

# **Residential Standard Offer Program**



**Texas Central Company**

**Texas North Company**

**2012 Program Year**

**Version 2.0**

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## 1. EXECUTIVE SUMMARY

AEP is offering the Residential Standard Offer Program (RSOP) through its Texas distribution companies which include AEP Texas Central Company (TCC) and AEP Texas North Company (TNC). The RSOP is open to a wide range of contractors, service companies, retail electric providers, and community action agencies referred to as Project Sponsors.

In its Standard Offer Programs (SOPs), AEP contracts with Project Sponsors to deliver peak demand savings (measured in kilowatts, or kW) and/or annual energy savings (measured in kilowatt-hours, or kWh) by installing qualifying energy efficient measures at existing homes. AEP will pay a fixed price in the form of incentives for kW and kWh savings resulting from the energy efficient measures installed.

The Public Utility Commission of Texas (PUCT) has issued rules and requirements for the SOPs that are to be implemented by most electric utility companies serving Texas customers. Those rules and requirements are outlined in the Substantive Rule 25.181, also known as the Energy Efficiency Rule. Project Sponsors participating in this RSOP must comply with all program rules and procedures. The purpose of this manual is to identify and explain these program requirements and to serve as a reference for potential project sponsors.

Key changes to the program for 2012 include:

- Underserved counties have been re-defined and are noted in Appendix C.
- Revised application forms
- Changes have been made to the Deemed Savings for Duct Efficiency
- Residential dwellings completed after January 1, 2010 do not qualify for the program.
- Work schedules required for project sponsors completing Duct Efficiency and/or Infiltration measures
- All ceiling insulation installations must affirm that an insulation installation certificate was permanently affixed near the attic opening
- Invoices may no longer be submitted the 1<sup>st</sup> 14 days of each month
- First-time applicants must apply in Small Projects
- To apply in Large Projects, project sponsors must have first successfully participated in Small Projects

**It is the Project Sponsor's responsibility to review the current year manual in its entirety prior to submitting an application.**

**Notice:** AEP reserves the right to incorporate any or all changes resulting from PUCT proceedings into AEP's 2012 programs as they are approved. Project sponsors will be provided with adequate notice of any changes affecting their projects.

## 2. PROGRAM DESIGN

### 2.1. PROGRAM DESCRIPTION

The primary objective of this program is to achieve cost-effective reduction of peak summer demand. This performance-based program offers incentive payments for “deemed” or “measured” energy savings generated by installing energy efficient measures.

Approved Project Sponsors are responsible for marketing their services to residential customers served by AEP, contracting with the homeowners, installing the measures, and reporting their work to AEP. AEP then inspects a randomly generated customer sample. Payment is made for the demand reductions and energy savings based on the percentage of installations that are approved by inspection as capable of delivering the reported savings.

*Example:*

*For a Project Sponsor installing a new central air conditioner, the savings (and incentives) are based on the difference between a high-efficiency unit, e.g., 14 SEER (or higher) and a “baseline” unit as defined in the approved Deemed Savings.*

**AEP has designed the RSOP manual to provide Project Sponsors who contract with AEP with the specific requirements of the RSOP. By contracting with AEP, Project Sponsors agree that they have read the program manual and will comply with the requirements of the program in order to receive incentive payments for the installation of qualifying measures.**

For a definition of “baseline” and other terms used in this Manual, please consult the Glossary, included as Appendix A.

### 2.2. PROJECT SPONSOR ELIGIBILITY

A Project Sponsor is any company, person, organization, group, or individual who contracts with AEP to provide energy savings under the RSOP. The following types of Project Sponsors are among those eligible to participate:

- Energy service companies
- Local contractors
- Retail electric providers
- National or local companies that provide energy-related products (e.g., insulation or HVAC)
- Product retailers, if they install the particular energy-efficient products sold as part of this program

Project Sponsors must meet minimum eligibility criteria and demonstrate their financial, technical, and managerial qualifications as part of the application process.

AEP also requires Project Sponsors and their subcontractors to carry all statutorily required insurance, as described in the SOP Agreement.

## 2.3. PARTICIPANT ELIGIBILITY

All participants must be customers of the AEP distribution company; however, they do not need to be retail customers of AEP. The AEP distribution company for a given customer may be determined by the Electric Service Identifier (ESI ID) number on the customer's bill from its Retail Electric Provider.

--AEP Texas Central customers may be identified by ESI ID's beginning with 100 327 894

--AEP Texas North customers may be identified by ESI ID's beginning with 102 040 497

ESI ID's are required to enter customers in the TCC and TNC programs.

Participants may include:

– **Residential customers**

- **Single Family properties** – Defined as residential dwellings consisting of two or less units (i.e., a duplex or less).
- **Mobile Home properties** – a manufactured home on a chassis with wheels so it can be moved to different locations. It is considered pier and beam floor construction, usually with the perimeter skirting from the floor to the ground.

– **Multi-Family properties** - Defined as residential buildings containing three or more dwelling units.

- **Individually metered multi-family properties.** These are considered separate residential accounts; each unit is counted as a residence. The common areas are considered commercial accounts, and are not eligible in the RSOP.
- **Master-metered multi-family buildings.** These are considered commercial facilities and are not eligible in the RSOP.
- **Individually metered townhomes are considered multi-family.**

***NOTE: All multi-family projects must be approved by AEP prior to installation. Pre-approval is done via the RSOP website. Project Sponsors must provide a work schedule via the RSOP website for multi-family projects seven (7) days prior to measure installation.***

**Multi-family projects are only allowed in the Large Project component. No work may begin at a multi-family project prior to AEP approval of the site and work schedule.**

## 2.4. ENERGY EFFICIENT MEASURE ELIGIBILITY

Any PUCT-approved retrofit measure included in the statewide RSOP template, or any measure assigned a deemed savings value by the PUCT and approved for the RSOP, is eligible under AEP's RSOP. Tables 1 and 2 in this section provide examples of eligible and ineligible measures. Appendix G provides a listing of approved measures and their corresponding Deemed Savings Values. With the exception of energy efficient lighting, all measures installed should be installed in such a way to provide an expected life of at least 10 years and deliver the energy savings intended. Only those approved measures installed in homes completed prior to January 1, 2010 are eligible. AEP will consider the permanent electric meter installation date as the home's completion date.

Project sponsors may propose other energy-efficiency measures, provided they meet the following requirements:

- Must produce a measurable and verifiable electric demand reduction during the peak period or produce electricity consumption savings
- Must produce savings through an increase in energy efficiency or a substitution of another energy source for electricity (provided the substitution results in overall lower energy costs, lower energy consumption, and the installation of high efficiency equipment)
- Must exceed applicable current federal minimum efficiency standards
- Renewable energy measures meeting the requirements of the PUCT's Energy Efficiency Rule (Substantive Rule 25.181) may qualify for an incentive

As a general rule, measures involving "plug loads" (equipment or appliances that are plugged into standard electrical outlets) are not permitted. This restriction may be waived by the utility if the Project Sponsor provides the utility with reasonable assurance that the energy and/or demand savings associated with such measures are likely to persist over a 10-year period of time and that quantifiable energy and/or demand reduction meeting the requirements of the PUCT's Energy Efficiency Rule can indeed be achieved through the proposed measure(s).

If the Project Sponsor proposes measures for which deemed savings values have not been approved by the PUCT, then the Project Sponsor must follow the International Performance Measurement and Verification Protocol (IPMVP) adopted by the PUCT (see Appendix D for M&V Guidelines). The M&V plan must be submitted to AEP within 24 hours of submitting the application.

**If any of the baseline equipment at a project site has been removed prior to the execution of the RSOP Agreement, or if any of the proposed energy-efficient measures has been installed prior to the execution of the RSOP Agreement, the project or the affected portions thereof shall be disallowed.**

**AEP shall have final authority on whether any particular measure is eligible for incentives.**

**TABLE 1**  
**EXAMPLES OF ELIGIBLE MEASURES**

Envelope Measures

- Insulation: ceiling, wall and floor
- Energy Star®-quality windows
- Infiltration control
- Duct sealing

Cooling and Ventilation Measures/Projects

- High efficiency air conditioning replacements
- Variable speed drive applications for HVAC equipment\*

Heating Measures/Projects

- Standard-efficiency heat pump to high-efficiency heat pump conversion

Electric Water Heating Measures

- ENERGY STAR® clothes washers
- ENERGY STAR® Dishwashers
- High efficiency gas water heater replacing electric resistance water heaters
- Heat pump water heaters\*
- Waste heat recovery units\*

Other Measures/Projects

- ENERGY STAR® refrigerators

Renewable Energy Measures (All renewable measures subject to approval by PUCT)\*

- Space conditioning (heating or cooling)
- Water heating
- PV or other distributed generation

\*Note: Deemed Savings values have not been created for all of the measures listed

**TABLE 2****EXAMPLES OF INELIGIBLE MEASURES**

- Measures installed at new homes (completed after January 1, 2010)
- Window air conditioners
- CFLs
- Showerheads and aerators
- Cogeneration and self-generation projects
- Load shifting/load management measures
- Load reductions caused by building vacancies
- Measures that rely solely on customer behavior or require no capital investment
- Measures that decrease building plug loads, such as “Green Plugs” or computer inactivity time-out controls
- Measures for which incentives were received under another AEP program
- Repair and maintenance projects
- Energy-efficient gas measures when replacing non-electric technologies
- Measures that result in negative environmental or health effects

## 2.5. ENERGY SAVINGS MEASUREMENT OPTIONS

Project Sponsors have two options for estimating the demand and energy savings of the measures they install. At the time of application, the Project Sponsor must specify which M&V option will be utilized. Once the M&V option is selected, the Project Sponsor must adhere to this process throughout the entire term of the RSOP Agreement. However, the Project Sponsor who selects the Measured Savings Option may request the M&V option be changed from the Measured to the Deemed Savings Option within the first three months of the Project Implementation Period.

1. **Deemed Savings.** Uses pre-determined average kW and kWh savings for each measure, as approved by the PUCT. Incentive payment is made as soon as installation inspections are completed, normally within 45 days of submitting an implementation report and invoice.

*This is the recommended option for virtually all residential projects, and any project composed of measures for which deemed savings values have been established.*

All of the common residential retrofit measures have approved deemed savings values. A listing of these measures and deemed savings values is included as Appendix F.

2. **Measured Savings.** This option is only available to Project Sponsors participating in the Large Project component. Specific measurement and verification procedures (see Appendix D), based on the International Performance Measurement and Verification Protocol (IPMVP), are to be used in calculating energy savings. This option may provide more accurate savings measurements, but will likely increase the Project Sponsor's implementation expenses. In addition, if AEP, in its sole judgment, determines that its own administrative costs would be substantially increased as a result of a Project Sponsor's proposed M&V plan, it has the option of charging the Project Sponsor for these incremental administrative costs.

**Project Sponsors selecting this option must submit an M&V plan with their Project Application within 24 hours of application submittal.** All proposed M&V plans must be approved by AEP before any measures may be installed.

## 2.6. SMALL VS. LARGE PROJECTS

The RSOP consists of two components: Small Projects and Large Projects.

### 2.6.1. Small Project Component

The Small Project Component enables Project Sponsors to apply for as little as \$250 in incentives. All first-time applicants must apply in the Small Project Component. This component is targeted towards:

- Smaller HVAC Dealers
- Local Contractors
- Insulation Contractors
- Community Action Agencies
- First-time applicants

The Small Project Component is ideal for local businesses that may want to participate on a trial basis or who may wish to apply for incentives on a one-job-at-a-time basis. Incentive money is reserved for a **30-day period**, during which Project Sponsors must complete and report installations. Residential single-family customers as described in Chapter 2.3 are eligible for the Small Project Component.

After completing a Small Project, Sponsors may request more incentives under the Small Project Component or may submit an application under the Large Project Component (if funding is still available). Please refer to Chapter 3 for funding limits.

### 2.6.2. Large Project Component

Project Sponsors who wish to ensure that incentives will be available to them throughout the year should submit an application in the Large Project Component, which requires a minimum incentive request and a security deposit. A Project Sponsor must have successfully participated in the Small Project component to be eligible to apply in the Large Project component.

A project consists of all eligible measures to be installed at one or more Host Customer sites. Projects that are similar in nature (type of facility, measures installed, etc.) may be aggregated by the Project Sponsor to meet the minimum project size requirements. Residential and multi-family customers as described in Chapter 2.3 are eligible for the Large Project Component.

Once an application has been approved, the Project Sponsor will be required to submit a security deposit in the amount of 5% of the total incentive payment requested. Additional details may be found in Chapter 6 of this manual.

### 2.6.3. Additional Information

The following is a comparison of the Small and Large Projects:

**TABLE 3**  
**SMALL VS LARGE PROJECTS**

Small Projects	Large Projects
<ul style="list-style-type: none"> <li>• <i>Simplified contract</i></li> <li>• <i>No security deposit required</i></li> <li>• <i>Minimum per incentive request: \$250</i></li> <li>• <i>Maximum per incentive request: up to \$5,000</i></li> <li>• <i>Funds reserved for 30 days</i></li> <li>• <i>No milestone schedule</i></li> <li>• <i>M&amp;V Options:</i> <ul style="list-style-type: none"> <li>• <i>Deemed Savings</i></li> </ul> </li> <li>• <i>Eligible Customers:</i> <ul style="list-style-type: none"> <li>• <i>Residential</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <i>Standard RSOP Agreement required</i></li> <li>• <i>5% Security deposit required</i></li> <li>• <i>Min. project size: \$10,000</i></li> <li>• <i>Max. project size: see section 3</i></li> <li>• <i>Funds reserved for up to a year</i></li> <li>• <i>Sponsors must adhere to milestone schedule</i></li> <li>• <i>M&amp;V Options:</i> <ul style="list-style-type: none"> <li>• <i>Deemed Savings</i></li> <li>• <i>Measured Savings</i></li> </ul> </li> <li>• <i>Eligible Customers:</i> <ul style="list-style-type: none"> <li>• <i>Residential</i></li> <li>• <i>Multi-family</i></li> </ul> </li> </ul>

A Project Sponsor with an active contract in the Large Project Component may not have a contract in the Small Project Component at the same time.

