPA has published the IM annually since October 1, 2015, but will be publishing it bi-annually (every two years) in tandem with the rate period beginning October 1, 2017. Changes that require notice will be announced the previous April in a separate changes document. BPA's new change notice policy will be as follows:

CHANGES TAKING EFFECT IN THE OCTOBER BI-ANNUAL IM WITH 6-MONTHS NOTICE IN THE APRIL CHANGES DOCUMENT	CHANGES TAKING EFFECT IN OCTOBER AND IN THE APRIL CHANGES DOCUMENT WITHOUT NOTICE	CHANGES TAKING EFFECT AT ANYTIME WITHOUT NOTICE
Savings change: up or down	New measure	Corrections
Payment amount change: up or down	Optional calculators	Limited changes to calculators and forms
Adding or substituting a requirement	Removal of a requirement	
Expiration of a measure		

Note that changes are different from corrections. Corrections are introduced to fix ambiguous or incorrect language or to align conflicting terms between BPA's rules (e.g., the IM, the ECA, standards of conduct, spreadsheets, calculators, outside specifications and the BPA Energy Efficiency Reporting System). A clarification is a type of correction. Corrections may be implemented at any time in order to provide immediate clarification and alignment to customers and BPA. Limited changes are corrections made to EE's supporting documents found in the IM Document Library that need to be implemented immediately. Off-cycle corrections (introduced outside of the April or October notice document) will be announced in the Updates/Revisions section at the end of the IM.

1.6 OFFICIAL INTERPRETATIONS

Only the BPA contract administration manager or director of energy services may issue interpretations, determinations and findings related to the IM, unless delegated to other BPA staff, such as the contracting officer's technical representative (COTR). Such interpretations, determinations and findings will be provided to the customer in writing. Only written statements (including email) by BPA officials acting within the scope of their authority are official BPA statements.

Supporting Content

Revised Energy Efficiency Post-2011 Implementation Program

Section 2: Funding

2.1 BPA FUNDING

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

This section discusses (1) bilateral funding, (2) pooling organizations, and (3) performance payments.

2.1.1 Bilateral Funding

Bilateral funds may be used for all BPA-funded measures, unless otherwise specified in the IM or ECA. Bilateral funding is administered through the customer's ECA and is referred to as the implementation budget (or, in certain instances, it is administered through a supplemental budget in a separate exhibit).

Customer rate period implementation budgets are based on customer Tier One Cost Allocators (TOCA). Customers may pursue budget changes under the ECA, per the terms of that agreement according to the 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 implementation budget.

The following section discusses: (1) Energy Efficiency Incentive (EEI) allocation; (2) Inter-Rate Period Budget Flexibility (Rollover); (3) EEI redistribution; (4) EEI Budget Reduction; and (5) EEI increase from the Unassigned Account.

1. EEI Allocation

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

2. Inter-Rate Period Budget Flexibility (Rollover)

   Customers have the ability to move up to 10 percent of their initial implementation budget or $50,000, whichever is greater. The amount of funds remaining at the end of a given rate period, not to exceed the rollover cap, 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 rollover funding be tied to specific projects or programs.

3. ECA Implementation Budget Redistribution (Bilateral Transfers and Pooling Organizations)

   Customers may redistribute EEI funds among each other by forming

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

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Supporting Content

Bilateral Transfer Request and Attestation Form

a pooling organization or by sending a completed Bilateral Transfer Request and Attestation Form (available in the IM Document Library) to BPA (email eedocs@bpa.gov or fax 1-866-535-7955). Approved bilateral transfers will result in ECA implementation budget revisions.

Customers may authorize a third party through a Bilateral Third Party Agreement (available in the IM Document Library) to request BPA to redistribute EEI funds on their behalf. If the third party requesting a transfer has been authorized to act on behalf of both the donor and the recipient of funds, this request can be made with an email request without the need of a signed Bilateral Transfer Request and Attestation form. The email request must provide details of the transfer, including the effective date, dollar amount and the associated utilities. In cases where the two customers do not have agreements with the same third party, a signed Bilateral Transfer Request and Attestation Form will still be required. In all cases, requests should be made via email to eedocs@bpa.gov, or by fax to 1-866-535-7955.

4. ECA Implementation Budget Reduction

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

5. ECA Implementation 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. Customers will have 10 working days to request an implementation budget increase after BPA provides an accounting of available funds. If a customer's request is approved, funds will be allocated via a revision to the customer's ECA implementation budget.

To request an implementation budget increase from funds in the Unassigned Account, customers must submit to BPA (email eedocs@bpa.gov or fax 1-866-535-7955) the Unassigned Account Funding Request Template (available in the IM Document Library).

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

2.1.2 Rules for Pooling Organizations

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

A pooling organization must appoint a legally authorized representative (such as a customer or separate entity) to assume nontransferable liability for the organization. BPA will fund a pooling organization only after it has reviewed and approved documentation of pool status (e.g., pooling

organization agreement, by-laws, 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.

2.1.3 Performance Payments

BPA highly recommends that customers use performance payments to support implementation costs in support of the IM's activities. Implementation costs may include (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 payments are taken out of the customer's ECA implementation budget and are based on EEI-funded savings achieved. The payment rate and cap depend on the customer's classification as "small," "rural," "residential" (SRR), or none of these (non-SRR), as defined in the chart below.[3]

SRR STATUS	DEFINITIONS	PAYMENT RATE $/KWH
Small	The customer's forecast net requirement is less than 10 aMW.	$0.08
Rural	The customer has fewer than 10 customers per line mile according to the Low-Density Discount calculation.	$0.08
Residential	The customer's load is greater than 66 percent residential, according to U.S. Energy Information Administration data.[4]	$0.08
Non-SRR	The customer is not small, rural or residential.	$0.04

Customers may claim payment at a rate up to the rate in the table above. The payment amount must be included on each invoice. If the performance payment is not claimed in an invoice or claimed only in part (e.g., at a rate less than the payment rate in the table above), then there is no opportunity to later collect money for the unclaimed payment. If the customer does not wish to claim a performance payment on invoices, they must submit the Performance Payment Form (available in the Interim Solution 2.0 Files). BPA does not allow a performance payment to be claimed on self-funded activities.

The calculation of a performance payment is based on the program participant's initial implementation budget plus any applicable rollover amount, plus or minus any applicable implementation budget transfers (known collectively as the implementation budget). This calculated amount can vary over the course of the rate period. The total of all performance payments available at any given time is capped at 30 percent of the implementation budget for SRR customers and at 20 percent of the implementation budget for non-SRR customers.

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 time period impacted, but not to exceed the

[3]BPA will notify customers of their rate period classification in the EEI allocation letter.
[4]BPA reserves the right to request additional documentation (such as an annual report) to verify a customer's load.

statute of limitations (6 years). Availability of historical invoice details may be limited due to availability within the reporting system of record.

Pooling organizations may claim performance payments up to the aggregate of each pool participant's allowance.

When funds are redistributed among customers (e.g., via a bilateral transfer), BPA may restrict the performance payment that can be claimed on the transferred funds.[5] 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, the utility will not be required to repay prior payments, but no additional performance payment will be allowed[6] for the remainder of the rate period, unless the utility receives additional EEI funds.

2.2 FUNDING SOURCES AND SAVINGS ALLOCATION

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

FUNDING SOURCE	BPA ENERGY EFFICIENCY REPORTING SYSTEM TITLE	DESCRIPTION
Implementation Budget	EEI	BPA payment in the form of EEI funding; ECA funded activities that are accepted by BPA.
BPA-Accepted, Non-BPA Funds	Self-Funding	Activities generating energy savings for which a utility chooses not to seek payment from BPA.
Not-BPA-Accepted, Non-BPA Funds[7]	Non-Reportable	Non-BPA-funded activities that are not accepted by BPA.

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

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

[5]This restriction reduces the risk that BPA will overpay because performance payments are paid on a $/kWh basis, independent of payment amount (i.e., a customer could max out its performance payment, receiving little payment and then transfer its remaining implementation budget to another customer that similarly maxes out the performance payment).
[6]To claim less than the calculated performance payment, use the Performance Payment calculator located on the Interim Solutions 2.0 Files webpage.
[7] Customers are allowed, but not required, to include nonreportable savings to BPA. BPA will not review the non-reportable data and customers will not be credited for the energy savings.

Supporting Content

Interim Solution 2.0 Files

Section 3: General Requirements

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3.4 Third-Party Operated Program Requirements. 10

3.1 DOCUMENTATION REQUIREMENTS

Each measure contains documentation requirements. All documentation must be retained in the customer's file (which may be in hard copy or electronic form) and certain documentation must be submitted to BPA (email eedocs@bpa.gov or fax 1-866-535-7955) or sent through BPA's Energy Efficiency Reporting System.

Customers must retain required information for no less than four years after the measure has been invoiced through the reporting system. Information must be made available to BPA upon request.

If a customer agent or contractor was used for some or all of the measure development, implementation or verification, the customer must also retain documentation that IM requirements have been met.

3.2 REPORTING REQUIREMENTS

Reports (invoices) must include supporting documentation required by the IM. This documentation must prove that measures were available for implementation during the claimed period, were properly installed, and are operating. BPA may reject measures that do not meet these requirements.

Should there be a disagreement regarding a report, BPA will work with the customer to correct errors and make agreed-upon revisions.

For each submitted report, customers must establish and maintain files and supporting documentation.

The files must clearly identify the corresponding invoice and meet the documentation requirements of the IM.

Until BPA Energy Efficiency procures a long-term reporting system, customers must use Interim Solution 2.0 (IS2.0), available through BPA Customer Portal, to report energy efficiency achievements to BPA – with and without requests for payment. Customers may report energy savings, at any time, as long as the completion dates are in the current or previous rate period.

The following describes the reporting steps. All referenced documents are available in the IM Document Library or the Interim Solution 2.0 Files websites.

1. Gather invoice package documents that may include, but are not limited to, the following:
    - UES Measure Upload Template (Use this to report specific measures that have been completed. Look up the specific reference number that applies to the end-user's situation in the UES Measure List posted to the Interim Solutions 2.0 Files website.)
    - Performance Payment Form (Only if requesting less than the total available performance payment on an invoice.)
    - Progress Payment Request Form (Only if requesting custom project progress payments.)
    - Calculators
        - Option 1 Custom Project Calculator (After COTR approval of project completion report, one calculator file for each COTR-approved completed project.)

Supporting Content

BPA Customer Portal

Interim Solution 2.0 Files

Required Documents

UES Measure Upload Template

Performance Payment Form

Progress Payment Request Form

Option 1 Custom Project Calculator

RTF-approved Small Compressed Air Calculator

Track and Tune Calculator v6.2

High PEM Version 6.2 Calculator

Energy Management Calculators

Nonresidential Lighting Calculator

Custom Project Calculator Version 2.1

File Naming Tool

Summarizer

- Option 2 Custom Project Calculator (Available for bulk reporting of multiple projects can be found as an Additional Document in the Energy Efficiency section of the BPA Customer Portal for eligible Option 2 customers.)
- RTF-Approved Small Compressed Air Calculator
- Energy Management Calculator (Energy Project Manager, Track and Tune, and High-Performance Energy Management.)
- Lighting Calculators
- Custom Program Calculators

2. Use the File Naming Tool to name all invoice package documents. Improperly named documents will not be processed by the system and may result in the customer having to resubmit the entire invoice package.
3. Use the Summarizer Tool (optional) to estimate the total invoice package payment and savings. This tool can also give preliminary indications of potential invoice package errors and warnings.
4. Upload invoice package documents (named using the File Naming Convention Tool) to the BPA Energy Efficiency Reporting System.

BPA will review the submitted documents and create an invoice report showing the amount to be paid. BPA will work with the customer to resolve any errors in the invoice package and will determine the acceptable payment for measures reported.

3.3 OVERSIGHT AND EVALUATION REVIEW PROCESS

As a part of the oversight review process, BPA shall (1) perform end-user site and record reviews, and (2) conduct impact and process evaluations.

1. Site and Record Reviews

BPA may conduct oversight inspections of all measures, contact end-users to verify reported measures, monitor or review the customer's procedures and records, conduct site visits to verify claimed energy savings and to oversee implementation. The number, timing and extent of inspections is decided by BPA and coordinated with the customer. BPA shall normally provide written notice not less than 30 days prior to an inspection and inspections will occur at BPA expense. BPA may contact appropriate federal, state or local jurisdictions regarding health, safety or environmental matters related to any activity under this IM.

If, at any time, BPA finds noncompliance with the requirements of the IM or the customer's ECA, it may make adjustments to the customer's invoices and/or payments to achieve compliance.

2. Impact and Process Evaluations

- BPA may evaluate measures to assess the amount, cost-effectiveness and reliability of conservation. BPA will determine the timing, frequency and type of evaluations with input from the customers on the evaluation plan.
- BPA may also require customers to provide billing data and contact information for participants. If so, billing data must be linked to the reported measure (e.g., through a unique identification) to allow BPA to assess savings by measure.
- BPA and/or regional participants will pay for evaluations initiated by BPA. In some cases, another party will manage the evaluation on behalf of BPA. BPA recognizes that customers participating in the evaluation provide some resource/cost, but the cost is not eligible for BPA payment.

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

3.4 THIRD-PARTY OPERATED PROGRAM REQUIREMENTS

It is unlikely, but unforeseeable contract circumstances could result in the termination or change of third-party operated programs, without prior notice. If BPA is forced to change 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 if there are terminations or changes, and it will work with customers to wrap-up and/or transition any work in progress.

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

Section 4: Custom Projects

4.1 CUSTOM PROJECTS PAYMENT RATE

Effective October 1, 2018, Option 1 customers must use Custom Project Calculator Version 4.12 or later for new custom projects. Effective October 1, 2018, BPA will no longer accept any previous versions.

CUSTOM PROJECT CALCULATOR OPTION 1 VERSION	EFFECTIVE DATE	RETIREMENT DATE	NO LONGER ACCEPTED IN IS2.0
1.1	Dec. 6, 2012	Dec. 31, 2015	Oct. 1, 2017
1.2	April 1, 2013	Dec. 31, 2015	Oct. 1, 2017
1.3	Oct. 1, 2013	Dec. 31, 2015	Oct. 1, 2017
1.4	Jan. 9, 2014	Dec. 31, 2015	Oct. 1, 2017
2.0	July 14, 2014	Dec. 31, 2015	Oct. 1, 2017
2.1	Oct. 1, 2014	Dec. 31, 2015	Oct. 1, 2017
2.2	Dec. 30, 2014	Dec. 31, 2015	Oct. 1, 2017
3.0	June 1, 2015	Dec. 31, 2015	Oct. 1, 2017
3.1	Oct. 1, 2015	Oct. 1, 2017	Oct. 1, 2017
3.2	Jan. 7, 2016	Oct. 1, 2017	Oct. 1, 2017
4.0	Oct. 1, 2016	Oct. 1, 2017	Oct. 1, 2017
4.1	Oct. 1, 2017	Nov. 14, 2017	Nov. 14, 2017
4.11	Nov. 14, 2017	March 8, 2018	Oct. 1, 2018
4.12	March 8, 2018	To Be Determined	To Be Determined

In all instances of site-specific calculations (Option 1 Custom Project Calculators, Option 2 Custom Project Calculators, Lighting Calculators, etc.), the current site-to-busbar savings factor being used is 1.09056.

BPA's willingness to pay for a custom project is equal to the lesser of (1) the BPA payment rate ($/kWh), or (2) the project cost cap.

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The applicable BPA payment rate ($/kWh) is the rate in place at the time of project start date. The BPA payment rate is calculated according to the table below:

PROJECT TYPE	MEASURES LIFE (YEARS)	SECTOR	PAYMENT RATE ($/KWH)
Nonresidential Lighting	All	Agricultural Commercial Industrial	$0.18
Retrofit Construction (excluding Nonresidential Lighting)	1	All	$0.025
	2–3	All	$0.05
	4–19	Agricultural Industrial Utility Distribution	$0.25
		Commercial Residential	$0.20
	20+	All	$0.35
New Construction and Major Renovation (excluding Nonresidential Lighting)	1	All	$0.025
	2–3	All	$0.05
	4–19	Agricultural Commercial Residential	$0.27
		Industrial Utility Distribution	$0.25
	20+	Agricultural Commercial Industrial Residential	$0.35
		Utility Distribution	$0.25
New Construction	45+	Residential	$0.45

Project cost cap: Payment for all sectors is capped at 70 percent of the incremental project cost. If incremental cost data is not available for commercial new construction projects, incremental cost may be calculated as 2.86 percent of the whole building.

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

Customers must pass through the entire BPA payment received to their end-users if the payment is for a progress payment.

4.2 CUSTOM PROJECTS SPECIAL FUNDING

All utilities are eligible to request special funding (e.g., progress payments).[1]

4.2.1 Progress Payments

Customers requesting progress payments must use the Option 1 Custom Project Process and Calculator (available in the IM Document Library) to request approval. The customer must request progress payments in the proposal, and the request must include a schedule with estimated progress payments that coincide with incurred costs and measurable milestones.

Progress payments will be made after project milestones are achieved and verified, in accordance with the BPA-Approved Custom Project Proposal. The customer must document project milestone achievements (e.g., ordered, delivered or installed equipment) prior to receiving a progress payment.

The full progress payment amount paid by BPA must be passed through to the end-user, and the customer must retain proof of payment. Customers will be required to repay BPA if the project is not completed within six months of the expected completion date (the expected completion date may be revised with BPA approval).

To qualify for progress payments, the project must have the following attributes:

1. The time period from the BPA Custom Project Proposal approval date to the completion report submittal date meets or exceeds 12 months.
2. The amount of each progress payment is $100,000 or greater.
3. The estimated incentive for the project is $250,000 or greater.
4. The sum of the progress payments does not exceed the lower of (a) 70 percent of actual expenditures of the project incurred, up to the date of the progress payment invoice to BPA, or (b) 50 percent of the estimated total project incentive.
5. For projects seeking the use of progress payments, the Custom Project Proposal and completion report must be approved prior to submission of the completion report into the BPA Energy Efficiency Reporting System. There is no required minimum time between the date of BPA's acceptance of a Custom Project Proposal and the date of completion report submission.

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 may elect Option 2 by using the COTR Request and Acknowledgment Procedure at the start of each rate period.They must submit/renew their application no later than September 1, preceding the new rate period.

A request to follow the Option 2 path must include the customer's proposed custom project delivery approach (including, but not limited to, documentation of rules, processes and staffing capability) to meet the custom project requirements. The request must also provide any internal M&V protocols used for custom projects for BPA review. BPA may request additional information before notifying the customer of its approval/nonapproval of Option 2 status. Option 2 customers may switch to Option 1 through the COTR Request and Acknowledgment Procedure (1) for any

[1] Option 2 customers may request progress payments for a project only if they use the Option 1 Custom Project Process to secure BPA's approval.

Supporting Content

IM Document Library

Required Documents

Option 1 Custom Project Calculator

COTR Request and Acknowledgment Procedure

IM Document Library

BPA Engineering Calculations with Verification Protocol

reason at the start of a new rate period [2], or (2) if customer circumstances change, making Option 2 unworkable.

- Option 1: BPA manages the project performance and cost-effectiveness of the bundle of energy savings from Option 1 custom projects. Option 1 customers may request technical support from BPA or BPA program implementers (i.e., Energy Smart Industrial) to develop projects and complete M&V regardless of the size of the project, or the requirement for review and comment.
- Option 2: Customers manage the project performance and cost-effectiveness of the bundle of energy savings from their custom projects. The customer conducts all aspects of M&V and custom project quality control (e.g., project proposal and project completion documentation review) internally. Technical assistance is available in relation to IM clarifications and consultations regarding M&V methods and protocols, as they apply to a single project or the customer's portfolio of projects. Project implementation assistance is not available unless provided by third-party implementation contractors as part of a program (e.g., Cascade Energy through Energy Smart Industrial, or the Northwest Trade Ally Network). Option 2 customers that request special BPA funding (such as progress payments, or those performing Limited Availability Emerging Technology Field Test Projects) must follow the Option 1 Custom Project Process.

4.3.2 Custom Projects General Requirements

1. It must not result in fuel switching.
2. 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.
3. Custom projects are limited to one sector each.
4. UES measures and calculated projects may be included in custom projects, on their own or in a project with other measures/projects, but must either (1) be included in the custom project M&V and not use the UES/calculated savings value; or (2) be reported separately through the UES/calculated path and the savings must not be included in the custom project savings.
5. Option 1 Custom Projects must meet the following B/C ratio requirements:
    - If the project savings are 200,000 kWh or less, no cost-effectiveness screen is applied.
    - If the project savings are over 200,000 kWh, and the project has a BPA-Approved proposal, the proposal must demonstrate that the project has a B/C ratio ≥ 0.5 based on proposed costs and savings. No additional screen will be applied at the completion report.
    - If the project savings are over 200,000 kWh, and the project does not have a BPA-Approved proposal, the completion report must demonstrate that the project has a B/C ratio ≥ 0.5.
6. Option 2 Custom Projects must have a minimum B/C ratio of 1.0 at the invoice level, based on verified costs and savings, when invoiced.
7. The BPA M&V Protocol Selection Guide (available in the IM Document Library) 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.

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

- Engineering calculations with a verification plan
  Detailed guidance on preparing engineering calculations with a verification plan is included in the BPA Engineering Calculations with Verification Protocol. As directed in the BPA M&V Protocol Selection Guide, engineering calculations with a verification plan may be used for projects with an expected annual energy savings of less than 200,000 kWh per year, which qualify under the BPA Engineering Calculations with Verification Protocol.
- Comprehensive M&V Plan
  Detailed guidance on preparing a comprehensive M&V plan is in the BPA M&V Protocols and Guidelines, and RTF Standard Savings Estimation Protocols.

4.4 OPTION 1 CUSTOM PROJECTS

4.4.1 Custom Project Proposal

Option 1 Custom Project Proposals (a component of the Option 1 Custom Project Calculator) are not required unless the customer is applying for Progress Payments, or is performing an 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 the Option 1 Custom Project Calculator and other supporting materials to BPA by emailing it to eedocs@bpa.gov or faxing to 1-866-535-7955, with the following tabs completed: Project Information, Proposal and Measure Input (all fields are labeled "required for proposals").

When a proposal is approved, BPA will notify the customer and email the approved Option 1 Custom Project Calculator to the customer with the BPA-assigned project ID. This file must be saved and used by the customer for submittal of the completion report.

4.4.2 Custom Project Completion Report

Option 1 customers must submit a completion report to BPA (email eedocs@bpa.gov or fax 1-866-535-7955) in BPA's Option 1 Custom Project Calculator. It must include the following completed documents: project information, measure input, and any supporting documentation for all custom projects.

When a completion report is approved, BPA shall notify the customer and email the approved Option 1 Custom Project Calculator to the customer. The customer must submit the BPA-Approved calculator in the BPA Energy Efficiency Reporting System when requesting payment or reporting self-funding.

Note that Option 1 customers electing to submit non-reportable projects must do so using the Option 2 Custom Project Calculator.

4.4.3 BPA Review

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

Supporting Content

BPA M&V Protocol Selection Guide and Example M&V Plan

BPA Engineering Calculations with Verification Protocol

RTF Standard Saving Estimation Protocols

Required Documents

Option 1 Customer Project Calculator

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

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

4.5 OPTION 2 CUSTOM PROJECTS

For Option 2 projects, BPA does not require or review proposals or completion reports. Option 2 customers may apply for special BPA funding such as Progress Payments using the Custom Project Proposal Process for Option 1 custom projects. If special BPA funding is approved, the projects are treated the same as Option 1 projects and must meet all requirements of Option 1 custom projects.

For all Option 2 projects, the customer must review and approve the completion report prior to customer submission of savings into the BPA Energy Efficiency Reporting System. The completion report itself 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 Option 2 Custom Project Calculator through the BPA Energy Efficiency Reporting System.

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, and (2) have verified energy savings that are reliable (i.e., M&V was implemented per the approved M&V plan, or M&V was appropriate for the project and consistent with BPA M&V Protocols).

4.6 CUSTOM PROJECTS DOCUMENTATION REQUIREMENTS

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY-EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Option 1 Custom Projects			
Option 1 Custom Project Calculator (Send to BPA for completion report review with all supporting documentation, including associated lighting calculator being used for estimates if applicable. Submit to the BPA Energy Efficiency Reporting System after approval of the project completion report, when requesting BPA payment or reporting self-funding).	X	X	X
Option 2 Custom Projects			
Option 2 Custom Project Calculator	X		X
Responsible entity implementing M&V plan, M&V plan, pre- and post-measurement data, assumptions, and any modeled or calculated data used to determine energy savings.			X
Project documentation including, at a minimum: 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 and sampling) and deviations from planned M&V; M&V report and/or detailed savings model; name of M&V protocol used; verified savings and documentation showing how the projected nonenergy benefits and operations and maintenance costs were calculated (if applicable); verified costs, including invoices and; delivery inspection report/date.			X

Section 5: Custom Programs

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Custom programs are a combination of similar projects, measures and/or end-users that have the same M&V or evaluation plan across the entire program. The scope of a custom program is multiple installations that may include one or more measures, or sectors[1] and that may occur at one or more end-user sites.

5.1 CUSTOM PROGRAMS PAYMENT RATE

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

The applicable BPA payment rate ($/kWh) is the rate in place at the time of Evaluated Custom Program approval or the start date for a project within a M&V Custom Program. BPA payment rate is calculated according to the table below:

PROGRAM MEASURE TYPE	MEASURE LIFE (YEARS)	SECTOR	PAYMENT RATE ($/kWh)
Nonresidential Lighting	All	Agricultural Commercial Industrial	$0.18
Retrofit Construction (excluding Nonresidential Lighting)	1	All	$0.025
	2–3	All	$0.05
	4–19	Agricultural Industrial Utility Distribution	$0.25
		Commercial Residential	$0.20
	20+	All	$0.35
New Construction and Major Renovation (excluding Nonresidential Lighting)	1	All	$0.025
	2–3	All	$0.05
	4–19	Agricultural Commercial Residential	$0.27
		Industrial Utility Distribution	$0.25
	20+	Agricultural Commercial Industrial Residential	$0.35
		Utility Distribution	$0.25
New Construction	45+	Residential	$0.45

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

Payment for all sectors is capped at 70 percent of the incremental cost. Eligible costs include measure costs (incremental measure costs, operations and maintenance costs) and program costs (implementation, evaluation and M&V).

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

5.2 CUSTOM PROGRAMS REQUIREMENTS

Both Option 1 and Option 2 customers are eligible for custom programs, and both must meet the same requirements and follow the same process with BPA. Option 2 customers must use the custom program path when the BPA M&V protocols are insufficient to provide direction, including use of an impact evaluation to estimate savings or where the M&V protocols do not cover a specific measure/application/method.

Custom Programs must meet the following criteria:

- Not result in fuel switching; and
- Contain only measures with a savings life of one year or more.

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

There are two types of custom programs:

1. M&V Custom Program: Savings are estimated for individual sites based on M&V methodologies. M&V methods are based on the BPA M&V Protocol Selection Guide or RTF Standard Savings Estimation Protocols.

   M&V Custom Programs must be TRC cost-effective (TRC>1.0) at a calculator level.

2. Evaluated Custom Program: 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.

5.3 CUSTOM PROGRAMS APPROVAL AND MODIFICATION PROCESS

The customer must secure BPA's approval of its custom program or any modifications (including cancellation) to it (e.g., new measures, measure exclusion, and M&V approach change).

Custom Program proposals must, at a minimum, contain the following information:

1. Basic program information, including:
   - Program name;
   - Contact information: customer name and proposer contact information; and

Supporting Content

M&V Protocol and Selection Guide

RTF Standard Savings Estimation Protocols

- Program summary, existing system and proposed system descriptions.

2. Documentation of baseline conditions.
3. A site-specific M&V plan or impact evaluation plan.
4. Proposed measure costs and savings.
5. Proposed program costs.
6. Estimated project-level cost-effectiveness.
7. For M&V Custom Program, completion report submission requirements (e.g., approved reports prior to submission for all projects, some projects, or no projects).

The customer's request for approval must be sent to BPA (email eedocs@bpa.gov or fax 1-866-535-7955) by submitting a Custom Program Calculator (available in the IM Document Library).

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

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

BPA may ask the customer clarifying questions during the approval process. Within 10 working days of the receipt of all documents (as listed below), BPA will email the customer with its decision or a time-frame for a decision.

5.4 CUSTOM PROGRAMS DOCUMENTATION AND REPORTING REQUIREMENTS

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Custom Program Calculator	X	X	X
Evaluation Plan		X	X
Evaluation Report for completed evaluated program.		X	X
Completion reports for M&V Custom Program projects, as defined in the proposal.		X	X
For M&V Custom Programs, 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, verified savings.			X

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

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

Supporting Content

Custom Project Calculator

Custom Program Calculator

1. M&V Custom Program

   The customer must conduct M&V in accordance with its approved M&V plan, and must document the type and quantity of measures installed.

   Completed projects may be submitted for payment using the Custom Program Calculator for each project (including measure specific results) no later than the reporting period immediately following project completion (i.e., when the project is installed and energy savings measured according to its M&V plan). The calculator will estimate the payment, consistent with the start date of each individual project.

   BPA will define M&V Custom Program completion report requirements at the proposal stage. Prior to customer submission in the BPA Energy Efficiency Reporting System, BPA must approve the completion report to ensure alignment with the requirements given at proposal.

2. Evaluated Custom Program

   Prior to reporting in the BPA Energy Efficiency Reporting System, the customer must submit a completed Custom Program Calculator and an evaluation report consistent with the previously approved evaluation plan.

   Payment is based on evaluated savings per the evaluation report.

   Upon conclusion of the program and approval of the final Custom Program Calculator and evaluation report, the COTR will direct the customer how to report the program savings to BPA.

Section 6: Agricultural Sector

Refer to the changes and corrections summary for revisions to the measures in this sector.

The Agricultural Sector includes electric energy used (1) by a farm or business where the primary purpose is applying water for food production or vegetation growth (e.g., pumping and irrigation), and (2) by a ranch or aquaculture (aquafarming) business where the primary business is breeding or raising domestic livestock, poultry, game animals, fish, oysters, etc.

Storing and processing farm products is not agricultural. Instead, it is industrial with the exception of dairies and milk storage at a milking facility (however, homogenizing, dehydrating and the bottling of milk and its derivatives are industrial). A facility may have a mix of both agricultural and industrial measures at the same location (e.g., a winery operation with a processing facility where the vineyard irrigation is considered agricultural and the grape processing facility is considered industrial).

6.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Freeze-Resistant Stock Water Tanks/Fountains	$140–$225/tank or fountain
Irrigation-Related Measures	
Irrigation System Upgrades	$0.75–$175
Scientific Irrigation Scheduling	$5.20/acre
Irrigation Pump Testing and System Analysis	$50–$300/test or analysis
Low-Energy Precision Agriculture	$100/complete pivot
Low-Elevation Sprinkler Application	$100/complete pivot
Variable Frequency Drives in Agricultural Turbine Pump Applications	$60/horsepower
Transformer De-Energization	$0.025/kWh of busbar savings
Agricultural Construction	See the Custom Projects Payment Table.
Other Agricultural Measures	See the Custom Projects Payment Table.
Additional Multisector Opportunities	
Nonresidential Lighting Program	See the lighting calculators.
Advanced Rooftop Controls	$150–$225/ton
Commercial Ductless Heat Pump	$800/ton
Commercial Heat Pump Conversion	$250/ton
Commercial Heat Pump Upgrade	< 6 tons: $1,000/unit; 6–20 tons: $200/ton

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Supporting Content

IM Document Library

Interim Solutions 2.0 Files

Scientific Irrigation Scheduling M&V Calculator

Irrigation Pump Testing and System Analysis BPA Screening Tool

BPA-Qualified and Provisional UES Input Sheet

Variable Frequency Drives in Agricultural Turbine Pump Applications – VFD Calculator

6.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Connected Thermostat	$200/thermostat
Variable Refrigeration Flow System	$800/ton
Variable Frequency Drive on Air Handling Unit Fan	$300/horsepower
Commercial Insulation	$0.45–$1.25/square foot
Commercial Windows	$3–$6/square foot
Generator Engine Block Heaters	$200–$1,500/unit
Vehicle Engine Block Heater Controls	$160/unit
Variable Frequency Drives in Small Compressed Air System	See the Custom Projects Payment Table.
Green Motors Rewind Initiative	$2/horsepower
Limited-Availability, Emerging Technology Demonstration Field Test Projects	See the Custom Projects Payment Table.

* The payment levels described in this table provide a summary only. Complete details of the payment levels and associated requirements may be found in the corresponding text of the IM. Please see the Table of Contents for the text location.