Chapters 5 and 6 detail the different implementation steps involved with the Small and Large Project Components.

### 3. PROGRAM INCENTIVES

AEP shall pay Project Sponsors a fixed incentive per kW and kWh of savings. All payments will be based upon the verified demand and energy savings, rather than on the number of measures installed. The Demand (kW) payment is based on Peak Demand Savings, and the Energy (kWh) payment is based upon the first-year energy savings.

In an effort to provide a more comprehensive program, AEP will encourage projects which target counties or measures which have typically been underserved in the RSOP by varying its incentive levels. Table 4 identifies measures which are considered underserved for the 2012 RSOP and which will be paid at the rate for Underserved Measures. Counties defined as underserved for the 2012 RSOP are identified in Appendix C. For qualifying measures installed in underserved counties, the incentive rate shown in Table 4 for Underserved Counties will be paid until 1) the portion of the budget reserved for Underserved Counties or 2) the entire program budget has been exhausted. The Standard incentive rates shown in Table 4 will apply for all other installations. After the budget reserved for Underserved Counties has been exhausted, installations in those counties will be paid at either the Standard Rate or the Underserved Measures Rate, whichever is applicable.

**TABLE 4**  
**PROGRAM INCENTIVES**

	kW	kWh
<b>TCC Incentives:</b>		
Standard	\$242	\$0.08
Underserved Measures: HVAC	\$269	\$0.09
Underserved Counties	\$296	\$0.10
<b>TNC Incentives:</b>		
Standard	\$242	\$0.08
Underserved Measures: HVAC, Insulation	\$269	\$0.09
Underserved Counties	\$296	\$0.10

**NOTE: AEP may modify its incentive payments during the program year if it is deemed necessary to meet its goals. At least 30 days notice will be provided to participating project sponsors before any such change is made.**

*All incentive payments will be subject to the limits set forth in 3.2 of this manual.*

#### 3.1. INCENTIVE EXAMPLE

A Project Sponsor installs 30 high-efficiency AC units. The units vary in size from 2.5 to 5 tons, and in SEER rating, from 14.0 to 18.0.

Using the deemed savings table for central air conditioners (Appendix G) and adding up the deemed kW and kWh savings for each of the units based on the varying tonnages and SEER ratings installed, the total kW savings is 25, and the kWh savings is 55,000. Using the incentive rate for Underserved Measures, the incentive payment is calculated as follows:

$$(25 \times \$269.00) + (55,000 \times \$0.09) = \$11,675$$

**Note that in all cases, payment procedures specified in the RSOP Agreement supercede this and any other documents, and all payments are subject to the limits set forth in this chapter.**

## 3.2. LIMITS ON INCENTIVE PAYMENTS

### 3.2.1. Load Factor Cap

For projects implemented under this SOP, a definite ratio (load factor cap) has been established between the kW and the kWh payment. To implement the load factor cap, the following table shows the maximum total payment allowed per kW savings. To determine the maximum combined demand and energy incentive payment (kW and kWh), multiply the kW savings by the dollar amount listed in Table 5.

**TABLE 5  
LOAD FACTOR CAPS**

TCC	TNC
\$627.00	\$627.00

The following are examples of application of the load factor cap at TNC:

#### **Example 1**

A project saved 30 kW (peak demand) and 75,000 kWh (annual savings). Without adjustment, the incentive at the rate for Underserved Measures is calculated to be:

$$(30 \text{ kW} \times \$269.00) + (75,000 \text{ kWh} \times \$0.09) = \$14,820$$

Referring to the table above, the maximum allowable incentive for this project at TNC would be:

$$30 \text{ kW} \times \$627 = \$18,810$$

Since the maximum allowable incentive is greater than the actual calculated incentive, this project would not be subject to the load factor cap. The payment would be \$14,820.

#### **Example 2:**

A project saves 20 kW (peak demand) and 150,000 kWh (annual savings). Without adjustment, the incentive at the rate for Underserved Measures is calculated to be:

$$(20 \text{ kW} \times \$269.00) + (150,000 \text{ kWh} \times \$0.09) = \$18,880$$

Referring to the table above, the maximum allowable incentive for this project at TNC would be:

$$20 \text{ kW} \times \$627 = \$12,540$$

Because the maximum allowable incentive is less than the actual calculated incentive, this project would be subject to the load factor cap. The payment would be \$12,540.

### 3.2.2. Project Sponsor Limits

To ensure that funding will be available to multiple participants, AEP has set a maximum limit on incentives paid to any one Project Sponsor. Project Sponsors may not receive more than the Project Sponsor Limit for the program year, as noted in Table 6.

**TABLE 6  
PROJECT SPONSOR LIMITS**

	TCC	TNC
Large Projects	\$150,000	\$40,000
Small Projects	\$150,000	\$20,000
Small Projects Monthly Reservation Limit	\$25,000	\$5,000

These limits may be waived if AEP determines that such limits would prevent it from achieving its energy efficiency goal.

### 3.2.3. Incentive Budget for Underserved Counties

AEP has also set aside a maximum budget for incentives paid at the Underserved Counties rate. Table 7 shows Large and Small Project maximum budgets for Underserved Counties. Incentives for Underserved Counties are available on a first-come, first-served basis. The maximum budgets for Underserved Counties will be reduced as project sponsors add customers and installations in any of the counties designated as Underserved in Appendix C, until the maximum budget has been exhausted. Once exhausted, installations may still be reported for underserved counties but incentives will be paid at the applicable Standard or Underserved Measures rate. AEP reserves the right to transfer funds as needed to or from the standard and underserved incentive budgets.

**TABLE 7  
BUDGETS FOR UNDERSERVED COUNTIES**

	TCC	TNC
Large Projects	\$650,000	\$72,000
Small Projects	\$650,000	\$38,000

### 3.2.4. Program Release Dates and Funding – Small Projects

**TABLE 8  
PROGRAM RELEASE DATES AND FUNDING**

	TCC	TNC
Small Projects – January 17, 2012 Release	\$900,000	\$80,000
Small Projects – June 5, 2012 Release	\$900,000	\$44,260

No Project Sponsor has unconditional entitlement or preferential rights to any RSOP incentive funds. Failure to comply with all program requirements may result in a project sponsor's termination from the program.

## 4. PROGRAM PROCESS AND TIMELINE

AEP's Program website, [www.aepressop.com](http://www.aepressop.com), will be the key informational resource for the RSOP. The application forms, instructions, frequently-asked questions, and helper applications are accessible on the website. AEP will post important program updates throughout the year on the News & Updates page of the Program website. **Project Sponsors shall check this website regularly for all program updates.**

All applications must be completed and submitted on-line. Interested contractors may fill out an application before the submittal date. Applicants may enter the information, save, and return at a later time to make adjustments or changes.

All information **MUST** be entered in the application. If necessary, use the designation NA for "not applicable". All information must be correct for serious consideration of the application.

AEP will not reimburse any Project Sponsor for any costs incurred by participating in the RSOP, including costs of preparing the Project Application, reviewing or executing the RSOP Agreement, or preparing and submitting implementation or performance reports.

**A copy of the RSOP Agreement that will be executed by AEP and the Project Sponsor prior to project implementation is located on the website under *Downloads/Tools*. Project Sponsors are urged to review the RSOP Agreement for the appropriate component (Large or Small Projects) before submitting an application.**

### 4.1. APPLICATION PROCESS

#### 4.1.1. Application & Program Timeline

AEP will update its application web page for each component at the times shown in Table 9. On the application submittal day, at the time scheduled below, AEP will activate a "submit button." Project Sponsors can submit their applications when this button becomes active. Project Applications will be accepted at the following times:

**TABLE 9  
APPLICATION & PROGRAM TIMELINE**

October 20, 2011	Register and begin completing applications
<b>Large Projects:</b>	
November 1, 2011 @ 10:00 am CDT	Submit Large Project Applications – TNC
November 2, 2011 @ 10:00 am CDT	Submit Large Project Applications – TCC
January 3, 2012 @ 10:00 am CST	Large Project Implementation Officially begins
<b>Small Projects:</b>	
December 1, 2011 @ 10:00 am, CST	Applicants may submit Small Project applications
January 17, 2012 @ 10:00 am, CST	Budget Reservations begin

AEP will accept applications until it determines that it has enough approved project sponsors to meet its goals. AEP will utilize its mail server's time stamp to determine the order of receipt. Confirmation of the receipt of the application will be sent via return e-mail.

### 4.1.2. Supplemental Documentation Requirements

All applicants wishing to install Duct Efficiency or Infiltration measures must submit a document stating the step-by-step process of your testing procedures, including the type of testing equipment you will be using. This document should be received within 24 hours of application submittal.

Applicants in the Large Project Component must submit an M&V plan if they do not intend to utilize the deemed savings or simplified M&V for all measures installed.

**Testing Procedures and M&V plans must be submitted by e-mail to the appropriate Program Administrator within 24 hours of submitting the internet application. Applications may be rejected for failure to submit documentation at the required time.**

### 4.1.3. Additional Application Guidelines

Additional information is required on the **Large Project Application** and is described in this section.

#### Project Description

Briefly describe the proposed project, including targeted customers, targeted counties, measures to be installed, marketing approach, and measurement and verification method. M&V options are described in Chapter 2.

#### M&V Plan

The M&V method to be used must be specified at the time of the application.

- Deemed Savings Option: Refer to the deemed savings measure list (Appendix G), and/or the excel spreadsheet file named deemedsavingshelper.xls (may be downloaded from [www.aepressop.com](http://www.aepressop.com)) to create estimates of average kW and kWh savings per installation site. You may then use these estimates to determine the incentive amount to request.
- Measured Savings Option: - Enter your estimate of kW and kWh savings per site. Refer to the M&V Form for a description of the additional information that needs to be submitted. Provide measure installation and savings information by customer type (Residential, Single-family or Multi-Family).

#### Security Deposit

A 5% security deposit will be required for all Large Project applicants upon notification of application approval. The security deposit will be refunded according to the requirements outlined in Chapter 6.

## 4.2. APPLICATION REVIEW PROCEDURES

AEP will review the Project Applications on a first-come, first-served basis. To ensure a comprehensive program targeting all eligible customers and measures while achieving its demand and energy goals, AEP will award contracts based upon the Project Sponsor's qualifications and targeted counties and measures until the RSOP has been fully subscribed. Previous program participation does not guarantee acceptance.

The application review process will take into consideration the project sponsor's record in previous programs including, but not limited to, the following criteria:

- Areas served compared to targeted areas listed on prior years' project application(s)

- Measures reported compared to targeted measures listed on prior years' project application(s)
- Level of workmanship and professionalism shown
- Ability to follow program guidelines for reporting
- History of reservations made and not completed
- History of customer complaints received
- Past inspection results history

#### **4.2.1. Application Confidentiality**

AEP's RSOP is subject to oversight by the PUCT, which may request a copy of any RSOP materials that AEP receives. Sensitive information identified as such and submitted by the Project Sponsor will be treated confidentially to the fullest extent possible, and will not be provided directly to outside parties other than the PUCT. AEP shall have no liability of any kind to any Project Sponsor or other party as a result of public disclosure of any submittals.

#### **4.2.2. Application Evaluation**

AEP may reject a Project Application if:

- The Project Application is received after the Project Application period has expired
- The Project Application is received after the RSOP has been fully subscribed
- The Project Sponsor fails to meet program eligibility requirements
- The Project Sponsor fails to respond to any request for additional information
- The Project Sponsor fails to submit supplemental documentation when requested
- The Project Sponsor is found to have made material misrepresentations in the Project Application
- The Project Sponsor fails to comply with applicable federal, state and local laws and regulations
- Changes occur in laws or regulations directly affecting the RSOP
- The Project Application is found to be incomplete or insufficient
- The Project Sponsor has performed poorly in previous AEP programs
- AEP, in its sole judgment, determines that the Project Sponsor is incapable of fulfilling the terms and conditions of the RSOP Agreement
- The Project Sponsor fails to submit required insurance documentation

AEP may request clarification of, or additional information about, any item submitted as part of the Project Application. Project Sponsors will have seven (7) business days to respond to such requests. If the clarification or additional information provided is not sufficiently responsive, AEP may, at its sole discretion, request additional information, or discontinue its evaluation of the submittal.

#### **4.2.3. Project Sponsor Approval**

AEP will notify each Project Sponsor of its application status within thirty (30) business days of the submittal of the application. AEP will establish a Budget Reservation for each applicant meeting Project Application requirements in the Large Project component until all program funds have been reserved. AEP may establish a Budget Reservation less than the amount the Project Sponsor has requested. AEP reserves the right to discontinue review of applications when it determines that enough applications have been received to fully-subscribe the programs and to meet its program goals.

Within seven (7) business days of the Project Application's **pre-approved status notification via email**, the Project Sponsor must provide AEP with the following, as directed in the pre-approval email:

- Two (2) signed copies of the RSOP Agreement
- Evidence of Insurance as required in the RSOP agreement. Certificates of Insurance (COI) must be mailed or e-mailed directly from the insurance agency to the attention of the appropriate AEP program administrator. AEP must be able to clearly distinguish that the COI has been sent from the issuing agency. Emailed COIs must show in the subject line: "Certificate of Insurance: Project Sponsor name". Failure to submit a properly-completed COI or to maintain the required insurance will result in a lock out of the Project Sponsor from the database and possible dismissal from program participation. As a reminder, AEP requires Project Sponsors and their subcontractors to carry all statutorily required insurance, as described in the SOP Agreement.

**All COIs shall show the certificate holder as:**

American Electric Power Company, Inc. and its Subsidiaries,  
American Electric Power Service Corporation, as agent  
[to the attention of the appropriate program administrator shown below]

- [For Large Project Component only] Security Deposit of 5% of Approved Project Application Amount – Cashier's Check, certified check, money order, or guaranteed check
- Any other documentation noted in the pre-approval email

All documents and COIs must be mailed to the appropriate Program Administrator as listed below. ***AEP is not responsible for documents not addressed to the attention of the appropriate Program Administrator:***

(for overnight delivery)

**AEP Texas Central Company**

Attn: Jim Fowler  
539 N. Carancahua  
Corpus Christi, TX 78401  
Phone: (361) 881-5790  
[jjfowler@aep.com](mailto:jjfowler@aep.com)

(for US Postal delivery)

**AEP Texas Central Company**

Attn: Jim Fowler  
P.O. Box 2121  
Corpus Christi, TX 78403  
Phone: (361) 881-5790  
[jjfowler@aep.com](mailto:jjfowler@aep.com)

(for overnight and US Postal delivery)

**AEP Texas North Company**

Attn: Rhonda Fahrlander  
910 Energy Drive  
Abilene, TX 79602  
Phone: (325) 674-7513  
[rrfahrlander@aep.com](mailto:rrfahrlander@aep.com)

It is the sole responsibility of the Project Sponsor to ensure that AEP receives the required supplemental materials by close of business on the applicable due date. **Faxed submittals are not acceptable.**

Once a Project Sponsor's application has been approved and the Agreement executed, the AEP Program Administrator will allow the Project Sponsor to access the Implementation section of the appropriate RES website. Information on the procedures for the Small and Large Project Components may be found in Chapters 5 and 6, respectively.

### 4.3. MARKETING

Under PUCT rules, AEP may only conduct informational activities to explain the program to energy efficiency service providers and vendors. As a result, AEP must rely upon the marketing capabilities of Project Sponsors for the success of the program to AEP's distribution customers. AEP will not directly market any energy efficiency-related product or service to its customers.

Project Sponsors may not use the AEP name or logo in any correspondence or promotional material; however, Project Sponsors are encouraged to use the one-page brochure provided by AEP and available on the program website. Any other marketing materials must be approved by AEP prior to their use. Examples of acceptable and non-acceptable phrases are in Appendix F. AEP reserves the right to terminate the contract of any Project Sponsor using marketing materials containing any unapproved reference to AEP.

Upon receipt of the countersigned contract and AEP approval of marketing materials, the Project Sponsor may begin marketing and installation activities.

AEP maintains an alphabetical listing of participating Project Sponsors on its main program website, [www.aepefficiency.com](http://www.aepefficiency.com). This site may be used for Project Sponsor verification by the prospective customer. AEP also includes on this site a place for program participants to register a complaint against a Project Sponsor. AEP also strongly encourages Project Sponsors to register with the Better Business Bureau(s) in those areas in which work is planned.

**Entering into an agreement with AEP as a Project Sponsor does not imply AEP's endorsement or approval of any company, product, or service.**

### 4.4. IMPLEMENTATION

**Large Project Sponsors** will market and install eligible measures according to the Program guidelines and provide required installation reports. Details about procedures and reporting requirements for Large Projects are included in Chapter 6. Project Sponsors participating in the Large Project Component **must** be in "Approved" status, have current year Host Customer Agreements and wait until the program officially opens according to Table 9 prior to beginning work at a home.

**Small Project Sponsors** will reserve funds, install measures and report installations within a 30 day time-frame. Details about procedures and reporting requirements for Small Projects are included in Chapter 5. Project Sponsors participating in the Small Project Component **must** be in "Approved" status, have an open reservation and current year Host Customer Agreements prior to beginning work at a home.

The **Host Customer Agreement and Acknowledgement (HCA)** is the primary agreement executed between the Host Customer and the Project Sponsor prior to measure installation. The PUCT requires that HCAs contain certain consumer protection provisions and disclosures.

All Project Sponsors are required to use the AEP-provided HCA form. The HCA must be signed and dated by the Project Sponsor; the Host Customer; and if applicable, the subcontractor. HCA forms will be sent to Project Sponsors upon approval and contract execution. Additional forms will be provided to Project Sponsors when requested via e-mail.

Installation and equipment standards are included in Appendix A.

#### 4.4.1. Prescriptive Requirements for Infiltration Measures

To qualify for incentives, a minimum air leakage reduction of 10% of the pre-installation blower-door CFM reading is required. This measure must be completed, including the post-installation CFM reading, prior to starting the duct efficiency measure, if applicable. In addition to meeting the installation standard in Appendix F, unless contraindicated for health and safety reasons, the following interior leakage points shall be treated as part of this measure, **if applicable**:

- Attic access;
- All plumbing penetrations;
- Other building envelope penetrations (Any hole or opening must be sealed using the proper method to ensure a permanent seal.);
- Missing or broken window panes;
- Weather-stripping and a door sweep or threshold with door bottom weather-stripping on all exterior doors;
- Furnace closet door: For homes with gas space heating, louvered doors or open ceilings to gas space heater closets may not be sealed off to reduce air infiltration unless an outside air source is installed according to applicable building and safety codes. Any sealing of louvered doors and the installation of an outside air source must be inspected by appropriate local, county, or state governmental building inspectors.

**Failure to complete the prescriptive requirements will result in a total measure failure regardless of the CFM reading.**

#### 4.4.2. Prescriptive Requirements for Duct Efficiency Measures

If both infiltration and duct efficiency measures are installed, infiltration measures must be done prior to performing duct efficiency measures. New duct efficiency deemed savings are in effect for 2012 and are described in Appendix G. To qualify for incentives for duct efficiency measures, in addition to meeting the installation standard in Appendix G, the following prescriptive requirements also apply, **if applicable**:

- Seal return air chase
- Seal plenum
- Seal all supply and return registers
- Check the condition of duct work in unconditioned space and seal or repair as necessary

**Failure to complete the prescriptive requirements will result in a total measure failure regardless if it meets the CFM reading requirement.**

#### 4.4.3. Prior to Installation

1. Subcontractors must be approved by AEP prior to beginning installations.
2. For duct efficiency and infiltration projects, the Project Sponsor must submit a work schedule via the program website at least seven (7) days prior to beginning installations. This requirement may be modified for good cause at the discretion of the Program Manager upon request via email from the Project Sponsor and approval via email by the Program Manager.
3. Upon prior notice from the program manager, project sponsors may be required to submit daily work schedules for other measure installation projects, if AEP deems it necessary to review work in progress.

4. For Large Project Component only, multi-family sites:
  - Multi-family projects will require pre-approval of the site and measures via the program website.
  - For multi-family projects, the Project Sponsor must submit a work schedule at least seven (7) days prior to beginning installations via the program website.
5. Host Customer **must** sign and date the HCA.

A CO test is required for all air infiltration, duct sealing, or wall insulation installations where combustion appliances exist. A CO test shall also be conducted for each residence with combustion (e.g., natural gas or propane) equipment or appliances. Project Sponsors are required to measure and record pre- and post-installation CO readings and shall not install any air infiltration control, duct sealing, or wall insulation measure that would result in the ambient air CO level exceeding 9 parts per million (ppm) at project completion. All gas equipment must be on and operating when all test readings are taken.

If the results of the pre-installation CO or air infiltration tests indicate that the installation of air infiltration control measures, duct sealing, or wall insulation may result in post-installation CO or CFM levels insufficient for program standards, the Project Sponsor shall exclude these measures from installation.

AEP will not consider payment for installations submitted without the proper pre-approvals.

#### **4.4.4. Post-Installation**

Each customer must sign and date the HCA upon completion of the project to verify the measures were installed as stated. The HCA provides AEP with permission to inspect the installation, which may be required before incentive payments are approved. **The customer copy of the signed and dated HCA must be provided to the customer. All signatures and dates must be properly completed by the customer, Project Sponsor, and subcontractor (if applicable).**

If a subcontractor was used, Project Sponsor must provide the customer with an **All Bills Paid Affidavit**. A copy of the document is available on the website.

A CO test is required for all air infiltration installations where combustion appliances exist.

## 4.5. REPORTING

Reporting and invoicing will be done via the website. The Project Sponsor will then mail hard copies to the program administrator.

Installations must be recorded on the website database on a monthly basis. In addition, for participants in the Small Project Component, installations must be recorded on the website before the 30-day incentive reservation period ends.

The Project Sponsor may enter the data for each installation either individually or all at one time, as long as the installation is entered and submitted on the Invoice Report within 45 days of the installation date. The following information is required for each Project completed:

- Customer type (Mobile Home or Single Family)
- Customer name and address
- AEP ESI ID number (TCC and TNC)\*
- Best day-time phone number
- County
- Type of Heating
- List of installed measures

\*AEP Texas Central customers: ESI IDs begin with 100 327 894.

\*AEP Texas North customers: ESI IDs begin with 102 040 497.

For apartment complexes, AEP will allow use of the office ESI ID and one HCA signed by the appropriate authority of the apartment complex.

## 4.6. INVOICING

All installations must be invoiced within 45 days of installation. The Project Sponsor is required to submit an **Invoice Report** between the 15<sup>th</sup> and last day of the month for all qualifying installations. To generate the **Invoice Report**, from the *Invoice Menu*:

- Select “Invoices”
- Select “Eligible Customer List”
- Click on “Select All” or select the customers that are to appear on this month’s invoice
- Click on “Submit Invoice”
- An invoice title/number is automatically generated by the database
- Review invoice for accuracy then click on “Confirm”
- Print the Invoice Summary

Mail the Invoice Report and the AEP copy of the signed and dated HCA forms for each customer to the appropriate AEP Program Administrator. This close out must be completed by the last day of the month. AEP must receive the Invoice Report and all required forms within 5 days of the date the Invoice Report is submitted in the database.

Project Sponsors requesting payment for Deemed Savings Measures or Simplified M&V Measures may request payment for 100% of eligible incentives based on deemed savings values for installed measures.

Invoicing and payment procedures for installations involving Measured Savings are outlined in Chapter 7.

## 4.7. INVOICE REVIEW PROCEDURES

### 4.7.1. Installation Inspections

All measures installed in the RSOP must conform to or exceed the standards listed in Appendix G – Deemed Savings. AEP will make random sample field inspections to determine if each measure has been installed properly and is capable of performing its intended function. Up to 10% of the customer sites may be inspected. If measures installed do not meet the inspection standards, they will not be eligible for incentives.

If AEP is unable to inspect measures installed at the customer's location, those measures may be counted as failures.

### 4.7.2. Invoice Adjustments

After field inspections are completed, all installations will be evaluated on a measure-by-measure basis to calculate an adjustment factor for the incentive payment. This adjustment factor will be the ratio of the incentive total for all measures that pass inspection to the total incentive for all measures tagged for inspection. **The adjustment factor will then be applied to the un-inspected sites.**

The algorithm for calculating the adjustment factor is described below:

$$\text{Adjustment Factor} = \frac{\text{Incentive total for measures that pass inspection}}{\text{Incentive total for all measures tagged for inspection}}$$

In instances where all measures pass inspection, the adjustment factor is 1.00. This assumes all figures on the Invoice Report are correct. If only 75% of the inspection sample passes inspection, the adjustment factor will be .75; only 75% of the invoice will be paid. If the Project Sponsor disagrees with the payment adjustment, the Project Sponsor may request that all information be reviewed again after the Project Sponsor provides additional clarifying information. If the Project Sponsor and AEP cannot agree on the adjustments after the review, the Project Sponsor and AEP must use the dispute resolution mechanisms that are specified in the program agreement.

### 4.7.3. Accurate and Timely Reporting

Accurate reporting is of key importance in calculating savings achieved. AEP may prohibit a project sponsor from submitting certain measures if problems occur repeatedly in accurately reporting of required information. Examples include, but are not limited to, square footage, air conditioner size, and the number and location of supply registers, plumbing penetrations, doors, and windows that were sealed. All installations must be entered and submitted on the Invoice Report within 45 days of the installation date. **Failure to adhere to the reporting requirements may result in total invoice failure or cause for termination of the contract.**

### 4.7.4. Excessive Failures

AEP reserves the right to limit the measures a project sponsor is allowed to install or to terminate contracts due to excessive failures.

### 4.7.5. Payment of Invoice

Payment terms are net 45 days. Payment will be processed when the inspections are completed and the invoice has been adjusted.