6.2 FREEZE-RESISTANT STOCK WATER TANKS/ FOUNTAINS

Basis for Energy Savings

The baseline for freeze-resistant tanks/fountains that replace a tank heated with an electrically resistive element is called the Electrically Heated Tank Consumption estimate. The efficient case is zero electric heating. Savings are calculated by taking the difference between the baseline and efficient case. The annual consumption from a submersible electric resistant tank heater is estimated by using monitored results from site metering studies. Baseline consumption is adjusted from the metering period to the full heating season using heating degree days (HDD) as a scaling factor. Savings are computed for each of the primary heating zones by using the weighted average number of HDD of each heating zone.

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

Requirements and Specifications

Freeze-resistant stock water tanks/fountains are available as a measure in heating zones (HZ) 1, 2 and 3. Electric resistance stock water tank heater(s) must be removed or permanently disabled, and the new freeze-resistant stock water tanks/fountains must have the following qualifications:

- New (i.e., not home- or kit-made);
- Enclosed, fully foam or dead-air space insulated, with the opening completely sealed in impact-resistant polyurethane;
- Possess elliptical or flap closures that tip easily so animals can drink without resistance;

- Sized in accordance with manufacturer's specifications for the type and number of animals where it will be used;
- The water supply is hard-piped underground and stubbed up into the insulated portion of the fountain;
- Contain no electric heat; and
- Possess a minimum five-year manufacturer defect warranty.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, farm name, meter number, GPS coordinates or legal property description).	X		X
Proof of manufacturer defect warranty of at least five (5) years.			X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X

Payment

HEATING ZONE	PAYMENT PER FREEZE-RESISTANT STOCK WATER TANK/FOUNTAIN
HZ 1	$140
HZ 2	$165
HZ 3	$225

6.3 IRRIGATION RELATED MEASURES

6.3.1 Irrigation System Upgrades

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 is based on a weighted average of the RTF-approved energy savings for each measure. The RTF-approved energy savings was based on regional location (irrigation system run-time and water pumping lift are the primary drivers) identified improvements in overall application efficiency and leak reduction. BPA has simplified each UES offering.

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

Requirements and Specifications

Energy efficiency upgrades to new or existing irrigation systems and water management must be designed, constructed and verified in compliance with the current specifications as listed in the UES Measure List (available in the Interim Solution 2.0 Files). Brass impact sprinklers shall be rebuilt by an established repair shop and shall meet or exceed manufacturers' specifications.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description).	X		X
Equipment/contractor invoice is to include: type of equipment or product installed/used and quantity, the order/purchase date and cost.			X

Payment

SPRINKLER EQUIPMENT	PAYMENT
Replace worn nozzle with new flow-controlling type nozzle for impact sprinklers.	$4/nozzle[i]
Replace leaking impact sprinkler with rebuilt or new impact sprinkler.	$3.75/sprinkler[i]
New nozzle for impact sprinkler, replacing existing worn nozzle of same flow rate or less.	$1.50/nozzle[i]
New nozzle for center pivot and lateral moves.	$1/nozzle
New, rotating type sprinklers that replace impact sprinklers.	$4/sprinkler[i]
Replace leaking pipe section and riser cap gaskets for wheel or hand lines, or portable main line gasket with new gasket.	$2.75/gasket
New, low-pressure regulators.	$5/regulator[i]
New rotating-type sprinklers that replace low-pressure models.	$4/sprinkler[i]
New multiple configuration nozzles for low-pressure pivot[ii] sprinklers.	$3/sprinkler[i]
New multitrajectory sprays that replace impact sprinklers.[iii]	$4/sprinkler[i]
New multitrajectory sprays that replace low-pressure sprinklers.[iii]	$1/sprinkler[i]
Replace leaking drain gaskets with new gaskets on wheel lines, hand lines or pivots.[ii]	$1/drain
New hubs for wheel lines.	$14.50/hub
New, gooseneck elbow for new drop tubes (to convert existing sprinkler equipment mounted on top of the pivot[ii] to low-pressure sprinkler package, LEPA or LESA[iv]).	$1.65/gooseneck
New drop tube for low-pressure pivot[ii] sprinklers (minimum three feet length).	$3/drop tube
Replace leaking center pivot base boot gasket with new gasket.	$175/pivot

SPRINKLER EQUIPMENT	PAYMENT
Pipe repair of leaking hand lines, wheel lines and portable mainline.	$10/pipe section
Rebuild or replace leaking or malfunctioning leveler with new or rebuilt wheel line leveler.	$0.75/leveler

[i] Rebate is limited to two units per sprinkled acre for solid set sprinklers.

[ii] Lateral moves are also included.

[iii] Regular sprays allowed for LESA conversions.

[iv] Allowed for LEPA or LESA conversions.

6.3.2 Scientific Irrigation Scheduling

Expires Dec. 31, 2018.

Basis for Energy Savings

The base case used to calculate this measure uses typical irrigation practices to determine when and how much to irrigate. Such practices include looking at soil moisture using the "shovel method" and the "feel method" or no method at all. The efficient case assists irrigators to know exactly when and how much to irrigate crops through a system that monitors weather and soil moisture data. In addition to reducing energy costs for pumping water, Scientific Irrigation Scheduling (SIS) conserves water and reduces fertilizer use and runoff. Previous BPA-sponsored studies have shown water savings of 10 percent, which is used for the energy savings of this measure.

The results of the 2017 SIS Baseline Research Study, funded by BPA, were presented to the Regional Technical Forum in June. This study found no difference between fields enrolled in SIS and those that are not; therefore the RTF voted to deactivate the measure. BPA will discontinue the Agricultural SIS program in December 2018. The irregular expiration date allows for one, final irrigation season to utilize the measure and time to submit the required documentation.

More information on typical irrigation practices can be found on Washington State University's website.

More information for the SIS measure can be found on the Regional Technical Forum's (RTF) website.

Requirements and Specifications

SIS applies to agricultural irrigation systems (1) with a pumping capacity beyond what is required to meet normal crop needs, as defined by the United States Department of Agriculture, and (2) that irrigate crops that benefit from improved irrigation practices.

Customers must collect and use weekly hydro application data including all water applied, evapo-transpiration needs and soil moisture tables. Energy savings are based on the actual on farm energy savings, determined by the Scientific Irrigation Scheduling M&V Calculator (available in the IM Document Library). Off-farm savings, such as potential savings on other irrigation systems, other utility systems or other irrigation districts cannot be reported, but adjustments of site savings to busbar savings can be claimed.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	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
Electronic or hard copies of the Contractor SIS Report, which includes: number of treated acres, performance period, and copies of weekly hydro application data (e.g., water applied, evapotranspiration needs, and soil moisture tables).		X	X
Completed Scientific Irrigation Scheduling M&V Calculator and data on measure costs, crop type, acreage and energy savings.		X	X

Payment

BPA shall pay customers $5.20 per acre per year.

6.3.3 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 health and identify potential energy efficiency improvements. Ideally, the pump test will be performed on systems that are inefficient as determined by the Irrigation Pump Testing and System Analysis BPA Screening Tool (available in the IM Document Library). The results of the pump test could be used in developing the custom project proposal. There is no energy savings associated with this reimbursement.

Requirements and Specifications

1. The irrigation pump must be electrically powered, 20 horsepower or greater and must not have been tested through BPA-sponsored pump testing services within the past five years.
2. The irrigation pump must have been in operation for the two previous years.
3. The irrigation pump test[1] must be performed by an individual possessing pump testing knowledge and experience.[2]
4. Customers and qualified vendors must use the Irrigation Pump Testing and System Analysis BPA Screening Tool (available in the IM Document Library) to limit the amount of dry holes (i.e., pump tests that do not result in a BPA-Approved custom project).
5. 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[3]: Perform irrigation pump test and evaluate mainlines and critical sprinklers.

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

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, pump number, GPS coordinates, farm name, or legal property description).	X		X
Electronic or hard copies of the completed Irrigation Pump Testing and System Analysis BPA Screening Tool, irrigation pump test and recommendation report.			X
Complete the "Agricultural Irrigation Pump Testing and System Analysis" tab in the BPA-Qualified and Provisionally Deemed Input Sheet (available in the "other documents" section of the IM Document Library).		X	X

Payment

TEST TYPE	PAYMENT
Simple System Evaluation	$50
Simple System Irrigation Pump Test (e.g., open discharge).	$100
Irrigation Pump Test and System Analysis, 400 acres or less.	$200
Irrigation Pump Test and System Analysis, over 400 acres.	$300
Irrigation Pump Test and System Analysis, Complex Pumping System (over 400 acres with multiple operating pumps).	$200/main pump plus $50/booster pump

[1] The test is the process to measure various aspects of the pump's operation including pumping lift, discharge pressure, power input and water flow. The results of the pump test estimate the overall efficiency of the pumping plant under the test conditions.
[2] Pump tests performed by BPA engineers do not qualify for payment.
[3] Irrigation System Analysis: Combined with a pump test, the irrigation delivery system is reviewed for potential efficiency improvements including lower flows, reduced pipeline friction and leak repair.

6.3.4 Low Energy Precision Agriculture (LEPA) (BPA-Qualified)

Basis for Energy Savings

The base case for this measure is a center pivot or lateral move system with low-pressure sprinklers located at mid-elevation (e.g., six feet above the soil surface). This BPA-Qualified measure is intended as an additional payment for conversion of a center pivot or lateral move irrigation system. LEPA can use a variety of methods to have the water delivered directly onto the soil using bubblers, hoses and/or socks. Lowering the water delivery point directly onto the soil has been shown to reduce the water evaporation during the irrigation season, as well as reducing the pressure requirements of the irrigation system's overall pressure — and energy — required to efficiently water crops. LEPA also may provide more uniform water application, reduce the incidence of disease, and may improve crop quality and yield. In BPA-sponsored research, the water savings average of 5 to 15 percent has been observed.

Requirements and Specifications

This measure is an additional payment for each center pivot and lateral move irrigation system that is converted to LEPA. Sprinkler hardware measures such as goosenecks, drop tubes, pressure regulators and sprinklers also can be claimed.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Completed Project Information Form for LEPA/LESA conversions (available in the IM Document Library).		X	X

Payment

BPA will pay $100 for each system conversion upon submission of the Project Information Form. Customers can separately claim all qualifying irrigation measures installed for LEPA conversion in the UES Measure Upload Template.

6.3.5 Low Elevation Sprinkler Application (LESA) (BPA-Qualified)

Basis for Energy Savings

The base case for this measure is a center pivot or lateral move system, with low-pressure sprinklers located at the mid-elevation (e.g., six feet above the soil surface). This BPA-Qualified measure is designed for center pivot and lateral move irrigation systems and places the sprinkler within three feet of the soil surface. LESA improves application efficiency, reduces direct evaporation from the sprinkler, and requires less pressure to operate; therefore reducing water consumption. A LESA equipped irrigation system can save water, save energy, reduce fertilizer requirements and costs, and may improve crop yield. In BPA-sponsored research, a water savings average of 5 to15 percent has been observed.

Requirements and Specifications

This measure is an additional payment for each center pivot and lateral move irrigation system that is converted to LESA. Sprinkler hardware measures such as goosenecks, drop tubes, pressure regulators and sprinklers can also be claimed.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Completed Project Information Form for LEPA/LESA conversions (available in the IM Document Library).		X	X

Payment

BPA will pay $100 for each system conversion upon submission of the Project Information Form. Customers can separately claim all qualifying irrigation measures installed for LESA conversion in the UES Measure Upload Template.

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

Basis for Energy Savings

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

BPA is collecting data on these retrofits to help support the RTF analysis of this measure.

Requirements and Specifications

This measure applies to pumping operations that deliver, distribute or transport irrigation water with qualifying VFDs from 20 to 500 horsepower. 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). BPA recommends that all new VFD installations meet the IEEE 519 standard. This measure provides an annual energy savings of 20 percent of the average of the previous three operating years' annual energy usage of the pump.

Customers must use the Variable Frequency Drives in Agricultural Turbine Pump Applications – VFD Calculator to estimate savings (available in the IM Document Library). BPA no longer collects information for this measure from the BPA-Qualified and Provisional UES Input Sheet.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Complete the Agricultural Turbine Pump Applications VFD Calculator (available in the IM Document Library) and include pump curve (available from the pump manufacturer) regardless of completion date.		X	X

Payment

BPA shall pay $60 per installed horsepower.

6.5 TRANSFORMER DE-ENERGIZATION

Basis for Energy Savings

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 nonirrigation season.

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

Requirements and Specifications

Transformer De-Energization (TRX-DX) 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 startup. TRX-DX applies to systems that serve only an agricultural load and must be submitted as a UES measure and have a one-year measure life.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Complete the Transformer De-Energization Worksheet (available in the IM Document Library).		X	X

Payment

BPA will pay $0.025 kWh of busbar savings.

6.6 NEW AGRICULTURAL CONSTRUCTION

Basis for Energy Savings

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

Requirements and Specifications

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

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table.

6.7 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); and
- Nursery and greenhouse project improvements in irrigation, air handling, temperature and humidity controls for facilities using less than 1 aMW (if usage is above 1 aMW, projects at the facility are considered industrial).

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table.

6.8 MULTISECTOR OPPORTUNITIES

Additional opportunities are available in the Multisector chapter and specific measure information may be found in the primary sector section listed below:

Processes

Measures and Initiatives

1. Nonresidential Lighting Program (see Commercial, section 7.3)
2. Advanced Rooftop Control Unit (see Commercial, section 7.4.1)
3. Commercial Ductless Heat Pump (see Commercial, section 7.4.2)
4. Commercial Heat Pump Conversion (see Commercial, section 7.4.3)
5. Commercial Heat Pump Upgrade (see Commercial, section 7.4.4)
6. Connected Thermostat (see Commercial, section 7.4.5)
7. Variable Refrigeration Flow System (see Commercial, section 7.4.6)
8. Variable Frequency Drive on Air Handling Unit Fan (see Commercial, section 7.4.7)
9. Commercial Insulation (see Commercial, section 7.5.1)
10. Commercial Windows (see Commercial, section 7.5.2)
11. Generator Engine Block Heaters (see Commercial, section 7.9.4)
12. Vehicle Engine Block Heater Controls (see Commercial, section 7.9.5)
13. Variable Frequency Drives in Small Compressed Air Systems (see Industrial, section 9.4)
14. Green Motors Rewind Initiative (see Multisector, section 12.3.2)
15. Limited Availability Emerging Technology Field Test Projects (see Multisector, section 12.3.3)

Section 7: Commercial Sector

The Commercial Sector includes electrical energy used in service providing facilities and businesses equipment; federal, state and local governments; and other private and public organizations. The Commercial Sector is generally defined as nonmanufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, health, social and educational institutions.

7.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Custom Projects – New and Existing Buildings	See the Custom Projects Payment Table.
New Construction/Major Renovation	See the Custom Projects Payment Table.
Nonresidential Lighting	See Nonresidential Lighting Program Offerings
HVAC	
Advanced Rooftop Unit Control Retrofit	$100–$225/ton
Ductless Heat Pump	$800/ton
Heat Pump Conversion	$500/ton
Heat Pump Upgrade	<6 tons: $1,000/heat pump; 6–20 tons: $200/ton
Connected Thermostat	$200/thermostat
Variable Refrigerant Flow System	$800/ton
Variable Frequency Drive on Air Handling Unit Fan	$300/horsepower
Shell Measures	
Insulation	$0.45–$1.25/square foot
Windows for Commercial Buildings	$3–$6/square foot
Electric Water Heaters	
Electric Resistance Water Heater	$50/electric resistance water heater
Heat Pump Water Heater	$300–$500/heat pump water heater
Refrigeration	
Anti-Sweat Heater (ASH) Controls	$40/linear feet of case controlled
Floating Head Pressure Control on Single Compressor Systems	$60–$100/compressor nameplate horsepower

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7.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Compressor Head Cooling Fan - Shaded Pole to Electronically Commutated Motor (ECM)	$62/motor
Walk-In or Display Case Evaporator Fan Motors-Shaded Pole to ECM	$55–$140/ECM motor
Walk-In Evaporator ECM Fan Speed Control - Constant to Variable	$35/motors per controller
Door Gasket Replacement for Walk-In and Reach-In Coolers and Freezers	$25–$65/door
Strip Curtains for Walk-In Coolers and Freezers	$9/square foot of doorway
Kitchen and Food Service Equipment	
Demand Controlled Kitchen Ventilation	$200–$400/horsepower of fan
Electric Commercial Steam Cookers	$50–$200/steamer pan
Hot Food Holding Cabinets	$75–$200/cabinet
Electric Combination Ovens	$500/oven
Electric Convection Ovens	$300/oven
Commercial Electric Fryers	$300/fryer
Pre-Rinse Spray Wash Valves	$100/spray valve
Additional UES Offerings	
ENERGY STAR Commercial Clothes Washers	$25–$125/washer
Smart Power Strips	$15/strip
Commercial Showerheads	$8–$11/showerhead
Generator Engine Block Heaters	$200–$1,500/unit
Vehicle Engine Block Heater Controls	$160/unit
Additional Multisector Opportunities	
Variable Frequency Drives in Small Compressed Air Systems	See the Custom Projects Payment Table.
ENERGY STAR Clothes Washers	$15–$50/washer
ENERGY STAR Clothes Dryers	$50–$175/dryer
Green Motors Rewind Initiative	$2/horsepower

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7.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Limited Availability Emerging Technology Demonstration Field Test Projects	See the Custom Projects Payment Table.

* The payment levels described in this table are a summary. Complete details of the payment levels and associated requirements may be found in the corresponding text of the IM. Please see the Table of Contents for the text location.

7.2 COMMERCIAL CUSTOM PROJECTS – EXISTING BUILDINGS AND NEW CONSTRUCTION

Many Commercial Sector efficiency opportunities are complex. They involve site-specific installations and include savings or interaction between energy consuming systems in a building. These opportunities include, but are not limited to: new construction, HVAC, shell measures, existing building commissioning, air-flow management in imbedded data centers, strategic energy management, high-performance new building design and, in rare circumstances, lighting projects.

Requirements and Specifications

These measures must be submitted as custom projects.

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table. The incremental cost to retrofit existing equipment is the fully installed measure cost. The incremental cost to replace burned-out/failing/failed equipment is the cost above code or its equivalent (e.g., for HVAC replacement, the incremental cost is the cost of equipment above the federal or state applicable standard for new or replacement equipment).

7.3 NONRESIDENTIAL LIGHTING

To participate in the Nonresidential Lighting Program, customers must capture site-specific project data in the lighting calculator (LC) (within the agricultural, commercial, federal or industrial sectors) and submit it to BPA for review and approval.

The Nonresidential Lighting Program applies to the following:

1. Existing building (retrofit/upgrade) projects;

2. New construction projects;

3. All High-Intensity Discharge (HID) (metal halide, high-pressure sodium, low-pressure sodium and mercury vapor) lighting in exterior applications regardless of sector (installations in residential settings must be reported as commercial).

To participate in the program, customers must capture project data in the lighting calculator and submit it to BPA for review and approval.

Required Documents

Nonresidential Lighting Calculators

Basis for Energy Savings

Site-specific calculators are used to determine energy savings when there is too much variability in the range of savings associated with a given technology and/or application. In the case of nonresidential lighting, the unique hours of operation by space use type, and the wide variety of building types and applications, create the demand for a comprehensive lighting calculator instead of a suite of lighting-focused UES measures. BPA's lighting calculator seeks to align with the RTF Nonresidential Lighting Protocol around issues such as baseline determination, control savings fractions and HVAC interactive effects. These factors are built into the lighting calculator's algorithms so the user only needs to enter information specific to the project — such as hours of operation by space, existing technology and proposed technology. Lighting Calculator ~~3.3 and~~ 4.0 and 5.0 produce utility and customer project reports, which detail the accounting of all savings values. More information about lighting calculator baselines and interactive effects can be found in the Lighting Formulas and Adjustments document contained within the lighting tools. More information on the RTF nonresidential lighting protocol can be found on the RTF website.

Lighting Calculators

Option 1 customers must use an eligible BPA lighting calculator. BPA will periodically release updated lighting calculators with improved functionality and other changes necessary to respond to an evolving market. When a new lighting calculator is released, it will be posted in the IM Document Library for customer use. The table below shows the effective dates and retirement dates for lighting calculators that are in use.

CALCULATOR	EFFECTIVE DATE	PLANNED RETIREMENT DATE*
LC 3.3 (and LC 3.35, the promotional version of LC 3.3)	Oct. 1, 2014	Sept. 30, 2019
LC 4.0 ~~(and LC 4.05, the promotional version of LC 4.0)~~	Oct. 1, 2017	Dec. 31, 2019
LC 5.0	April 1, 2019	Dec. 31, 2021

*Note that "retirement date" means the last date that customers may submit a completed calculator through the Customer Portal to the BPA reporting system.

Lighting Calculator 3.3

Lighting Calculator 3.3 Measure Types and Approval Procedures

Lighting Calculator 3.3 may include two types of measures: (1) deemed and (2) calculated. These are submitted as projects, as outlined below:

1. Deemed Lighting Measures – Deemed measures have been preapproved by BPA and do not require review by BPA prior to submission to the BPA reporting system. Incentives for deemed lighting measures are detailed in the Program Offerings section of Lighting Calculator 3.3.

2. Calculated Lighting Measures – If a proposed measure is not on the list of Deemed Measures, it may be submitted as a calculated measure. 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.

Lighting Calculator 3.3 offers three types of calculated lighting measures:

1. Decommissioning – the number of proposed fixtures is less than the number of existing fixtures.

2. Fixture Increase – the number of proposed fixtures is greater than the number of existing fixtures.

3. Nonstandard – the measure is not deemed, decommissioning, or a fixture increase.

No BPA approval is required for decommissioning or fixture increase measures — Lighting Calculator 3.3 will automatically apply a calculated payment.

To request a nonstandard measure in Lighting Calculator 3.3, the user should select the nonstandard option from the drop-down menu. The calculator will highlight the measure in red and indicate that the measure is nonstandard and requires BPA approval. The customer must send the lighting calculator and any applicable product documentation requested by the BPA Lighting Team such as cut sheets, product specification sheets, or third-party tests (e.g., LM-79) to lighting@bpa.gov for review and acceptance.

The BPA Lighting Team will review the nonstandard measures and notify the customer whether or not the measures were accepted. Once the measures are accepted, the red highlighting and project-level alert about needing BPA approval will disappear. No further documentation is required for nonstandard measures.

As solid-state lighting proliferates, new wattage options are emerging on the market, which may not be included in the calculator drop down menus. In the event the lighting calculator does not list the exact proposed wattage, a utility may choose one of two options:

1. A utility may round the selected wattage in the lighting calculator to the nearest available value in the drop-down menu. Utilities may not round more than 10 watts.

2. A utility may manually enter the value of the efficient product, which will result in a nonstandard calculated measure.

Lighting Calculator 3.3 Project Types and Requirements

Lighting Calculator 3.3 recognizes four types of projects: (1) new construction; (2) retrofit; (3) batch; and (4) custom. This section outlines eligibility criteria, requirements, and payments for each of these project types.

1. New Construction Projects

Eligibility: A nonresidential lighting project is new construction if the answer to any of the following questions is "yes."

• Is this a newly constructed facility or newly constructed exterior area with new lighting fixtures?

• Is this a newly constructed addition to an existing facility that adds usable floor area?

• Is the project a major renovation? A project is considered a major renovation whenever a whole building permit is required.

• Is there a change in occupancy type (e.g., office to food service or retail to office)?

Requirements for new construction lighting projects:

- Enter the lighting power allowance (i.e., total watts allowed) into the lighting calculator as determined by one of the following:
  - i. Applicable code compliance form
  - ii. Calculation using applicable state or local energy code*

iii. Common practice calculation approved by the BPA Lighting Team**

*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.

**When a code compliance form is not available or a project is exempt from code, upon approval from the BPA Lighting Team, the lighting power allowance may be determined by using a common practice calculation.

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

  i. Applicable code compliance form

  ii. Calculation of total installed watts

- New construction projects must achieve at least a 20 percent kWh reduction from the lighting power allowance, as determined by the lighting calculator.

Payments: Payments are calculated at $0.18 per kWh saved, using the fully adjusted savings (factoring in HVAC and busbar adjustments).

2. Retrofit Projects for Existing Buildings

Eligibility: Nonresidential lighting projects that do not meet the criteria for new construction are eligible as retrofit projects.

Requirements:

- The project must achieve at least a 25 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.

Payments: See the Program Offerings page in Lighting Calculator 3.3 for payments.

3. Batch Lighting Projects

Eligibility: Retrofit projects that target a specific technology and specific application across multiple sites within a utility service territory (such as street lights or area lights) may be submitted in a lighting calculator as a batch lighting project. These projects may cover multiple pre- and post-conditions, but are limited to a single technology and application.

Requirements: The location of individual installations shall be documented using one of the following available methods:

a) The utility may enter the site addresses in the notes section of the Measures tab for each measure within a lighting calculator

b) The utility may create a separate spreadsheet, to be kept in their utility file, which documents the site address for each installation site.

For measures in batch lighting projects which do not have a physical address, the nearest intersection, utility pole identifier, or geographic coordinates may be submitted as documentation.

Payments: See the Program Offerings page in Lighting Calculator 3.3 for payments.

4. Custom Lighting Projects

Eligibility: Any nonresidential lighting project may be submitted as a custom project.

Requirements: Custom lighting projects may be submitted using a BPA custom project calculator or an equivalent, such as a vendor-provided

lighting calculator or energy-modeling software. It also must follow the custom projects requirements of the IM. BPA will review the calculator or energy model and supporting documentation to determine whether the project qualifies as a custom lighting project. Once the project is accepted as a custom lighting project, it must meet the following requirements:

• Equivalent calculators must use all current BPA baselines (as determined by applicable baseline on project start date), controls and requirements.

• If the measures contain additional fixtures (not replacements) that are required to meet operating requirements, the measures must be identified as new fixtures in the custom project, and incremental cost and savings information must be provided.

• The baseline description must contain the justification for the additional fixtures (e.g., required for safety, change in equipment layout or change in use of area).

• Power measurements for new induction and fluorescent fixtures are not required; customers may use manufacturers' published wattage specifications (e.g., cut sheets) to determine energy savings.

• The actual input power of all new or existing LED and high-intensity discharge (HID) fixtures must measure true root-mean-square power.

• Customers may use the manufacturer's stated wattage or lighting power estimates in the form of the submitted lighting calculator for all other non-HID or non-LED lights.

• Fixed schedule controls (e.g., time-based and photo cells) must have a fixed control operating schedule that documents commissioning and clearly outlines programmed hours of operation. These types of controls do not require logging.

• Nonfixed schedule controls (e.g., occupancy sensors and day lighting) require a minimum of two weeks of data logging to accurately determine hours of operation. Foot candle measuring is acceptable.

Payment: See the Custom Projects Payment Table.

Lighting Calculator 3.3 Baselines

Lighting Calculator 3.3 applies the baselines listed in this section to determine the savings delta reportable to BPA. As the market changes, and as federal codes and standards take effect, BPA modifies reportable baselines as applicable. The table below follows the guidance offered by the RTF Lighting Protocols for baseline determination:

PROJECT TYPE	BASELINE	APPLIES TO	NOTES
Retrofit	Market average baseline.	All 4' and 8' T12 linear fluorescent lamps.	See the Market Average Baseline table.
	Energy Independence and Security Act (EISA)	All 100, 75, 60, and 40-watt standard incandescent A-lamps.	See the EISA Baseline table.
	Preconditions	All existing lighting technologies not deemed obsolete by RTF lighting protocols or covered by codes or standards.	The preconditions baseline is the same as "what's in the ceiling".
New Construction	State/local codes or common practice if approved by the BPA Lighting Team.	All new construction projects.	The maximum lighting power allowance is the baseline – contact the BPA Lighting Team if project is exempt from code.

MARKET AVERAGE BASELINE		
EXISTING OBSOLETE EQUIPMENT (APPLIES TO ALL BALLAST TYPES)		NEW MARKET BASELINE
LIGHTING SYSTEM CATEGORIES	EXISTING T12 LAMP WATTAGES	REPORTABLE FIXTURE WATTAGE/LAMP (MULTIPLY BY NUMBER OF LAMPS IN FIXTURE TO SCALE)
All 4' T12	34	28.7
	40	
All Slim line 8' T12	60	51.7
	75	
All HO 8' T12	95	90
	110	
All VHO 8' T12	185	131.5
	215	

EISA BASELINE	
EXISTING 'OBSOLETE' EQUIPMENT	REPORTABLE LAMP WATTAGE
100-watt incandescent	72
75-watt incandescent	53
60-watt incandescent	43
40-watt incandescent	29

Lighting Calculator 3.3 Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
New Construction Lighting Projects			
Completed lighting calculator.	X		X
Comply with one of the following: • An applicable code compliance form documenting the source of lighting power allowance (watts) and proposed lighting power (watts) figures used in the lighting calculator; • Document showing calculations using an applicable code to determine lighting power allowance (watts) and proposed lighting power (watts) figures used in the lighting calculator; or • Document showing calculations using applicable common practice (approved by BPA Lighting Team) to determine lighting power allowance (watts) and proposed lighting power (watts) figures used in the lighting calculator.			X

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Retrofit Lighting Projects			
Completed lighting calculator.	X		X
Submit project invoice(s) documenting site address and total project cost, including costs incurred from equipment, labor, permits and disposal fees.			X
Batch Lighting Projects			
Completed lighting calculator.	X		X
Show documentation of location and quantity of fixtures in batch, either in the customer-generated spreadsheet or in the "notes" section of the lighting calculator.			x
Custom Lighting Projects			
Custom projects must follow the Custom Projects Documentation Requirements.			

Lighting Calculator 4.0 and 5.0

Lighting Calculator 4.0 and 5.0 Measure Types and Approval Procedures

Lighting Calculator 4.0 ~~includes~~ and 5.0 inlcude two types of measures: deemed and calculated, which are submitted as projects, as outlined below:

1. Deemed Lighting Measures – Deemed measures have been pre-approved by BPA and do not require review by BPA prior to submission to the BPA reporting system. Available deemed lighting measures are in the Program Offerings section of Lighting Calculator 4.0 and 5.0 respectively.

2. Calculated Lighting Measures – If a proposed measure is not on the Deemed Measure List, it may be submitted as a calculated measure. 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.

Lighting Calculator 4.0 and 5.0 offer~~s~~ four types of calculated lighting measures:

- 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: Lighting Calculator 4.0 and 5.0 provide~~s~~ Signage and LED Linear measures with an auto-calculated incentive.
- Nonstandard: the measure is not deemed, decommissioning, fixture increase, or auto-calculated.

No BPA approval is required for decommissioning, fixture increase, or auto-calculated measures–Lighting Calculator 4.0 and 5.0 will automatically apply a calculated payment.

To request a nonstandard measure in Lighting Calculator 4.0 and 5.0, the user

should select the "nonstandard" option from the available drop-down menu. The calculator will highlight the measure in red and indicate the measure is nonstandard and requires BPA approval. The customer must send the lighting calculator and any applicable product documentation requested by the BPA Lighting Team such as cut sheets, product specification sheets, or third-party tests (e.g., LM-79) to lighting@bpa.gov for review and acceptance.

The BPA Lighting Team will review the nonstandard measures and notify the customer whether or not the measures were accepted. Once the measures are accepted, the red highlighting and Project-Level Alert about needing BPA approval will disappear. No further documentation is required for nonstandard measures.

As solid-state lighting continues to proliferate, new wattage options emerge on the market that may not be included in the calculator drop down menus. In the event the lighting calculator does not list the exact proposed wattage a utility may choose one of two options:

1. A utility may round the selected wattage in the lighting calculator to the nearest available value in the drop down menu. Utilities may not round more than 10 watts; or

2. A utility may manually enter the value of the efficient product, which will result in a nonstandard calculated measure.

Lighting Calculator 4.0 and 5.0 Project Types and Requirements

Lighting Calculator 4.0 and 5.0 recognizes four types of projects: (1) new construction, (2) retrofit, (3) batch, and (4) custom projects. This section outlines eligibility criteria, requirements, and payments for each of these project types.

1. New Construction Projects

Eligibility: A nonresidential lighting project is new construction if the answer to any of the following questions is "yes."