**AEP'S PAYMENT OF INCENTIVE PAYMENT(S) TO PROJECT SPONSOR IS EXPRESSLY AND SPECIFICALLY CONDITIONED UPON AEP RECEIVING ALL REQUIRED NOTICES, SUBMITTALS AND MATERIALS FROM PROJECT SPONSOR WITHIN THE APPLICABLE PERIOD SPECIFIED IN THIS MANUAL AND THE AGREEMENT. FAILURE BY PROJECT SPONSOR TO DELIVER ANY REQUIRED NOTICE, SUBMITTAL, OR MATERIAL WITHIN THE APPLICABLE PERIOD SPECIFIED IN THIS AGREEMENT SHALL BE DEEMED A MATERIAL BREACH OF THE AGREEMENT.**

#### **4.8. PERFORMANCE PERIOD**

The Performance Period applies only to those Project Sponsors who are installing measures under the Measured Savings Option. Detailed information on the Performance Period is available in Chapter 7.

## 5. SMALL PROJECT PROCEDURES

### 5.1. SMALL PROJECT INCENTIVE RESERVATION GUIDELINES

The Project Sponsor will be able to access the Small Project Sponsor page of the program website to reserve incentive amounts for specific projects. The current available incentive amount will be found on the reservation page for Small Projects. A Project Sponsor may reserve from \$250 up to \$5,000 with each request. These incentive requests do not need to be approved by AEP. **Each reservation will expire at the end of 30 days.** Monthly limits and yearly project sponsor limits are noted in Chapter 3.

After completing a small project, Sponsors may request more incentives under the Small Project Component or may submit an application under the Large Project Component, as long as funding is still available.

#### 5.1.1. Small Project Example

An example of the implementation of a small project is as follows:

1. Project Sponsor identifies a customer in an underserved county at TCC who needs a new central air conditioner
2. Project Sponsor recommends a qualifying air conditioner, as well as duct sealing and additional attic insulation
3. Using the deemed savings tables for Zone 4, the kW and kWh savings are as follows:

Measure	kW Savings	Incentive per kW	kW Payment	kWh Savings	Incentive per kWh	kWh Payment	Total Incentive
3 ton, 14 SEER A/C	\$0.39	\$269	\$104.91	1,236	\$0.09	\$111.24	\$216.15
Duct Sealing	0.972	\$296	\$287.71	1488	\$0.10	\$148.80	\$436.51
Attic Insulation	0.42	\$296	\$124.32	478	\$0.10	\$47.80	\$172.12
Total Incentive							\$824.78

4. The Project Sponsor would need \$824.78 in incentives for this project.
5. Project Sponsor logs on to the RES Program website, checks available funding, and reserves \$1,000 in incentives. This funding is reserved for 30 days.
6. Project Sponsor installs these measures, and returns to the website within 30 days to report installation information.
7. If Project Sponsor implements other small projects during the invoice period, then these are combined on a single report and invoice. Otherwise, Project Sponsor submits a report and invoice for this single project.

**Note: All payments are subject to the limits in 3.2.**

### 5.1.2. Reservation Penalty

AEP may incorporate a reservation penalty at any time during the program year if a Project Sponsor consistently does not use a majority of their reservation. If incorporated, the maximum amount for all future reservations will be reduced.

## 5.2. FREQUENTLY-ASKED QUESTIONS

*What if the measures I actually install are slightly different from what was described in the original Small Project application?*

A Project Sponsor may only install the measures approved in the application.

*Can customer sites be combined?*

Yes. Project sites may be combined in a single Incentive Reservation Request, up to the \$5,000 limit. In doing so, however, Project Sponsors should be aware that the 30-day timeframe for installing the measures still applies. Combining too many sites or installations into a single incentive reservation may make it difficult to complete installations within that timeframe.

*Do I have to give the incentive to the customer?*

No. The Project Sponsor may use the incentive in any manner they see fit. In the Host Customer Agreement that the customer and the Project Sponsor are required to sign, the customer acknowledges that the Project Sponsor is receiving incentives through a ratepayer-funded program.

*What happens if I don't report the measure installation data within the 30-day period?*

After the 30-day period expires, the incentive money that has been reserved will be withdrawn from the Project Sponsor, and will go back into the Small Project incentive budget.

*What happens if I reserve incentive funding, but don't get to do the project?*

Small Project Sponsors should be cautioned against reserving more funds than will be used in the 30 day period. Poor performance in this area may be used by AEP to limit a Project Sponsor's future participation. ***A reservation penalty may also be incorporated to limit the amount a project sponsor may reserve, as noted in 5.1.2.***

### 5.3. SUMMARY OF SMALL PROJECT PROCEDURES

#### **Small Project Application and Approval Process:**

1. Complete Project Sponsor Application Forms at [www.aepressop.com](http://www.aepressop.com)
2. Submit Project Sponsor Application Forms via [www.aepressop.com](http://www.aepressop.com) at the appropriate time
3. Submit the following within 24 hours of application, if applicable:
  - Summary of the step-by-step process of your testing procedures and the type of testing equipment you will be using (Duct Efficiency or Infiltration measures only)
4. AEP will notify applicants of the status (pre-approved, rejected or pending) of their application within 30 business days
5. Successful applicant must ensure that AEP receives all items as requested in the contract pre-approval e-mail within 7 business days
6. Once all of the above has been received and approved, AEP will execute the Agreement

#### **Prior to Installation:**

1. Subcontractors must be approved by AEP prior to beginning installations
2. All marketing materials must be approved by AEP
3. The Small Project Sponsor checks for available funding at [www.aepressop.com](http://www.aepressop.com)
4. Sponsor requests incentives; minimum incentive amount is \$250 and the maximum is up to \$5,000
5. The customer must sign and date the HCA

#### **After Installation:**

1. Customer must sign and date the HCA indicating measures were installed
2. Project Sponsor must provide customer with the signed customer copy of the HCA
3. If using subcontractors, provide the customer with All Bills Paid Affidavit

#### **Reporting:**

Project Sponsor must complete installations ***and report*** installation information via website within 30 days of incentive request. All installations will be entered and submitted on the Invoice Report within 45 days of the installation date.

Project Sponsor must also close out the **Invoice Report** by the last day of the month and mail the following to the Program Administrator:

1. Invoice Report for the month
2. AEP copy of the HCA form for each customer included on the Invoice Report

#### **Payment:**

Payment may be adjusted based on the results of the inspections and are subject to the limits set forth in Chapter 3.

## 6. LARGE PROJECT PROCEDURES

### 6.1. PROJECT MILESTONES

The Project Sponsor must adhere to the required implementation milestone schedule.

Milestone 1: 40% of the contract must be completed **and** reported by May 31, 2012

Milestone 2: 75% of the contract must be completed **and** reported August 31, 2012

For the purpose of measuring a Project Sponsor's progress towards achieving its milestones, AEP will use the total amount paid after any adjustments, for invoices submitted by the milestone date.

Failure to meet the milestones may result in forfeiture of a proportional share of the funds reserved for the Project Sponsor. AEP may withdraw Budget Reservation according to the percentage below the milestone's target.

In the event the Project Sponsor has achieved little or no progress toward achieving the goal by the milestone date, AEP reserves the right to withdraw the Project Sponsor's entire incentive reservation. Such failure to adhere to the milestone schedule shall constitute an event of default under the agreement.

#### ***Example: Large Project***

A Project Sponsor signs an RSOP agreement and has \$20,000 of incentive funds reserved by AEP.

*Milestone:*

Goal:  $0.40 \times \$20,000 = \$8,000$

Amount Achieved = \$4,000

Budget Withdrawal = \$4,000

Revised Contract Amount = \$16,000

Prior to the milestone date, the Project Sponsor performs installations and submits required reports resulting in \$4,000 worth of incentives after review of the inspections and reports. Because the amount achieved is less than the milestone goal, AEP withdraws \$4,000 of budget reservation for that Project Sponsor, making this money available to other Project Sponsors.

### 6.2. SECURITY DEPOSIT RETURN

Project security funds required by Section 4.1 will be returned to the Project Sponsor when 90% or more of the Project Sponsor's estimated incentives have been met through inspection-adjusted, approved invoices. Otherwise, the project security funds will be retained by AEP.

*Security Deposit Example for \$20,000 reserved incentive funds:*

$\$20,000 \times 0.90 = \$18,000$

Before the end of the program year, the Project Sponsor will have to install measures resulting in \$18,000 of incentives in order to recover the Security Deposit.

### 6.3. SUMMARY OF LARGE PROJECT PROCEDURES

#### **Large Project Application and Approval Process**

1. Complete Application Forms at [www.aepressop.com](http://www.aepressop.com)
2. Submit Application Forms via [www.aepressop.com](http://www.aepressop.com)
3. Submit the following within 24 hours of application, if applicable:
  - Summary of the step-by-step process of your testing procedures and the type of testing equipment you will be using (Duct Efficiency or Infiltration measures only)
  - M&V plan, if using the measured savings option
4. AEP will notify applicants of the application's status within 30 business days
5. Successful applicant must ensure that AEP receives all items as requested in the contract pre-approval e-mail within 7 business days
6. Once all required items have been received and approved, AEP will execute the RSOP agreement

#### **Prior to Installation:**

1. Subcontractors must be approved by AEP prior to beginning installations
2. All marketing materials must be approved by AEP
3. Customer must sign and date the HCA
4. Prior to installations at Multi-family sites:
  - Submit multi-family projects for pre-approval of the site and measures via the website
  - For multi-family projects, submit a work schedule at least seven (7) days prior to beginning installations via the website
  - AEP will not consider payment for installations submitted without the proper pre-approvals

#### **After Installation:**

1. Customer must sign and date the **HCA** indicating measures were installed
2. Project Sponsor must provide customer with the signed customer copy of the **HCA**
3. If using subcontractors, provide the customer with **All Bills Paid Affidavit**

#### **Reporting:**

All installations will be entered and submitted on the Invoice Report within 45 days of the installation date.

1. Report installations on-line by the last day of the month
2. Review & close out Invoice Report by the last day of the month
3. Mail the following to the Program Administrator:
  - Invoice Report for the month
  - The AEP copy of the HCA form for each customer included on the Invoice Report (if multi-family unit then a single HCA form signed by the appropriate authority of the complex is sufficient)

#### **Payment:**

After inspecting a random sample of sites, AEP will issue payment based upon the percentage of measures that pass inspection. All payments are subject to the limits set forth in Chapter 3.

#### **Milestones & Security Deposit**

Milestones: 40% Completion by May 31, 2012  
75% by August 31, 2012.

Deposit refunded when 90% or more of the Project Sponsor's estimated incentives have been met through inspection-adjusted, approved invoices.

## 7. PERFORMANCE PERIOD FOR MEASURED SAVINGS OPTION

**Please note:** This chapter provides information to Project Sponsors who are installing measures for which the Measured Savings Option has been selected in the Large Project component. Project Sponsors who are installing measures entirely under the Deemed Savings Option do not need to follow any of the procedures outlined in this chapter.

### 7.1. INTRODUCTION

M&V procedures must follow the guidelines of the International Performance Measurement Verification Protocol (IPMVP). Further, these M&V procedures must conform to the M&V plan that was submitted with the Sponsor's Project Application and approved by AEP.

The Project Sponsor who chooses the Measured Savings Option may request the M&V option be changed from the Measured Savings Option to the Deemed Savings Option within the first three months of the Project Implementation Period.

### 7.2. INVOICE REPORT

The Project Sponsor must submit the Invoice Report, as outlined in Chapter 4, and may submit implementation period invoices. The Project Implementation Report (PIR) and HCAs must accompany such invoices.

For installations involving Measured Savings, the Project Sponsor may request payment for 40% of the Estimated Savings kW and kWh after submittal of the monthly PIR.

Invoicing for "Post Performance Period" Measured Savings may be submitted after the Performance Period. (The length of the Performance Period will vary according to the types of measures installed and the Project Sponsor's M&V Plan.) This Performance Period invoice shall be for 60% of the Estimated Savings kW and kWh, or for the balance of savings identified through measurement and verification, whichever is less.

Note: the Estimated Savings, expressed as the initial Estimated Incentive Payment, shall always be the cap for incentive payments. Project Sponsors shall refund any payments made in excess of the M&V-determined incentive amount that may have been paid upon initial measure installation reporting via the Project Implementation Report.

AEP may adjust the incentive payment based on findings from field inspections. Payment terms are net 45 days.

### 7.3. THE PERFORMANCE REPORT

The Project Sponsor must submit a Performance Report within 45 days after the Performance Period has ended. The length of the Performance Period will vary based on the types of measures installed--generally one year for HVAC or building envelope measures, with shorter Performance Periods possible for non weather-dependent measures. This report must contain the following components:

#### 7.3.1. M&V Methodology Description

This is a description of the particular analysis technique (IPMVP Option A, B, C or D) used to determine baseline and post-installation energy consumption. The information should summarize the Project Sponsor's M&V Plan that is outlined in the Measurement and Verification Procedures in Appendix D of this manual. This report should be formatted so as to facilitate AEP's review.

### **7.3.2. Performance Payment Calculations**

Provide pre- and post-installation energy use calculations, including a complete description of any adjustments to baseline energy use, which should contain all variables and assumptions used in baseline adjustment calculation methodology. Include results of metering, billing data analysis, or other calculations.

The performance payment will be equal to the performance incentive payments minus payments made during the implementation period. This payment will also take into account any adjustments AEP found necessary to perform during site inspections. The performance payments and implementation payments cannot exceed payments for incentives applied for under the project application and specified in the program agreement. When the Project Sponsor determines the kW and kWh savings for all the approved measures by the specified M&V analysis, the result will be multiplied by the appropriate incentives to determine the performance period incentive payment. Payments will be based on verified savings analysis and weighted-average incentive rates that reflect incentive rates for the project's actual mix of measures. Refer to Chapter 3 for incentive levels.

AEP will review the Performance Report's measured kW and kWh savings, and incentive amounts. These figures will be compared to those figures provided in the Project Implementation Reports to ensure all figures are reasonable and consistent with the Project Application.

AEP will determine the approved performance payment by adding the performance year savings incentive for the measures installed, and subtracting all payments made for the Implementation Period.

Total Incentive payments cannot exceed the total eligible payments that are estimated in the Project Sponsor's Project Application and RSOP Agreement.

If there are any adjustments to be made to kW or kWh savings or incentive payments, AEP will notify the Project Sponsor in writing and provide the necessary supporting documentation. Upon receipt of the notification, Project Sponsor shall revise the Performance Report to correct the deficiency. The revised Performance Report shall be resubmitted until it is approved by AEP. If the Project Sponsor disagrees with the adjustments, it must notify AEP in writing and request a meeting between the two parties be conducted to resolve the disputed adjustment(s). If the two parties cannot resolve these issues, the dispute resolution process provided in the Residential SOP Agreement must be utilized.

### **7.4. PERFORMANCE PERIOD INVOICE**

Project Sponsors may submit their Performance Period Invoice along with the Performance Report, as specified above. AEP will review the Performance Report and pay any undisputed performance period incentive amounts within 45 days.

**APPENDIX A - GLOSSARY****- A -**

**Affiliate:** As adopted by the PUCT, an Affiliate is:

- (A) a person who directly or indirectly owns or holds at least 5.0% of the voting securities of an energy efficiency service provider;
- (B) a person in a chain of successive ownership of at least 5.0% of the voting securities of an energy efficiency service provider;
- (C) a corporation that has at least 5.0% of its voting securities owned or controlled, directly or indirectly, by an energy efficiency service provider;
- (D) a corporation that has at least 5.0% of its voting securities owned or controlled, directly or indirectly, by:
  - (i) a person who directly or indirectly owns or controls at least 5.0% of the voting securities of an energy efficiency service provider; or
  - (ii) a person in a chain of successive ownership of at least 5.0% of the voting securities of an energy efficiency service provider; or
- (E) a person who is an officer or director of an energy efficiency service provider or of a corporation in a chain of successive ownership of at least 5.0% of the voting securities of an energy efficiency service provider;
- (F) a person who actually exercises substantial influence or control over the policies and actions of an energy efficiency service provider;
- (G) a person over which the energy efficiency service provider exercises the control described in subparagraph (F) of this paragraph;
- (H) a person who exercises common control over an energy efficiency service provider, where "exercising common control over an energy efficiency service provider" means having the power, either directly or indirectly, to direct or cause the direction of the management or policies of an energy efficiency service provider, without regard to whether that power is established through ownership or voting of securities or any other direct or indirect means; or
- (I) a person who, together with one or more persons with whom the person is related by ownership, marriage or blood relationship, or by action in concert, actually exercises substantial influence over the policies and actions of an energy efficiency service provider even though neither person may qualify as an affiliate individually.

## - B -

**Baseline:** For purposes of determining estimated and measured energy savings for equipment replacement projects implemented under the SOP, the baseline is generally defined as the energy consumed by equipment with efficiency levels that meet the applicable current federal standards and reflects current market conditions. In certain limited circumstances, the baseline may be determined by the equipment or conditions currently in place. This is likely to occur only when federal energy efficiency standards do not apply, or when the existing equipment can be shown by the Project Sponsor to have a remaining service life of at least ten years. For determining estimated and measured savings for building shell improvements, the baseline is generally determined by the building's current condition, e.g., existing insulation r-values, air infiltration rates, etc.

**Budget Reservation:** The amount of incentive funds AEP sets aside during the project implementation phase for a given Project Sponsor who has submitted a successful application prior to AEP's complete commitment of funds through Budget Reservations to other Project Sponsors.

## - D -

**Deemed Savings:** A pre-determined, validated estimate of energy and peak demand savings attributable to an energy efficiency measure in a particular type of application that a utility may use instead of energy and peak demand savings determined through measurement and verification activities.

**Demand Savings:** A quantifiable reduction in the rate at which energy is delivered to or by a system at a given instance, or average over a designated period, usually expressed in kilowatts (kW) or megawatts (MW).

## - E -

**Energy-Efficiency Measures (EEM):** Equipment, materials, and practices that when installed and used at a customer site result in a measurable and verifiable reduction in either purchased electric energy consumption, measured in kilowatt-hours (kWh), or peak demand, measured in kW, or both.

**Energy Efficiency Project:** An energy efficiency measure or combination of measures installed under an SOP Agreement or a market transformation contract that results in both a reduction in customers' electric energy consumption and peak demand, and energy costs.

**Energy Efficiency Service Provider:** A person who installs energy efficiency measures or performs other energy efficiency services.

**Energy Savings:** A quantifiable reduction in a customer's consumption of energy, or the amount by which energy consumption is reduced as a result of the installation of qualifying Energy-Efficiency Measures. Energy savings are determined by comparing the efficiency of the installed Measures to that of an appropriate Baseline.

**Existing Equipment:** The equipment that is installed at the host customer's site prior to the customer's participation in the SOP.

## - H -

**Host Customer or Customer:** A residential distribution customer of AEP that owns or leases facilities at a Project Site or Sites and that has entered into a Host Customer Agreement with Project Sponsor for the installation of Measures as a part of Project.

## - I -

**Implementation Payment:** The first of two incentive payments made to a Project Sponsor. The implementation payment is for 40% of the total estimated incentive amount as specified in the SOP Agreement. A Project Sponsor may submit an invoice for this payment following AEP's approval of the Project Sponsor's Project Implementation Report (PIR).

**Incentive Payment:** Payments made to an Energy Efficiency Service Provider based on the level of approved demand and energy savings (expressed as kW and kWh). Incentive rates are based on PUCT approved avoided costs and incentive caps.

**Inspection:** Onsite examination of a project to verify that a measure has been installed and is capable of performing its intended function.

## - M -

**Measurement and Verification Plan:** The Project Sponsor's specific plan for verifying measured savings estimates. The measurement and verification (M&V) plan should be consistent with the International Performance Measurement and Verification Protocol.

**Measured Energy Savings:** The Energy Savings derived during Performance Period, from the Measures installed at the Project Site as determined in accordance with the Measurement and Verification Plan set forth in Exhibit C of the SOP Agreement.

## - P -

**Peak Demand:** The electrical demand at the time of the highest annual demand on the utility's system, measured in 15 minute intervals.

**Peak Demand Reduction:** Peak demand reduction on the utility system during the utility system's peak period, calculated as the maximum average demand reduction over a period of one hour during the peak period.

**Peak Period:** For the purposes of this program, the peak period is defined as the hours from 1 PM to 7 PM CDT weekdays, from June 1 through September 30 (federal holidays and weekends excluded).

**Performance Period:** The one-year period, for weather-dependent measures or shorter for non weather-dependent Measures, following the approval of a Project Sponsor's Project Implementation Reports. It is during this period that measurement and verification is to take place.

**Performance Payment:** The second of two incentive payments made to a Project Sponsor under the terms of an SOP Agreement. The performance payment is based on the one-year measured energy savings documented in AEP's M&V Report and may be up to 60% of the total estimated incentive included in the SOP Agreement.

**Program Manual:** The complete set of AEP RSOP materials, including the program description, procedures and forms.

**Project Application:** The Project Application, comprising of a set of standard forms, is submitted by an organization wanting to participate in the SOP as a Project Sponsor.

**Project Site:** The location of a Host Customer's facilities where approved Measures will be installed and from which Peak Demand Savings or Energy Savings, or both, will be obtained. A single Project may include Measures installed at multiple Project Sites.

**Project Sponsor:** Any organization, group, or individual who contracts with AEP to provide Energy Savings or Peak Demand Savings, or both, under the SOP.

**Prudent Electrical Practices:** Those practices, methods, standards, and equipment commonly used in prudent electrical engineering and operations to operate electrical equipment lawfully and with safety, dependability, and efficiency and in accordance with the National Electrical Safety Code, the National Electrical Code, and any other applicable federal, state and local codes. In the event of a conflict, the applicable federal, state, or local code shall govern.

## - R -

**Renewable Demand Side Management (DSM) Technologies:** Equipment that uses a renewable energy resource that, when installed at a customer site, reduces the customer's net purchases of energy (kWh), electrical demand (kW), or both.

## - S -

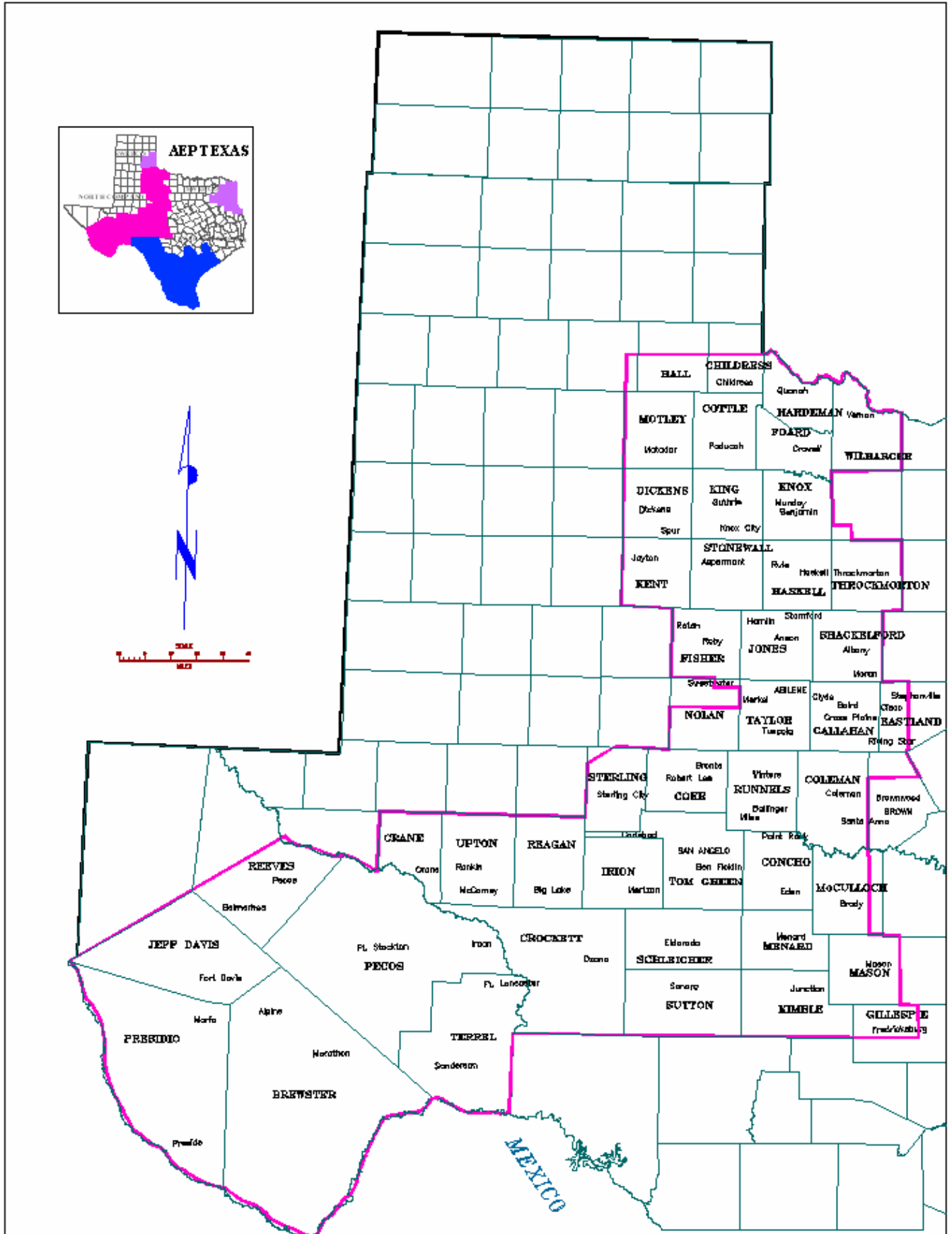
**SOP Agreement:** A contract entered into by the Project Sponsor and AEP following the approval of the Project Sponsor's project application and AEP's design of a project-specific M&V plan. The SOP Agreement specifies the energy-efficiency measures to be installed, the expected energy savings, the expected total incentive payment, and the agreed-upon M&V approach.