- Is the facility or exterior lighting system newly constructed?
- Is the facility a newly constructed addition to an existing facility?
- Is there a change in occupancy type as part of the lighting project? *(e.g., is the occupancy type changing from retail to office or library to retail, etc.?)*
- Is the project a major renovation for reasons other than lighting? A project is considered a major renovation whenever a whole building permit is required. *(In other words, if the only reason building energy codes are triggered is the lighting project itself, the project can be classified as a retrofit. However, if the project encompasses any other major building systems, such as HVAC, the project should be considered new construction.)*

Requirements for new construction lighting projects:

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

  i. Applicable code compliance form;

  ii. Calculation using applicable state or local energy code;* or

  iii. Common practice calculation approved by the BPA Lighting Team.**

  *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.

**When a code compliance form is not available or a project is exempt from code, upon approval from the BPA Lighting Team, the lighting power allowance may be determined by using a common practice calculation.

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

  i. Applicable code compliance form; or

  ii. Calculation of total installed watts.

- ~~Square footage figures for both interior and exterior (if applicable) new construction projects must be entered into Lighting Calculator 4.0.~~

- New Construction projects must achieve at least a 20 percent kWh reduction from the lighting power allowance, as determined by the lighting calculator.

~~*Payments:* Payments are calculated at $0.18 per kWh saved, using the fully adjusted savings (factoring in HVAC and busbar adjustments).~~

Payments: See the Program Offerings page in Lighting Calculator 4.0 and 5.0 respectively for payments.

2. Retrofit Projects for Existing Buildings

Eligibility: Nonresidential lighting projects that do not meet the criteria for new construction are eligible as retrofit projects.

Requirements:

- Project must achieve at least a 25 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.

Payments: See the Program Offerings page in Lighting Calculator 4.0 and 5.0 respectively for payments.

3. Batch Lighting Projects

Eligibility: Retrofit projects that target a specific technology and specific application across multiple sites within a utility service territory (such as street lights or area lights) may be submitted in a lighting calculator as a batch lighting project. These projects may cover multiple pre- and post-conditions, but are limited to a single technology and application.

Requirements: The location of individual installations shall be documented using one of the following available methods:

- The utility may enter the site addresses in the notes section of the Measures tab for each measure within a lighting calculator; or

- The utility may create a separate spreadsheet, to be kept in their utility file, which documents the site address for each installation site.

For measures in batch lighting projects which do not have a physical address, the nearest intersection, utility pole identifier, or geographic coordinates may be submitted as documentation.

Payments: See the Program Offerings page in ~~the~~ Lighting Calculator 4.0 and 5.0 respectively for payments.

4. Custom Lighting Projects

Eligibility: Any nonresidential lighting project may be submitted as a custom project.

Requirements: Custom lighting projects may be submitted using a BPA Custom Project Calculator or an equivalent, such as a vendor-provided lighting calculator or energy-modeling software, and must follow the custom projects requirements of the IM. BPA will review the calculator or energy model and supporting documentation to determine whether the project qualifies as a custom lighting project. Once the project is accepted as a custom lighting project, it must meet the following requirements:

- Equivalent calculators must use all current BPA baselines (as determined by applicable baseline on project start date), controls and requirements.
- If the measures contain additional fixtures (not replacements) that are required to meet operating requirements, the measures must be identified as new fixtures in the custom project, and incremental cost and savings information must be provided.
- The baseline description must contain the justification for the additional fixtures (e.g., required for safety, change in equipment layout or change in use of area).
- Power measurements for new induction and fluorescent fixtures are not required; customers may use manufacturers' published wattage specifications (e.g., cut sheets) to determine energy savings.
- The actual input power of all new or existing LED and high-intensity discharge (HID) fixtures must measure true root-mean-square power.
- Customers may use the manufacturer's stated wattage or lighting power estimates in the form of the submitted lighting calculator for all other non-HID or non-LED lights.
- Fixed schedule controls (e.g., time-based and photo cells) must have a fixed-control operating schedule that documents commissioning and clearly outlines programmed hours of operation. These types of controls do not require logging.
- Nonfixed schedule controls (e.g., occupancy sensors and day lighting) require a minimum of two weeks of data logging to accurately determine hours of operation. Foot candle measuring is acceptable.

Payment: See the Custom Projects Payment Table.

Lighting Calculator 4.0 and 5.0 Lighting Promotions

Periodically, BPA may promote specific lighting measures and applications by temporarily offering higher incentives and/or allowing the total incentive to cover up to 100 percent of the project cost. To claim these promotions, customers must contact lighting@bpa.gov, and BPA will modify customers' existing version of LC 4.0 or 5.0 (creating version 4.05 or 5.05 respectively) to accommodate the promotions. This modified calculator may only be used for the specific lighting measures eligible within the promotion. If a project also contains nonpromotional measures, these measures must be submitted on a nonpromotional lighting calculator.

Promotions will be announced through normal communication channels.

Lighting Calculator 4.0 and 5.0 Baselines

Lighting Calculator 4.0 and 5.0 ~~applies~~ apply the following baselines to determine the savings delta reportable to BPA. As the market changes and federal codes and standards take effect, BPA modifies reportable baselines as applicable. The table below follows the guidance offered by the RTF Lighting Protocols for baseline determination

PROJECT TYPE	BASELINE	APPLIES TO	NOTES
Retrofit	Energy Independence and Security Act (EISA)	All 100, 75, 60, and 40-watt standard incandescent A-lamps.	See the EISA Baseline table.
	Preconditions	All existing lighting technologies determined by the RTF nonresidential lighting protocol to have a remaining useful life greater than one year.	The preconditions baseline is the same as "what's in the ceiling." For retrofit projects, all existing technologies will qualify for preconditions baseline with the exception of standard base screw-in incandescent lamps.
New Construction	State/local codes or common practice if approved by the BPA Lighting Team.	All new construction projects.	The maximum lighting power allowance is the baseline – contact the BPA Lighting Team if the project is exempt from code.

EISA BASELINE	
EXISTING 'OBSOLETE' EQUIPMENT	**REPORTABLE LAMP WATTAGE**
100-watt incandescent	72
75-watt incandescent	53
60-watt incandescent	43
40-watt incandescent	29

Lighting Calculator 4.0 and 5.0 Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
New Construction Lighting Projects			
Completed lighting calculator	X		X
Comply with one of the following: • An applicable code compliance form documenting the source of the lighting power allowance (watts) and proposed lighting power (watts) figures used in the lighting calculator; • Document showing calculations using an applicable code to determine the lighting power allowance (watts) and proposed lighting power (watts) figures used in the lighting calculator; or • Document showing calculations using applicable common practice (approved by BPA Lighting Team) to determine the lighting power allowance (watts) and proposed lighting power (watts) figures used in the lighting calculator.			X
Retrofit Lighting Projects			
Completed lighting calculator	X		X
Submit project invoice(s) documenting site address and total project cost, including costs incurred from equipment, labor, permits and disposal fees.			X

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Batch Lighting Projects			
Completed lighting calculator.	X		X
Show documentation of location and quantity of fixtures in batch, either in the customer-generated spreadsheet or in the "notes" section of the lighting calculator.			x
Custom Lighting Projects			
Custom projects must follow the Custom Projects Documentation Requirements.			

7.4 COMMERCIAL HVAC

7.4.1 Advanced Rooftop Unit Control (ARC) (BPA-Qualified)

Basis for Energy Savings

Advanced Rooftop Control (ARC) retrofits add a variable frequency drive (VFD) and controls to existing, constant-speed HVAC rooftop unit (RTU) supply fans. Energy savings are predominantly achieved by reducing the operation of the supply fan. For this reason, the measure applies to both electric and gas systems. This measure offers two approaches for installation; ARC-Lite and Full ARC. The Full ARC system includes both a digital, integrated economizer control and web monitoring with alerts. These additional features allow the Full ARC to achieve greater savings.

Requirements and Specifications

This measure is available for retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

Qualifying ARC retrofit applications have the following characteristics:

- Heating type is electric or gas.
- Existing RTU has the following characteristics:
  - A cooling capacity equal to or greater than five 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:

Both Full ARC and ARC-Lite retrofits must add one of the following equipment options to the existing RTU:

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

Required Documents

Advanced Rooftop Control Qualified Products List

Advanced Rooftop Control Project Information Form

The Full ARC Retrofit applications must also include a controller with both of the following capabilities:

- Digital, integrated economizer control; and
- Web-enabled control, monitoring and alarms.

BPA will accept only ARC and ARC-Lite products that are on the BPA ARC Qualified Products List. The Qualified Products List includes only those products that meet the above equipment requirements.

If a product or combination of products meets these requirements, but is not on the Qualified Products List, please use the COTR Request and Acknowledgement Procedure for approval to use the product.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Advanced Rooftop Unit Control (ARC) Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

Project reporting to BPA is based on whole tons of cooling capacity. At a project level, total tons of cooling capacity shall be calculated using one of the following two methods:

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

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

MEASURE CATEGORY	OCCUPIED HOURS PER YEAR	PAYMENT PER TON
ARC Retrofit – Full	2,000 – 4,000	$150
	4,001 – 8,760	$225
ARC Retrofit – Lite	2,000 – 4,000	$100
	4,001 – 8,760	$150

7.4.2 Ductless Heat Pump (BPA-Qualified)

Basis for Energy Savings

The following two base HVAC system energy savings were used to calculate ductless heat pump (DHP) energy savings in commercial buildings, using a 2009 code baseline:

- 70 percent energy savings for electric forced air with A/C; and
- 30 percent energy savings for electric resistance heat without cooling.

CBSA data was used to weight the average savings for the following elements: (1) building envelope, (2) occupancy schedule, (3) number of stories, (4) base case pre-existing HVAC system, and (5) climate zone.

The efficient case used to calculate energy savings installs a fully ductless, inverter-driven DHP with a variable-speed indoor fan.

Requirements and Specifications

This measure is available for retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

Qualifying applications have the following characteristics:

- The space conditioned by the DHP is heated by either zonal or forced-air electric resistance heat as the primary system (gas is not eligible); and
- The space conditioned by the DHP is not conditioned by an air source, ground source or ductless heat pump; or:
- Even if the space was previously conditioned by an air source, ground source, or ductless heat pump that is no longer working, and the space is conditioned by backup zonal or forced-air electric resistance heat, the application is still eligible for a DHP.

Post-conditions:

Installed DHPs must have all of the following features:

- A split-system heat pump employing an inverter-driven outdoor compressor;
- Inverter-driven or variable-speed indoor blowers; and
- Rated with a minimum of 9.0 HSPF (for single head systems) and 8.2 HSPF (for multihead systems).

BPA will accept only products listed on the BPA Ductless Heat Pump Qualified Products List (QPL). For multihead systems, the outdoor unit must be listed on the QPL. The QPL includes only those products that meet the above equipment requirements.

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

Beginning April 1, 2018, this measure will utilize a Qualified Applications List to document installation applications that were approved by BPA after publication of this document.

Required Documents

Ductless Heat Pump Qualified Products List

Ductless Heat Pump Project Information Form

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Ductless Heat Pump Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and it has been BPA-Approved.			X

Payment

Project reporting to BPA is based on whole tons of outdoor unit cooling capacity. At a project level, total tons of outdoor unit cooling capacity shall be calculated using one of the following two methods:

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

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

MEASURE CATEGORY	PAYMENT PER TON
Ductless Heat Pump	$800

7.4.3 Heat Pump Conversion (BPA-Qualified)

Basis for Energy Savings

A heat pump conversion replaces an existing electric resistance heating system with a heat pump (e.g., adds an electric air source heat pump to a system where one did not previously exist). Heat pump-to-heat pump systems are not eligible for heat pump conversion payments (see the Heat Pump Upgrade measure). The basis for savings comes from BPA's review and analysis of the heat pump installations and associated heat pump calculators completed between 2013 and 2015. The savings are based on BPA's analysis of historical projects that assume an electric resistance heat baseline.

Requirements and Specifications

This measure is available for retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

Qualifying heat pump conversion applications have the following building characteristics:

Required Documents

BPA Heat Pump Specification

Heat Pump Conversion Project Information Form

- Electric resistance heat (air source, ground source and ductless heat pumps, and gas systems are not eligible).

Post-conditions:

- Less than 20 tons of cooling capacity;
- Be an air-to-air heat pump system; and
- Meets BPA Tier 1 or Tier 2 efficiency requirements per the BPA Heat Pump Specification located in the IM Document Library.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Heat Pump Conversion Project Information Form (located in the IM Document Library), showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

Project reporting to BPA is based on whole tons of cooling capacity. At a project level, total tons of cooling capacity shall be calculated using one of the following two methods:

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

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

MEASURE CATEGORY	PAYMENT PER TON
Heat Pump Conversion	$500

7.4.4 Heat Pump Upgrade (BPA-Qualified)

Basis for Energy Savings

A heat pump upgrade either: 1) replaces an existing heat pump with a more efficient heat pump (e.g., replacing a code minimum heat pump with a CEE Tier 2 heat pump); or 2) is an efficient heat pump installed as part of a new construction project.

The basis for savings comes from BPA's review and analysis of the heat pump installations and associated heat pump calculators completed between 2013 and 2015. BPA's analysis of each project assumed a code baseline. Results showed an average project size of four tons, with an average savings of 650 kWh per ton. Using this data, BPA assumes an average savings of 650 kWh per ton for all heat pump sizes.

Required Documents

Heat Pump Upgrade Project Information Form

BPA Heat Pump Specification

Requirements and Specifications

This measure applies to both existing building retrofits and new construction.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

Qualifying Heat Pump Upgrade applications have the following characteristics:

- For retrofits, it replaces an existing heat pump;
- Even if the space was previously conditioned by an air source, ground source, or ductless heat pump that is no longer working, and the space is conditioned by backup zonal or forced-air electric resistance heat, the application is still eligible for a heat pump upgrade; and
- For new construction, there are no precondition requirements.

Post-conditions:

Heat pumps installed must meet the following requirements:

- Less than 20 tons of cooling capacity;
- Be an air-to-air heat pump system; and
- Meet BPA Tier 1 or Tier 2 efficiency requirements per the BPA Heat Pump Specification located in the IM Document Library.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Heat Pump Upgrade Project Information Form (located in the IM Document Library, showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

For a heat pump, less than six tons:

- Payment is provided per heat pump. For example, a building where two heat pumps are being installed shall be eligible for two separate payments.

For a heat pump, six to 20 tons:

- Project reporting to BPA is based on whole tons of cooling capacity. At a project level, total tons of cooling capacity shall be calculated using one of the following two methods:

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

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

MEASURE CATEGORY	PAYMENT
Heat Pump, less than six tons.	$1,000/heat pump
Heat Pump, between six and 20 tons.	$200/ton

7.4.5 Connected Thermostat (BPA-Qualified)

Basis for Energy Savings

Connected thermostats were previously referred to as web-enabled programmable thermostats (WEPTs). The efficient case used to calculate savings for connected thermostats includes thermostats that are capable of controlling the HVAC supply fan. This meets the mechanical building code-required, minimum ventilation level during occupied periods, while also saving energy during unoccupied periods. For this reason, the measure applies to both electric and gas systems.

Energy savings result from the ability to program operating schedules, temperature set-points, and supply fan operation during unoccupied periods. This includes evenings, holidays and breaks. Energy savings occur primarily during unoccupied periods and were found to be more dependent on heating system type, and less dependent on building type and heating zone.

Requirements and Specifications

This measure is available for retrofits only. Hotel rooms are not eligible.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

Qualifying connected thermostat applications have the following characteristics:

- Heating type is electric or gas;
- Existing HVAC system (which will be controlled by the new thermostat) has an existing supply fan; and
- It replaces an existing thermostat that is not web-enabled.

Buildings are eligible for more than one connected thermostat, as long as each connected thermostat controls an existing HVAC system with a separate supply fan serving a separate zone

Post-conditions:

Connected thermostats installed must include the following features:

- Limited duration occupied-period override;
- Multiple set-back schedules with energy-saving temperature set-points during unoccupied periods, including evenings, holidays and breaks;
- Capable of scheduling the supply fan to operate continuously during occupied periods, and to operate in auto mode during unoccupied periods;
- Remote, web-based monitoring and programming; and
- Settings are retained during power or internet losses (e.g., battery and memory back-up).

BPA will accept only connected thermostat products that are on the BPA Commercial Connected Thermostat QPL. The QPL includes only those products that meet the requirements listed above.

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

Required Documents

Connected Thermostat Project Information Form

Connected Thermostat Qualified Products List

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Connected Thermostat Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

MEASURE CATEGORY	PAYMENT PER THERMOSTAT
Connected Thermostat	$200

7.4.6 Variable Refrigerant Flow System (BPA-Qualified)

Basis for Energy Savings

The energy savings for variable refrigerant flow (VRF) systems in commercial buildings were estimated using building simulation models including: (1) building type; (2) occupancy schedule; (3) existing HVAC system; and (4) climate zone. A climate zone sensitivity analysis did not find significantly varying savings. The existing HVAC systems were either rooftop units with electric heat or variable air volume systems with electric heat. The efficient case used to calculate the energy savings used an inverter-driven VRF system with variable-speed indoor fans and an optimized ventilation system, such as a dedicated outside air system (DOAS). The VRF system was assumed to be 30 percent smaller than the existing HVAC system, and to have better part-load and low-ambient performance.

As a BPA-Qualified measure, BPA will evaluate and track the installations of this measure to better understand the basis for savings.

Requirements and Specifications

This measure applies to retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

The new VRF system is installed in a building with the following characteristics:

- An existing building that has either been 1) occupied for at least one year and didn't change building use type, or 2) it is an existing building with electricity use data available for the previous year;
- 100,000 square feet or less of conditioned floor area; and
- The area conditioned by the new VRF system needs to have been heated previously by either zonal or forced-air, electric-resistance heat as the primary heating source. Buildings heated by air source heat pumps or gas are not eligible.

Required Documents

Variable Refrigerant Flow Project Information Form

BPA Variable Refrigerant Flow Specification

Post-conditions:

VRF systems installed must meet the following requirements:

- A split-system heat pump employing an inverter-driven outdoor compressor;
- Inverter-driven or variable-speed indoor blowers; and
- Meet BPA Tier 1 or Tier 2 efficiency requirements per the BPA Variable Refrigerant Flow Specification located in the IM Document Library.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Variable Refrigerant Flow System Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

Project reporting to BPA is based on whole tons of outdoor unit cooling capacity. At a project level, total tons of outdoor unit cooling capacity shall be calculated using one of the following two methods:

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

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

MEASURE CATEGORY	PAYMENT PER TON
Variable Refrigerant Flow System	$800

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

Basis for Energy Savings

A variable frequency drive (VFD) on an air handling unit (AHU) fan adds a VFD on a constant-speed AHU fan in a variable flow-based air handling system. 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

Required Documents

Variable Frequency Drive on Air Handling Unit Fan Project Information Form

draws less power than at constant speed, resulting in energy savings.

Note that in a variable flow-based air handling system, which is an IM precondition requirement (see below), the air distribution system (e.g., variable air volume, or VAV boxes) can modulate to change air-flow rates. In a constant volume system, which is not an eligible precondition, the air distribution system cannot modulate to change air-flow rates (e.g., a traditional rooftop unit).

The basis for savings is derived from BPA's review and analysis of historical custom project VFD installations, completed between 2011 and 2016.

Requirements and Specifications

This measure applies to retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

Qualifying VFD applications have the following building characteristics:

- Heating type is electric or gas;
- Building operates for equal to or greater than 2,000 hours per year;
- AHU has a variable flow-based HVAC system (constant volume systems in which the air distribution system cannot modulate to change air-flow rates are not eligible); and
- AHU has a constant-speed fan (AHUs with variable speed fans are not eligible).

Post-conditions:

VFD applications must have the following characteristics:

- Retrofit adds a VFD and controller for variable-speed fan operation;
- The VFD is set to trend historical kWh usage, fan runtime and average fan speed; and
- AHU throttling or bypass devices (e.g., inlet guide vanes, dampers, etc.) are removed or permanently disabled.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed VFD on AHU Fan Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form, and has been BPA-Approved.			X

Payment

Project reporting to BPA is based on whole horsepower. At a project level, total horsepower shall be calculated using one of the following two methods:

1. Sum the horsepower for all VFDs installed, then round to the nearest whole horsepower; or

2. Round the horsepower for each individual VFD to the nearest whole horsepower, then sum all rounded horsepower amounts.

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

MEASURE CATEGORY	PAYMENT PER HORSEPOWER
VFD on AHU Fan	$300

7.5 COMMERCIAL SHELL MEASURES

7.5.1 Commercial Insulation

Basis for Energy Savings

The base case used to calculate energy efficiency savings for commercial insulation is based on precondition 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 also dependent on the building type, heating zone and heating system types.

Requirements and Specifications

This measure applies to retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

This measure is eligible in commercial buildings with the following characteristics:

- The building is electrically heated; and
- The existing insulation value must be between R-0 and R-5.

Post-condition:

Post insulation levels required are noted in the payment tables below:

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X

Required Documents

Commercial Insulation Project Information Form

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Completed Commercial Insulation Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

Per square foot of insulation.

BPA-QUALIFIED COMMERCIAL INSULATION MEASURES: ALL COMMERCIAL			
	HZ1	HZ2	HZ3
Attic/Roof Insulation*			
≤R-5 to R-19	$0.80	$1	$1.15
≤R-5 to R-30	$0.85	$1.05	$1.20
≤R-5 to R-49	$0.90	$1.10	$1.25
Wall Insulation			
≤R-5 to R-11	$0.45	$0.60	$0.70
≤R-5 to R-19	$0.60	$0.75	$0.80

*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.

7.5.2 Windows for Commercial Buildings (BPA-Qualified)

Basis for Energy Savings

Savings estimates for this measure are based on small commercial buildings. Energy savings vary by heating zone and heating system type.

As a BPA-Qualified measure, BPA will evaluate and track the installations of this measure to better understand the basis for savings.

Requirements and Specifications

This measure applies to retrofits only.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure as commercial when reporting to BPA.

Preconditions:

This measure is eligible in commercial buildings with the following characteristics:

- Electrically heated;
- A total floor area under 20,000 square feet; and

Required Documents

Commercial Window Project Information Form

- Pre-existing windows that are single-pane, single-pane with storms, or double-paned metal-frame windows.

Post-conditions:

The replacement windows must have a National Fenestration Rating Council rated U-value of 0.30 or lower.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Commercial Window Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

HEATING ZONE	PAYMENT PER SQUARE FOOT OF WINDOW REPLACED
1	$3
2	$6
3	$6

7.6 ELECTRIC WATER HEATERS

7.6.1 Electric Resistance Water Heater

Basis for Energy Savings

The efficient case used to calculate energy efficiency savings for commercial electric storage water heaters (that use only electric resistance heat) is an estimate of "current practice," which is defined as the average of all units within the AHRI database that meet the minimum federal standard. The efficient case used to calculate energy efficiency savings is based on a minimum hourly heat loss reduction of 20BTU/hr., less than the current practice base case.

Requirements and Specifications

Preconditions:

This measure is available for retrofits only.

Post-conditions:

An electric storage water heater on the BPA Commercial Electric Water Heaters Qualified Products List that meets the following requirements:

Required Documents

Commercial Electric Water Heater Qualified Products List

- Electric storage water heater (uses only resistance electric heat);
- A capacity of 25 to 120 gallons; and
- The efficient case maximum heat loss for the tank size does not exceed the measurement detailed in the table below.

BPA will accept all products that are on the BPA Commercial Electric Water Heaters Qualified Products List located in the IM Document Library.

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

COMMERCIAL WATER TANK SIZE BY GALLON	EFFICIENT CASE MAXIMUM HEAT LOSS [BTU/HR]
25–34.99	157
35–44.99	185
45–54.99	201
55–74.99	238
75–99.99	249
100–120	287

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing manufacturer name and model number, installed cost and new equipment order/purchase date.			X

Payment

$50 per water heater.

7.6.2 Heat Pump Water Heater (BPA-Qualified)

Basis for Energy Savings

Energy Savings estimates are based on equipment on the Residential Qualified Products List (QPL) installed in commercial establishments that use hot water in a manner similar to residential applications (i.e., not a high use application, such as commercial laundry or commercial dishwashing). Savings estimates vary by tier. As a BPA-Qualified measure, BPA will evaluate and track the installations of this measure to better understand the basis for savings.

Requirements and Specifications

This measure is available for retrofits only.

Required Documents

Heat Pump Water Heater Qualified Products List

Heat Pump Water Heater Project Information Form

Precondition:

This measure is eligible in commercial applications with the following characteristics:

- Existing water heater must be electric resistance.

Post-conditions:

The heat pump water heater must have the following characteristics:

- Water heater capacity of 50 gallons or greater; and
- Is listed on the Heat Pump Water Heater QPL (any tier).

BPA will accept all products that are on the Heat Pump Water Heater QPL located in the IM Document Library.

If a product meets these requirements, but is not on the Heat Pump Water Heater Qualified Products List, please use the COTR Request and Acknowledgement Procedure for approval to use the product.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Heat Pump Water Heater Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

ADVANCED WATER HEATER SPECIFICATION TIER	PAYMENT PER WATER HEATER
Tier 1	$300
Tier 2 and above	$500

7.7 COMMERCIAL REFRIGERATION

7.7.1 Anti-Sweat Heater (ASH) Controls

Basis for Energy Savings

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

To verify the requirements, the amps/ft. of the case can be found on the amp tag on the inside of the door frame. If there is no amp tag for the case, please call BPA engineering staff to help qualify your equipment.

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

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

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

Post-conditions:

- Cooler Case: An installed controller with settings that reduce the ASH run-time by at least 50 percent. Includes any heating element in a door rail, glass and/or frame; and
- Freezer Case: An installed 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		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

MEASURE	PAYMENT (PER LIN. FT. OF CASE)
Anti-Sweat Heater (ASH) Controls – Freezer	$40
Anti-Sweat Heater (ASH) Controls – Cooler	$40

7.7.2 Floating Head Pressure Control on Single Compressor Systems

Basis for Energy Savings

This measure is for the installation of floating head pressure controls on condensing and remote condensing refrigeration systems in building types with retail food sales, excluding restaurants. To meet the requirements of this measure, an existing, single compressor system from a fixed control must be converted to a floating control.

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- A fixed pressure head control valve;
- An expansion valve;
- A compressor motor nameplate that indicates motor is 1 HP or more;
- A single compressor that serves a suction group; and
- The condenser intake air must be from outside ambient air.

Post-conditions:

- ~~Must~~ This measure must replace any nonadjustable flood-back control valve with an adjustable flood-back control to saturated pressure equivalent of 70°F or less. Alternatively, a fan control safety switch can be used to maintain adequate head pressure;
- The pressure setting must be verified against a calibrated pressure gauge or transducer; and
- To prevent the evaporator from starving, at low-condensing pressures, one of the following must be implemented (if the existing expansion valve is a balanced port or electronic expansion valve, this requirement does not apply):
    - Replace each expansion valve with balanced-port valve or electronic expansion valve sized to meet the load requirement at 70°F condensing temperature; or
    - Install a device to supplement refrigerant feed to each evaporator attached to the condenser.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

MEASURE CATEGORY	PAYMENT PER COMPRESSOR
Cooler – Condensing Unit	$100
Freezer – Condensing Unit	$100
Cooler – Remote Condenser	$60
Freezer – Remote Condenser	$60

7.7.3 Compressor Head Cooling Fan – Shaded Pole to Electronically Commutated Motor (ECM)

Basis for Energy Savings

An electronically commutated motor (ECM) is a fractional horsepower direct current (DC) motor often used in commercial refrigeration applications such as display cases, walk-in coolers/freezers, refrigerated vending machines and bottle coolers. This measure is for the replacement of existing shaded pole, compressor head-cooling fan motors with ECMs. This measure only applies to low-temperature reciprocating compressor systems that are an integral part of a refrigeration system, with a remote air-cooled or evaporative condenser.

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- A low-temperature reciprocating compressor system that is a part of a refrigeration system; and
- A shaded pole motor with an air-cooled or evaporative condenser requiring 35 to 55 watts.

Post-condition:

- An ECM motor that requires 20 watts or less.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

$62 per motor.

7.7.4 Walk-In or Display Case Evaporator Fan Motor – Shaded Pole to Electronically Commutated Motor (ECM)

Basis for Energy Savings

This measure is for existing, shaded pole evaporator fan motors in refrigerated reach-in display cases, walk-in coolers, and walk-in freezers that are replaced by electronically commutated motors (ECMs). Though this measure does not apply to motors with fans less than 10-inches in diameter on walk-in coolers and freezers. There is no restriction for the fan size on refrigerated display cases.

Requirements and Specifications

This measure applies to retrofits only.

Precondition:

- Shaded pole motor in a refrigerated display case, walk-in cooler or freezer.

Post-condition:

- A refrigeration system shaded pole evaporator fan motor that is replaced with an ECM.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

APPLICATION	PAYMENT PER ECM MOTOR
Display Case: Shaded Pole to ECM	$55
Walk-In Cooler or Freezer, ECM Motor Rating ≤ 23 Watts	$140
Walk-In Cooler or Freezer, ECM Motor Rating > 23 Watts	$140

7.7.5 Walk-In Evaporator ECM Fan Speed Control – Constant to Variable

Basis for Energy Savings

This UES measure is for the installation of controls that reduce energy consumption of evaporator fan motors in walk-in coolers and freezers. The control reduces fan speed when there is no refrigerant being delivered to the evaporator.

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- ECM;
- Evaporator fan motor size (nameplate rated output power) > 23 watts;
- Evaporator fan full speed runtime: full speed 24 hrs/day except if off for defrost periods; and

- Evaporator fan full speed: 1,550 RPM.

Post-conditions:

- ECM;
- Evaporator fan full speed runtime: full speed only during call for cooling (compressor on or liquid-line solenoid open);
- Evaporator fan full speed: 1,550 RPM;
- Evaporator fan low speed: 500-600 RPM;
- Alternative to low speed: on/off cycling. During periods when there is no refrigerant being delivered to the evaporator, eligible controllers may cycle the fans off only if they turn the fans on periodically during that time to circulate air in the walk-in (not more than one minute every eight minutes or 13 percent of time); and
- On walk-in refrigeration circuits served by multiplex systems, liquid-line solenoid is required for adequate control; multiplex systems without liquid-line solenoid on the walk-in circuit are not eligible at this time.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

MEASURE CATEGORY	SPECIFICATION	PAYMENT
Coolers	1 motor per controller	$35
	2 or more motors per controller	$35
Freezers	1 or 2 motors per controller	$35
	3 or more motors per controller	$35

7.7.6 Door Gasket Replacement for Walk-In and Reach-In Coolers and Freezers

This measure is for the replacement of door gaskets in walk-in and reach-in coolers and freezers in retail food sales businesses. This measure applies to main insulated solid door(s) of walk-in coolers or freezers that open to ambient temperatures. This also applies to the replacement of gaskets in standard size reach-in glass or solid door(s) of freezer or cooler display cases. Under-counter half-coolers, freezers, or beverage merchandisers do not qualify for payment.

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- Walk-in or reach-in cooler or freezer, and
- A worn or damaged gasket and/or door sweep with degradation sufficient to create an air gap or leak that is equal to or greater than six inches in length.

Post-conditions:

- Replacement gasket and/or door sweep must meet the manufacturer's specifications regarding dimensions, materials, attachment method, style, compression and magnetism.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

APPLICATION	PAYMENT PER DOOR
Door Gaskets – Walk-In Cooler	$25
Door Gaskets – Walk-In Freezer	$65
Door Gaskets – Reach-In Cooler	$25
Door Gaskets – Reach-In Freezer	$40

7.7.7 Strip Curtains for Walk-In Coolers and Freezers

Basis for Energy Savings

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

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- No strip curtains installed inside of a walk-in.

Post-conditions:

- Strip curtains or swinging doors ≥ 0.06-inches thick; and
- Low-temperature strip curtains or doors must be used on low temperature applications.

The following applications will not apply:

- Walk-in freezers located inside of walk-in coolers;
- Walk-in coolers in restaurants, drug or convenience stores;
- Replacement of existing strip curtains; or
- Application of strip curtains on display cases.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Product Specification Sheet (also referred to as cut-sheet) documenting product name and model number.			X

Payment

$9 per square foot of doorway.

7.8 COMMERCIAL KITCHEN AND FOOD SERVICE EQUIPMENT

BPA pays for a suite of high-efficiency commercial kitchen and food service electric equipment, including steamers, hot food holding cabinets, combination ovens, convection ovens, fryers and pre-rinse spray wash valves. All equipment must be new.

7.8.1 Demand Controlled Kitchen Ventilation (BPA-Qualified)

Demand-controlled kitchen ventilation (DCKV) reduces fan speed during times of low activity or demand. Qualifying applications include new and modified existing exhaust hoods and the associated make-up air units, installed in existing commercial zones that meet the following requirements:

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- Constant speed exhaust fan; and
- Installed in a zone that contains a kitchen.