**APPENDIX B - SERVICE AREA****AEP TEXAS DISTRIBUTION COMPANIES – COUNTIES SERVED**

<b>AEP- TEXAS CENTRAL COMPANY</b>		<b>AEP- TEXAS NORTH COMPANY</b>			
<b>County</b>	<b>Climate Zone</b>	<b>County</b>	<b>Climate Zone</b>	<b>County</b>	<b>Climate Zone</b>
Aransas	4	Baylor	2	Kimble	2
Atascosa	3	Brewster	2	King	1
Bee	3	Briscoe	1	Knox	1
Brooks	4	Brown	2	Mason	2
Caldwell	3	Callahan	2	McCullough	2
Calhoun	4	Childress	1	Menard	2
Cameron	4	Coke	2	Motley	1
Colorado	3	Coleman	2	Nolan	2
DeWitt	3	Concho	2	Pecos	2
Dimmit	3	Cottle	1	Presidio	2
Duval	4	Crane	2	Reagan	2
Edwards	2	Crockett	2	Reeves	2
Frio	3	Dickens	1	Runnels	2
Goliad	3	Eastland	2	Schleicher	2
Gonzales	3	Edwards	2	Shackelford	2
Guadalupe	3	Fisher	2	Stephens	2
Hidalgo	4	Foard	1	Sterling	2
Jackson	3	Gillespie	2	Stonewall	1
Jim Hogg	3	Hall	1	Sutton	2
Jim Wells	4	Hardeman	1	Taylor	2
Karnes	3	Haskell	2	Throckmorton	2
Kenedy	4	Irion	2	Tom Green	2
Kinney	3	Jeff Davis	2	Upton	2
Kleberg	4	Jones	2	Wheeler	1
La Salle	3	Kent	1	Wilbarger	1
Live Oak	3				
Matagorda	3				
Maverick	3				
Medina	3				
McMullen	3				
Nueces	4				
Real	2				
Refugio	4				
San Patricio	4				
Starr	4				
Uvalde	3				
Val Verde	3				
Victoria	3				
Webb	4				
Wharton	3				
Willacy	4				
Wilson	3				
Zavala	3				
Zapata	4				



### AEP Texas North Company



## APPENDIX C - UNDERSERVED COUNTIES

### AEP Texas Central Company's RSOP 2012 Underserved Counties

ATASCOSA  
BEE  
BROOKS  
CALDWELL  
COLORADO  
DE WITT  
DIMMIT  
DUVAL  
EDWARDS  
FRIO

GOLIAD  
GONZALES  
GUADALUPE  
JACKSON  
JIM WELLS  
KENEDY  
KINNEY  
LA SALLE  
LIVE OAK  
MAVERICK

MCMULLEN  
MEDINA  
REAL  
REFUGIO  
UVALDE  
VAL VERDE  
WHARTON  
WILSON  
ZAPATA  
ZAVALA

### AEP Texas North Company's RSOP 2012 Underserved Counties

BAYLOR  
BREWSTER  
BROWN  
COKE  
COLEMAN  
CONCHO  
CRANE  
CROCKETT  
EDWARDS  
GILLESPIE  
IRION  
JEFF DAVIS  
KIMBLE

MASON  
MENARD  
PECOS  
PRESIDIO  
REAGAN  
REEVES  
RUNNELS  
SCHLEICHER  
STEPHENS  
STERLING  
SUTTON  
UPTON

## Appendix D - Measurement and Verification Procedures

The Residential SOP offers three measurement and verification (M&V) options that can be used for determining energy savings and incentive payments.

The first of these options is referred to as the “Deemed Savings Option.” This option provides pre-determined energy savings amounts for most of the common energy-efficiency measures. These deemed savings values have been approved by the PUCTT. (For a listing of these savings values, refer to Appendix A in the Residential SOP.) This option allows for incentive payments that are more predictable and require fewer administrative resources.

The second option is the Simplified M&V Option for Commercial and Industrial (C&I) Lighting Retrofits. Under this approach, savings are based on engineering calculations using typical equipment characteristics and operating schedules developed for particular applications. Project measures must meet certain criteria in order to calculate their resulting energy savings using the Simplified M&V Option.

The third option is referred to as the “Measured Savings Option.” With this option, actual measurements and analysis are relied upon to calculate energy savings. This option may provide more accurate savings measurements, but will also add to both Project Sponsor’s and to AEP’s administrative costs. Project Sponsors selecting this option must submit an M&V plan with their Project Application. All proposed M&V plans must be approved by AEP before any measures may be installed. In addition, if AEP, in its sole judgment, determines that its own administrative costs would be substantially increased as a result of Project Sponsor’s proposed M&V plan, it has the option of charging the Project Sponsor for these incremental administrative costs.

During the development of the Project Application, the Project Sponsor must specify which M&V option is going to be utilized. Once the M&V option is selected, the Project Sponsor must adhere to this process throughout the entire term of the SOP Agreement. However, the Project Sponsor may request the M&V option be changed from the Measured Savings option to the Deemed Savings option within the first three months of the Project Implementation Period.

The payments calculated below may be adjusted based on results of AEP’s site inspection results as described elsewhere in this document and in the SOP Agreement.

### Deemed Savings Option

If the project consists of energy efficiency measures for which deemed savings have been approved by the PUCT and the Project Sponsor wishes to be paid entirely on the basis of these deemed savings values, then the Project Sponsor is eligible to receive 100% of deemed savings incentive payments within 45 days after submitting a monthly implementation report and invoice, subject to AEP’s on-site inspection results.

Refer to the Program Manual for a description of the process for submitting Project Implementation Reports, documentation, and invoices.

### Measured Savings Option

The Measured Savings Option provides a mechanism of measurement and verification (M&V) where actual measurements and analysis are relied upon to calculate energy savings. This option has

specific measurement and verification procedures, which are based on the International Performance Measurement and Verification Protocol (IPMVP). This Protocol specifies how and what M&V procedures are to be used in calculating energy savings. Project Sponsor will receive an initial payment that represents 40% of the total estimated incentive payment within 45 days after submitting a monthly implementation report and invoice, subject to AEP's post-installation inspection results.

For measured savings projects, AEP will use the following formula to calculate the amount of the initial (implementation) payment:

$$\text{Implementation Payment} = [((\text{estimated kW}) \times (\$/\text{kW incentive})) + ((\text{estimated kWh}) \times (\$/\text{kWh incentive}))] * 40\%$$

The second payment (the "Performance Payment") will be based on the energy and demand savings that the Project Sponsor measures and documents in its M&V Report at the conclusion of the performance period. The performance period starts at the conclusion of the installation period and extends for up to one year to allow sufficient time for measurement of savings. Performance Payment may be up to 60% of the total estimated incentive included in the SOP Agreement, and will be calculated as follows:

$$\text{Performance Payment} = [((\text{measured kW saved}) \times (\$/\text{kW incentive})) + ((\text{measured kWh saved}) \times (\$/\text{kWh incentive}))] - \text{Implementation Payment}$$

Under no circumstances will AEP make a total incentive payment (i.e., the sum of the implementation payment and the performance payment) that is more than 100% of the total estimated incentive payment specified in the SOP Agreement. If the final M&V Report indicates that the measured savings are less than the estimated savings, then the total incentive payment will be less than the payment estimated in the Agreement. If the above formula results in a negative amount, the Project Sponsor must refund that amount to AEP within 45 days of the submittal of the M&V Report.

If the Project Sponsor specified the Measured Savings Option in the project application, it must either implement projects that conform to the Simplified M&V Guidelines for C&I Lighting Retrofits, as described below, or perform detailed measurement and verification (M&V) procedures that are specified in the International Performance Measurement Verification Protocol (IPMVP). The IPMVP Protocol contains four methodologies that the Project Sponsor can use to perform the necessary M&V. If the Project Sponsor intends to implement only those retrofits that conform to the Simplified M&V Guidelines for C&I Lighting Retrofits, then the Project Sponsor is not required to submit a detailed M&V plan as part of the supplemental Project Application information.

## Detailed M&V Plan Requirements

If a Project Sponsor elects to provide a detailed M&V plan, it must conform with the International Performance Measurement and Verification Protocol (IPMVP). A copy of IPMVP may be downloaded from the World Wide Web at <http://www.ipmvp.org>. Copies can also be obtained from the following source:

Efficiency Renewable Energy Clearing House (EREC)

Contact by telephone at 1-800-DOE-EREC, or fax name, address & telephone number to EREC at (703) 893-0400, and ask for the “International Performance Measurement and Verification Protocol,” and include the code IPMVP. Project Sponsors may also transmit a request via E-mail at [doe.erec@nclinc.com](mailto:doe.erec@nclinc.com).

All four measurement options presented in IPMVP (Options A, B, C, &D) are applicable to residential projects, given certain considerations. The choice of the M&V method is influenced by building and equipment type, along with the type of retrofit.

## **APPENDIX E - FORMS**

All Bills Paid Affidavit

Host Customer Agreement & Acknowledgement

**AFFIDAVIT OF PAYMENT OF CONTRACTORS,  
LABORERS, AND MATERIALMEN**

Date: \_\_\_\_\_

Affiant: \_\_\_\_\_

Host Customer: \_\_\_\_\_

Property: \_\_\_\_\_  
\_\_\_\_\_

Affiant on oath swears that the following statements are true:

1. Affiant is the seller and the installer of the high efficiency materials and equipment as described on the accompanying Host Customer Agreement.
2. Affiant has paid each of Affiant’s contractors, laborers, and materialmen in full for all labor and materials provided to Affiant for the purchase and installation of the high efficiency measures. Affiant is not indebted to any person, firm, or corporation by reason of any such construction.
3. Affiant hereby warrants that no mechanics or materialmen’s liens will be placed on Host Customer’s property relating to the installation of high efficiency measures.

\_\_\_\_\_  
Affiant Signature

\_\_\_\_\_  
Affiant Name and Position

---

Acknowledgement

STATE OF TEXAS §

COUNTY OF \_\_\_\_\_ §

This instrument was acknowledged before me on the \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_ , by seller.

\_\_\_\_\_  
Notary Public, State of Texas

**2012 HOST CUSTOMER AGREEMENT & ACKNOWLEDGEMENT**

This Agreement is entered on this day \_\_\_\_\_ between the following two parties;

(Date)

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, TX, \_\_\_\_\_, and \_\_\_\_\_  
(Host Customer/Title) (Street Address) (City) (State) (Zip Code) (Best Daytime Phone Number)

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_  
(Project Sponsor) (Street Address) (City) (State) (Zip Code) (Phone number)

Project Sponsor is participating in one of the following Standard Offer Programs ("SOP") developed by American Electric Power ("AEP"): Check One:  Hard-to-Reach SOP Residential SOP

**Project Sponsor and Customer agree as follows:**

1. Project Sponsor agrees to sell and install and Customer agrees to purchase the energy efficiency measures described on the **Bill of Sale** that will produce energy savings and/or peak demand savings that are qualified for the SOP.
2. Project Sponsor warrants that it will install all energy efficiency equipment or materials in a good and workman-like manner consistent with the prevailing standards for efficiency measure installation as practiced by qualified contractors in the area and inform Customer of any adverse environmental or health effects associated with the measures installed.
3. Customer has received a list of equipment to be installed (quantity, model #s and efficiency ratings): **(Refer to Bill of Sale)**
4. Project Sponsor will maintain, or will ensure subcontractor maintains, liability insurance to cover property damage.
5. Customer has received a written and oral disclosure of the financial arrangement between Project Sponsor and Customer. This includes an explanation of the total Customer payments, the total expected interest charged, all possible penalties for non-payment, and whether Customer's installment sales agreement may be sold: **(Refer to Bill of Sale)**.
6. Customer has received a written disclosure of all warranties, work activities and terms and conditions: **(Refer to Bill of Sale)**
7. If a subcontractor is used, Project Sponsor shall provide Customer an "All Bills Paid" affidavit guaranteeing that no mechanic's or materialmen's liens will be placed on Customer's property relating to the installation of energy efficiency measures pursuant to this Agreement.  
**Subcontractor:** \_\_\_\_\_ Address \_\_\_\_\_  
Phone #: \_\_\_\_\_ If a subcontractor is used, subcontractor must sign where indicated below.
8. Project Sponsor will provide a complaint procedure for Customer to address performance issues by the Project Sponsor or subcontractor.
9. In the event of non-performance by Project Sponsor or the subcontractor, Customer may make a complaint to the Office of Customer Protection of the Public Utility Commission of Texas (PUCT) at 1-888-782-8477 (TTY 1-800-735-2988) or the Office of the Attorney General's Consumer Protection Hotline at 1-800-621-0508.

10. Customer shall have the right to cancel this Agreement at any time and for any reason prior to midnight of the third business day following the date of this Agreement. Customer may exercise this right of cancellation by providing Project Sponsor any written statement that is signed and dated by Customer and states Customer's intention to cancel this Agreement.
11. Customer acknowledges that Project Sponsor is receiving an incentive for the energy and peak demand savings derived from Customer's energy efficiency improvements and that such incentive is paid for through a ratepayer funded program, manufacturers or other entities. In addition, the Project Sponsor must measure and report to the utility the respective energy and demand savings.
12. Customer acknowledges that any review, inspection, or acceptance by AEP of Customer's premises or of the design, construction, installation, operation or maintenance of the energy efficiency equipment is solely for the information of AEP. In performing any such inspection or review or in accepting the installed equipment, AEP makes no representation or warranty whatsoever as to the economic or technical feasibility, capability, safety or reliability of the equipment, its installation by Project Sponsor or its compatibility with Customer's facilities.
13. Customer acknowledges that Project Sponsor is an independent contractor and is not part of, nor endorsed by the PUCT or by AEP, and that Project Sponsor is not authorized to make representations or incur obligations on behalf of AEP. Customer further acknowledges that AEP is not a party to Customer Agreement and that Project Sponsor and Customer are solely responsible for performance hereunder.
14. Customer acknowledges that AEP makes no warranty or representation regarding the qualifications of Project Sponsor, and that the Customer is solely responsible for the selection of Project Sponsor.
15. Customer acknowledges AEP will play no role in resolving any disputes that arise between Customer and Project Sponsor; however, Customer may register a complaint against Project Sponsor on the program website, [aepefficiency.com](http://aepefficiency.com).
16. Customer acknowledges they are a **residential** distribution customer of AEP.