Post-conditions:

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

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Demand Controlled Kitchen Ventilation Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

DCKV	DCKV CONTROL SENSORS	PAYMENT PER HORSEPOWER OF FAN
New or Retrofit	One	$200
New or Retrofit	Multiple	$400

7.8.2 Electric Commercial Steam Cookers

Requirements and Specifications

This measure applies to both retrofits and new construction.

Measures must meet ENERGY STAR v1.2.0 requirements.

Required Documents

Demand Controlled Kitchen Ventilation Project Information Form

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Invoice showing installed cost and new equipment order/purchase date.			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-Qualified at the time they were manufactured).			X

Payment

SIZE	PAYMENT
3 pan, 4 pan, 5 pan or 6 pan	$50
10 pan	$200

7.8.3 Hot Food Holding Cabinets

Requirements and Specifications

This measure applies to both retrofits and new construction.

Measures must meet ENERGY STAR v2.01.2 requirements.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Invoice showing installed cost and new equipment order/purchase date.			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-Qualified at the time they were manufactured.)			X

Payment

SIZE	PAYMENT
Half	$75
Full	$200

7.8.4 Electric Combination Ovens

Requirements and Specifications

This measure applies to both retrofits and new construction.

Measures must meet ENERGY STAR v2.0 requirements, and the oven capacity must be between six and 20 pans.

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Invoice showing installed cost and new equipment order/purchase date.			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-Qualified at the time they were manufactured).			X

Payment

$500 per oven. Note that there are two measures for combination ovens: one for six to 15 pan ovens, and one for 16 to 20 pan ovens.

7.8.5 Electric Convection Ovens

Requirements and Specifications

This measure applies to both retrofits and new construction.

Measures must meet ENERGY STAR v2.0 requirements.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Invoice showing installed cost and new equipment order/purchase date.			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-Qualified at the time they were manufactured).			X

Payment

$300 per oven.

7.8.6 Commercial Electric Fryers (BPA-Qualified)

Requirements and Specifications

This measure applies to both retrofits and new construction.

Measures must meet ENERGY STAR v2.0 requirements and be new.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Invoice showing installed cost and new equipment order/purchase date.			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-Qualified at the time they were manufactured).			X

Payment

$300 per fryer.

7.8.7 Pre-Rinse Spray Wash Valves

Requirements and Specifications

This measure applies to retrofits only.

Preconditions:

- The spray valve must be regularly used every day of business; and
- The spray valve must use hot water heated with an electric water heater.

Post-conditions:

- A new spray valve that uses up to one gallon per minute; and
- Be distributed via direct installation of a new nozzle (per the Measure Distribution Processes section in the Multisector chapter).

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Invoice showing installed cost and new equipment order/purchase date.			X
A copy of a completed Commercial Measure Distribution Form found in the IM Document Library. See the Measure Distribution Processes in the Multisector section for additional requirements.			X

Payment

$100 per spray valve.

7.9 ADDITIONAL UES OFFERINGS

7.9.1 ENERGY STAR Commercial Clothes Washers

Basis for Savings

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

Requirements and Specifications

This measure applies to both retrofits and new construction.

Preconditions:

Eligible existing equipment to be replaced includes:

- Electric or gas water heating; and
- Electric or gas drying.

Post-conditions:

- The clothes washer must be ENERGY STAR.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Invoice showing installed cost and new equipment order/purchase date.			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-Qualified at the time they were manufactured).			X

Payment

MEASURE NAME	PAYMENT
Clothes Washers ENERGY STAR Electric Water Heater/Electric Dryer	$125
Clothes Washers ENERGY STAR Electric Water Heater/Gas Dryer	$100
Clothes Washers ENERGY STAR Gas Water Heater/Electric Dryer	$75
Clothes Washers ENERGY STAR Gas Water Heater/Gas Dryer	$25

7.9.2 Smart Power Strips

Basis for Savings

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

Energy savings assume that smart power strips are used in accordance with the manufacturer's instructions.

In contrast, residential advanced power strips control entertainment-related plug-loads. This measure can be found in the IM's Residential chapter.

Requirements and Specifications

This measure applies to both retrofits and new construction.

Preconditions:

Peripheral plug-loads, such as printers, copiers, task lights and phone battery chargers, are regularly left on, and draw power even when not in use.

Post-conditions:

Smart power strips must:

- Automatically turn off power to peripheral plug loads;
- Prevent false switching through the use of resistor-capacitor circuit filters or the equivalent; and
- Be distributed via Direct Install or By Request per the Measure Distribution Processes section in the Multisector chapter.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Invoice showing installed cost and new equipment order/purchase date.			X
A copy of a completed Commercial Measure Distribution Form found in the IM Document Library See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

$15 per smart power strip.

7.9.3 Commercial Showerheads

Basis for Savings

Savings for commercial showerheads vary based on gallons per minute, fuel used for water heating, type of commercial building, and distribution method (direct install or by request). Common applications in the commercial sector include fitness centers, hospitality buildings (hotels/motels), health care facilities (including hospitals) and small commercial facilities (including office showers).

Required Documents

Commercial Sector Measure Distribution Documentation Form

Requirements and Specifications

This measure is available for retrofits only.

Preconditions:

- Any commercial building; and
- Any water heating type.

Post-conditions:

- The showerhead must have a rated flow of 2.0 gallons (or fewer) per minute; and
- Showerheads must be distributed via Direct Install or By Request per the Measure Distribution Processes section in the Multisector chapter.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Invoice showing installed cost and new equipment order/purchase date.			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE NAME	PAYMENT
Showerheads, 1.5–2.0 Gallons Per Minute, by Request	$8
Showerheads, 1.5–2.0 Gallons Per Minute, Direct Install	$11

Required Documents

Commercial Sector Measure Distribution Documentation Form

7.9.4 Generator Engine Block Heaters (BPA-Qualified)

Basis for Savings

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

1. Less than three kW; and
2. Greater than or equal to three kW.

The generator engine block heater base case used to calculate energy savings is 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 emerging technology pilot found that in addition to energy savings, forced-circulation heaters provide better block temperature control and less extreme temperatures, possibly extending hose lifetimes, reducing maintenance costs and improving generator reliability. Savings vary by size of heater.

Required Documents

Generator Block Heater Project Information Form

Requirements and Specifications

Retrofit of existing installations and new equipment are both eligible.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure to the applicable sector when reporting to BPA.

Preconditions:

- The forced-circulation generator engine block heater must replace a thermosiphon, electric-resistance block heater; and
- The generator or engine must be stationary and fixed.

Post-condition:

Generator engine block heater installations must meet the following requirement:

- Forced-circulation heaters, which are electric resistance heaters with a pump.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Completed Generator Block Heater Project Information Form (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

GENERATOR ENGINE BLOCK HEATER SIZE	PAYMENT
<3 kW	$200
≥3 kW	$1,500

7.9.5 Vehicle Engine Block Heater Controls (BPA-Qualified)

Basis for Savings

Vehicle engine block heater controls use a combination of temperature sensing and heater cycling to save energy. Studies 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. Also, since this measure is only for hard-wired controls, vehicle fleets that are regularly parked in the same location are good candidates.

Required Documents

Vehicle Engine Block Heater Controls Project Information Form

Requirements and Specifications

Retrofit of existing installations and new equipment are both eligible.

This measure is available for the commercial, industrial and agricultural sectors. Utilities shall report this measure to the applicable sector when reporting to BPA.

Preconditions:

- New or existing block heater that does not have temperature or heater controls except for manual control; and
- Any vehicle that uses block heaters during cold months, in any Pacific Northwest climate zone.

Post-conditions:

Qualifying Vehicle Engine Block Heater Control applications must meet the following requirements:

- Vehicle engine block heater controls must be hard-wired, either in the form of a dedicated controlled outlet that the engine block heater is plugged in to, or controls installed directly on the engine block heater;
- 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; and
- Controls that do not qualify include those that are portable and can be unplugged, such as extension cord models.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Invoice showing installed cost and new equipment order/purchase date.			X
Completed Vehicle Engine Block Heater Controls Project Information Form for generator engine block heaters (located in the IM Document Library) showing that the measure requirements have been met. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-Approved.			X

Payment

VEHICLE ENGINE BLOCK HEATER CONTROLS	HEATING ZONES	PAYMENT PER HARD-WIRED CONTROL UNIT
Vehicle Engine Block Heater Controls	1, 2, 3	$160

7.10 MULTISECTOR OPPORTUNITIES

Additional opportunities are available in the Multisector chapter and specific measure information may be found in the primary sector section listed below:

Processes

Measures and Initiatives

1. Variable Frequency Drives in Small Compressed Air Systems (see Industrial, section 9.4)
2. ENERGY STAR Clothes Washers (see Residential, section 10.4)
3. ENERGY STAR Clothes Dryers (see Residential, section 10.4)
4. Green Motors Rewind Initiative (see Multisector, section 12.3.1)
5. Limited Availability Emerging Technology Field Test Project (see Multisector, section 12.3.3)

Section 8: Federal Sector

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

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

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

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

Section 9: Industrial Sector

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

The Industrial Sector includes electrical energy used by fixed pieces of equipment, buildings or complexes to produce, manufacture or store goods in connection with, or as part of, any process or system. This includes those related to food production, transportation and rail infrastructure.[1]

These processes and systems also include, but are not limited to: electric distribution system hardware, voltage optimization, water/wastewater production and treatment, and data centers/server farms.[2] In general, Industrial Sector activities must not devote the majority of energy use within a facility to nonprocess-related HVAC or potable hot water.

9.1 PAYMENT SUMMARY*

PROGRAM COMPONENT OR MEASURE	PAYMENT
Custom Projects	See the Custom Projects Payment Table.
Trade Ally-Delivered Small Industrial Measures	See the Custom Projects Payment Table.
BPA-Funded Technical Service Providers (TSP)	Not applicable
Variable Frequency Drives for Fans in Spud and Onion Storage Facilities	$200/horsepower
Variable Frequency Drives in Small, Compressed Air System	See the Custom Projects Payment Table.
Energy Management	
Energy Project Manager	See the Payment section of this offering.
Strategic Energy Management Projects	See the Payment section of this offering.
Additional Multisector Opportunities	
Nonresidential Lighting Program	See the lighting calculators.
Advanced Rooftop Control Unit	$150–$225/ton
Commercial Ductless Heat Pump	$800/ton
Commercial Heat Pump Conversion	~~$250~~ $500/ton
Commercial Heat Pump Upgrade	< 6 tons: $1,000/unit; 6–20 tons: $200/ton
Connected Thermostat	$200/thermostat
Variable Refrigerant Flow System	$800/ton
Variable Frequency Drive (VFD) on Air Handling Unit Fan	$300/horsepower
Commercial Insulation	$0.45–$1.25/square foot

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9.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Commercial Windows	$3–$6/square foot
Generator Engine Block Heaters	$200–$1,500/unit
Vehicle Engine Block Heater Controls	$160/unit
Green Motors Rewind Initiative	$2/horsepower
Limited Availability, Emerging Technology, Demonstration Field-Test Projects	See the Custom Projects Payment Table.

* The payment levels described in this table provide a summary only. Complete details of the payment levels and associated requirements may be found in the corresponding text of the IM. Please see the Table of Contents for the text location.

[1] This does not include loading dock systems or facilities associated with the Commercial Sector.

[2] This does not include Commercial Sector data centers/server farms, such as those integrated into a commercial building that serve the information technology needs of the business.

9.2 INDUSTRIAL SECTOR OVERVIEW

The BPA Energy Efficiency Industrial Sector includes Energy Smart Industrial (ESI) and Multisector opportunities.

Customers must enroll in ESI to receive BPA funding for custom project incentives and technical services. Without ESI enrollment, industrial custom project incentives and technical services must be customer-funded, as BPA funding is available only for Multisector measures and initiatives.

9.3 ENERGY SMART INDUSTRIAL

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

- Industrial Custom Projects
- Energy Management: Energy Project Managers and Strategic Energy Management Projects
- Trade Ally-Delivered Small Industrial Measures
- ~~Northwest Trade Ally Network~~ Industrial Lighting Specialists (Nonresidential Lighting Program)
- Technical Service Providers (TSP)
- VFDs for fans in spud and onion storage facilities

Requirements and Specifications

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

ESI program partner: The customer must meet with the ESI program partner (in person or over the phone) to outline their 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.

Supporting Content

Nonresidential Lighting Program

COTR Request & Acknowledgment Procedure

ESI Partner (ESIP): An ESIP (provided by the ESI program partner) is assigned to the customer and is the single point of contact for customers to help them 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.

Custom Projects: The end-user must design and construct 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 custom project step:

CUSTOM PROJECT PROCESS STEPS	RESPONSIBLE PARTY	
	OPTION 1	OPTION 2
Develop an M&V plan.	ESIP, TSP or Customer	ESIP, TSP or Customer
Prepare Option 1 Custom Project Proposal documents (optional).	ESIP or Customer	n/a
Submit Option 1 Custom Project Proposal documents (optional).	Customer	n/a
Review Option 1 Custom Project Proposal Documents, if submitted.	BPA ESI engineer, ESI program partner, Quality Control engineer and COTR	n/a
Provide Technical Advice to Customer.	ESIP	ESIP
Develop Custom Project Results Data.	ESIP, TSP or Customer	ESIP, TSP or Customer
Prepare Custom Project Completion Report documentation.	ESIP or Customer	ESIP or Customer
Submit Custom Project Completion Report documentation to BPA.	Customer	Customer
Review Custom Project Completion Report documentation.	BPA ESI engineer, ESI program partner, Quality Control engineer and COTR	~~BPA ESI engineer, ESI program partner, Quality Control engineer and COTR~~ Customer, see Section 4.5

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table.

9.3.1 Energy Management (Optional Energy Management Feature)

Energy Management is a component composed of (1) the Energy Project Manager; and (2) Strategic Energy Management (SEM) Projects (formerly known as Track and Tune Projects, Refrigerator Operator Coaching, Wastewater Energy Coaching, and High-Performance Energy Management).

Required documents to be submitted by customer to BPA in support of ESI Energy Management efforts must be sent in to eedocs@bpa.gov as either an email attachment, via a secure link from the online ESI HUB, or fax 1-866-535-7955.

Required Documents

EPM Calculator

ESI HUB

9.3.1.1 Energy Project Manager

Requirements and Specifications

BPA will co-fund Energy Project Managers (EPMs), end-user employees or contractors who manage energy efficiency custom projects at the end-users' facilities. If applicable, EPMs may manage SEM projects and UES lighting at the end-users' facilities. A customer may request EPM co-funding by sending the executed EPM agreement between itself and the end-user to eedocs@bpa.gov as either an email attachment, via a secure link from the ESI HUB,or fax 1-866-535-7955. The executed EPM agreement must, at a minimum, identify an energy-savings goal of at least 1,000,000 kWh of verifiable annual busbar energy savings per year, and specify the end-user's obligation to employ a qualified EPM.

The customer (via its end-user) must achieve projected energy savings of at least 1,000,000 kWh verifiable annual busbar energy savings and should do so within one year of the EPM funding commencement date (but is allowed up to 18 months from the commencement date). The commencement date is the date the final of the following actions occur: (1) the customer submits the executed EPM agreement to eedocs@bpa.gov as either an email attachment, via a secure link from the ESI HUB, or fax 1-866-535-7955; (2) an EPM is hired or designated by the end-user; and (3) BPA approves the EPM. The customer must ensure that the end-user meets the following requirements:

- The end-user must hire or designate an EPM to identify, evaluate and implement industrial electrical energy efficiency projects (e.g., SEM and UES lighting). The EPM must be familiar with, and have experience in, industrial electric energy efficiency and the end-user's type of business.
- The EPM must manage electrical energy efficiency projects that deliver 1,000,000 kWh or greater in verifiable annual busbar energy savings. These savings must be verified, i.e., the savings must be reportable to and approved by BPA.
- The end-user may replace the EPM; however, the customer must inform BPA in writing, within 30 days of replacement, and the replacement EPM must meet the requirements of this IM.
- No later than 90 days after the commencement date, the EPM must submit the EPM Comprehensive Plan to the customer and BPA to eedocs@bpa.gov as either an email attachment, via a secure link from the ESI HUB, or fax 1-866-535-7955. They must be approved by BPA and include, at a minimum, the following:
    - Projected verifiable annual busbar energy savings (at least 1,000,000 kWh). Eligible project status shall precede completion of post-project M&V on the commencement date;

- Name of the EPM;
- Total annual cost of the EPM, which includes base salary, benefits, costs associated with attendance at ESI-sponsored annual EPM meeting, and associated direct costs (e.g., travel and training[3]), if known;[4]
- Itemized summary of planned electrical-energy projects (including participation in SEM[5]) that will comprise the verifiable annual busbar energy savings, including estimates of the energy savings, cost savings and implementation costs;
- Schedule for project development, implementation and completion; and
- Project implementation schedule showing energy savings or energy-savings progress expected at (a) six months after the commencement date, and (b) over the life of the plan.

The EPM must submit status reports to the customer and BPA to eedocs@bpa.gov as either an email attachment, via a secure link from the ESI HUB or fax 1-866-535-7955. It must describe (1) the energy savings achieved and projected; and (2) projects completed, in-process, or planned. Status reports are due no later than six months and also one year from the commencement date.

No later than six months after the commencement date, the end-user must achieve, to BPA's satisfaction, the six-month verified annual busbar energy savings or energy-savings progress described in the six-month status update section of the EPM Comprehensive Plan. Examples include BPA-approved custom project proposals (Option 1), customer-approved custom projects (Option 2), or in-progress SEM projects. If energy-savings achievements differ significantly from savings predictions, BPA may revise the savings goal and use the revised goal for payment calculations.

Upon completion of the EPM agreement, the customer may elect to extend the agreement for an additional 12-18 months by sending the executed EPM agreement between the customer and end-user to eedocs@bpa.gov as either an email attachment, via a secure link from the ESI HUB, or fax 1-866-535-7955. The EPM agreement must, at a minimum, identify an additional energy savings goal of at least 1,000,000 kWh of verifiable annual busbar energy savings and the end-user's obligation to employ a qualified EPM. The customer must repeat the same process for the ensuing contract period, including creating a new EPM Comprehensive Plan.

A customer may send a request to BPA (email eedocs@bpa.gov or fax 1-866-535-7955) for consideration of BPA directly contracting with its end-user to provide EPM co-funding. The request must include the following:

- Documentation of the direct contract qualification, either because (1) the customer is prevented by charter or policy from contracting with its end-users; or (2) the EPM will be assigned to multiple facilities served by multiple customers;
- End-user information (name, address and contact information); and
- The allocated amount must be capped at the lesser of: (1) $0.025 per kWh of the energy savings goal, (2) the total annual cost of the EPM(s) as described in the EPM Comprehensive Plan not-to-exceed (NTE) $250,000 per EPM(s) contracted, or (3) an amount specified in the EPM agreement.

[3]EPM training costs must be pre-approved by BPA based on the customer's budget, EPM costs and the relevancy of the training. EPM costs include only qualifying costs incurred between the EPM commencement date and the date of the last project in the EPM Comprehensive Plan as approved by BPA. BPA will not pay customers for EPM time in a custom or SEM project if it was included in the EPM Comprehensive Plan.
[4]The total EPM co-funding amount may not exceed the total annual EPM costs as specified in the EPM Comprehensive Plan. Documentation of actual EPM costs must accompany the final EPM Status Report, which precedes the final payment. Where an EPM term is less than 12 months, the eligible EPM costs must be based on pay records from the period between the EPM commencement date and BPA acceptance of the final project. A customer may include a performance incentive as a portion of the EPM's salary.
[5]SEM project first-year savings and subsequent years' incremental savings may be applied toward the EPM savings goal.

If a customer's request is approved, BPA will (1) reduce the customer's ECA implementation budget by the allocated amount, (2) hold the funds to pay the EPM payment to the end-user, and (3) execute a contract with the end-user to pay for an EPM. The allocation may not be changed without approval from BPA, the customer and the end-user. At the end of the EPM contract period, if the customer's allocation exceeds the amount BPA paid the end-user, the remaining budget will be returned to the customer's ECA implementation budget.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Executed EPM Agreement Between Customer and End-User		X	X
EPM Comprehensive Plan and Status Reports		X	X
EPM Calculator (available in the IM Document Library)	X		X

Payment

To receive payment, the customer must invoice BPA once they reach the milestones in the chart below. If the customer elects to renew the EPM(s) for an additional period, the payment schedule repeats with the first payment starting with payment number two. Customers are not obligated to return money already received.

Use the EPM Calculator (available in the IM Document Library) to calculate payment amounts.

PAYMENT NO.	FUNDING AMOUNT	MILESTONE
1	$25,000[i]	Commencement date.
2	1/3 of the funding[ii] less previous payments.	BPA approves the EPM Comprehensive Plan.
3	2/3 of the funding[ii] less previous payments.	End-user achieves, to BPA's satisfaction, the six-month energy savings, or energy-savings progress described in the project implementation schedule of the EPM Comprehensive Plan.
4	The lesser of: (1) $0.025 per kWh of verified busbar energy savings; (2) the total annual cost of the EPM(s) as described in the EPM Comprehensive Plan, NTE $250,000 per EPM(s) contracted; or (3) an amount specified within the EPM agreement, less previous payments.	End-user meets, exceeds, or fails to meet (as certified by BPA) the EPM Comprehensive Plan projected verified energy savings.

[i] Payment number one is issued in the first year of an EPM engagement to address initial recruiting and placement costs. In subsequent years of the engagement, the payment schedule begins with payment number two. Funding beyond this payment will not be provided unless the verified energy savings goal or actual savings achieved is greater than 1,000,000 kWh.

[ii] Funding is based on the lesser of (1) $0.025 per kWh of the verified energy savings goal; (2) the total annual cost of the EPM(s) as described in the EPM Comprehensive Plan, NTE $250,000 per EPM(s) contracted; or (3) an amount specified within the EPM agreement.

9.3.1.2 SEM Projects (Optional Energy Management Feature)

Requirements

SEM Projects are an optional component of the ESI Program. SEM is designed to acquire energy savings by improving facilities' energy intensity through custom projects, and operations and maintenance improvement. Annual performance incentives are available from BPA for verified savings from the annual Completion Report.

Option 1 and Option 2 customers must follow the M&V requirements addressed in the ESI MT&R Reference Guide (available in the IM Document Library). The tables below describe the requirements for (1) enrollment and staffing, (2) performance period, (3) component implementation, and (4) savings reports.

Enrollment and End-User Staffing

To enroll in the SEM component, a customer must meet these enrollment requirements and ensure that end-user staffing requirements have also been met, as outlined below:

ACTIVITY	REQUIREMENT
Enroll	Send an executed SEM enrollment agreement to eedocs@bpa.gov as an email attachment, via a secure link from the ESI HUB, or fax 1-866-535-7955.
End-User Appoint Energy Champion	The Energy Champion is a key contact person for the energy management continuous improvement process, who implements energy efficiency measures.
End-User Appoint Executive Sponsor	The Executive Sponsor is the management-level supporter of the energy management system.
End-User Engagement	**Attend Energy Management Training** Classroom and on-site training develops the end-user's energy management system. End-users must present their energy efficiency implementation. Training sessions are confidential. Two employees must attend training sessions during the performance period. The length and frequency of the training sessions will vary based on the type of engagement (e.g., formerly HPEM, T&T, ROC (Refrigerator Operator Coaching) and SI HPEM). or **Implement Action Items** Tune-up site or subsystem through no-cost or low-cost operations and maintenance (O&M) action items.

Performance Period

SEM projects are enrolled in two-year performance periods. The customer may enroll end-users in consecutive performance periods.

	MEASURE LIFE BY YEAR	
	YEAR 1	YEAR 2
Strategic Energy Management	1 year	1 year

Customers will be credited with 100 percent of the verified energy savings for each reporting year (i.e., year one of the SEM engagement and again in each subsequent reporting year).

Required Documents

ESI MT&R Reference Guide

Strategic Energy Management Calculator

Component Implementation

SEM generates energy savings through project implementation.

ACTIVITY	SEM REQUIREMENTS
Performance Tracking System	Follow requirements in the Performance Tracking System (PTS) requirements table.
Energy Management System	Assess current energy management practices (e.g., does the end-user track, manage or reduce energy usage?). Establish an energy management policy with goals and an energy team to implement energy efficiency measures.
Implement Energy Efficiency Measures	Use continuous-improvement practices (led by the energy team) to identify, implement and evaluate energy efficiency measures.

Optional – Performance Tracking System

	PERFORMANCE TRACKING SYSTEM (PTS)
Description	The PTS is metering hardware and/or electric energy data collection software that tracks key variables to develop a meaningful, normalized energy-use profile. The PTS is installed and owned by the end-user and is eligible for BPA co-funding.
Requirements	1. Collect key process energy-performance indicators sufficient to predict energy consumption, or track performance at a facility or system level. 2. Provide data frequently to measure changes in energy performance.
PTS Design Approval	Prior to installing the PTS, BPA approval may be requested by the customer to ensure collected baseline data will be useful for M&V, or otherwise serve to promote project implementation.
Verification	Prior to beginning implementation activities, BPA will verify the PTS and collected baseline data sufficiently models baseline energy consumption.

Savings Reports

	REQUIREMENT
M&V Protocol	Both Option 1 and Option 2 customers must calculate verified energy savings following the M&V prescribed in the ESI MT&R Reference Guide (available in the IM Document Library).
	SEM energy savings may not include energy savings from other ESI program components or BPA programs (e.g., custom projects or deemed projects).
	SEM energy savings are relative to a baseline period preceding the first enrollment year.
Performance Period	The SEM performance period starts: 1. No earlier than the SEM kick-off workshop or tune-up event, whichever is applicable. 2. No later than the date determined by BPA and the customer. For re-enrolled SEM participants, customers may choose a continuous performance period or opt to delay the start of the performance period, as defined in the SEM engagement plan report.
Annual Completion Reports	Customers are required to send an Annual Completion Report documenting energy usage and unit production over the previous year to eedocs@bpa.gov either as an email attachment, via a secure link from the ESI HUB, or fax 1-866-535-7955. The Annual Completion Report documents energy usage and unit production over the previous year, energy efficiency measures implemented, SEM systems and practices implemented, and optional: energy efficiency measure implementation costs (invoices).

Documentation Requirements

DOCUMENTATION DESCRIPTION	DUE DATE	RETENTION/SUBMITTAL LOCATIONS		
		BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV	CUSTOMER FILE
Signed Customer/End-user Agreement (secure link or file).	Prior to requesting first payment		X	X
PTS Design Proposal (secure link or file) – Optional.	Prior to installation of PTS		X	
PTS Installation Invoice, Design Proposal and Verification Report (secure link).	Prior to requesting PTS payment		X	X
Annual Completion Report (secure link).	Prior to annual payments		X	X
SEM Calculator (secure link).	Prior to annual payments	X		X
PTS Maintenance Invoice (secure link).	Prior to annual payments		X	X

Payment

The customer may invoice BPA when the end-user reaches the milestones in the chart below. Use the SEM Calculator (available in the IM Document Library) to calculate the payment amount.

MILESTONE	PAYMENT
FOR ANY PAYMENT, THE CUSTOMER MAY SELECT A SMALLER PAYMENT CAP THAN SPECIFIED BELOW (I.E., SELECT A PAYMENT SMALLER THAN THE CALCULATED PAYMENT).	
End-User Purchases and Installs PTS	> 4 Million kWh System Baseline Lesser of the following: • Documented PTS costs • $0.0025 per kWh of estimated annual energy consumption. • $50,000.00 < 4 Million kWh System Baseline Lesser of the following: • Documented PTS costs • $10,000
BPA Approves Annual Completion Report	Supporting cost documentation provided Lesser of the following: • $0.075 per kWh of verified annual eligible energy savings, adjusted by busbar. • 70 percent of documented action item costs. No cost documentation • $0.025 per kWh of verified, annual eligible energy savings, adjusted by busbar. The SEM enrollment agreement will specify applicable requirements for eligible energy savings during renewal periods.
BPA Approves PTS Maintenance Payment	Lesser of the following: • Documented PTS costs • $10,000

9.3.2 Trade Ally-Delivered Small Industrial Measures (Optional ESI Component)

Requirements and Specifications

The Small Industrial Measures component provides cost-effective, simple measures with broad market applicability to leverage trade ally networks (e.g., compressed air, refrigeration and motors) to handle specific efficiency measures where the energy savings of individual projects are small.

Simplified analysis tools will be created 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 Small Industrial Measures.

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table.

9.3.3 BPA-Funded Technical Service Providers (Optional ESI Component)

Requirements and Specifications

BPA funding, through the ESI program partner, is available for eligible technical services necessary to develop and complete custom projects and SEM projects. Technical Service Provider (TSP) consultants can be utilized for scoping, project assessments, completion reports (M&V), SEM training, and miscellaneous consulting. BPA funding of technical services is based on the cost-effectiveness of the proposal and the likelihood that the end-user will implement it.

Payment

No funds are paid to the customer. BPA funds the TSP consultants through the ESI program partner contract.

9.3.4 Variable Frequency Drives (VFD) for Fans in Spud 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

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

Required Documents

EPM Calculator

ESI MT&R Reference Guide

ESI HUB

Strategic Energy Management Calculator

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name, or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X

Payment

BPA shall pay $200 per horsepower. To calculate the payment, the customer will add the total fan VFD horsepower installed on a per-building basis.

9.3.5 Variable Frequency Drives (VFD) in Small Compressed Air Systems

NOTE: This measure is also available for projects in the agricultural and commercial sectors.

Basis for Energy Savings

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

Requirements and Specifications

VFDs applied to a single air compressor 75 horsepower or less must use the RTF-Approved Small, Compressed Air Savings Calculator (available in the IM Document Library). Each VFD compressor must be submitted as an individual project (i.e., compressors may not be combined or divided). The calculator will determine energy savings.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
~~End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, or legal property description).~~			~~X~~
Equipment/contractor invoice is to include: manufacturer, model number, and size (horsepower) of equipment or product installed/used, quantity, order/purchase date, and cost.			X
Completed RTF-Approved Small Compressed Air Savings Calculator (available in the IM Document Library).	X		X

Payment

Although this is not a custom project, payment is paid according to the Custom Projects Payment Table.

9.4 MULTISECTOR OPPORTUNITIES

Additional opportunities are available in the Multisector chapter and specific measure information may be found in the primary sector section listed below:

Processes

Measures and Initiatives

1. Nonresidential Lighting Program (see Commercial, section 7.3)
2. Advanced Rooftop Control Unit (see Commercial, section 7.4.1)
3. Commercial Ductless Heat Pump (see Commercial, section 7.4.2)
4. Commercial Heat Pump Conversion (see Commercial, section 7.4.3)
5. Commercial Heat Pump Upgrade (see Commercial, section 7.4.4)
6. Connected Thermostat (see Commercial, section 7.4.5)
7. Variable Refrigeration Flow System (see Commercial, section 7.4.6)
8. Variable Frequency Drive on Air Handling Unit Fan (see Commercial, section 7.4.7)
9. Commercial Insulation (see Commercial, section 7.5.1)
10. Commercial Windows (see Commercial, section 7.5.2)
11. Generator Engine Block Heaters (see Commercial, section 7.9.4)
12. Vehicle Engine Block Heater Controls (see Commercial, section 7.9.5)
13. Green Motors Rewind Initiative (see Multisector, section 12.3.2)
14. Limited Availability Emerging Technology Field Test Projects (see Multisector, section 12.3.3)

Section 10: Residential Sector

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

The Residential Sector includes electrical energy used in a residential setting* (e.g., single-family residences, multifamily structures, and manufactured homes). Multifamily housing that is three stories or less above ground is multifamily low-rise. Multifamily housing that is four stories or more above ground is 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, dorms 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 the Nonresidential Lighting Program.*

10.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Lighting	
~~ENERGY STAR Linear Fluorescent Fixtures~~	~~$5–$15/fixture~~
LED Bulbs	$1–$9/LED
LED Fixtures	$2–9/fixture
TLEDs	$3–$5/TLED
Advanced Power Strips	
Advanced Power Strips – Home Entertainment	$40–$60/unit
Advanced Power Strips – Personal Computer	$40–$60/unit
Appliances (New)	
ENERGY STAR Clothes Washers	$15–$100/washer
ENERGY STAR Clothes Dryers	$50–$175/dryer
Electric Water Heating	
Showerheads	$15–$23/unit
Thermostatic Shut-Off Valves	$14–$23/unit
Unitary Heat Pump Water Heaters	$300–$500/water heater
Split System Heat Pump Water Heaters	$700/water heater
Pipe Insulation	$5–$25/unit

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10.1 PAYMENT SUMMARY*	
PROGRAM COMPONENT OR MEASURE	**PAYMENT**
Simple Steps	
BPA Simple Steps, Smart Savings Retail Promotion	See the payment section of this measure.
HVAC Measures	
Ductless Heat Pumps and Ducted Mini-Splits	See the payment section of this measure.
Ducted Systems	See the payment section of this measure.
Thermostats	See the payment section of this measure.
Line Voltage Thermostats	$18/unit
Smart Thermostats	$100–$125/unit
New Construction	
NEEM 1.1 Manufactured Homes	$1,200/home
NEEM 2.0 Manufactured Homes	$1,400/home
Manufactured Home Replacement	$2,200–$2,500/home
Single-Family New Construction Performance Path	Varies based on measures installed.
Montana House	See the payment section of this measure.
Energy Efficient New Multifamily Construction	See the payment section of this measure.
Zero Energy Ready New Multifamily Construction	See the payment section of this measure.
Weatherization (standard income)	
Insulation	See the UES Measure List in the IM Document Library.
Prime Window and Patio Door Replacement	$2–$8/square foot
Exterior Insulated Doors	$40/door
Whole House Air Sealing and Testing	See the UES Measure List in the IM Document Library.
Weatherization (low-income)	
Low-income weatherization, ductless heat pumps, air source heat pumps, heat pump water heaters, and duct sealing	See the payment section of this measure.