AEP ESID number(s) for this project: \_\_\_\_\_ (for SWEPCO TX customers list meter #s or account #s)

17. Customer agrees, upon three (3) days' prior oral notice, to provide AEP and the independent measurement and verification expert selected by the PUCT with full and complete access to Customer's property for any purpose related to the SOP. The right of access will be subject to Customer's reasonable access requirements and, unless otherwise agreed, must occur within the normal business hours of Customer.
18. Customer agrees to provide AEP with access to Customer's utility bills, project documentation, contractor invoices, and technical and cost information directly related to the project.
19. No energy efficiency service provider, manufacturer, or other business involved in providing your energy efficiency improvements may ask or require you, the Customer, to give up your rights under consumer protection statutes, waive performance warranties, or make false claims of energy savings and reductions in energy costs.

The parties have signed this Agreement as of the date first written above.

Project Sponsor: ▶ \_\_\_\_\_  
 ▶ \_\_\_\_\_  
 (Date) (Signature) (Date)

Subcontractor:  
 \_\_\_\_\_  
 (Signature)

▶ I have executed and been given a copy of the Host Customer Agreement.  
 ▶ \_\_\_\_\_  
 (Signature - Customer or Authorized Representative) (Date)

▶ The measures described on this form have been installed to my satisfaction.  
 ▶ \_\_\_\_\_  
 (Signature - Customer or Authorized Representative) (Date)

*White-Customer Yellow-AEP Pink-Project Sponsor*

## **APPENDIX F - MARKETING MATERIAL: ACCEPTABLE AND UNACCEPTABLE**

Information has sometimes been relayed to customers that is incorrect or misleading, giving the customer a misrepresentation of the responsibility of the Utility Company. Suggestions are offered here for correct verbiage that can be used. Statements in the second section are incorrect and must NOT be used.

### **Acceptable phrases:**

"The local electric utility company has started an energy conservation program for their customers..."

"This program is offered at subsidized or no cost to the homeowner."

"The electric delivery companies are purchasing the energy savings we have provided you."

"The State of Texas has developed programs to assist qualified electric customers with installing energy saving improvements to help reduce consumption of energy..."

"Current State law requires local electric utilities to make funds available to independent contractors so that you have the opportunity to improve the energy efficiency of your home."

"The Utility Companies typically call about 10% of the customers we do work for to ensure we are following guidelines and proper upgrades have been done."

"...your only obligation may be to allow the utility to inspect our work."

"(Project sponsor) provides free upgrades to your home to lower costs on your electric bill."

"(Project sponsor) is not part of, or endorsed by the PUCT or the local electric utility. We are an independent company that provides energy efficiency measures under the programs for electric utilities."

"These funds are provided by rate payers and are regulated by the Public Utility Commission."

"The State of Texas has developed programs to encourage energy service providers to offer energy conservation services to electric customers of investor-owned utilities."

### **These phrases, or anything similar, are NOT to be used:**

"All costs are paid by your electric company."

"Would you like your utility company to pay for energy efficiency upgrades to your home at no cost to you?"

"It is free because we are paid by the utilities"

"We are getting paid but not from you, but by your utility company."

"(Project Sponsor) bills your electric utility for the work performed on your home."

**APPENDIX G - DEEMED SAVINGS,  
INSTALLATION & EFFICIENCY STANDARDS**

# **Deemed Savings, Installation & Efficiency Standards**

**Residential and Small Commercial Standard Offer Program  
Hard-To-Reach Standard Offer Program**

**Prepared by:**

**Frontier Associates LLC  
1515 Capital of Texas Hwy, Suite 110  
Austin, Texas 78746**

**Updated:  
January 2012**

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# **DEEMED SAVINGS**

## **All Residential and Hard-To-Reach SOP Measures for Texas Programs**

### **Introduction**

This document contains all of the approved energy and peak demand deemed savings values established for energy efficiency programs in Texas. The figures correspond with the set of residential and small commercial sector deemed savings values approved by the Public Utility Commission of Texas in Project No. 22241. A more detailed description of the methodology used to calculate these savings is found in the Petitions, which may be found on the PUCT website: <http://www.puc.state.tx.us/>. Once at the PUCT homepage, select “Filings” and then select “Filings Search.” Enter 22241 into the Control Number box and then click “Search.” Separate deemed savings values have been calculated for homes with electric air conditioning / gas heat, for electric air conditioning / electric resistance heat, and for heat pumps. For climate-sensitive energy efficiency measures, separate calculations have been performed for four different regions of the state. The heat pump water heater measures includes a fifth region – El Paso:

- Panhandle Region - using typical weather information for Amarillo or Oklahoma City (for windows only).
- North Region - using typical weather information for Dallas or Fort Worth.
- South Region - using typical weather information for Houston or San Antonio (for windows only).
- Valley Region - using typical weather information for Corpus Christi or Brownsville (for windows).
- West Region – using typical weather information for El Paso (for heat pump water heaters only).

### **GENERAL INSTALLATION STANDARDS**

Equipment must exceed applicable federal energy standards adopted at the time the Project Sponsor submits the project application.

No used or reconditioned equipment shall be qualified for incentives. All equipment shall be new. Project Sponsor must follow all state and local building codes. Project Sponsor shall be responsible for licenses, building permits and inspections. Any fees/payments for licenses, building permits, and inspections shall be paid by the Project Sponsor.

### **Central Air Conditioner Replacement**

#### **Measure**

Residential retrofit of an existing central air conditioning system with a new central air conditioning system in an existing building or the installation of a new central air conditioning system in a new residential construction. A new central air conditioning system includes an entire

packaged unit, or a split system consisting of an indoor unit with a matching remote condensing unit. Maximum cooling capacity per unit is 65,000 Btu/hour.

### Baseline

In new construction, the baseline is assumed to be a new central air conditioning system with an ARI-listed SEER rating of 13.0. For retrofit installations, the baseline is assumed to be 12.44. This value incorporates an adjustment to the baseline SEER value to reflect the percentage of current non-program replacements that do not include the installation of an ARI-matched condensing unit and evaporator coil.

### Installation & Efficiency Standard

#### Installation & Efficiency Standard

Air conditioning equipment shall be properly sized to dwelling based on ASHRAE or ACCA Manual J standards.

Manufacturer data sheets on installed air conditioning equipment or ARI reference numbers must be provided.

The central air conditioning equipment must meet the following standard:

- Minimum ARI-listed SEER rating of 14.00
- Minimum ARI-listed EER of 11.5
- Heat pumps must have a minimum ARI-listed HSPF rating of 8.2

### Deemed Savings

#### Central Air Conditioner

Climate Zone 1: Panhandle Region, Amarillo Weather Data

Demand Savings (kW) for 13.0 SEER New Construction Baseline - Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.13	0.15	0.18	0.23	0.30	0.31
2.0	0.17	0.21	0.24	0.31	0.41	0.42
2.5	0.21	0.26	0.30	0.39	0.51	0.52
3.0	0.25	0.31	0.36	0.46	0.61	0.63
3.5	0.30	0.36	0.42	0.54	0.71	0.73
4.0	0.34	0.41	0.48	0.62	0.81	0.83
5.0	0.42	0.51	0.60	0.77	1.01	1.04

Energy Savings (kWh) for 13.0 SEER New Construction Baseline - Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	218	301	384	456	615	657
2.0	291	401	512	608	820	875
2.5	364	502	639	760	1,025	1,094
3.0	437	602	767	913	1,230	1,313
3.5	510	702	895	1,065	1,434	1,532
4.0	582	803	1,023	1,217	1,639	1,751
5.0	728	1,003	1,279	1,521	2,049	2,188

Central Air Conditioner

Climate Zone 1: Panhandle Region, Amarillo Weather Data

Demand Savings (kW) for 12.44 SEER Retrofit Baseline - Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.22	0.25	0.30	0.37	0.38
2.0	0.26	0.29	0.33	0.40	0.49	0.51
2.5	0.32	0.37	0.41	0.50	0.62	0.63
3.0	0.38	0.44	0.49	0.60	0.74	0.76
3.5	0.45	0.51	0.58	0.70	0.86	0.88
4.0	0.51	0.59	0.66	0.79	0.99	1.01
5.0	0.64	0.73	0.82	0.99	1.23	1.26

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline- Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	323	405	488	560	719	761
2.0	430	540	650	747	959	1,014
2.5	538	675	813	934	1,198	1,268
3.0	645	810	976	1,121	1,438	1,521
3.5	753	945	1,138	1,308	1,677	1,775
4.0	860	1,081	1,301	1,494	1,917	2,029
5.0	1,075	1,351	1,626	1,868	2,396	2,536

Central Air Conditioner

Climate Zone 2: North Region, Dallas / Ft. Worth Weather Data

Demand Savings (kW) for 13 SEER New Construction Baseline - Zone 2

	SEER Range					
Size (tons)	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.12	0.14	0.17	0.23	0.28	0.28
2.0	0.16	0.19	0.22	0.30	0.37	0.37
2.5	0.20	0.24	0.28	0.38	0.46	0.47
3.0	0.24	0.28	0.33	0.45	0.55	0.56
3.5	0.28	0.33	0.39	0.53	0.64	0.65
4.0	0.32	0.38	0.44	0.60	0.73	0.75
5.0	0.39	0.47	0.55	0.75	0.92	0.93

Energy Savings (kWh) for 13 SEER New Construction Baseline - Zone 2

	SEER Range					
Size (tons)	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	319	441	562	667	910	968
2.0	426	587	749	889	1,214	1,291
2.5	532	734	936	1,111	1,517	1,613
3.0	639	881	1,124	1,334	1,821	1,936
3.5	745	1,028	1,311	1,556	2,124	2,259
4.0	852	1,175	1,498	1,778	2,427	2,581
5.0	1,065	1,469	1,873	2,223	3,034	3,227

Central Air Conditioner

Climate Zone 2: North Region, Dallas / Ft. Worth Weather Data

Demand Savings (kW) for 12.44 SEER Retrofit Baseline - Zone 2

	SEER Range					
Size (tons)	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.21	0.24	0.30	0.34	0.35
2.0	0.25	0.28	0.31	0.39	0.46	0.47
2.5	0.31	0.35	0.39	0.49	0.57	0.58
3.0	0.38	0.42	0.47	0.59	0.69	0.70
3.5	0.44	0.49	0.55	0.69	0.80	0.82
4.0	0.50	0.56	0.63	0.79	0.92	0.93
5.0	0.63	0.70	0.78	0.98	1.15	1.17

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline - Zone 2

	SEER Range					
Size (tons)	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	472	594	715	820	1,063	1,121
2.0	630	791	953	1,093	1,418	1,495
2.5	787	989	1,191	1,366	1,772	1,868
3.0	945	1,187	1,430	1,640	2,126	2,242
3.5	1,102	1,385	1,668	1,913	2,481	2,616
4.0	1,259	1,583	1,906	2,186	2,835	2,989
5.0	1,574	1,978	2,383	2,733	3,544	3,736

Central Air Conditioner

Climate Zone 3: South Region, Houston Weather Data

Demand Savings (kW) for 13.0 SEER New Construction Baseline - Zone 3

	SEER Range					
Size (tons)	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.13	0.15	0.17	0.23	0.29	0.30
2.0	0.17	0.20	0.23	0.30	0.39	0.41
2.5	0.21	0.25	0.29	0.38	0.49	0.51
3.0	0.25	0.30	0.35	0.46	0.58	0.61
3.5	0.30	0.35	0.41	0.53	0.68	0.71
4.0	0.34	0.40	0.46	0.61	0.78	0.81
5.0	0.42	0.50	0.58	0.76	0.97	1.02

Energy Savings (kWh) for 13.0 SEER New Construction Baseline - Zone 3

	SEER Range					
Size (tons)	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	361	506	650	758	1,042	1,118
2.0	481	674	867	1,011	1,389	1,490
2.5	601	843	1,084	1,264	1,737	1,863
3.0	722	1,011	1,301	1,517	2,084	2,235
3.5	842	1,180	1,518	1,770	2,431	2,608
4.0	962	1,348	1,734	2,023	2,778	2,980
5.0	1,203	1,685	2,168	2,528	3,473	3,725

Central Air Conditioner  
Climate Zone 3: South Region, Houston Weather Data  
Demand Savings (kW) for 12.44 SEER Retrofit Baseline- Zone 3

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.22	0.24	0.29	0.36	0.37
2.0	0.26	0.29	0.32	0.39	0.48	0.50
2.5	0.32	0.36	0.40	0.49	0.60	0.62
3.0	0.39	0.44	0.48	0.59	0.72	0.74
3.5	0.45	0.51	0.56	0.69	0.84	0.87
4.0	0.52	0.58	0.64	0.79	0.96	0.99
5.0	0.65	0.73	0.80	0.98	1.20	1.24

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline - Zone 3

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	522	667	811	919	1,203	1,278
2.0	696	889	1,082	1,226	1,604	1,705
2.5	870	1,111	1,352	1,532	2,005	2,131
3.0	1,043	1,333	1,623	1,839	2,406	2,557
3.5	1,217	1,555	1,893	2,145	2,807	2,983
4.0	1,391	1,777	2,163	2,452	3,208	3,409
5.0	1,739	2,222	2,704	3,065	4,009	4,261