** 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 manual. Please see the Table of Contents for the text location.*

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10.2 LIGHTING

10.2.1 ENERGY STAR Linear Fluorescent Fixtures

Linear Fluorescent Fixtures expired September 30, 2018.

Basis for Energy Savings

The base case used to calculate the energy efficiency savings for the current BPA Residential linear fluorescent fixture measures is an estimate of the current state of residential lighting using: (a) the Residential Building Stock Assessment (RBSA), which identifies the socket saturation of efficient lighting by both low-use locations and moderate-/high-use locations; or (b) through actual observance (Direct Install only).

Savings estimates also include deductions for the storage factor, HVAC interactions and assumptions on hours of use. The storage factor attempts to predict if any bulbs went into storage rather than into an available socket. For example, Direct Install has no storage factor, Retail has a low storage factor and By Request or Mailed Nonrequest have the highest storage factors. HVAC interaction accounts for the increased heating load requirement from more efficient bulbs producing less heat. Hours of use are estimates taken from the 2011 RBSA metering study.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

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

The linear fluorescent fixture measures are available for distribution only by Retail (Simple Steps and utility-run retail programs) and must follow the Measure Distribution Processes section in the Multisector chapter. They cannot be offered via By Request, Mailed Nonrequest or Direct Install.

Linear fluorescent fixtures must be ENERGY STAR-Qualified, high-performance T8. Fixtures may be found on the Linear Fluorescent Fixture-Qualified Products List in the IM Document Library.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo (in the event ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Qualified at the time they were manufactured).			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Supporting Content

RTF Unit Energy Savings (UES) Measures

Measure Distribution Processes

Required Documents

Linear Fluorescent Fixture QPL

Payment

TYPE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
ENERGY STAR Linear Fluorescent Fixture 1 Lamp	$5	n/a	n/a	n/a
ENERGY STAR Linear Fluorescent Fixture 2 Lamp	$7	n/a	n/a	n/a
ENERGY STAR Linear Fluorescent Fixture 3 Lamp	$10	n/a	n/a	n/a
ENERGY STAR Linear Fluorescent Fixture 4 Lamp	$15	n/a	n/a	n/a

10.2.2 ENERGY STAR Solid-State Lighting/Light-Emitting Diodes Bulbs and Fixtures

Linear flushmount fixtures expired September 30, 2018

Basis for Energy Savings

The base case for LEDs factors in current socket saturation and Energy Independence and Security Act (EISA) compliance, and uses a weighted average of incandescent, halogen and CFL bulbs.

Savings estimates also include deductions for the storage factor, HVAC interactions and assumptions on hours of use. The storage factor attempts to predict if any bulbs went into storage rather than into an available socket. For example, Direct Install has no storage factor, Retail has a low storage factor, and By Request or Mailed Nonrequest have the highest storage factors. HVAC interaction accounts for the increased heating load requirement from more efficient bulbs producing less heat. Hours of use are estimates taken from a California study conducted by KEMA.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

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

LED bulbs may be distributed by Retail (Simple Steps and utility-run retail programs), By Request, Mailed Nonrequest (bulbs only, limited to four LEDs per household per fiscal year) or Direct Install, and must follow the Measure Distribution Processes section in the Multisector chapter.

LED fixtures may be distributed only by Retail (Simple Steps and utility-run retail programs) and Direct Install and must follow the Measure Distribution Processes section in the Multisector chapter. Direct Install measures are also categorized by the RTF using the RBSA as Exterior, Moderate/High-Use Interior or Low-Use Interior.

LED bulbs must be ENERGY STAR-Qualified ~~or listed on the Lighting Design Lab (LDL)-Qualified LED Lamp List~~ at the time of purchase, as integral omnidirectional, directional or decorative, and must have corresponding measures on the UES Measure List in the IM Document Library.

LED Fixtures must be ENERGY STAR-Qualified ~~or listed on the LDL Qualified LED Lamp List~~, at the time of purchase, with corresponding measures on the UES Measure List in the IM Document Library.

Supporting Content

LDL Qualified LED Lamp List

Measure Distribution Processes

UES Measure List

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

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
A copy of the ENERGY STAR/~~Lighting Design Lab~~ product list showing the product or the product information insert or packaging, which includes the ENERGY STAR logo (in the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Qualified at the time they were manufactured).			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

TYPE	LUMENS	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
LED Decorative and Minibase*	250-1049	~~$4~~ $3	~~$5~~ $4	$4	$7
LED Decorative and Minibase*	1050-1489	~~$4~~ $3	~~$5~~ $4	$4	$7
LED Decorative and Minibase*	1490-2600	~~$4~~ $3	~~$5~~ $4	$4	$7
LED General Purpose and Dimmable,Three-Way (Omnidirectional)*	250-1049	~~$4~~ $1	~~$6~~ $5	$5	$7
LED General Purpose and Dimmable,Three-Way (Omnidirectional)*	1050-1489	~~$4~~ $2	~~$6~~ $5	$5	$7
LED General Purpose and Dimmable,Three-Way (Omnidirectional)*	1490-2600	~~$4~~ $2	~~$6~~ $5	$5	$7
LED Globe	250-1049	~~$4~~ $2	~~$6~~ $5	$5	$7
LED Globe	1050-1489	~~$4~~ $3	~~$6~~ $5	$5	$7
LED Globe	1490-2600	~~$4~~ $3	$5	$5	$7
LED Reflectors and Outdoor (Directional, includes R, PAR, BR, MR)*	250-1049	~~$5~~ $1	~~$7~~ $6	$6	$9
LED Reflectors and Outdoor (Directional, includes R, PAR, BR, MR)*	1050-1489	~~$5~~ $1	~~$7~~ $6	$6	$9
LED Reflectors and Outdoor (Directional, includes R, PAR, BR, MR)*	1490-2600	~~$5~~ $3	~~$7~~ $6	$6	$9
Bi-Pin Multifaceted Reflector (MR)	250-499	~~$4~~ $2	n/a	n/a	$5
Bi-Pin Multifaceted Reflector (MR)	500-999	~~$4~~ $3	n/a	n/a	$5
Bi-Pin Non-Multifaceted Reflector (Non MR)	250-499	~~$4~~ $3	n/a	n/a	$5
Bi-Pin Non-Multifaceted Reflector (Non MR)	500-999	~~$4~~ $4	n/a	n/a	$5
LED Downlight (Retrofit Kit) Kit Fixture	0-499	~~$5~~ $2	n/a	n/a	$7
LED Downlight (Retrofit Kit) Kit Fixture	500-1999	~~$5~~ $2	n/a	n/a	$7
LED Downlight (Retrofit Kit) Kit Fixture	2000-7999	~~$5~~ $3	n/a	n/a	$7
LED Decorative Ceiling Flush Mount Fixture	0-499	~~$5~~ $2	n/a	n/a	$7
LED Decorative Ceiling Flush Mount Fixture	500-1999	~~$5~~ $2	n/a	n/a	$7
LED Decorative Ceiling Flush Mount Fixture	2000-7999	~~$5~~ $4	n/a	n/a	$7
LED Track Light Fixture	0-499	~~$5~~ $2	n/a	n/a	$7
LED Track Light Fixture	500-1999	~~$5~~ $3	n/a	n/a	$7
LED Track Light Fixture	2000-7999	~~$5~~ $4	n/a	n/a	$7
~~LED Linear Flush Mount Fixture~~	~~n/a~~	~~$5~~	~~n/a~~	~~n/a~~	~~$7~~

TYPE	LUMENS	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
LED Exterior Porch Light Fixture	0-499	~~$5~~ $3	n/a	n/a	$7
LED Exterior Porch Light Fixture	500-1999	~~$5~~ $4	n/a	n/a	$7
LED Exterior Porch Light Fixture	2000-7999	~~$5~~ $5	n/a	n/a	$7
LED Exterior Security Fixture	0-499	~~$7~~ $4	n/a	n/a	$9
LED Exterior Security Fixture	500-1999	~~$7~~ $5	n/a	n/a	$9
LED Exterior Security Fixture	2000-7999	~~$7~~ $6	n/a	n/a	$9
Bathroom Vanity Fixture	0-499	~~$4~~ $3.50	n/a	n/a	~~$6~~ $7
Bathroom Vanity Fixture	500-1999	~~$4~~ $3.50	n/a	n/a	~~$6~~ $7
Bathroom Vanity Fixture	2000-7999	~~$4~~ $8	n/a	n/a	~~$6~~ $7

*Savings are determined by LED bulb type and lumen categories. See the UES Measure List in the IS2.0 files page for details.

Additional Information

Measures that can be distributed "By Request" may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try an efficient LED?" By Request may also be used to supplement Direct Install if there are fixtures that an installer is unable to retrofit with an efficient bulb, such as an antique lamp.

10.2.3 TLEDs

Basis for Energy Savings

The base case used to calculate energy efficiency savings for the BPA residential tubular light emitting diode (TLED) bulb measures is a T8 linear fluorescent bulb, with an RBSA-weighted average hours of use based on the location distribution of T8 bulbs found in RBSA homes.

Savings estimates also include HVAC interactions and assumptions on hours of use. HVAC interaction accounts for the increased heating load requirement from more efficient bulbs producing less heat. Hours of use are estimates taken from the 2011 RBSA metering study.

RBSA ROOM TYPE	RTF CATEGORY
Exterior	Exterior
Bedroom	Moderate and High-Use Interior
Dining Room	Moderate and High-Use Interior
Family Room	Moderate and High-Use Interior
Garage	Moderate and High-Use Interior
Kitchen	Moderate and High-Use Interior

RBSA ROOM TYPE	RTF CATEGORY
Laundry Room	Moderate and High-Use Interior
Living Room	Moderate and High-Use Interior
Master Bedroom	Moderate and High-Use Interior
Bathroom	Low-Use Interior
Closet	Low-Use Interior
Hall	Low-Use Interior
Office	Low-Use Interior
Other	Low-Use Interior

Requirements and Specifications

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

TLEDs are only available for distribution by Retail (Simple Steps and utility-run retail programs) or Direct Install, and must follow the Measure Distribution Processes section in the Multisector chapter.

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

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
A copy of the ENERGY STAR/DLC product list showing the product or the product information insert or packaging, which includes the ENERGY STAR logo (in the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Qualified at the time they were manufactured).			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

TYPE	LUMENS	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
TLED	1000-1999	$3 ~~$2~~	n/a	n/a	$4 ~~$3~~
TLED	2000-3999	$3	n/a	n/a	$5

10.3 ADVANCED POWER STRIPS

10.3.1 Advanced Power Strips (Home Entertainment Centers)

Basis for Energy Savings

The base case used to calculate energy efficiency savings for the BPA Residential Home Entertainment Center Advanced Power Strip (APS) measures is the estimated annual electric usage of home entertainment centers and their peripheral AV devices. It is based on three detailed field trials conducted in South Africa, Australia and the U.S. The Australian savings (the largest trial) were adjusted to account for demographics and future electronic trends. Efficient case savings includes the reduction of loads from master/peripheral load-sensing strips and Infrared Sensing (IR) strips that are capable of shutting off power to controlled devices when not in use. Other inputs include the prevalence of different peripherals (DVD, VCR, video games, stereo, speakers, etc.) and each peripheral's hours of use.

These measures are currently deemed as planning measures by the RTF Guidelines, requiring the completion of a research plan to provide more data on the inputs.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for all types of residential home entertainment centers only (a TV with any combination of peripherals).

Home Entertainment Center Advanced Power Strips may be distributed by Retail (Simple Steps and utility-run retail programs), By Request, or Direct Install and must follow the Measure Distribution Processes in the Multisector chapter. This measure cannot be distributed via Mailed Non-request.

The Home Entertainment Advanced Power Strip measure is an infrared remote sensing strip that reduces power consumption of home entertainment centers by shutting off power to the main device (such as a television) and controlled peripherals, when no infrared remote signal is detected for a predetermined period of time.

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

Home Entertainment Advanced Power Strips must meet the following qualifications:

- Infrared remote sensing;
- Consume less than 1W of energy;
- One-year warranty and any length warranty for connected devices;
- Surge protection to 740 joules;
- UL1449-listed;
- Rated for 15 amps; and
- Resettable circuit breaker.

Supporting Content

Advanced Power Strip Qualified Products List

COTR Request and Acknowledgment Procedure

Measure Distribution Multisector

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
Home Entertainment Center Advanced Power Strip	$40	$40	n/a	$60

Additional Information

Measures that can be distributed "By Request" may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try an advanced power strip on your home entertainment center?" By Request may also be used to supplement Direct Install when an installer is unable to install the APS, due to complicated setups or accessibility constraints.

10.3.2 Advanced Power Strips (Personal Desktop Computers)

Basis for Energy Savings

The base case used to calculate energy efficiency savings for the BPA Residential Personal Desktop Computer Advanced Power Strip measure is the estimated annual electric usage of home personal computers and monitors, based on a 2012 RBSA metering study.

Requirements and Specifications

This measure is available for all types of residential desktop computers only; laptop applications do not qualify.

This measure may be distributed by Retail (Simple Steps and utility-run retail programs), By Request, or Direct Install and must follow the Measure Distribution Processes in the Multisector chapter. This measure cannot be distributed by Mailed Nonrequest.

The Personal Desktop Computer Advanced Power Strip measure reduces power consumption of home offices by putting the desktop CPU in sleep mode, and shutting off power to the monitor and peripherals, when PC power consumption has been stable for a set period. This indicates idle mode.

Qualified products are on the Advanced Power Strip Qualified Products List (if a customer believes a product should be on the list, and is not, the customer should use the COTR Request and Acknowledgment Procedure to request approval to use the product).

Personal Desktop Computer Advanced Power Strips must meet the following qualifications:

- PC Interaction sensing;
- Consume less than 1W of energy;
- One-year warranty and any length warranty for connected devices;
- Surge protection to 740 joules;
- UL1449-listed;
- Rated for 15 amps; and
- Resettable circuit breaker.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
PC Interaction Sensing Advanced Power Strip	$40	$40	n/a	$60

Additional Information

Measures that can be distributed "By Request" and may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try an advanced power strip on your home desktop computer?" By Request may also be used to supplement Direct Install when an installer is unable to install the APS due to complicated setups or accessibility constraints.

10.4 APPLIANCES

Basis for Energy Savings

The base case used to calculate energy efficiency savings for new appliance measures is the average annual energy consumption of appliances meeting the Federal Standard. If a standard has been updated recently, BPA examines the potential prevalence of equipment not meeting the standard remaining in the marketplace. Energy savings is calculated as the difference between the annual energy consumption of the baseline case and the energy efficient case.

Clothes washers have additional characteristics for savings based on the associated water heater fuel type (for their use of heated water) and dryer

Supporting Content

Measure Distribution Processes

RTF Unit Energy Savings (UES) Measures

fuel type (for the electric savings on drying time). Note: a slight deduction of dryer savings for the very small percentage of more efficient electric dryers was included in the last update to the clothes washer measure.

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

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

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

Clothes washers and electric clothes dryers may be rebated by the utility or distributed by Retail (Simple Steps and utility-run retail programs). Retail measures must follow the Measure Distribution Processes in the Multisector chapter.

Clothes washers and dryers must meet the following qualifications:

- Clothes washers must be ENERGY STAR-Qualified and top loaders must have a minimum IMEF of 2.38.
- Clothes dryers must be electric and ENERGY STAR-Qualified. Tiers are provided on the BPA Clothes Dryer-Qualified Product List on the BPA Residential Appliance webpage.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.			X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo (in the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Qualified at the time they were manufactured), or a copy of the BPA-Qualified Product List showing the product if applicable.			X
Documentation of water heater fuel and clothes dryer fuel (applies to clothes washers only, if claiming measures with fuel-specific savings). Customers who are able to document the absence of natural gas within their service territory (through a statement or map provided by the public utilities commission or equivalent regulatory body) may claim clothes washer electric domestic hot water heater/electric dryer without the verification of water heater or dryer fuel type.			X

Payment

APPLIANCE	PAYMENT
Any Front-load ENERGY STAR Clothes Washer (gas water heater)	$15
Any Front-Load ENERGY STAR Clothes Washer (electric water heater)	$30
Any Top-Load ENERGY STAR Clothes Washer IMEF 2.38+ (electric water heater)	$30
Any Front-Load ENERGY STAR Clothes Washer (any water heater)	$20
Any Top-Load ENERGY STAR Clothes Washer IMEF 2.38+ (any water heater)	$20
ENERGY STAR Clothes Washer – CEE Tier 1 (electric water heater)	$30
ENERGY STAR Clothes Washer – CEE Tier 1 (any water heater)	$20
ENERGY STAR Clothes Washer – CEE Tier 2 (electric water heater)	$40
ENERGY STAR Clothes Washer – CEE Tier 2 (any water heater)	$30
ENERGY STAR Clothes Washer – CEE Tier 3/Advanced (electric water heater)	$50
ENERGY STAR Clothes Washer – CEE Tier 3/Advanced (any water heater)	$40
Any ENERGY STAR Electric Clothes Dryer	$50
ENERGY STAR Electric Clothes Dryer – BPA Tier 1	$50
ENERGY STAR Electric Clothes Dryer – BPA Tier 2	$125
ENERGY STAR Electric Clothes Dryer – BPA Tier 3	$175
ENERGY STAR Clothes Washers Electric Water Heater/Electric Dryer Multifamily Common Area	$100
ENERGY STAR Clothes Washers Electric Water Heater/Gas Dryer Multifamily Common Area	$50
ENERGY STAR Clothes Washers Gas Water Heater/Gas Dryer Multifamily Common Area	$25
ENERGY STAR Clothes Washers Gas Water Heater/Electric Dryer Multifamily Common Area	$50

Additional information

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

Current and archived ENERGY STAR-Qualified appliance lists may be found on the BPA Residential Appliance 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 on the same invoice submitted to BPA. Utilities may switch to the "any" measures if reporting to the tier-specific measures delivers little benefit.

10.5 ELECTRIC WATER HEATING

10.5.1 Showerheads

Basis for Energy Savings

The base case used to calculate energy efficiency savings for the current BPA residential showerhead measures is the RTF current practice baseline. Savings from the efficient replacement are based on the nominal flow rates of 2.0, 1.75 and 1.5-gallons per minute (GPM) showerheads for all types of residences. Savings inputs also include an average for the number of persons per residence type and the number of showers per day.

Direct Install measures may gain higher savings by identifying the water heater fuel type. For Retail measures, shower type and water heater fuel type are restricted to "any" in order to collapse shower location and water heater fuel type. BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

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

Showerheads may be distributed by Retail (Simple Steps and utility-run retail programs), By Request, or Direct Install and must follow the Measure Distribution Processes section in the Multisector chapter. This measure is not available for distribution by Mailed Nonrequest.

- Showerheads must have a GPM flow rate of 2.0 or less.
- All showerhead measures are limited to two showerheads per residence.
- Direct Install showerheads are only eligible in homes with electric water heaters and the water heater fuel must be documented.
- By Request claims must (1) document a request by the end-user; and (2) water heater fuel type.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Request by end-user and fuel source documentation (By Request or Direct Install).			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Required Documents

HPWH Qualified Products List

Heat Pump Water Heater Form

Supporting Content

Installation training

COTR Request & Acknowledgment Procedure

Measure Distribution Processes

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
All Showerhead measures	$15	$15	n/a	$23

Additional Information

Measures that can be distributed By Request may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try an efficient showerhead?" If for any reason the homeowner refuses the contractor-installed measure, the installer can default to By Request.

10.5.2 Thermostatic Shut-Off Valves (TSV)

Basis for Energy Savings

Electric savings are a product of the averted behavioral waste, reductions in the percentage of hot water used during warm up, and the percent of shower versus tub starts. Savings inputs also include the number of showers per person, per year, and people per household per shower. These devices may be installed by themselves or in conjunction with an efficient, lower-GPM showerhead.

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 F (35 C) to reduce hot water waste while waiting for water warm up. Products must reduce the showerhead's flow to a trickle when a water temperature of 95 degrees F (35 C) or greater reaches the fixture. The reduced trickle must continue until normal flow is restored manually. Once restored, water must flow at its normal rate until being shut off. The unit must automatically reset itself for the next use.

Direct Install and By Request measures may gain higher savings by identifying the water heater and water heater fuel types. For Retail measures, the showerhead flow rate and water heater fuel are restricted to "any."

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

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

TSVs may be distributed by Retail (Simple Steps and utility-run retail programs), By Request, or Direct Install and must follow the Measure Distribution Processes section in the Multisector chapter. This measure is not available for distribution by Mailed Nonrequest.

Customers claiming the measures By Request must document a request by the end-user and identify the water heater fuel source.

Direct Install TSVs are only eligible in homes with electric water heaters and the water heater fuel source must be documented.

TSVs are available as a stand-alone product, or as a combination unit with an efficient showerhead built in.

Installations must adhere to manufacturer recommendations for minimum static water pressure. For example, many units are recommended to have a minimum of 30 PSI water pressure.

Supporting Content

Thermostatic Shut-Off Valves (TSVs) Qualified Products List

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Request by end-user and water heater fuel source documentation (By Request or Direct Install TSVs).			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
TSV – valve only	$14	$17	n/a	$20
TSV – valve with efficient showerhead	$17	$20	n/a	$23

Additional Information

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

10.5.3 Unitary Heat Pump Water Heater

Unitary heat pump water heaters combine the tank and compressor in a single unit.

Basis for Energy Savings

The base case used to calculate energy efficiency savings for new heat pump water heaters (HPWHs) is the average annual energy consumption of electric water heaters meeting the RTF's current practice baseline. If a standard has been updated recently, BPA examines the potential prevalence of equipment not meeting the standard remaining in the marketplace.

Energy savings is calculated as the difference between the annual energy consumption of the base case and the energy efficient case of the HPWH. Additional factors include draw profiles (water consumption) and interaction with the home HVAC system.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

These measures are available for new and existing, single-family homes and manufactured homes. Savings for multifamily homes have yet to be demonstrated and may not be claimed.

Unitary Heat Pump Water Heaters may be rebated by the utility or distributed by Retail (Simple Steps and utility-run retail programs). Retail measures must follow the Measure Distribution Processes in the Multisector chapter.

In existing homes, the Unitary Heat Pump Water Heater must replace an electric storage water heater on a one-to-one basis.

Unitary HPWHs must be (1) listed on BPA's HPWH Qualified Products List; and (2) installed according to manufacturer's specifications. (If a customer believes a product should be on the list, and it is not, the customer should use the COTR Request & Acknowledgment Procedure to request approval to use the product.)

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used), (b) the order/purchase date, and (c) cost OR for Retail measures follow the Documentation Description of the Retail delivery mechanism found in the Multisector section.			X

Payment

MEASURE	PAYMENT	RETAIL
Unitary HPWH Tier 1 – Any size tank	$300	$300
Unitary HPWH Tier 2 – Any size tank	$500	$500
Unitary HPWH Tier 3 – Any size tank	$500	$500

10.5.4 Split-System Heat Pump Water Heater

Split-system HPWHs have interior storage tanks and outdoor units installed outside the house.

Basis for Energy Savings

The base case used to calculate energy efficiency savings for new HPWHs is the average annual energy consumption of electric water heaters meeting the RTF's current practice baseline. If a standard has been updated recently, BPA examines the potential prevalence of equipment not meeting the standard remaining in the marketplace.

Energy savings is calculated as the difference between the annual energy consumption of the base case and the energy efficient case of the HPWH. Additional factors include draw profiles (water consumption) and interaction with the home HVAC system.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

These measures are available for new and existing single-family homes and manufactured homes. Savings for multifamily homes have yet to be demonstrated and may not be claimed.

Split-System HPWH's may be rebated by the utility or distributed by Retail (Simple Steps and utility-run retail programs). Retail measures must follow the Measure Distribution Processes in the Multisector chapter.

Split-System HPWHs must meet the following qualifications:

- Listed on BPA's HPWH Qualified Products List;
- Installed according to manufacturer's specifications;
- All water or refrigerant lines connecting the tank and outdoor units shall be insulated with minimum R-4;
- If domestic hot water pipes outdoors are freeze-protected with heat cable, the cable shall be installed per manufacturer's instructions, underneath the insulation, and shall be thermostatically controlled to prevent the tape from operating above 38°F;
- No resistance heating is allowed (except heat tape for freeze protection); and
- System plumbed with a thermal mixing valve, which is equipped with internal check valves on the hot and cold water lines connecting to it.

If a customer believes a product should be on the list, and it is not, the customer should use the COTR Request and Acknowledgment Procedure to request approval to use the product.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used), (b) the order/purchase date, and (c) cost OR for Retail measures follow the Documentation Description of the Retail delivery mechanism found in the Multisector section.			X

Payment

TANK SIZE	PAYMENT	RETAIL
Split-System Heat Pump Water Heater – Any size tank	$700	$700

Additional Information

The RTF recently reviewed savings assumptions associated with ducting HPWHs. There was no savings benefit from ducting Tier 2 HPWH. Because there was no demonstrated savings benefit from ducting, the requirement has been removed. Please refer to manufacturer's installation instructions for guidance on location and recommendations for ducting.

10.5.5 Pipe Insulation - Short and Whole-House (BPA-Qualified)

Basis for Energy Savings

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

Requirements and Specifications

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

The Short and Whole-House pipe insulation measures may only be rebated by the utility and are not available to be claimed as Retail, By Request, Mailed Nonrequest or Direct Install.

Customers may claim only one measure per project.

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

Both Short and Whole-House insulation measures must meet the following requirements:

- Hot and cold pipes must be insulated with a minimum of R-3 closed-cell, foam insulation for at least the first three feet past the water heater and, if accessible, up to six feet adjacent to the water heater;
- Insulation material, jackets or facing, and adhesive (if used) must have a flame spread/smoke density rating in accordance with ASTM E-84;
- Pipe insulation must not cover pressure relief valves, handles, safety drain valves or any other safety control device;
- All pipe elbows and joints must be mitered to ensure coverage at the same thickness as straight runs; and
- Pipe insulation must be secured with twine, corrosion resistant wire, or plastic compression ties every 12 inches and within three inches of the ends.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID, address, and water heater fuel type			X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost			X

Payment

APPLICATION	PAYMENT
Short (3-6 foot minimum, hot and cold water pipes)	$5
Whole-House (trunk lines and all exposed hot water pipe)	$25

10.6 BPA SIMPLE STEPS, SMART SAVINGS RETAIL PROMOTION

Basis for Energy Savings

The basis for savings for measures promoted in the Simple Steps, Smart Savings promotion is found in each of the measure sections for the corresponding measures.

Requirements and Specifications

The BPA Simple Steps, Smart Savings retail promotion is implemented by a third-party Simple Steps contractor. Current contact information may be found on the Residential Lighting website. The contractor provides regional coordination of the delivery of retail linear fluorescent fixtures, LED bulbs and fixtures, tubular LED bulbs, home entertainment center advanced power strips, personal desktop advanced power strips, clothes washers and clothes dryers, showerheads, thermostatic shut off valves, unitary heat pump water heaters and split-system heat pump water heaters.

Other Retail measures may be added at the request of the utilities. The program also offers bulk purchase, direct mail and Direct Install delivery options.

The Retail Sales Allocation Tool (RSAT) is used to allocate program savings to customers. Participating customers receive credit for savings achieved in their service territory. Customers may participate by either signing a contract directly with the contractor or by allocating ECA funds to the promotion through BPA.

The Simple Steps, Smart Savings program results in energy efficiency savings that are distributed among the utility participants using the RSAT. In addition, because the program model requires a commitment to all sales of efficient products in active stores (including those that would be attributed to nonparticipating utilities), the program acquires savings from these unclaimed sales. These nonparticipating/unclaimed sales are reported by BPA for credit towards regional self-funding goals to be consistent with the IM requirements and utility ECA agreements.

To limit volatility in nonparticipating utility savings, while preserving the flexibility of participating in Simple Steps, the retroactive purchase of nonparticipating/unclaimed sales by a new program participant will be limited to the current quarter within which the customer joins. For more information on joining the program, contact your EER.

Supporting Content

Simple Steps, Smart Savings ECA Implementation Budget Release Form

Residential Lighting Website

COTR Request and Acknowledgment Procedure

PARTICIPATION OPTION	REQUIREMENTS
Signing a contract directly with the Simple Steps contractor	Customers must sign a Promotion Services Agreement with the contractor and pay the contractor directly for sales under that agreement. Interested customers must contact the contractor. Contact information is available on the Residential Lighting website. Customers may use any funding source available under this option and may invoice BPA for eligible measures.
Allocating ECA funds to the promotion through BPA	Customers must send to BPA (1) a completed Simple Steps, Smart Savings ECA Implementation Budget Release Form (available in the IM Document Library); and (2) a sales projection provided by the contractor. It must be sent by email at eedocs@bpa.gov or by fax to 1-866-535-7955. Customers must commit to a funding period of a minimum of six months, or be approved for participation by the contractor. The funding period may not exceed the rate period. BPA reduces the customer's ECA implementation budget by the allocated amount in the budget release form, and pays the contractor for program incentives using these funds. BPA tracks savings and the contractor sends the customer monthly savings reports. If actual sales are below the sales projection at the midpoint of the customer's selected funding period, BPA, the contractor and the customer may work together to recommend corrective action. If sales are still below the sales projection at the third quarter of the funding period, at the customer's request, BPA will return the unused funds to the ECA implementation budget. If allocated funds have not been spent at the conclusion of the rate period, they will be returned to the customer's ECA implementation budget. If actual sales are above the sales projection at the midpoint or at the third quarter of the customer's funding period, the customer may elect to add funds by submitting a new budget release form. If no funds are added, work in the customer's service territory may be subject to curtailment. If the contractor fails to deliver according to their projection, the customer may terminate participation with 30 days notice to BPA using the COTR Request and Acknowledgment Procedure.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Simple Steps or contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost for sales in service territory.			X

Payment

Customers are paid according to the established payment levels noted in each of the measure sections for the corresponding measures.

10.7 HEATING, VENTILATION, AIR CONDITIONING (HVAC)

Ductless and Ducted Mini-Split Heat Pumps Eligible Measures by Housing Type

Existing Construction	Single Ductless and Ducted Mini-Split Heat Pumps (and other applications as detailed below) (10.7.1.1)	Multiple Indoor Heads Ductless, Multiple Indoor Ducted Mini-Split Heat Pumps, Combination Indoor Head(s) and Ducted Mini-Split Heat Pump(s), and Homes with Multiple Outdoor Compressors (10.7.1.2)	DHP Upgrade (10.7.1.3)
Single-Family Homes	All States	All States claim under 10.7.1.2	All States
Manufactured Homes	All States	All States claim under 10.7.1.1	All States
New Construction	**Single Ductless and Ducted Mini-Split Heat Pumps (and other applications as detailed below) (10.7.1.1)**	**Multiple Indoor Heads Ductless, Multiple Indoor Ducted Mini-Split Heat Pumps, Combination Indoor Head(s) and Ducted Mini-Split Heat Pump(s), and Homes with Multiple Outdoor Compressors**	**DHP Upgrade (10.7.1.3)**
Single-family Homes	All States except Washington	All States except Washington. All other States claim under 10.7.1.1	Not Applicable
Manufactured Homes	All States	All States claim under 10.7.1.1	Not Applicable

10.7.1.1 Single Interior Head and Single Outdoor Compressor Ductless and Ducted Mini-Split Heat Pump(s)

This measure is for single interior head installations in homes that have only one outdoor compressor in:

1. Existing single-family homes
2. Existing manufactured homes
3. New single-family homes in all states except Washington
4. New manufactured homes in all states

This measure is also for: (a) multiple ductless indoor heads, (b) multiple indoor ducted head mini-split heat pumps or (c) combination indoor head(s) and ducted mini-split heat pumps in:

1. New single-family homes in all states except Washington
2. Existing and new manufactured homes in all states.

Multiple ductless indoor heads, multiple indoor ducted mini-split heat pumps, combination indoor head(s), ducted mini-split heat pumps and multiple outdoor compressors in existing single-family homes use measure 10.7.1.2.

Support Documents

RTF Unit Energy Savings (UES) Measures

COTR Request & Acknowledgment Procedure

Northwest DHP Project Best Practices Guides

Qualified Applications List

Required Documents

DHP Qualified Product List

Basis for Energy Savings

The base case (pre-existing state) used to calculate energy efficiency savings for Ductless Heat Pump (DHP) in existing homes is single-family and manufactured homes with electrical zonal or electric forced-air furnace HVAC. The base case (pre-existing state) used to calculate energy efficiency savings for DHP in new, single-family homes is single-family homes with electric zonal HVAC. The base case (pre-existing state) used to calculate energy efficiency savings for DHP in new manufactured homes is new manufactured homes with electric forced-air furnace HVAC. The calculation of energy efficiency savings for DHP utilized multiple runs of the SEEM simulation engine, calibrated with results from a study of the performance of DHPs in actual homes, in combination 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. The basis for energy savings for ducted mini-splits is based on the SEEM model with adjustments made to:

- System capacity from the SEEM DHP default size of 1.5, up to 2.5 tons;
- SEEM modeling used to approximate the performance in a multi-head system; and
- DHP input power curve.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Measures include single indoor head DHP or single indoor head ducted mini-splits in single-family and manufactured homes, and multiple-indoor-head ductless and ducted mini-splits in existing and new manufactured homes and new single-family homes in Oregon, Montana, Idaho, Nevada, Wyoming and California. For homes with zonal electric heat or electric forced-air furnace as their primary system. Ducted Mini-Split does not include whole home centrally ducted systems; see PTCS Air Source Heat Pump for further information on whole home centrally ducted systems

Qualifying applications for existing homes include the following:

- Single-family residences with zonal electric resistance heat, including zonal electric 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.
- Single-family residences with electric resistance forced-air furnaces, with or without air conditioning.
- 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.
- Manufactured homes with zonal electric heat.
- Manufactured homes with electric forced-air furnaces, with or without air conditioning.

Qualifying equipment/installation requirements:

- HSPF: DHP or Ducted Mini-Split must be a split-system heat pump employing an inverter-driven outdoor compressor, with inverter-driven or variable-speed indoor blower, rated with a minimum of 9.0 HSPF.

- QPL: DHPs or Ducted Mini-Split must be listed on BPA's DHP Qualified Product List. If a customer believes a product should be on the list, and it is not, the customer should use the COTR Request and Acknowledgment Procedure to request approval to use the product.
- Installation requirements: DHP must be installed on a dedicated electrical circuit, according to manufacturers' specifications and the Best Practices for Installing Ductless Heat Pumps Guide, by a HVAC company who is listed on the Northwest Ductless Heat Pump Installer GoingDuctless.com website. Ducted Mini-Splits must be installed on a dedicated electrical circuit and according to manufacturers' specifications.
- Existing homes with electric forced-air furnaces are eligible for PTCS or Prescriptive Duct Sealing.
- Existing homes where plug-in electric heaters are the primary heating system in the home qualify for DHP Payment. The customer should determine if a weather-related heating signature exists that demonstrates electric resistance heating use.

For existing single-family homes, this measure can only be claimed in homes with a single outdoor unit and a single indoor unit. Existing single-family homes with multiple indoor heads and/or more than one outdoor unit use 10.7.1.2.

PLEASE NOTE: This measure also applies to instances where multiple indoor heads are installed in existing and new manufactured homes, and new single-family homes in Idaho, Montana, Nevada Oregon, and Wyoming. For multiple indoor heads installed in existing single-family homes. see section 10.7.1.2

Beginning April 1, 2018, this measure will utilize a Qualified Applications List to document installation applications that were approved by BPA after publication of this document.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Ductless Heat Pump Installation Form (or other form(s) that contain the same information) available in the IM Document Library.			X

Payment

BUILDING TYPE	EXISTING HEATING SYSTEM TYPE	PAYMENT
Existing Single-Family Homes	Zonal electric heat	$800
	Electric forced-air furnace	$1,000

BUILDING TYPE	EXISTING HEATING SYSTEM TYPE	PAYMENT
Existing Manufactured Homes	Zonal electric heat	$800
	Electric forced-air furnace	$1,000
New Single-family Homes Oregon	No existing heating system in new construction.	$400
New Single-family Homes Montana, Idaho, Nevada, Wyoming and California	No existing heating system in new construction.	$700
New Manufactured Homes in all States	No existing heating system in new construction.	$1,000

10.7.1.2 Multiple Ductless Indoor Heads, Multiple Indoor Ducted Mini-Split Heat Pumps, Combination Indoor Head(s) and Ducted Mini-Split Heat Pump(s), and Homes with Multiple Outdoor Compressors – BPA Qualified

This measure is for existing single-family homes with multiple indoor heads supplied by one or more outdoor compressors.

This measure is intended for existing single-family homes with multiple indoor heads supplied by one outdoor compressor. However, for qualifying homes with more than one outdoor compressor and multiple indoor ductless, ducted mini-split or a combination of both head types, these may also be reported under the appropriate reference number corresponding to this section. One payment is permissible per qualifying home. Please see the table in the previous section for additional reporting guidance or contact your COTR for guidance on atypical installations not listed. This measure is available for existing single-family residences in all states. Ducted Mini-Splits do not include whole home centrally ducted systems. See PTCS Air Source Heat Pump for further information on whole home centrally ducted systems.

For new single-family construction and new and existing manufactured homes with single interior head installations in homes with more than one outdoor unit and multiple single indoor heads ductless, multiple indoor ducted mini-split heat pumps or combination indoor head(s) and ducted mini-split heat pumps use 10.7.1.1.

For homes with a single interior head and single outdoor compressor, use measure 10.7.1.1

Basis for Energy Savings

Savings for Ductless Heat Pumps and/or Ducted Mini-Splits is based on the SEEM model with adjustments made to:

- System capacity from the SEEM DHP default size of 1.5, up to 2.5 tons;
- SEEM modeling used to approximate the performance in a multihead system; and
- DHP input power curve.

Assumptions were made to the fraction of heating load provided by the DHP versus auxiliary resistance heat.

Support Documents

Qualified Applications List

Requirements and Specifications

This measure is available for existing single-family residences in all states. Ducted Mini-Splits do not include whole home centrally ducted systems. See PTCS Air Source Heat Pump for further information on whole home centrally ducted systems.

Qualifying applications for existing homes include the following:

- Existing single-family residences with zonal electric resistance heat, including zonal electric 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 residences with electric resistance forced-air furnaces, with or without air conditioning; and
- 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 use section 10.7.1.1.

Qualifying equipment/installation requirements:

- HSPF:
    - Multihead DHPs and/or Ducted Mini-Splits must be a split-system heat pump employing an inverter-driven outdoor compressor, with inverter-driven or variable speed indoor blower(s), rated with a minimum of 8.2 HSPF.
- QPL:
    - The outdoor unit must be listed on the DHP Qualified Product List, and the indoor and outdoor units must be compatible. For assistance on verification of compatibility of the outdoor and indoor units, contact your EER.
- Install Requirements:
    - DHPs and/or Ducted Mini-Splits must be installed on a dedicated electrical circuit and according to manufacturers' specifications.
    - Existing homes with electric forced-air furnaces are eligible for PTCS or Prescriptive Duct Sealing.
    - Existing homes where plug-in electric heaters are the primary heating system in the home qualify for DHP Payment. The customer should determine if a weather-related heating signature exists that demonstrates electric resistance heating use.

PLEASE NOTE: This measure *does not apply* to instances where multiple indoor heads are installed in existing and new manufactured homes, and new single-family homes in Idaho, Montana, Oregon, Wyoming and Nevada. These installs may qualify per section 10.7.1.1.

Beginning April 1, 2018, this measure will utilize a Qualified Applications List to document installations applications that were approved by BPA after the publication of this document.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	SITE REGISTRY	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used), (b) the order/purchase date, and (c) cost.			X
Ductless Heat Pump Installation Form (or other form(s) that contain the same information) available in the IM Document Library.			X

Payment

BUILDING TYPE	EXISTING HEATING SYSTEM TYPE	PAYMENT
Existing Single-Family Homes	Zonal electric heat	$1,000 per Home
	Electric forced-air furnace	$1,200 per Home

10.7.1.3 Ductless Heat Pump Upgrade

Basis for Energy Savings

The calculation of energy efficiency savings for DHPs utilized multiple runs of the SEEM simulation engine, calibrated with results from a study of the performance of DHPs in actual homes, in combination 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.

Requirements and Specifications

- Measure includes upgrading an existing DHP for existing single-family and manufactured homes in all states.
- DHP must be a split-system heat pump employing an inverter-driven outdoor compressor, with inverter-driven or variable speed indoor blower(s), rated with a minimum of 11.0 HSPF or greater for single head systems and must be listed on BPA's DHP Qualified Product List. (If a customer believes a product should be on the list, and is not, it should use the COTR Request and Acknowledgment Procedure to request approval to use the product.)
- Ductless heat pump must be installed on a dedicated electrical circuit, according to manufacturers' specifications and the Best Practices for Installing Ductless Heat Pumps Guide, by a HVAC company who is listed on the Northwest Ductless Heat Pump Installer GoingDuctless.com website.
- In the event end use customer is replacing a DHP system and adds more indoor head(s), this application is eligible for one DHP Upgrade payment only.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	SITE REGISTRY	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of product installed/used); (b) the order/purchase date; and (c) cost.			X
Ductless Heat Pump Installation Form (or other form(s) that contain the same information) available in the IM Document Library.			X

Payment

BUILDING TYPE	EXISTING HEATING SYSTEM TYPE	PAYMENT
Existing Single-Family and Manufactured Homes	Ductless Heat Pump	$100

10.7.2 HVAC – Ducted Systems

This section covers:

- Air Source Heat Pumps and Variable Speed Heat Pumps;
- Ground Source Heat Pumps; and
- Duct Sealing.

10.7.2.1 PTCS Air Source Heat Pumps, Variable Speed Heat Pumps and Commissioning Controls and Sizing

Basis for Energy Savings

The base case (pre-existing state) used to calculate energy efficiency savings for air source heat pumps and variable speed heat pump upgrades are the heat pumps determined by RTF data to be current practice (8.5 HSPF and 14.0 SEER). The base case (pre-existing state) for air source heat pumps and variable speed heat pump conversions are an electric forced air furnace (with or without central air conditioning). The base case (pre-existing state) for air source heat pumps and variable speed heat pump upgrades includes nonelectric heating savings represented as a cost savings.

Energy savings are calculated using multiple runs of the calibrated SEEM simulation engine in combination with the prototype house weightings. This is in order to generate heating energy use for baseline and efficient cases for each heating system type and heating zone within the analysis, for the efficient case of 9.0 HSPF/14.0 SEER. Savings for the efficient case includes a Performance Tested Comfort Systems (PTCS) installation with commissioning, controls and sizing.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Measures include PTCS heat pump upgrades; PTCS heat pump conversions; and PTCS commissioning, controls and sizing.

Required Documents

PTCS Heat Pump and Central Air Conditioner Sizing Calculator

Support Documents

Air Source Heat Pump Installation Form

PTCS Program Requirements

PTCS Online Registry

IM Document Library

RTF Unit Energy Savings (UES) Measures

Residential HVAC Website

Air Source Heat Pump Specification

Qualified Applications List

These measures are available for new construction single-family, existing construction single-family, or existing manufactured homes.

- These measures are applicable to whole home centrally ducted systems. For ducted mini-splits, see section 10.7.1.
- Air source heat pumps and variable speed heat pump upgrades include replacing an existing heat pump, installing an air source heat pump in single-family new construction, adding a heat pump to a nonelectric heating system (i.e., gas, oil, propane or wood) or upgrading from zonal (including zonal hydronic systems that do not utilize a duct system for distribution) to air source heat pump. These can be claimed as "Any Electric or Non-Electric Heating System."
- New air source heat pumps (upgrades or conversions) must be rated as having a minimum of 9.0 HSPF and 14 SEER, and the equipment must be AHRI tested and certified. Manufacturer claims of "equivalent to AHRI certified equipment" will not be accepted.
- Air source heat pumps and variable speed heat pump conversions must convert an electric forced-air furnace to a high-efficiency heat pump. When a home is hydronically heated, an electric resistance water heater serving a forced-air hydronic coil is considered equivalent to an electric furnace.
- Commissioning, controls and sizing may be applied to any new heat pump that meets the federal minimum standards, and that refers to the PTCS installation procedures of commissioning any new air source heat pumps and variable speed heat pumps for the proper sizing of the unit, refrigerant charge, the control of auxiliary heat and air flow to ensure the system is installed to operate efficiently. This measure cannot be claimed in combination with any other heat pump measure.
- PTCS work must be performed by a technician certified in PTCS, or an approved alternative (listed in the PTCS Program Requirements) Also, the technician must be PTCS-certified in the online site registry.
- Air source heat pumps and variable speed heat pumps must be installed according to the PTCS Air Source Heat Pump Installation Specification dated April 1, 2017, which is available in the IM Document Library.
- All eligible installations must be entered in the online site registry.

PTCS forms and specifications are available in the IM Document Library and on the BPA Residential HVAC webpage.

Homes with a heated floor area greater than 4,500 square feet, or with two separate duct systems, may claim up to two heat pump measures when two qualifying heat pumps are installed — provided that all other program requirements are met.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	SITE REGISTRY	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
PTCS site registry measure ID.	X	X	
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	SITE REGISTRY	CUSTOMER FILE
Proof that the required form(s) for the claimed measure have been accepted in the PTCS site registry of certified systems.		X	
• Installation Information • PTCS Registry Installation Report, or • PTCS Air Source Heat Pump Form (handwritten form located in the IM Document Library), or • CheckMe!® Heat Pump Protocol Data Entry Form for PTCS Summer and Winter. • Technician documentation used to determine size of the heat pump per PTCS specifications: • "PTCS Heat Pump and Central Air Conditioner Sizing Calculator" (located in the IM Document Library), or • A heat load/heat loss calculation and associated balance point worksheet (i.e. a calculator, graph, or chart).			X

Payment

MEASURE CATEGORY	PAYMENT
Heat Pump Upgrade to Air Source Heat Pump.	$500
Heat Pump Upgrade to Variable Speed Heat Pump.	$700
Heat Pump Conversion from Electric Forced-Air Furnace to Air Source Heat Pump.	$1,400
Heat Pump Conversion from Electric Forced-Air Furnace to Variable Speed Heat Pump.	$1,600
Commissioning, Controls and Sizing.	$300

Additional Information

PTCS air source and variable speed heat pumps are subject to quality assurance inspection by a BPA-Approved quality assurance inspector. The PTCS air source and variable speed heat pump specifications require the PTCS technician to provide (and for utilities to keep on file) the technician's documentation of sizing calculations. The options for meeting this documentation requirement are: PTCS Heat Pump and Central Air Conditioner Sizing Calculator or both the heating load/heat loss calculations and the balance point worksheet. Installations lacking this information will fail their quality assurance inspection.

The updated CheckMe!® Heat Pump Protocol Data Entry Form for PTCS summer and winter forms are considered equivalent to the PTCS Heat Pump Form.

10.7.2.2 Ground Source Heat Pumps

Basis for Energy Savings

The base case (pre-existing state) used to calculate energy efficiency savings for ground source heat pump upgrades are the heat pumps determined by RTF data to be current practice (8.5 HSPF and 14.0 SEER). The base cases (pre-existing state) for ground source heat pump conversions are an electric forced-air furnace (with or without central air conditioning).

Energy savings is calculated using multiple runs of the calibrated SEEM simulation engine, in combination with the prototype house weightings. This generates heating energy use for baseline and efficient cases for each heating system type and heating zone within the analysis, for the efficient case of an ENERGY STAR Ground Source Heat Pump. Additional savings are added in the case of a desuperheater. Savings for the efficient case includes a PTCS and IGSHPA installation with commissioning, controls and sizing.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Measures include PTCS ground source heat pump upgrades or conversions with or without a desuperheater.

These measures are available for new construction single-family and existing single-family in heating zones 2 and 3 only.

- For new construction homes, the baseline is considered to be an electric forced-air furnace.
- For existing homes, qualifying ground source heat pumps may be eligible for a conversion or upgrade incentive, depending on the baseline system.
- Baseline systems that qualify for conversions:
    - An electric furnace; and
    - An electric boiler used for forced-air hydronic heating or zonal radiant heat.
- Baseline systems that qualify for upgrades:
    - An existing air source heat pump;
    - Zonal electric; and
    - Nonelectric heating system (i.e., gas, oil or propane).
- Projects that replace only the compressor portion (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 may be eligible for an upgrade measure. The compressor portion must be ENERGY STAR-Qualified and should be claimed using the ground source heat pump "compressor portion only" upgrade measure in the UES Measure List.
- 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.
- Ground source heat pump systems must be ENERGY STAR-Qualified. They must be installed according to the International Ground Source Heat Pump Association (IGSHPA) specifications available at the

Required Documents

PTCS Ground Source Heat Pump Form

Support Documents

PTCS Program Requirements

PTCS Online Registry

RTF Unit Energy Savings (UES) Measures

Residential HVAC Website

PTCS Closed Loop Ground Source Heat Pump Specification

PTCS Ground Water Source Open Loop Heat Pump Installation Specification

time of installation, and one of the two Ground Source Heat Pump Specifications listed below. All specifications are available in the IM Document Library and on the BPA Residential HVAC webpage.

  - Closed-loop ground source heat pumps must be installed according to the "Ground Source Heat Pump System Installation Standards," dated Oct. 4, 2011.
  - Open-loop ground source heat pumps must be installed according to the "PTCS Ground Water Source Open Loop Heat Pump Installation Specification," dated April 1, 2015.

- Work must be performed by a technician or technicians certified in PTCS, or an approved alternative found in the PTCS Program Requirements and IGSHPA. Multiple technicians may be employed to meet these certification requirements, but they must have been present during the installation to qualify.
- Only one ground source heat pump per home qualifies for BPA payment. Ground source heat pumps may be connected to hydronic heating systems in residential end-use applications if all PTCS and IGSHPA specifications are met.
- All eligible installations must be entered in the online site registry. Ground source heat pump forms and specifications are available in the IM Document Library and on the BPA Residential HVAC webpage.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	SITE REGISTRY	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
PTCS site registry measure ID.	X	X	
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Proof that the required form(s) for the claimed measure have been accepted in the PTCS site registry of certified systems.		X	
• PTCS Ground Source Heat Pump Form (handwritten form located in the IM Document Library); and • Technician documentation used to determine size of heat pump per PTCS specifications, by submitting a heat load/heat loss calculation, and a balance point worksheet (i.e. a calculator, graph, or chart), and loop-design documentation.			X

Payment

MEASURE CATEGORY	PAYMENT
Ground Source Heat Pump Upgrade or Conversion without Desuperheater	$3,000
Ground Source Heat Pump Upgrade or Conversion with Desuperheater	$3,500

Additional Information

PTCS ground source heat pumps are subject to quality assurance inspection by a BPA-Approved quality assurance inspector.

The PTCS ground source heat pump specifications require the PTCS technician to provide (and utilities to keep on file) the technician's documentation of sizing calculations (e.g., both the heating load/heat loss calculations, and balance point worksheet) and loop design documentation. Installations lacking this information will fail their quality assurance inspection.

10.7.2.3 Duct Sealing – PTCS or Prescriptive

Basis for Energy Savings

Multiple runs of the calibrated SEEM simulation engine are used in combination with the prototype house weightings. This generates heating energy use for baseline and efficient cases for each heating system type and heating zone, within the analysis for both PTCS and prescriptive duct sealing measures. Primary parameters are the key SEEM inputs and factors in differences in average duct leakage to the exterior of the home with variations for basement, crawlspace and/or slab homes, as provided by the RBSA.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Measures include PTCS duct sealing and prescriptive duct sealing.

- PTCS duct sealing measures are available for existing single-family homes or existing manufactured homes with ducts that are connected to electric heat.
- PTCS work must be performed by a technician certified in PTCS, or an approved alternative (listed in the PTCS Program Requirements) and the technician must be PTCS certified in the online site registry.
- PTCS duct sealing measures must be sealed according to the "PTCS Duct Sealing Specification," dated April 1, 2015. Available in the IM Document Library.
- Prescriptive duct sealing measures are available for existing single-family homes or existing manufactured homes with ducts that are connected to electric heat.
- Prescriptive work must be performed by a technician certified in prescriptive duct sealing, (listed in the Prescriptive Duct Sealing Program Requirements) and the technician must be certified as prescriptive in the online site registry.
- Prescriptive duct sealing measures must be installed according to the "Prescriptive Duct Sealing Specification," dated April 1, 2015, which is available in the IM Document Library.
- All eligible installations must be entered in the online site registry.

PTCS and prescriptive forms and specifications are available in the IM Document Library and on the BPA Residential HVAC webpage.

Supporting Content

PTCS Duct Sealing Form

Prescriptive Duct Sealing Form

PTCS Program Requirements

PTCS Online Registry

RTF Unit Energy Savings (UES) Measures

PTCS Duct Sealing Specifications

Prescriptive Duct Sealing Specifications

Homes with two independent, electrically-heated duct systems may claim up to two duct sealing measures provided that all other program requirements are met.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	SITE REGISTRY	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
PTCS site registry measure ID.	X	X	
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/ purchase date; and (c) cost.			X
Proof that the required form(s) for the claimed measure have been accepted in the PTCS site registry of certified systems.		X	
• PTCS Registry Installation Report, or • PTCS or Prescriptive Duct Sealing Form (handwritten form located in the IM Document Library).			X

Payment

MEASURE CATEGORY	BUILDING TYPE	PAYMENT
PTCS and Prescriptive Duct Sealing	Manufactured homes	$200
	Existing single-family homes	$250

Additional Information

PTCS and prescriptive duct sealing are subject to quality assurance inspection by a BPA-Approved quality assurance inspector.

10.8 THERMOSTATS

10.8.1 Line-Voltage Thermostats

Basis for Energy Savings

The base case (pre-existing state) is a home with electric resistance zonal heat (baseboards or wall heaters) with line-voltage, bi-metal thermostats. The energy savings for line-voltage thermostats uses a weighted average of heating loads multiplied by a percent reduction of heating load. This savings arises from the line-voltage thermostats maintaining temperature closer to the set temperature on the dial (smaller hysteresis) than do older, bi-metal thermostats. The hysteresis, also known as dead band, refers to the temperature difference range between a thermostat coming on and shutting off.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is claimed on a per thermostat basis and is available for existing

single-family and existing multifamily low-rise and mid-/high- rise homes. Customers must replace thermostats in existing, electrically heated single-family or multifamily homes with line-voltage electronic thermostats.

All thermostats must meet the following requirements:

- Have a digital display;
- Be electronically line-voltage type;
- Have a thermistor temperature sensing element that is accurate to within 1.5 degrees or better; and
- Be UL- or CSA-listed for use with their application (i.e., fan-forced, baseboard, wall or ceiling radiant).

In addition, programmable line-voltage thermostats must maintain temperature and program settings during power failures, and have a temporary override feature.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.			X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X

Payment

Payments are per unit as listed in the table below:

HEATING ZONE	PAYMENT
All Heating Zones – existing single-family and multifamily	$18/unit

10.8.2 Smart Thermostats - BPA Qualified

Basis for Energy Savings

The base case used to calculate energy efficiency savings for 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 SEEM simulation engine, calibrated with results from a study of the performance of 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 Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Measures include smart thermostats for homes with electric forced-air furnace, air source heat pumps and ground-source heat pumps as their primary system.

Supporting Content

RTF Unit Energy Savings (UES) Measures

Simplified Energy Enthalpy Model (SEEM)

These measures are available for existing and new construction single-family, manufactured, multifamily low-rise, and multifamily mid-/high-rise homes. Smart thermostats may be installed by homeowners or directly installed by utilities, utility representatives or HVAC contractors.

Qualifying smart thermostats must:

- Be listed on BPA's Smart Thermostat Qualified Products List; and
- Be set to the geographic location where the thermostat is located.

In addition to the requirements above, thermostats controlling air source heat pumps must be programmed to recognize the existing heat pump system.

Thermostats that control cooling-only systems or duel fuel heating systems (gas furnace and electric heat pump) are not eligible for an incentive.

Smart Thermostats distributed through any of the five channels listed below must follow the Measure Distribution Processes in the Multisector chapter. Smart Thermostats distributed through any of the five retail channels listed below do not require completion or submission of the Smart Thermostat Project Information Form.

(Please note, not all of those options are currently available through BPA, but may become available in the future. BPA will notify customers if and when these delivery channels are available.)

a. Utility created kits provided to a customer

b. Kits (including those fulfilled through Simple Steps)

c. Customer receives an instant rebate through a coupon provided physically or digitally by their utility

d. Through a traditional retail program (such as Simple Steps or other similar program)

e. Through a utility run retail program (such as over the counter sales from utility facilities)

Utility provided rebates for smart thermostats that are independently purchased by the customer and outside of the above channels need not adhere to the Measure Distribution Processes in the Multisector chapter, but must meet all other program requirements below.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Smart Thermostat Project Information Form (or other form(s) that contain the same information) available in the IM Document Library. This documentation is not required if the measure is installed using the five retail channels listed above.			X

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
For measures installed using the retail channels listed above, see the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

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

MEASURE	RETAIL OR END-USER INSTALLED	DIRECT INSTALL (CONTRACTOR OR UTILITY/ UTILITY REPRESENTATIVE INSTALLED)
Smart Thermostat	$100/thermostat	$125/thermostat

10.9 NEW CONSTRUCTION

10.9.1 New Northwest Energy Efficient Manufactured Housing (NEEM)

Basis for Energy Savings

The base case (pre-existing state) is a current manufactured home built in the Pacific Northwest, which tend to be slightly better than HUD code. The base case considers individual components including envelope, HVAC, lighting, appliances and water heating. Energy savings for a new, NEEM manufactured home is 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. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Manufactured homes must be electrically heated, new, and be designed, constructed, and certified by the Northwest Energy Efficient Manufactured Housing program (NEEM).

NEEM has an online tracking and certification system operated by Northwest Energy Works. Contact Northwest Energy Works at (888) 370-3277, ext. 102 for current information.

Documentation Requirements

Supporting Content

IM Document Library

UES Measure List / IS 2.0

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	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

HEATING ZONE	PAYMENT
NEEM 1.1 All Heating Zones	$1,200
NEEM 2.0 All Heating Zones	$1,400

New NEEM 1.1 or 2.0 Home payments are available for NEEM 1.1 and 2.0 versions.

Beginning in 2018, NEEM marketing materials were 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.

10.9.2 Replacement of Pre-1976 Manufactured Home with New Northwest Energy Efficient Manufactured Housing (NEEM) Certified Home

Basis for Energy Savings

The base case (pre-existing state) is a manufactured home built before the 1976 HUD Manufactured Housing Code. Energy consumption estimates for the pre-1976 home are based on Residential Building Stock Assessment 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 NW) based on prototype and heating/cooling system type for single prototype square footage. Output of this analysis is then divided into three heating/cooling zones based on a weighted average of SEEM run results for the five locales. The SEEM model also accounts for interaction with the lighting power reduction of this measure. Total energy savings is based on the difference between the estimated energy use of the pre-1976 home and the new NEEM 1.1 or NEEM 2.0 home. BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's webpage.

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 can not 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 Northwest Energy Efficient Manufactured Housing (NEEM) program as a New NEEM 1.1 or 2.0 Home. NEEM has an online tracking

and certification system operated by Northwest Energy Works. Contact Northwest Energy Works (888) 370-3277, ext. 102 for current information.

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.

Customers must utilize the BPA Manufactured Home Replacement Project Information Form to document the pre-and post-condition and related cost data for this measure, and maintain the Project Documentation Form in the customer file.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
NEEM 1.0 or 2.0 certificate of compliance.			X
Completed BPA Manufactured Home Replacement Project Documentation 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.

HEATING ZONE	PAYMENT
Replacement of Pre-1976 Manufactured Home with an electrically heated new NEEM 1.1 home.	$2,200 All heating zones.
Replacement of Pre-1976 Manufactured Home with an electrically heated new NEEM 2.0 home.	$2,500 All heating zones.

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.

In addition to Northwest Energy Efficient Manufactured Housing (NEEM) 1.1 and 2.0, and Replacement of Pre-1976 Manufactured Home with New Northwest Energy Efficient Manufactured Housing (NEEM) Certified Home the following measures are available as stand-alone measures in New Manufactured Homes. For requirements and specifications and payment levels, please see the referenced section.

ADDITIONAL MEASURES AVAILABLE FOR NEW MANUFACTURED HOMES	LOCATION IN IM
Residential Lighting Fixtures	10.2
Residential Lighting	10.2
Clothes Washers	10.4
Clothes Dryers	10.4

ADDITIONAL MEASURES AVAILABLE FOR NEW MANUFACTURED HOMES	LOCATION IN IM
Showerheads	10.5.1
Thermostatic Shut-Off Valves	10.5.2
Heat Pump Water Heaters – All Tiers	10.5.3, 10.5.4
Ductless Heat Pumps	10.7.1
Some Types of Thermostats (please see thermostat section for details).	10.8

10.9.3 Single-Family New Construction Performance Path

Basis for Energy Savings

The base case (pre-existing state) is a code minimum home for Idaho, Montana, Oregon or Washington. Energy savings for the Single-Family New Construction Performance Path is based on RTF-Approved New Homes Standard Protocol. BPA requirements also integrate the NW Modeling Requirements and RTF Unit Energy Savings (UES) Measures through the AXIS Database.

When state energy codes are updated, base case homes for each state will be updated, which may result in a reduction in potential energy savings and payment.

The Single-Family New Construction Performance Path utilizes REM/Rate, RTF UES Measures, and the NEEA-maintained AXIS database to compare the modeled energy consumption of a new home to the modeled energy consumption of a typical, code-built home. This will allow a customer to request a payment based on the energy savings of the new home, compared to the code home. Calculations are performed by the AXIS database, which provides a report with required documentation to customers.

Requirements and Specifications

Homes must be new, single-family homes. Individual dwelling units in buildings that meet the BPA definition of "single-family," which contain more than one dwelling unit, must be modeled separately. This measure is available for all heating zones in all states.

Homes must be 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.

In order 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. The Performance Path Calculator Summary Report is a report generated by the AXIS database that has fields similar to the BPA UES Measure Upload Template but also contains additional information necessary for savings reliability. For more information on how to access this report please contact NEEA.

This measure is supported by NEEA. For assistance or questions on REM/Rate, becoming a rater or AXIS, please visit betterbuiltnw.com.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X		X
Performance Path Calculator Summary Report			X

Payment

BPA shall pay for Single-Family New Construction Performance Path on a kWh 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

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.

10.9.4 Montana House (v 2.0)

Basis for Energy Savings

The base case (pre-existing state) is a code-minimum home for Montana. Energy savings for the Montana House is based on the upgrades over a code-minimum home based on the Montana House v 2.0 Program Specifications (RTF, 2015). It was modeled through multiple runs with the SEEM simulation engine for baseline and efficient cases (an energy modeling software calibrated to real world energy consumption), for homes with and without basements. SEEM analysis was performed for each foundation type, and takes into account the interaction with lighting and ventilation components. Upgrades to HVAC efficiency are additive for the Montana House new construction measures.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Homes must be new, electrically heated and compliant with the Montana House v 2.0 specification (available in the IM Document Library). This measure is available only for single-family new construction homes built in Montana, and Heating Zones 2 and 3 in Idaho, Wyoming and Nevada.

Air Source Heat Pump, Variable Speed Heat Pump, Ground Source Heat Pumps (with or without desuperheater), Ductless Heat Pumps, and Commissioning and Controls may be combined with the shell upgrade measures for the Montana House. Please see the Ducted Systems section for Requirements and Specifications. Note that the Commissioning, Controls and Sizing measures may not be claimed in combination with any other heat pump measure.

Supporting Content

Montana House v2.0 Specifications

RTF Unit Energy Savings (UES) Measures

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
HVAC system details (type of equipment, ventilation system and specific measures installed including rated CFM), foundation type; and home square footage.			X
Documentation Report of inspections performed by the customer, including any substantial findings and documentation of any corrective actions taken.			X
Documentation Requirements for HVAC options per the Ducted Systems section.			X

Payment

BPA shall pay for the Montana House as indicated below. Air Source Heat Pump, Variable Speed Heat Pump, Ground Source Heat Pumps (with or without desuperheaters), Commissioning, and Controls and Sizing payments can be combined with the shell upgrade payment. To report heating measures, report stand-alone measures and use stand-alone measure reference numbers. Heating measures must follow the requirements and specifications in the appropriate section above.

MEASURE	PAYMENT
Montana House Shell Upgrade	$1,500
Montana House Shell Upgrade (with Ground Source Heat Pump).	$500

In addition to the Single-Family New Construction Performance Path and Montana House, the following measures are available as stand-alone measures in New, Single-Family Homes. For requirements and specifications and payment levels, please see the referenced section.

ADDITIONAL MEASURES AVAILABLE FOR NEW, SINGLE-FAMILY CONSTRUCTION	LOCATION IN IM
Residential Lighting Fixtures	10.2
Residential Lighting	10.2
Clothes Washers	10.4
Clothes Dryers	10.4
Showerheads	10.5
Thermostatic Shut-Off Valves	10.5.2
Heat Pump Water Heaters – all tiers	10.5.3, 10.5.4
Ductless Heat Pumps (ID, MT, OR only)	10.7.1

ADDITIONAL MEASURES AVAILABLE FOR NEW, SINGLE-FAMILY CONSTRUCTION	LOCATION IN IM
HVAC Ducted Systems (including Air Source Heat Pumps and Ground Source Heat Pumps).	10.7.2
Some Types of Thermostats (please see thermostat section for details).	10.8

10.9.5 BPA Energy Efficient New Multifamily Construction (BPA-Qualified)

Basis for Energy Savings

The base case (pre-existing state) is a representative sample of dwelling units built to the 2015 Washington Energy Code. Energy savings for Energy Efficient New Multifamily Construction is based on SEEM analysis of the energy savings necessary to exceed the 2015 Washington Energy Code by a minimum of 10 percent. This results in a dwelling unit that is a minimum of 10 percent more efficient than the 2015 Washington Energy Code. Energy savings for each state is adjusted to the specific state energy code and climate zones. This model takes into account interaction with lighting and ventilation components, and whole house energy savings specific to electric components.

Requirements and Specifications

BPA maintains a Qualified Programs List of certification programs and pathways that qualify for BPA Energy-Efficient, New Multifamily Construction payments. Certifications programs and pathways listed on the BPA New Energy Efficient New Multifamily Construction Qualified Programs List have been pre-approved by BPA as reliably achieving a minimum of 10 percent energy savings over the 2015 Washington Energy Code. Programs and pathways must be on the Qualified Programs List in order for to qualify for this payment. 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 remain a minimum of 10 percent above Washington Energy Code to remain on the Qualified Programs List for any state.

Individual dwelling units in new, multifamily low-rise and mid-/high-rise construction in all states qualify for this payment. Please consult the individual certification program or pathway requirements to determine whether the certification is available for low-rise multifamily buildings, mid-/high-rise multifamily buildings, or both. Not all certifications and pathways on the BPA Energy Efficient New Multifamily Construction Qualified Programs List may be utilized for both low-rise and mid-/high-rise multifamily construction. Customers may only claim one incentive per dwelling unit.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	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
New, Multifamily Construction Project Information Form.			X

Payment

ENERGY EFFICIENT NEW MULTIFAMILY CONSTRUCTION SPECIFICATION	DWELLING UNIT TYPE	PAYMENT PER DWELLING UNIT
BPA Energy Efficient New Multifamily Construction	All Electric	Washington $350; All Other States $450

10.9.6 BPA Zero Energy Ready New Multifamily Construction (BPA-Qualified)

Basis for Energy Savings

The base case (pre-existing state) is a representative sample of dwelling units built to the 2015 Washington Energy Code. Energy savings for BPA Zero Energy Ready New Multifamily Construction is based on SEEM analysis of the energy savings necessary to exceed the 2015 Washington Energy Code by a minimum of 25 percent. This results in a dwelling unit that is a minimum of 25 percent more efficient than the 2015 Washington Energy Code. Energy savings for each state is adjusted to the specific state energy code and climate zones. This model takes into account interaction with lighting and ventilation components and whole house energy savings specific to electric components.

Requirements and Specifications

BPA maintains a Qualified Programs List of certification programs and pathways that qualify for BPA Zero Energy Ready, New Multifamily Construction payments. Certifications programs and pathways listed on the BPA Zero Energy Ready New Multifamily Construction Qualified Programs List have been pre-approved by BPA as reliably achieving a minimum of 25 percent energy savings over the 2015 Washington Energy Code. Programs and pathways must be on the Qualified Programs List in order for to qualify for this payment. 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 remain a minimum of 25 percent above Washington Energy Code to remain on the Qualified Programs List for any state.

Individual dwelling units in new, multifamily low-rise and mid-/high-rise construction in all states qualify for this payment. Please consult the individual certification program or pathway requirements to determine whether the certification is available for low-rise multifamily buildings, mid-/high-rise multifamily buildings or both. Not all certifications and pathways on the BPA Zero Energy Ready New Multifamily Construction Qualified Programs List may be utilized for mid-/high-rise multifamily construction. Customers may only claim one incentive per dwelling unit.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	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
New Multifamily Construction Project Information Form			X

Payment

ENERGY EFFICIENT NEW MULTIFAMILY CONSTRUCTION SPECIFICATION	DWELLING UNIT TYPE	PAYMENT PER DWELLING UNIT
BPA Zero Energy Ready Multifamily Construction	All Electric	Washington $900, All other States $1,100

In addition to the Energy Efficient New Multifamily Construction and BPA Zero Energy Ready New Multifamily Construction measures, the following measures are available as stand-alone measures in New, Multifamily Construction. For requirements and specifications and payment levels, please see the referenced section.

ADDITIONAL MEASURES AVAILABLE FOR NEW, SINGLE-FAMILY CONSTRUCTION	LOCATION IN IM
Residential Lighting Fixtures	10.2
Residential Lighting	10.2
Clothes Washers	10.4
Clothes Dryers	10.4
Showerheads	10.5.1
Thermostatic Shut-Off Valves	10.5.2

10.10 WEATHERIZATION (STANDARD INCOME)

Weatherization measures include insulation, prime window replacement, exterior insulated doors and air sealing. All weatherization measures in single-family and manufactured homes must be installed according to the 2016 BPA Residential Weatherization Specifications in the IM Document Library.

Weatherization measures must be installed in homes with an electric heating system as the primary system (see definitions); or the homes must have one of the following as an existing heating system:

1. A permanently installed electric heating system with either (a) no other functioning nonelectric heating system; or (b) a wood stove, pellet stove, fireplace, fireplace insert (wood or pellet); or (c) wood furnace;
2. An electric heat pump system integrated with a nonelectric heating system (e.g., natural gas, propane or wood supplementary/backup system);
3. A wood stove or pellet stove with no other nonelectric space heating system, accompanied by the current usage of plug-in electric space heaters; or
4. An electric heat system and a separate functional or nonfunctional, nonelectric space heating system (i.e., oil, natural gas or wood furnace) with the entire nonelectric space heating system decommissioned, removed, all penetrations sealed, and all fuel (electric, gas or oil)

Supporting Content

IM Document Library

Interim Solution 2.0 Files - UES Measure List

connections to the decommissioned heating system disconnected. System equipment includes furnace, air-handler, fuel lines and fuel tanks (abated in compliance with local code). If, however, construction limitations prevent the 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.

10.10.1 Insulation

Basis for Energy Savings

The base case (pre-existing state) is defined as a range of R-values for a building component before insulation is installed. The efficient case for insulation measures are defined as meeting a minimum insulation R-value in that building component. Energy savings for insulation measures are estimated using SEEM, an energy modeling software calibrated to real world energy consumption using prototype homes representative of Northwest construction, assuming that all other weatherization measures have been installed in the home. "Average electric heat" measures are a weighted average of homes with an electric furnace, electric zonal, or a heat pump based on the Residential Building Stock Assessment (RBSA). Savings are reduced by the percentage of heat supplied by supplemental fuels for an average home.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

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

Insulation measures in single-family and manufactured homes must be installed according to the 2016 BPA Residential Weatherization Specifications found in the IM Document Library.

Final installed R-values for a reportable measure must meet the required final R-value at a minimum, unless a physical barrier prevents the full depth of insulation from being installed.

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
		R-31 to R-38	R-38	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-11, 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	Attic	R-0 to R-5	R-0	R-19
	Attic	R-0 to R-5	R-0	R-49
	Wall	R-0 to R-5	R-0	R-11
	Wall	R-0 to R-5	R-0	R-19

*Precondition definitions were modified for consistency across building types, where possible.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Documentation of pre-and post-insulation R-values, and square footage of installed insulation.			X
Description of home type (single-family, multifamily or manufactured).			X
Description of primary heating type (electric zonal, electric forced-air furnace, air source heat pump, ground/water source heat pump or ductless heat pump).			X

Payment

Payments and busbar energy savings for specific measures are available in the UES Measure List in the Interim Solution 2.0 Files.

Additional Information

The Any Electric Heat measures assume a weighted average of reported measures. Utilities who report single-family insulation to the HVAC-specific measures should not also use the Any Electric measures on the same invoice submitted to BPA. Utilities may switch to Any Electric if reporting to the HVAC-specific measures delivers little benefit.

10.10.2 Prime Window and Patio Door Replacement

Basis for Energy Savings

The base case (pre-existing state) is a single-pane window or patio door with any frame type, or a double-pane window or patio door with a metal frame. The efficient case for prime window replacement measures is the U-factor for the efficient replacement window. Energy savings for prime window replacement measures are estimated using SEEM, an energy modeling software calibrated to real world energy consumption using prototype homes representative of Northwest construction, assuming that all other weatherization measures have been installed in the home. "Average electric heat" measures are a weighted average of homes with an electric furnace, electric zonal, or a heat pump based on the RBSA. Savings are reduced by the percentage of heat supplied by supplemental fuels for an average home.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

Pre-existing windows and patio doors must be: (1) single-pane with/without storms, any frame type (e.g., metal, wood or vinyl); or (2) double-pane, metal frame only. The weighted average of replacement windows must have a National Fenestration Rating Council (NFRC) minimum U-value of 0.30 or 0.22 for windows, and 0.35 or 0.30 for patio doors. Multifamily mid-/high-rise buildings are not eligible for patio door replacement.

Window and patio door measures in single-family and manufactured homes must be installed according to the 2016 BPA Residential Weatherization Specifications found in the IM Document Library.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
NRFC stickers or other verification of U-value			X
Documentation (a) of number and square footage of windows or patio doors replaced, (b) precondition (frame type, i.e., wood, metal, single/double-pane), and (c) post-condition U-value.			X
Description of home (single-family, multifamily or manufactured)			X
Description of primary heating type (electric zonal, electric forced-air furnace, air source heat pump, ground/water source heat pump or ductless heat pump).			X

BPA maintains an optional windows project information form that documents windows requirements on a single page. Use of the form is optional. The form is available in the IM Document Library.

Payment

PAYMENT (PER SQUARE FOOT)				
Single-Family	Single-pane window, any frame type or double-pane window, metal frame type.	0.30	Any Electric	$3
			EFAF	$4
			Zonal/DHP	$3
			Ducted HP	$2
	Single-pane patio door, any frame type or double-pane patio door, metal frame type.	0.35	Any Electric	$3
			EFAF	$4
			Zonal/DHP	$3
			Ducted HP	$2
	Single-pane window, any frame type or double-pane window, metal frame type.	0.22	Any Electric	$4
			EFAF	$5
			Zonal/DHP	$4
			Ducted HP	$3
	Single-pane patio door, any frame type or double-pane patio door, metal frame type.	0.30	Any Electric	$4
			EFAF	$5
			Zonal/DHP	$4
			Ducted HP	$3
Manufactured	Single-pane window, any frame type or double-pane window, metal frame type.	0.30	Any Electric	$3
	Single-pane patio door, any frame type or double-pane patio door, metal frame type.	0.35	Any Electric	$3
	Single-pane window, any frame type or double-pane window, metal frame type.	0.22	Any Electric	$4
	Single-pane patio door, any frame type or double-pane patio door, metal frame type.	0.30	Any Electric	$4
Multifamily	Single-pane window, any frame type or double-pane window, metal frame type.	0.30	Any Electric	$6
	Single-pane patio door, any frame type or double-pane patio door, metal frame type.	0.35	Any Electric	$6
	Single-pane window, any frame type or double-pane window, metal frame type.	0.22	Any Electric	$8
	Single-pane patio door, any frame type or double-pane patio door, metal frame type.	0.30	Any Electric	$8
Multifamily Mid-/ High-Rise	Single-pane window, any frame type or double-pane window, metal frame type.	0.30	Any Electric	$3–$6

Additional Information

The Any Electric Heat measures assume a weighted average of reported measures. Utilities who report single-family windows to the HVAC-specific measures should not also use the Any Electric measures on the same invoice submitted to BPA. Utilities may switch to Any Electric if reporting to the HVAC-specific measures delivers little benefit.

10.10.3 Low-E Storm Windows

Basis for Energy Savings

The base case (pre-existing state) is a single-pane window with any frame type, or a double-pane window with a metal frame without existing storm windows. The efficient case for the replacement Low-E storm and prime window system is the combined U-factor for the combined storm window and pre-existing window. Specifications for the Low-E storm window include emissivity, solar transmittance, thickness and warranty period. Energy savings for Low-E storm window installation measures are estimated using SEEM, an energy modeling software calibrated to real world energy consumption using prototype homes representative of Northwest construction. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for existing single-family, manufactured and multifamily low-rise buildings. This measure is not available for multifamily mid-/high-rise.

Pre-existing windows must be either (1) single-pane any frame type (e.g., metal, wood or vinyl) without existing storm windows; or (2) double-pane, metal frame only without existing storm windows. The new Low-E storm window must be included in the BPA Low-E Storm Window Qualified Product List and have:

- An emissivity of 0.22 or lower;
- Solar transmittance greater than or equal to 0.55;
- A minimum glass thickness of 3 mm;
- A minimum 10-year warranty on the window assembly and all individual parts; and
- A Low-E storm window as an exterior storm window, with weep holes or other means to dissipate water.

The Low-E storm window must have the same opening type as the existing prime window (i.e., single/double hung, casement, slider, etc.) to facilitate summertime ventilation and egress. 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). The Low-E storm window must be installed per manufacturer's specification, fastened by screws, not designed for seasonal removal, and with the Low-E coating facing toward the home's interior.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Documentation (a) of number and square footage of storm windows installed; and (b) pre condition (frame type, i.e., wood, metal, single/double pane).			X
Description of home (single-family, multifamily low-rise or manufactured).			X

Payment

MEASURE	OBSERVED EXISTING	PAYMENT
All Low-E storm windows with an emissivity of 0.22 or lower, a solar transmittance of 0.55 or greater, a minimum glass thickness of 3 mm, and a minimum 10-year warranty on the window for all housing types (single-family, manufactured and multifamily low-rise).	Single-pane, any frame type or double-pane metal frame.	$2 per Square Foot

Additional Information

Installing Low-E storm windows with windows of the same opening type can be difficult when the prime window is a casement or awning style. For these prime window types, installation of a new prime window may be preferable over the addition of a Low-E storm window.

10.10.4 Exterior Insulated Doors (BPA-Qualified)

Basis for Energy Savings

The base case (pre-existing state) is a substandard exterior door, such as one that does not contain an insulating material or one where the weather stripping has degraded by at least 50 percent. The efficient case for an Insulated Exterior Door is a prehung, ENERGY STAR door. Energy savings comes from the improvement to the building envelope and the reduction of infiltration. BPA Documentation Requirements consider these factors for this BPA-Qualified measure.

Requirements and Specifications

This measure is available for existing, single-family, manufactured and multifamily low-rise buildings. This measure is not available for multifamily mid-/high-rise.

The door must be a prehung, ENERGY STAR-Qualified door, include replacement of the threshold and replace an uninsulated or otherwise substandard (from a thermal perspective) exterior door.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X		X

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
A copy of the ENERGY STAR product list showing the product or the product information insert or packaging that includes the ENERGY STAR logo (in the event that ENERGY STAR specifications change, BPA will accept pre-existing models that were ENERGY STAR-Qualified at the time they were manufactured).			X
Documentation of the doors replaced and pre- and post-conditions.			X
Description of home (single-family, multifamily low-rise or manufactured).			X

Payment

BPA shall pay $40 per door.

10.10.5 Whole House Air Sealing and Testing

Basis for Energy Savings

Whole House Air Sealing is an incremental improvement in leakage of a home, measured with a blower door. Energy savings for Whole House Air Sealing are estimated using SEEM, an energy modeling software calibrated to real world energy consumption, assuming all other weatherization measures have been installed in the home. "Average electric heat" measures are a weighted average of homes with an electric furnace, electric zonal, or a heat pump based on the RBSA. Savings are reduced by the percentage of heat supplied by supplemental fuels for an average home.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for existing, single-family or manufactured homes. Multifamily does not qualify at this time.

- 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 PTCS duct sealing is performed at the same time as air sealing, the baseline blower door CFM50 reading for the whole house air sealing and testing measure must be taken with all the supply and return duct registers temporarily sealed off, so that house air leakage can be measured independently from duct leakage.
- If combustion appliances are present (e.g., fireplace, wood or gas stove, gas range, gas water heater), a UL- or CUL-approved carbon monoxide detector must be present or be installed.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Documentation of the following conditions are required: • Pre- and post-conditions CFM (CFM at 50 Pascals); • Total square footage of the pressure zone tested and sealed (typically this is the conditioned, interior space heated floor area of the home); • Building volume; • Notes on mechanical ventilation requirement; and • Age and description of home type (single-family/manufactured.			X
A description of primary heating type (electric zonal, electric forced-air furnace, air source heat pump, ground/water source heat pump or ductless heat pump).			X

Payment

BPA payment is based on the reduction in air infiltration per reduction in CFM50, rounded to the nearest whole number. Payments and busbar energy savings are available in the UES Measure List in the Interim Solution 2.0 Files.

Total Payment = Quantity x Payment

Quantity = Difference between pre-and-post CFM50

10.10.6 Prescriptive Air Sealing

Basis for Energy Savings

Prescriptive Air Sealing is an incremental improvement in the leakage of a home. Leakage reductions are based on the attic or crawlspace portion of an average Whole House Air Sealing project. Energy savings for Prescriptive Air Sealing are estimated using SEEM, an energy modeling software calibrated to real world energy consumption, assuming that all other weatherization measures have been installed in the home. "Average electric heat" measures are a weighted average of homes with an electric furnace, electric zonal, or a heat pump based on the RBSA. Savings are reduced by the percentage of heat supplied by supplemental fuels for an average home.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for existing single-family homes only. Multifamily and manufactured homes do not qualify at this time.

Prescriptive air sealing must be done according to the checklists found in sections 4.4 and 6.2 of the BPA Residential Weatherization Specifications Effective Oct. 1, 2016, in the IM Document Library.

Supporting Content

IM Document Library

Interim Solution 2.0 Files - UES Measure List

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.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS			
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	PTCS SITE REGISTRY	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X			X
Contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of product installed/used); (b) the order/purchase date; and (c) cost.				X
Documentation of square footage of area air sealed (attic and/or crawlspace) and the age of home.				X

Payment

Payments and busbar energy savings are available in the UES Measure List in the Interim Solutions 2.0 Files are based on the square footage of the area where prescriptive air sealing is performed.

10.10.7 Low-Income Weatherization, Ductless Heat Pumps and Duct Sealing

Low-income household eligibility is defined in the Federal Weatherization Assistance Program as 200 percent of the poverty income levels. Approved, statewide eligibility definitions may substitute for federally established low-income levels, if provided.

At least 50 percent of households in two-, three- and four-unit dwellings must income qualify (one household in a two-unit dwelling, two households in a three-unit dwelling, two households in a four-unit dwelling) in order for the weatherization of the entire building to qualify for low-income payments. Utilities, however, may set more stringent requirements at their discretion.

For multifamily properties with five or more units, a minimum of 50 percent of the households must income qualify in order for the weatherization of the entire building or complex to qualify for low-income payments. Utilities, however, may set more stringent requirements at their discretion.

Customers shall retain documentation of the total number of individuals in the household and proof that the end-user's income eligibility was reviewed from a verifiable source. "Verifiable" refers to any documentation that can be verified by another source, such as a pay stub, copies of IRS form 1040, Section 8 eligibility, certification by a CAP agency, certification by LIHEAP administrator, etc.

Customers may use the eligible measures listed below to run low-income weatherization programs themselves, through an implementation firm or Community Action Agency, but must retain responsibility for and control over the program.

Basis for Energy Savings

The basis for savings for measures can be found in each of the measure sections above for the corresponding measures.

Requirements and Specifications

All existing housing types (single-family, manufactured and multifamily) are eligible for low-income measures, although not all measures are applicable to each housing type. See the chart below for available measures.

Low-income weatherization measures include insulation, prime windows and patio doors, Low-E storm windows, exterior insulated doors, ductless and air source heat pumps, heat pump water heating, smart thermostats (see 13.2.3.3), PTCS or prescriptive duct sealing, and whole house air sealing. Requirements and specifications for each measure can be found in each of the measure sections above for the corresponding measures. When a BPA-Qualified products list applies to the measure, the technology must be on the BPA-Qualified products list to qualify for payment.

All weatherization measures in single-family and manufactured homes must be installed according to the 2016 BPA Residential Weatherization Specifications in the IM Document Library and follow the specification, requirements and documentation requirements as listed under the appropriate sections (Standard Income) above.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS			
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	PTCS SITE REGISTRY	CUSTOMER FILE
End-user identifying information, including unique site ID and address.	X			X
Documentation of total number of individuals in the household, and documentation that the end-user's income eligibility was reviewed from a verifiable source (e.g., paystub, Section 8 voucher, etc.).				X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; (c) cost of installed measures; and (d) cost of any related repairs.				X
Description of home type (single-family, multifamily low-rise, multifamily mid-/high-rise or manufactured).				X
Insulation (if installed): square feet and pre- and post-R-value documentation.				X
Prime window/patio door: (a) number and square footage of windows or patio doors replaced; (b) precondition (frame type/ i.e., wood, metal, single/double-pane); and (c) NFRC stickers or other verification of U-values.				X
Exterior insulated doors: Documentation of number of doors replaced and pre- and post-conditions.				X
Ductless Heat Pumps: DHP Installation form.				X
PTCS or Prescriptive Duct Sealing Form (handwritten form completed by technician).				X
PTCS/prescriptive duct sealing information entered into the PTCS Site Registry.			X	X
PTCS site registry measure ID.			X	X
Smart Thermostat Project Information Form				X

Payment

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., verification of income, attic and crawl space ventilation, removal of knob and tube wiring, and underfloor moisture barriers).

Customers may also report costs related to repair work that is directly associated with the installation of the measure required for health and safety, 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.

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

HOME TYPE	LOW INCOME QUALIFYING MEASURE	INSTALLED MEASURE COST PAYMENT - DOLLAR-FOR-DOLLAR (EXCEPT AS NOTED)	*REPAIR COST PAYMENT - DOLLAR-FOR-DOLLAR (EXAMPLES PROVIDED)*
Single-Family	Attic Insulation (up to R-49)	Dollar-for-dollar	*Examples include: repair roof leak, rebuild external entrance covering and fix hole in siding.*
	Floor Insulation (up to R-30)	Dollar-for-dollar	
	Wall Insulation (up to R-11)	Dollar-for-dollar	
	Prime Window	Dollar-for-dollar, not to exceed $20/square foot	*Examples include: address dry rot in window framing, replace rotten threshold and repair cracked header.*
	Low-E Storm Window	Dollar-for-dollar, not to exceed $10/square foot	
	Patio Door	Dollar-for-dollar, not to exceed $20/square foot	
	Exterior Insulated Door	Dollar-for-dollar, not to exceed $400/door	
	Whole House Air sealing	Dollar-for-dollar	*Examples include: reframe attic access hatch and repair pull-down stairs.*
	Prescriptive Air Sealing	Dollar-for-dollar	
	PTCS/Prescriptive Duct Sealing	Dollar-for-dollar, not to exceed $500	*Examples include: replace rusted duct work and repair broken filter slot.*
	Ductless Heat Pump	Dollar-for-dollar, not to exceed $3,800	*Examples include: improve structural support for interior head.*
	PTCS Heat Pump Upgrade or PTCS Heat Pump Conversion	Dollar-for-dollar, not to exceed $3,800	*Examples include: repair to damaged siding at connection point.*
	Tier 1 Heat Pump Water Heater	Dollar-for-dollar, not to exceed $1,360	*Examples include: replacement of plumbing connections at water heater.*
	Tier 2 or 3 Heat Pump Water Heater	Dollar-for-dollar, not to exceed $1,700	*Examples include: replacement of plumbing connections at water heater.*
	BPA Approved Smart Thermostat	Dollar-for-dollar, not to exceed $400	*No repair costs allowed for this measure*

HOME TYPE	LOW INCOME QUALIFYING MEASURE	INSTALLED MEASURE COST PAYMENT - DOLLAR-FOR-DOLLAR (EXCEPT AS NOTED)	*REPAIR COST PAYMENT - DOLLAR-FOR-DOLLAR (EXAMPLES PROVIDED)*
Multifamily Low-Rise	Attic Insulation (up to R-49)	Dollar-for-dollar	*Examples include: repair roof leak, rebuild external entrance covering and fix hole in siding.*
	Floor Insulation (up to R-30)	Dollar-for-dollar	
	Wall Insulation (up to R-19)	Dollar-for-dollar	
	Prime Window	Dollar-for-dollar, not to exceed $20/square foot	*Examples include: address dry rot in window framing, replace rotten threshold and repair cracked header.*
	Low-E Storm Window	Dollar-for-dollar, not to exceed $10/ square foot	
	Patio Door	Dollar-for-dollar, not to exceed $20/square foot	
	Exterior Insulated Door	Dollar-for-dollar, not to exceed $400/door	
	BPA Approved Smart Thermostat	Dollar-for-dollar, not to exceed $400	*No repair costs allowed for this measure*
Multifamily Mid/High-Rise	Attic Insulation (up to R-49)	Dollar-for-dollar	*Examples include: repair roof leak, rebuild external entrance covering and fix hole in siding.*
	Wall Insulation (up to R-19)	Dollar-for-dollar	*Examples include: repair roof leak, rebuild external entrance covering and fix hole in siding.*
	Prime Window	Dollar-for-dollar, not to exceed $20/square foot	*Examples include: address dry rot in window framing, replace rotten threshold and repair cracked header.*
	BPA Approved Smart Thermostat	Dollar-for-dollar, not to exceed $400	*No repair costs allowed for this measure*
Manufac-tured	Attic Insulation (up to R-30)	Dollar-for-dollar	*Examples include: repair roof leak, rebuild external entrance covering.*
	Floor Insulation (up to R-22)	Dollar-for-dollar	
	Prime Window	Dollar-for-dollar, not to exceed $20.00/square foot	*Examples include: address dry rot in window framing, replace rotten threshold and repair cracked header.*
	Low-E Storm Window	Dollar-for-dollar, not to exceed $10/ square foot	
	Patio Door	Dollar-for-dollar, not to exceed $20/square foot	
	Exterior Insulated Door	Dollar-for-dollar, not to exceed $400/door	
	Whole House Air sealing	Dollar-for-dollar	*Examples include: install whole house ventilation fan.*
	PTCS and Prescriptive Duct Sealing	Dollar-for-dollar, not to exceed $500	*Examples include: replace rusted duct work and repair broken filter slot.*
	Ductless Heat Pump	Dollar-for-dollar, not to exceed $3,800/DHP	*Examples include improve structural support for interior head.*
	PTCS Heat Pump Upgrade or PTCS Heat Pump Conversion	Dollar-for-dollar, not to exceed $3,800	
	Tier 1 Heat Pump Water Heater	Dollar-for-dollar, not to exceed $1,360	*Examples include: replacement of plumbing connections at water heater.*

HOME TYPE	LOW INCOME QUALIFYING MEASURE	INSTALLED MEASURE COST PAYMENT - DOLLAR-FOR-DOLLAR (EXCEPT AS NOTED)	*REPAIR COST PAYMENT - DOLLAR-FOR-DOLLAR (EXAMPLES PROVIDED)*
Manufac-tured	Tier 2 or 3 Heat Pump Water Heater	Dollar-for-dollar, not to exceed $1,700	*Examples include: replacement of plumbing connections at water heater.*
	BPA Approved Smart Thermostat	Dollar-for-dollar, not to exceed $400	*No repair costs allowed for this measure*

10.11 RESIDENTIAL CUSTOM PROJECTS

Requirements and Specifications

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

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table.

Section 11: Utility Distribution Sector

BPA acquires Utility Distribution Sector energy savings through Energy Smart Utility Efficiency (ESUE), which includes Voltage Optimization (VO) and Electrical Distribution System Improvements (SI). VO is a technique for improving the efficiency of the electrical grid by reducing voltage on the feeder lines running from substations to retail loads, while SI improves the energy efficiency of the electrical distribution system.

Customers must submit VO and SI as custom projects. They may combine SI and VO in one custom project when SI increases the amount of voltage that can be reduced or improves the monitoring of reduced voltage.

Requirements and Specifications

The requirements of VO and SI are discussed below:

1. Voltage Optimization
   BPA developed the Simplified Voltage Optimization Measurement & Verification Protocol (available in the IM Document Library) to assist utilities with implementing VO projects. In developing the project M&V plan, the customer has the option to use a custom M&V plan or the Simplified Protocol. The Simplified Protocol requires analytics from load flow studies and is based on RTF guidelines and focuses on residential and small commercial end-use loads, and requires that specific system stability thresholds be met prior to lowering service voltages.
2. Electrical Distribution System Improvements
   SI may include the following measures:
   - Power transformer replacement;
   - Service conductor replacement;
   - Higher distribution primary voltage (including insulator additions and replacement);
   - Transformer load management (replacement of improperly sized transformers for loss improvements);
   - Balancing loads and phases;
   - Adding parallel feeders;
   - Operation improvement (recognition and phase balancing);
   - Power factor improvement to reduce line losses;
   - Volt-Amperes-Reactive (Reactive Power) Management;
   - Fixed and switched capacitors; and
   - Service distribution transformer:
     - Replacing an existing or proposed transformer with a higher-efficiency transformer;
     - Multiple transformers versus a single transformer based on system analysis; and
     - Voltage management.

Documentation Requirements

See the Custom Projects Documentation Requirements.

Payment

See the Custom Projects Payment Table.

Section 12: Multisector

Please check the changes and corrections summary to see if revisions were made to any of the measures in this sector. This section contains general information applicable across the sectors.

12.1 PAYMENT SUMMARY*		
PROGRAM COMPONENT OR MEASURE	**PAYMENT**	**PRIMARY SECTION**
Nonresidential Lighting Program	See the lighting calculator	Commercial
Advanced Rooftop Control Unit	$100–$225/ton	Commercial
Commercial Ductless Heat Pump	$800/ton	Commercial
Commercial Heat Pump Conversion	$500/ton	Commercial
Commercial Heat Pump Upgrade	< 6 tons: $1,000/unit; 6–20 tons: $200/ton	Commercial
Connected Thermostat	$200/thermostat	Commercial
Variable Refrigerant Flow System	$800/ton	Commercial
Variable Frequency Drive on Air Handling Unit Fan	$300/horsepower	Commercial
Commercial Insulation	$0.45–$1.25/square foot	Commercial
Commercial Windows	$3–$6/square foot	Commercial
Generator Engine Block Heater Controls	$200–$1,500/unit	Commercial
Vehicle Engine Block Heater Controls	$160/unit	Commercial
Variable Frequency Drives in Small Compressed Air Systems	See the Custom Projects Payment Table	Industrial
ENERGY STAR Clothes Washers	$15–$50/washer	Residential
ENERGY STAR Clothes Dryers	$50–$175/dryer	Residential
Green Motors	$2/horsepower	Multisector
Limited Availability Emerging Technology Field-Test Projects	See the Custom Projects Payment Table	Multisector

* The payment levels described in this table provide a summary only. Complete details of the payment levels and associated requirements may be found in the corresponding text of the IM. Please see the Table of Contents for the text location.

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12.2 PROCESSES

12.2.1 COTR Request and Acknowledgment Procedure

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

If approved, the COTR shall confirm the request by written notice. A customer request is not effective until the COTR approves the request in writing.

12.2.2 Measure Distribution Processes

Measures requiring distribution may allow one or more of the following distribution methods: Retail, By Request, Mailed Non-request and Direct Install. Allowable distribution methods are listed in the specific measure section and the requirements in the IM apply. If a customer believes a product should be on the list, and it is not, the customer should use the COTR Request and Acknowledgment Procedure to request approval to use the product.

DISTRIBUTION TYPE	REQUIREMENTS AND SPECIFICATIONS	DOCUMENTATION DESCRIPTION (RETAIN IN CUSTOMER FILE)
Retail	Includes Simple Steps Smart Savings and utility-run retail programs. Mechanisms may include in-store markdowns, midstream/ upstream promotions and coupons. See specific measure for complete requirements and specifications.	For in-store markdowns, online markdowns, or midstream/ upstream promotions customers must submit a store sales report or invoice detailing: the date period for sales, sales by store location, qualified product make, model and manufacturer sufficient to assign corresponding energy efficiency measure. Reports must document the allocation methodology when a store serves multiple customers. Retail measures (both Simple Steps Smart Savings and utility-run programs) must be reported using the Retail Sales Allocation Tool, or an alternate methodology must be provided to BPA for review and approval to mitigate the possibility of double counting. Coupons must contain the (utility) customer name and end-user address, and require the customer to (1) document that the product meets BPA's requirements; and (2) provide store name and address.
By Request and Mailed By Request	Applies to delivery mechanisms that include distributing products "over the counter," at events, or otherwise directly to the end-user upon their request. Also applies to reimbursing end-users for a qualified purchase. The customer must document the request by the end-user. Additional requirements such as: documenting water heater fuel for showerheads may apply. See specific measure for complete requirements and specifications.	Product invoice documenting that the product meets BPA's requirements. Completed Measure Distribution Log (available in the IM Document Library) or equivalent form with required information. The customer must document the request by the end-user. Examples of end-user requests may be postcards, ~~signatures on a~~ the Measure Distribution Log (available in the IM Document Library), or an equivalent form with required information. Mailed By Request also requires documentation of mailing, air waybill, or bill of lading to document the date the product entered the mail stream (i.e., for drop shipments, the "round stamp" date on United States Postal Service (USPS) Form 8125 and for straight mailings, the "statement certification date" of USPS Form 3607R).

DISTRIBUTION TYPE	REQUIREMENTS AND SPECIFICATIONS	DOCUMENTATION DESCRIPTION (RETAIN IN CUSTOMER FILE)
Mailed, Non-request (LED bulbs only)	Applies to LED bulbs only. Limited to four bulbs per fiscal year, per household. See specific measure for complete requirements and specifications.	Product invoice documenting that the product meets BPA's requirements. Completed Measure Distribution Log (available in the IM Document Library) or equivalent form with required information. Documentation of mailing, air waybill or bill of lading to document the date the product entered the mail stream (i.e., for drop shipments, the "round stamp" date on United States Postal Service (USPS) Form 8125 and for straight mailings, the "statement certification date" of USPS Form 3607R).
Direct Install	Measures must be (1) installed by the customer or their agent; (2) witnessed by the customer or their agent; or (3) visually inspected by a representative sample after installation by another party.[1] Additional requirements such as documenting water heater fuel for showerheads may apply. See specific measure for complete requirements and specifications.	Product invoice documenting that the product meets BPA's requirements. Completed Measure Distribution Log (available in the IM Document Library) or equivalent form with required information.

12.3 MULTISECTOR MEASURES AND INITIATIVES

12.3.1 Eligible Multisector Measure

The following table identifies existing measures that are eligible in more than one sector. Specific IM requirements and program offerings language are found in the sector chapter most associated with the measure.

MULTISECTOR MEASURES				
MEASURES	**AGRICULTURAL**	**COMMERCIAL**	**INDUSTRIAL**	**RESIDENTIAL**
Generator Engine Block Heaters	Eligible	Eligible – Primary	Eligible	Not Eligible
Vehicle Engine Block Heater Controls	Eligible	Eligible – Primary	Eligible	Not Eligible
ARC & ARC Lite	Eligible	Eligible – Primary	Eligible	Not Eligible
Commercial Air Source Heat Pump (upgrade & conversion)	Eligible	Eligible – Primary	Eligible	Not Eligible
Commercial Ductless Heat Pumps	Eligible	Eligible – Primary	Eligible	Not Eligible
Variable Refrigerant Flow Heat Pumps	Eligible	Eligible – Primary	Eligible	Not Eligible
Variable Frequency Drive on Air Handling Unit Fan	Eligible	Eligible – Primary	Eligible	Not Eligible
Connected Thermostat	Eligible	Eligible – Primary	Eligible	Not Eligible

[1]Installation, witness or verification may be conducted by a customer program employee or customer's agent/contractor.

MULTISECTOR MEASURES				
MEASURES	**AGRICULTURAL**	**COMMERCIAL**	**INDUSTRIAL**	**RESIDENTIAL**
Commercial Windows	Eligible	Eligible – Primary	Eligible	Not Eligible
Commercial Insulation	Eligible	Eligible – Primary	Eligible	Not Eligible
ENERGY STAR Clothes Washers	Not Eligible	Eligible	Not Eligible	Eligible – Primary
ENERGY STAR Clothes Dryers	Not Eligible	Eligible	Not Eligible	Eligible – Primary

MULTISECTOR CALCULATORS				
CALCULATORS	**AGRICULTURAL**	**COMMERCIAL**	**INDUSTRIAL**	**RESIDENTIAL**
Nonresidential Lighting Calculator	Eligible	Eligible – Primary	Eligible	Not Eligible
VFD Small Compressed Air Calculator	Eligible	Eligible	Eligible – Primary	Not Eligible

12.3.2 Green Motors Rewind Initiative

Basis for Energy Savings

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

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

More details on the recommended practice for the repair of rotating electrical apparatus can be found at: http://www.easa.com/sites/files/resource_library_public/EASA_AR100-2010_1010.pdf.

Requirements and Specifications

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

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

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

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

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Third-party provided monthly reports			X
Third-party provided annual reports			X

Payment

A payment of $2 per horsepower is made to the service center that rewound the motor. The service center acknowledges the payment is provided by the end-user's serving customer and passes through $1 per horsepower to the end-user as a credit on the end-user's invoice.

12.3.3 Limited Availability Emerging Technology Field Test Projects

Requirements and Specifications

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

If a customer is eligible and wishes to participate in a project, they must use the Option 1 custom project process and submit a custom project proposal that uses the Engineering Calculations with Verification Protocol for measurement and verification. BPA will provide the information necessary 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 (e.g., customers may be asked to provide access to end-user billing history and contact information). If additional metering is required, it will not change customers' payment or savings.

Documentation Requirements

Customers must follow the Option 1 custom project documentation requirements and may be required to provide end-user billing information and contact information.

Payment

See the Custom Projects Payment Table.

Section 13: Updates, Revisions and New Measures

13.1 UPDATES AND REVISIONS TABLES

13.1.1 October 2019 Changes & Corrections Summary

Available on the Implementation Manual Homepage

13.2 NEW MEASURES

This section outlines the new measures that become effective on October 1, 2018. These are optional, new measures for utilities to implement locally at their convenience. The text in this section will not be incorporated into the body of the IM programmatic sections until the next October rate period manual. The decision to separate out new measures was made based on feedback from BPA's utility customers to keep the principle of having a rate period manual intact.

13.2.1 AGRICULTURE

13.2.1.1 Variable Frequency Drive for Centrifugal Agriculture Pumps (BPA-Qualified)

Basis for Energy Savings

The base case for this measure is a centrifugal-style pump that is 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 is collecting additional data on these upgrades to help support the RTF analysis of this measure.

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 20 to 500 horsepower. Eligible installations are limited to pumps with substantial variation in head pressure requirements (20 percent variation or more). BPA recommends that all new VFD installations meet the IEEE 519 harmonics standard. This measure provides an annual energy savings of 10 percent of the calculated annual energy usage of the centrifugal pump.

Customers must use the Agricultural Centrifugal Pump Deemed Savings Tool to estimate savings (available in the IM Document Library).

Preconditions:

The VFDs for agriculture pumping system with the following characteristics:

- A fixed speed centrifugal pumping plant ranging from 20 to 500 horsepower,
- Eligible installations are limited to pumps with substantial variation in head pressure requirements (20 percent variation or more).

Post-conditions:

- Add a VFD that will reduce pressure to better serve the irrigation system and save energy.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Complete the ~~Agricultural~~ Centrifugal Pump Applications VFD Deemed Savings Tool (available in the IM Document Library) regardless of completion date. A utility may create and submit their own form if it collects the same information as the ~~Project Information Form~~ tool and has been BPA-approved.		X	X

Payment

~~BPA shall pay $50 per installed motor horsepower.~~

MEASURE	PAYMENT
Centrifugal Pump VFD	$50 per nameplate horsepower

Effective Date

This measure is retroactively available effective October 1, 2017.

13.2.1.2 Variable Frequency Drive for New Agriculture Pump Installations (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, which operates at a fixed speed, but that has a variation of flow or head requirements. The 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 is collecting additional data on these upgrades to help support the RTF analysis of this measure.

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 20 to 500 horsepower.

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). BPA recommends that all new VFD installations meet the IEEE 519 harmonics standard. This measure provides an annual energy savings of 20 percent of the estimated annual energy usage for turbine pumps and savings of 10 percent for centrifugal pumps.

Customers must use the New Construction Turbine or Centrifugal Pump VFD Savings Tool to estimate savings (available in the IM Document Library).

Preconditions:

The VFDs for new agriculture pumping system with the following characteristics:

- The baseline is a newly installed fixed-speed pumping plant ranging from 20 to 500 horsepower,

- 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).

Post-conditions:

- Add a new pumping plant that will reduce pressure or flow to better serve the irrigation system and save energy

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Complete the Agricultural New Construction Turbine or Centrifugal Pump VFD Deemed Savings Tool (available in the IM Document Library) regardless of completion date. A utility may create and submit their own form if it collects the same information as the ~~Project Information Form~~ tool and has been BPA-approved.		X	X

Payment

~~BPA shall pay $80 per installed motor horsepower for turbine pump VFDs and $50 per horsepower for centrifugal pump VFDs.~~

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

Effective Date

This measure is retroactively available effective October 1, 2017.

13.2.1.3 Agriculture New Pump Efficiency Upgrade (BPA-Qualified)

Basis for Energy Savings

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

Requirements and Specifications

This measure requires the installation of a new turbine- or centrifugal-style irrigation pump. This measure applies to pumping operations that deliver, distribute or transport irrigation water for pumps ranging from 20 to 500 horsepower. This measure may be used alone, or in combination with the retrofit measures "Variable Frequency Drive for Centrifugal Agriculture Pumps" or "Variable Frequency Drive for Turbine Agriculture Pumps".

Preconditions:

The eligible agriculture pumping system with the following characteristics:

- An installed irrigation pump ranging from 20 to 500 horsepower,
- The existing pump must be centrifugal, turbine or submersible turbine,
- The existing pump is believed to be inefficient where the new pump will be better matched to the irrigation system requirements, be more efficient and as a result it will reduce energy usage.

Post-conditions:

- A new (not previously used or rebuilt) more efficient pump.
- The new replacement pump must have the same or lower horsepower rating,
- A change from a turbine pump to a centrifugal pump or centrifugal to a turbine is allowable,
- A larger HP pump is allowed if coupled to a VFD,
- If there is no nameplate, contact your energy efficiency engineer to help you convert utility kW readings to horsepower.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Complete the Agricultural Pump Efficiency Upgrade PIF (available in the IM Document Library) regardless of completion date. A utility may create and submit their own form if it collects the same information as the Project Information Form and has been BPA-approved.		X	X
Pump Performance Curve (available from the pump manufacturer).		X	X

Payment

~~BPA shall pay $50 per installed pump motor nameplate horsepower for new pumps.~~

MEASURE	PAYMENT
New agriculture pump	$50 per nameplate horsepower

Effective Date

This measure is retroactively available effective October 1, 2017.

13.2.1.4 Thermostatically Controlled Outlets

Basis for Energy Savings

The base case for this measure is an electric resistance heater operating in a pump house or utility room to provide freeze protection to piping and other equipment. The more efficient case for this measure adds thermostatically controlled outlets that provide power in specific temperature bands. The thermostatically controlled outlet shall be able to turn 'on' when the building ambient temperature is below 35° F, and shall stop providing power at a temperature higher than 50° F.

Requirements and Specifications

This measure is available to all sectors, but it must be reported under the Agriculture program. This measure requires the addition of a thermostatically controlled outlet or controller to control the heating load in a pump house or utility shed, ~~which was not previously thermostatically controlled~~, to prevent piping and other equipment from freezing. Thermostatically controlled outlet should turn on to prevent freezing conditions and turn off at temperatures higher than 50°F. ~~Due to the nature of this measure, it may be installed and claimed through any sector, but it will be reported under the Agriculture program.~~

~~Preconditions:~~

- ~~Outlet located in a pump house or utility room, serving a heater that provides freeze protection.~~
- ~~Outlet is not already thermostatically controlled.~~

~~Post-conditions:~~

- ~~Add a thermostatically controlled outlet that turns on to prevent freezing conditions and that turns off at a temperatures higher than 50° F.~~
- Only one outlet per pump house or utility room is eligible.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X

Payment

~~BPA shall pay $14 per installed thermostatically controlled outlet.~~

MEASURE	PAYMENT
Thermostatically controlled outlet	$14 per outlet

Effective Date

This measure is available effective October 1, 2018.

13.2.1.5 Themostatically Controlled Stock Tank Deicers

Basis for Energy Savings

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

Requirements and Specifications

This measure is available to all sectors, but it must be reported under the Agriculture program. This measure ~~requires~~ is for the ~~replacement~~ installation of ~~of an existing, uncontrolled stock tank deicer~~ with a stock tank deicer that is thermostatically controlled. ~~Due to the nature of this measure, it may be installed and claimed through any sector, but it will be reported under the Agriculture program.~~

~~Preconditions:~~

- ~~An electric stock tank deicer that is functional and not thermostatically controlled.~~

Post-conditions:

- A deicer that is thermostatically controlled to control usage when ambient temperatures are above freezing. ~~Only one outlet per pump house or utility room is eligible.~~
- Only one thermostatically controlled tank deicer per tank is eligible.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	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
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X

Payment

~~BPA shall pay $52 per installed thermostatically controlled stock tank deicer.~~

MEASURE	PAYMENT
Thermostatically controlled stock tank deicer	$52 per stock tank deicer

Effective Date

This measure is available effective April 1, 2019.

13.2.1.6 Sprinkler Package Replacement

Basis for Energy Savings

Sprinkler packages may be installed as a maintenance measure, to replace leaky components, or as part of an irrigation system upgrade. The eligible base case for this measure is a sprinkler package on an a center pivot or linear move irrigation system. Eligible configurations include Low Elevation Spray Application (LESA), Low Energy Precision Application (LEPA), Mobile Drip Irrigation (MDI), Mid Elevation Spray Application (MESA), or high pressure sprinklers.

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. These measures were approved March 28, 2018, and are outlined in an RTF memo posted online and dated April 25, 2018.

Requirements and Specifications

The measure requires the replacement of a sprinkler package, either for maintenance or as part of an Irrigation System Conversion.

Preconditions:

- A sprinkler package on an eligible system (LESA/LEPA/MDI/MESA/high pressure)

Post-conditions:

- A new, installed sprinkler package. A LESA/LEPA/MDI/MESA sprinkler package includes a low pressure regulator, nozzle, and rotating or multi-trajectory sprinkler. A high pressure sprinkler package includes a nozzle and an impact sprinkler.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X

Payment

~~BPA shall pay $52 per installed thermostatically controlled stock tank deicer.~~

SPRINKLER PACKAGE REPLACEMENT TYPE	PAYMENT PER PACKAGE
High Pressure Center Pivot or Lateral Move System	$ 12
MESA Center Pivot or Lateral Move System	$ 6
LESA/LEPA/MDI Center Pivot or Lateral Move System	$ 3

Effective Date

This measure is available effective April 1, 2019.

13.2.1.7 Irrigation System Conversion: LESA/LEPA/MDI

Basis for Energy Savings

The base case for this measure is a center pivot or linear move system with high pressure sprinklers on top or a MESA configuration. The efficient case for this measure converts the system to Low Energy Precision Agriculture (LEPA), Low Elevation Spray Application (LESA), or Mobile Drip Irrigation (MDI). This measure was approved as a planning measure at the Regional Technical Forum on March 28, 2018.

Requirements and Specifications

This measure requires conversion of a center pivot or linear move system from high pressure sprinklers on top or MESA to LESA, LEPA, or MDI configuration, including one gooseneck and drop tube per drop. This measure may be combined with Sprinkler Package Replacement measures, but may not be combined with any other irrigation hardware measures. A project information form is required to support savings calculations to move this measure from planning to proven at the RTF.

Preconditions:

A center pivot or linear move system with either

(1) high pressure sprinklers on top, or

(2) a MESA configuration

Post-conditions:

A center pivot or linear move system with a LEPA, LESA, or MDI configuration.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address (e.g., field location, meter number, GPS coordinates, farm name or legal property description).	X		X
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Completed Project Information Form for Irrigation System Conversions (available in the IM Document Library).		X	X

Payment

SYSTEM COMPONENT	PAYMENT
A system converted to LEPA/LESA/MDI	$12 per drop

Effective Date

This measure is available effective April 1, 2019.

13.2.1.8 Irrigation System Conversion: MESA

Basis for Energy Savings

The base case for this measure is a center pivot or linear move system in a high pressure configuration. The efficient case for this measure converts the center pivot or linear move system to a Mid Elevation Spray Application (MESA) configuration. This measure was approved at the Regional Technical Forum on March 28, 2018.

Requirements and Specifications

This measure requires conversion of a center pivot or linear move system from a high pressure to a MESA configuration, including one gooseneck and drop tube per drop.

Preconditions:

- A center pivot or linear move system with a high pressure configuration.

Post-conditions:

- A center pivot or linear move system with a MESA configuration.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	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

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice is to include: manufacturer, model number, type or size of equipment or product installed/used, quantity, order/purchase date and cost.			X
Completed Project Information Form for Irrigation System Conversions (available in the IM Document Library).		X	X

Payment

SYSTEM COMPONENT	PAYMENT
Payment per drop on a system converted to MESA	$10

Effective Date

This measure is available effective April 1, 2019.

13.2.1.9 Irrigation System Upgrades

The payment table for section 6.3.1 is updated to include the following:

Payment

SPRINKLER EQUIPMENT	PAYMENT
Tower/Span/Pivot Flex Gasket	$ 2 per gasket

Effective Date

This measure is available effective April 1, 2019.

13.2.2 COMMERCIAL

No new measures have been announced for this rate period at this time.

13.2.3 RESIDENTIAL

13.2.3.1 Air Source Heat Pump Conversion from Electric Forced Air Furnace to Air Source Heat Pump (without PTCS)

Basis for Energy Savings

The base case (pre-existing state) for air source heat pumps conversions are an electric forced air furnace (with or without central air conditioning).

Energy savings are calculated using multiple runs of the calibrated SEEM simulation engine in combination with the prototype house weightings. This is in order to generate heating energy use for baseline and efficient cases for each heating system type and heating zone within the analysis, for the efficient case of 9.0 HSPF and 14.0 SEER.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for existing single-family, and existing manufactured homes. Air source heat pumps must convert an electric forced-air furnace to a high-efficiency heat pump.

This measure is applicable to whole home centrally ducted systems. For ducted mini-splits, see section 10.7.1.

New air source heat pumps must be rated as having a minimum of 9.0 HSPF and 14 SEER and the equipment must be AHRI tested and certified. A copy of the AHRI certificate documenting a minimum 9.0 HSPF and 14 SEER must be provided. Manufacturer claims of "equivalent to AHRI certified equipment" will not be accepted.

Homes with a heated floor area greater than 4,500 square feet, or with two separate duct systems, may claim up to two heat pump payments when two qualifying heat pumps are installed, provided that all other program requirements are met. No more than two heat pumps may be claimed per home.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
AHRI Certificate documenting a minimum of 9.0 HSPF and 14 SEER			X
Air Source Heat Pump Conversion Form (without PTCS)			X

Payment

MEASURE CATEGORY	PAYMENT
Heat Pump Conversion from Electric Forced-Air Furnace to Air Source Heat Pump.	$800

Additional Information

This measure is for air source heat pumps installations that do not follow the Performance Tested Comfort Systems (PTCS) installation specification. Air source heat pumps installed according to PTCS installation specifications and requirements qualify for higher energy savings and payments. For PTCS air source heat pumps and PTCS variable speed air source heat pumps, please refer to section 10.7.2.1.

Homes with a zonal heating baseline do not qualify for this measure. Homes with zonal heating must utilize PTCS air source heat pumps and PTCS variable speed air source heat pumps section 10.7.2.1.

Customers may not claim payments for this measure and PTCS Air Source Heat Pumps for the same equipment. However, if more than one air source heat pump is installed in a home, customers may claim a combination of this measure and PTCS Air Source Heat Pumps if requirements are met.

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

13.2.3.2 Air Source Heat Pump Conversion from Electric Forced Air Furnace to Variable Speed Air Source Heat Pump (without PTCS)

Basis for Energy Savings

The base case (pre-existing state) for air source heat pumps conversions are an electric forced air furnace (with or without central air conditioning).

Energy savings are calculated using multiple runs of the calibrated SEEM simulation engine in combination with the prototype house weightings. This is in order to generate heating energy use for baseline and efficient cases for each heating system type and heating zone within the analysis, for the efficient case of 9.0 HSPF and 14.0 SEER.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

The measure is available for existing single-family, and existing manufactured homes. Variable speed heat pump conversions must convert an electric forced-air furnace to a high-efficiency heat pump.

The measure is applicable to whole home centrally ducted systems. For ducted mini-splits, see section 10.7.1. Air source heat pumps invoiced under this measure must include documentation that the air source heat pump installed has a variable speed or inverter driven outdoor compressor. For installations without a variable speed compressor or air source heat pumps where it cannot be confirmed that the compressor is variable speed, please use 13.2.3.1, Air Source Heat Pump Conversion from Electric Forced Air Furnace to Air Source Heat Pump (without PTCS).

New air source heat pumps must be rated as having a minimum of 9.0 HSPF and 14 SEER, and the equipment must be AHRI tested and certified. A copy of the AHRI certificate documenting a minimum 9.0 HSPF and 14 SEER must be provided. Manufacturer claims of "equivalent to AHRI certified equipment" will not be accepted.

Homes with a heated floor area greater than 4,500 square feet, or with two separate duct systems, may claim up to two heat pump payments when two qualifying heat pumps are installed, provided that all other program requirements are met. No more than two heat pumps may be claimed per home.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
End-user identifying information including unique site ID and address.	X		X
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
AHRI Certificate documenting a minimum of 9.0 HSPF and 14 SEER			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
Air Source Heat Pump Conversion Form (without PTCS)			X

Payment

MEASURE CATEGORY	PAYMENT
Heat Pump Conversion from Electric Forced-Air Furnace to Variable Speed Heat Pump.	$1,000

Additional Information

This measure is for air source heat pumps and variable speed air source heat pump installations that do not follow the Performance Tested Comfort Systems (PTCS) installation specification. Variable speed air source heat pumps installed according to PTCS installation specifications and requirements qualify for higher energy savings and payments. For PTCS air source heat pumps and PTCS variable speed air source heat pumps, please refer to section 10.7.2.1.

Homes with a zonal heating baseline do not qualify for this measure. Homes with zonal heating must utilize PTCS air source heat pumps and PTCS variable speed air source heat pumps section 10.7.2.1.

Customers may not claim payments for this measure and PTCS Air Source Heat Pumps for the same equipment. However, if more than one air source heat pump is installed in a home, customers may claim a combination of this measure and PTCS Air Source Heat Pumps if requirements are met.

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

13.2.3.3 Low-Income Smart Thermostats

Low Income Smart Thermostats are now available for Single Family, MultiFamily Low Rise, MultiFamily Mid/High Rise, and Manufactured homes. Please see section 10.10.7 for documentation requirements and incentive rates.

13.2.3.4 Aerators

Basis for Energy Savings

The base case used to calculate energy efficiency savings for the current BPA residential faucet aerator measures is the RTF current practice baseline. The definition of each unit in this measure and subsequent energy savings from the efficient replacement for all types of residences is based on two installed aerators. The nominal flow rates are 1.0 gallons per minute (GPM) for bathroom faucet aerators and 1.5 GPM for kitchen faucet aerators.

Direct Install measures may gain higher savings by identifying the water heater fuel type. For the By Request measure, fuel type is restricted to "any water heater" in order to collapse faucet location and water heater fuel type. BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for all types of residential homes.

This measure may be distributed By Request or Direct Install and must follow the Measure Distribution Processes section in the Multisector chapter.

- By Request aerators are restricted to "any water heater" fuel type and must be requested either directly or as part of a kit.
- Direct Install aerators are only eligible in homes with electric water heaters and the water heater fuel type must be documented.

Aerators cannot be distributed via Retail (Simple Steps and utility-run retail programs), or Mailed Nonrequest.

Each unit reported to BPA must reflect installation of two aerators.

Aerators must be rated for the following flows:

- 1.0 GPM or less for bathroom faucets
- 1.5 GPM or less for kitchen faucets

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
Request by end-user and fuel source documentation (Direct Install only).			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
Aerators (two per unit)	n/a	$3/unit	n/a	$8/unit

Additional Information

Measures eligible for By Request may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try efficient faucet aerators?" If for any reason the homeowner refuses the contractor-installed measure and wants to install the measure themselves, these measures should be claimed as "By Request".

13.2.3.5 Advanced Power Strips – Load Sensing (Home Entertainment Centers)

Basis for Energy Savings

The base case used to calculate energy efficiency savings for the BPA Residential Load Sensing Advanced Power Strip (APS) measures is the estimated annual electric usage of home entertainment centers and their peripheral Audio Visual devices. It is based on RTF analysis which uses several relevant metering studies from 2016-2018 to estimate savings. Efficient case savings include the reduction of loads from master/peripheral load sensing strips that are capable of shutting off power to controlled devices when not in use. Other inputs include the prevalence of different peripherals (DVD, VCR, video games, stereo, speakers, etc.) and each peripheral's hours of use.

These measures are currently deemed as planning measures by the RTF Guidelines, requiring the completion of a research plan to provide more data on the inputs.

BPA Documentation Requirements consider these factors. More detailed information is available on the RTF's Unit Energy Savings (UES) Measures webpage.

Requirements and Specifications

This measure is available for all types of residential home entertainment centers only (a TV with any combination of peripherals).

Load Sensing Home Entertainment Center Advanced Power Strips may be distributed by Retail (Simple Steps and utility-run retail programs), By Request, or Direct Install and must follow the Measure Distribution Processes in the Multisector chapter and are limited to three load sensing advanced power strips per home. This measure cannot be distributed via Mailed Non-request.

The Load Sensing Home Entertainment Advanced Power Strip measure reduces power consumption of home entertainment centers by shutting off power to the controlled peripheral devices when the main device (such as a television) enters sleep mode or is turned off.

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

Load Sensing Home Entertainment Advanced Power Strips must meet the following qualifications:

- Load sensing
- Consume less than 1W of energy;
- One-year warranty and any length warranty for connected devices;
- Surge protection to 740 joules;
- UL1449-listed;
- Rated for 15 amps; and
- Resettable circuit breaker.

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
Advanced Power Strip – Load Sensing (Home Entertainment Centers)	$15	$20	n/a	$25

Additional Information

Measures that can be distributed "By Request" may be distributed at events such as trade shows, annual meetings, or community events after asking attendees a question such as, "Would you like to try a load sensing advanced power strip on your home entertainment center?" By Request may also be used to supplement Direct Install when an installer is unable to install the APS, due to complicated setups or accessibility constraints.

These measures are also referred to as "Tier 1" Advanced Power Strips. BPA, however, uses the "Load Sensing (Home Entertainment Centers)" name.

13.2.3.6 Energy Saver Kits

Basis for Energy Savings

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

These measures are an aggregate of the individual RTF UES measures for each kit component. More detailed information on energy savings assumptions is available on the RTF's Unit Energy Savings (UES) Measures webpage.

MEASURE	KIT COMPONENTS
Energy Saver Kit 1	4 LED (ENERGY STAR A-Lamps)
Energy Saver Kit 2	8 LED (ENERGY STAR A-Lamps)
Energy Saver Kit 3	4 LED (ENERGY STAR A-Lamps), Load Sensing Advanced Power Strip
Energy Saver Kit 4	8 LED (ENERGY STAR A-Lamps), Load Sensing Advanced Power Strip
Energy Saver Kit 5	4 LED (ENERGY STAR A-Lamps), 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator

MEASURE	KIT COMPONENTS
Energy Saver Kit 6	8 LED (ENERGY STAR A-Lamps), 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator
Energy Saver Kit 7	4 LED (ENERGY STAR A-Lamps), Thermostatic Shut-Off Valve/Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator
Energy Saver Kit 8	8 LED (ENERGY STAR A-Lamps), Thermostatic Shut-Off Valve/Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator
Energy Saver Kit 9	4 LED (ENERGY STAR A-Lamps), Load Sensing Advanced Power Strip, 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator
Energy Saver Kit 10	8 LED (ENERGY STAR A-Lamps), Load Sensing Advanced Power Strip, 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator
Energy Saver Kit 11	4 LED (ENERGY STAR A-Lamps), Load Sensing Advanced Power Strip, Thermostatic Shut-Off Valve/Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator
Energy Saver Kit 12	8 LED (ENERGY STAR A-Lamps), Load Sensing Advanced Power Strip, Thermostatic Shut-Off Valve/Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator

Requirements and Specifications

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

Kits other than the configurations listed here created out of individual refnos for each component continue to be available through Simple Steps or assembly by utilities or their vendors. Energy Saver Kits must be distributed By Request only and must follow the Measure Distribution Processes in the Multisector chapter. These measures cannot be distributed via Retail, Mailed Non-request, or Direct Install.

Participation in the Simple Steps program is not required to order kits. Utilities can use the Simple Steps infrastructure to order kits, or purchase the kits through other vendors. The Simple Steps infrastructure is dependent on a third party program contract, and as such may not be available during an entire rate period.

Energy Saver Kits must meet the following qualifications:

- Lamps must be ENERGY STAR qualified
- Individual products must meet the requirements outlined in their sections in the current IM
- Limited to one kit type per household

Documentation Requirements

DOCUMENTATION DESCRIPTION	RETENTION/SUBMITTAL LOCATIONS		
	BPA ENERGY EFFICIENCY REPORTING SYSTEM	EEDOCS@BPA.GOV OR FAX 1-866-535-7955	CUSTOMER FILE
Equipment/contractor invoice showing (a) the measure requirements have been met (e.g., manufacturer, model number, type, size and quantity of equipment or product installed/used); (b) the order/purchase date; and (c) cost.			X
See the Measure Distribution Processes section in the Multisector chapter for additional requirements.			X

Payment

MEASURE	RETAIL	BY REQUEST	MAILED NON-REQUEST	DIRECT INSTALL
Energy Saver Kit 1: 4 LED	n/a	$10	n/a	n/a
Energy Saver Kit 2: 8 LED	n/a	$21	n/a	n/a
Energy Saver Kit 3: 4 LED, Load Sensing Advanced Power Strip	n/a	$27	n/a	n/a
Energy Saver Kit 4: 8 LED, Load Sensing Advanced Power Strip	n/a	$38	n/a	n/a
Energy Saver Kit 5: 4 LED, 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$35	n/a	n/a
Energy Saver Kit 6: 8 LED, 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$60	n/a	n/a
Energy Saver Kit 7: 4 LED, Thermostatic Shut-Off Valve/ Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$40	n/a	n/a
Energy Saver Kit 8: 8 LED, Thermostatic Shut-Off Valve/ Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$65	n/a	n/a
Energy Saver Kit 9: 4 LED, Load Sensing Advanced Power Strip, 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$50	n/a	n/a
Energy Saver Kit 10: 8 LED, Load Sensing Advanced Power Strip, 1 Showerhead, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$70	n/a	n/a
Energy Saver Kit 11: 4 LED, Load Sensing Advanced Power Strip, Thermostatic Shut-Off Valve/ Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$65	n/a	n/a
Energy Saver Kit 12: 8 LED, Load Sensing Advanced Power Strip, Thermostatic Shut-Off Valve/ Showerhead combo, 2 Bath Aerator, 1 Kitchen Aerator	n/a	$85	n/a	n/a

Additional Information

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