Central Air Conditioner  
Climate Zone 4: Valley Region Corpus Christi Weather Data  
Demand Savings (kW) for 13.0 SEER New Construction Baseline- Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.13	0.15	0.18	0.23	0.30	0.31
2.0	0.17	0.20	0.24	0.31	0.40	0.41
2.5	0.21	0.25	0.30	0.38	0.50	0.52
3.0	0.25	0.30	0.36	0.46	0.60	0.62
3.5	0.30	0.36	0.42	0.54	0.70	0.72
4.0	0.34	0.41	0.47	0.61	0.80	0.82
5.0	0.42	0.51	0.59	0.77	1.00	1.03

Energy Savings (kWh) for 13.0 SEER New Construction Baseline - Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	426	596	766	896	1,234	1,321
2.0	568	795	1,021	1,195	1,645	1,761
2.5	710	993	1,277	1,494	2,056	2,202
3.0	852	1,192	1,532	1,793	2,468	2,642
3.5	994	1,391	1,787	2,092	2,879	3,082
4.0	1,136	1,589	2,043	2,390	3,290	3,522
5.0	1,420	1,987	2,553	2,988	4,113	4,403

Central Air Conditioner

Climate Zone 4: Valley Region Corpus Christi Weather Data

Demand Savings (kW) for 12.44 SEER Retrofit Baseline - Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.22	0.24	0.30	0.37	0.38
2.0	0.26	0.29	0.33	0.40	0.49	0.50
2.5	0.32	0.36	0.41	0.49	0.61	0.63
3.0	0.39	0.44	0.49	0.59	0.73	0.75
3.5	0.45	0.51	0.57	0.69	0.85	0.88
4.0	0.52	0.58	0.65	0.79	0.97	1.00
5.0	0.64	0.73	0.82	0.99	1.22	1.25

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline - Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	618	788	958	1,089	1,426	1,513
2.0	824	1,051	1,277	1,451	1,901	2,017
2.5	1,030	1,313	1,597	1,814	2,377	2,522
3.0	1,236	1,576	1,916	2,177	2,852	3,026
3.5	1,442	1,839	2,236	2,540	3,327	3,530
4.0	1,648	2,102	2,555	2,903	3,803	4,035
5.0	2,060	2,627	3,194	3,628	4,753	5,043

## Heat Pump Replacement

### Measure

Residential retrofit of an existing central heat pump system with a new central heat pump system in an existing building or the installation of a new central heat pump system in a new residential construction. A new central heat pump system includes an entire packaged unit, or a split system consisting of an indoor unit with a matching remote condensing unit. Maximum cooling capacity per unit is 65,000 Btu/hour.

**All measure installation standards and baseline data from the central air conditioner measure shall apply to the heat pump measure.**

### Baseline

In new construction, the baseline is assumed to be a new heat pump system with an ARI-listed SEER rating of 13.0 and an HSPF of 7.7. For retrofit installations, the baseline is assumed to be 12.44 SEER and 7.7 HSPF. This value incorporates an adjustment to the baseline SEER value (cooling only) to reflect the percentage of current non-program replacements that do not include the installation of an ARI-matched condensing unit and evaporator coil.

### Installation & Efficiency Standard

Equipment shall be properly sized to dwelling based on ASHRAE or ACCA Manual J standards. Manufacturer data sheets on installed air conditioning equipment or ARI equivalent combined compressor and coil HSPF must be provided to the utility in the Implementation Report. Heat pumps shall have a minimum SEER of 14.00 and an HSPF of 8.2.

## Deemed Savings

### Climate Zone 1: Panhandle Region

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 1: Panhandle Region, Amarillo Weather Data

Demand Savings (kW) 13.0 SEER New Construction Baseline- Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.12	0.16	0.20	0.20	0.23	0.32
2.0	0.16	0.22	0.27	0.27	0.31	0.42
2.5	0.21	0.27	0.33	0.34	0.39	0.53
3.0	0.25	0.32	0.40	0.41	0.46	0.63
3.5	0.29	0.38	0.47	0.48	0.54	0.74
4.0	0.33	0.43	0.53	0.54	0.62	0.85
5.0	0.41	0.54	0.66	0.68	0.77	1.06

Energy Savings (kWh) 13.0 SEER New Construction Baseline - Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	204	293	383	500	541	650
2.0	273	391	510	667	722	867
2.5	341	489	638	834	902	1,084
3.0	409	587	765	1,001	1,083	1,301
3.5	477	685	893	1,167	1,263	1,518
4.0	545	783	1,020	1,334	1,444	1,734
5.0	682	978	1,275	1,668	1,805	2,168

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 1: Panhandle Region, Amarillo Weather Data

Demand Savings (kW) 12.44 SEER Retrofit Baseline- Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.23	0.26	0.27	0.30	0.38
2.0	0.25	0.30	0.35	0.36	0.40	0.51
2.5	0.31	0.38	0.44	0.45	0.49	0.64
3.0	0.38	0.45	0.53	0.54	0.59	0.76
3.5	0.44	0.53	0.62	0.63	0.69	0.89
4.0	0.50	0.60	0.70	0.72	0.79	1.02
5.0	0.63	0.75	0.88	0.90	0.99	1.27

Energy Savings (kWh) 12.44 SEER Retrofit Baseline - Zone 1

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	306	396	485	602	643	752
2.0	409	527	646	803	858	1,003
2.5	511	659	808	1,004	1,072	1,254
3.0	613	791	969	1,205	1,287	1,505
3.5	715	923	1,131	1,405	1,501	1,756
4.0	817	1,055	1,292	1,606	1,716	2,006
5.0	1,022	1,318	1,615	2,008	2,145	2,508

Heat Pump – Energy Savings (Heating kWh Only), Climate Zone 1					
HSPF Range					
Size (tons)	8.2 - 8.3	8.4 - 8.5	8.6 - 8.7	8.8 - 8.9	9.0 - 9.1
1.5	269	365	460	554	648
2.0	358	486	613	739	864
2.5	448	608	767	924	1,080
3.0	537	730	920	1,109	1,295
3.5	627	851	1,073	1,293	1,511
4.0	717	973	1,226	1,478	1,727
4.5	806	1,094	1,380	1,663	1,943
5.0	896	1,216	1,533	1,848	2,159

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 2: North Region, Dallas / Ft. Worth Weather Data

Demand Savings (kW) for 13.0 SEER New Construction Baseline - Zone 2

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.13	0.16	0.19	0.20	0.20	0.28
2.0	0.17	0.21	0.25	0.26	0.27	0.38
2.5	0.21	0.26	0.31	0.33	0.34	0.47
3.0	0.25	0.31	0.38	0.39	0.41	0.57
3.5	0.29	0.37	0.44	0.46	0.48	0.66
4.0	0.33	0.42	0.50	0.52	0.54	0.75
5.0	0.42	0.52	0.63	0.65	0.68	0.94

Energy Savings (kWh) for 13.0 SEER New Construction Baseline - Zone 2

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	307	432	558	763	809	956
2.0	409	577	744	1,017	1,079	1,275
2.5	511	721	931	1,271	1,349	1,594
3.0	613	865	1,117	1,526	1,619	1,912
3.5	716	1,009	1,303	1,780	1,889	2,231
4.0	818	1,153	1,489	2,034	2,159	2,550
5.0	1,022	1,442	1,861	2,543	2,698	3,187

Heat Pump (Cooling Only – See Separate Heating Tables)  
 Climate Zone 2: North Region, Dallas / Ft. Worth Weather Data  
 Demand Savings (kW) for 12.44 SEER Retrofit Baseline- Zone 2

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.23	0.26	0.26	0.27	0.35
2.0	0.26	0.30	0.34	0.35	0.36	0.47
2.5	0.32	0.38	0.43	0.44	0.45	0.59
3.0	0.39	0.45	0.51	0.53	0.55	0.70
3.5	0.45	0.53	0.60	0.62	0.64	0.82
4.0	0.52	0.60	0.68	0.71	0.73	0.94
5.0	0.65	0.75	0.86	0.88	0.91	1.17

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline - Zone 2

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	457	583	708	913	960	1,106
2.0	609	777	945	1,217	1,279	1,475
2.5	761	971	1,181	1,521	1,599	1,844
3.0	913	1,165	1,417	1,826	1,919	2,212
3.5	1,066	1,359	1,653	2,130	2,239	2,581
4.0	1,218	1,553	1,889	2,434	2,559	2,950
5.0	1,522	1,942	2,361	3,043	3,198	3,687

Heat Pump – Energy Savings (Heating kWh Only), Climate Zone 2

Size (tons)	HSPF Range				
	8.2 - 8.3	8.4 - 8.5	8.6 - 8.7	8.8 - 8.9	9.0 - 9.1
1.5	120	162	204	245	286
2.0	160	216	272	327	381
2.5	200	270	340	409	476
3.0	239	324	408	490	572
3.5	279	378	476	572	667
4.0	319	432	544	654	762
4.5	359	486	612	735	857
5.0	399	540	680	817	953

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 3: South Region, Houston Weather Zone

Demand Savings (kW) for 13.0 SEER New Construction Baseline - Zone 3

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.12	0.16	0.19	0.20	0.22	0.30
2.0	0.17	0.21	0.26	0.27	0.29	0.40
2.5	0.21	0.27	0.32	0.33	0.37	0.51
3.0	0.25	0.32	0.39	0.40	0.44	0.61
3.5	0.29	0.37	0.45	0.47	0.51	0.71
4.0	0.33	0.42	0.52	0.53	0.59	0.81
5.0	0.41	0.53	0.65	0.67	0.73	1.01

Energy Savings (kWh) for 13.0 SEER New Construction Baseline - Zone 3

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	337	488	638	875	931	1,099
2.0	450	650	850	1,166	1,241	1,466
2.5	562	813	1,063	1,458	1,551	1,832
3.0	675	975	1,275	1,749	1,861	2,199
3.5	787	1,138	1,488	2,041	2,171	2,565
4.0	900	1,300	1,700	2,332	2,481	2,931
5.0	1,125	1,625	2,125	2,915	3,102	3,664

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 3: South Region, Houston Weather Zone

Demand Savings (kW) for 12.44 SEER Retrofit Baseline- Zone 3

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.23	0.26	0.27	0.29	0.37
2.0	0.25	0.30	0.35	0.36	0.38	0.49
2.5	0.32	0.38	0.43	0.44	0.48	0.62
3.0	0.38	0.45	0.52	0.53	0.57	0.74
3.5	0.45	0.53	0.61	0.62	0.67	0.86
4.0	0.51	0.60	0.70	0.71	0.76	0.99
5.0	0.64	0.75	0.87	0.89	0.96	1.23

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline - Zone 3

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	495	645	795	1,032	1,088	1,257
2.0	660	860	1,060	1,376	1,451	1,676
2.5	825	1,075	1,325	1,720	1,813	2,095
3.0	990	1,290	1,590	2,064	2,176	2,513
3.5	1,155	1,505	1,855	2,408	2,539	2,932
4.0	1,320	1,720	2,120	2,752	2,901	3,351
5.0	1,650	2,150	2,650	3,440	3,627	4,189

Heat Pump – Energy Savings (Heating kWh Only), Climate Zone 3					
Size (tons)	HSPF Range				
	8.2 - 8.3	8.4 - 8.5	8.6 - 8.7	8.8 - 8.9	9.0 - 9.1
1.5	69	93	117	141	164
2.0	92	124	156	187	218
2.5	115	155	195	234	273
3.0	138	186	234	281	327
3.5	161	217	273	328	382
4.0	184	248	312	375	436
4.5	207	279	351	422	491
5.0	230	310	390	468	546

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 4: Valley Region, Corpus Christi Weather Data

Demand Savings (kW) for 13.0 SEER New Construction Baseline- Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.12	0.16	0.20	0.20	0.23	0.31
2.0	0.17	0.21	0.26	0.27	0.30	0.41
2.5	0.21	0.27	0.33	0.34	0.38	0.52
3.0	0.25	0.32	0.39	0.40	0.45	0.62
3.5	0.29	0.37	0.46	0.47	0.53	0.72
4.0	0.33	0.43	0.53	0.54	0.60	0.83
5.0	0.41	0.53	0.66	0.67	0.76	1.04

Energy Savings (kWh) for 13.0 SEER New Construction Baseline - Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	399	575	752	1,031	1,099	1,299
2.0	532	767	1,002	1,375	1,465	1,731
2.5	665	959	1,253	1,718	1,831	2,164
3.0	798	1,151	1,503	2,062	2,197	2,597
3.5	931	1,342	1,754	2,406	2,564	3,030
4.0	1,064	1,534	2,004	2,749	2,930	3,463
5.0	1,330	1,918	2,505	3,437	3,662	4,329

Heat Pump (Cooling Only – See Separate Heating Tables)

Climate Zone 4: Valley Region, Corpus Christi Weather Data

Demand Savings (kW) for 12.44 SEER Retrofit Baseline- Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	0.19	0.23	0.26	0.27	0.29	0.38
2.0	0.25	0.30	0.35	0.36	0.39	0.50
2.5	0.32	0.38	0.44	0.45	0.49	0.63
3.0	0.38	0.45	0.53	0.54	0.58	0.75
3.5	0.44	0.53	0.61	0.62	0.68	0.88
4.0	0.51	0.60	0.70	0.71	0.78	1.00
5.0	0.63	0.75	0.88	0.89	0.97	1.25

Energy Savings (kWh) for 12.44 SEER Retrofit Baseline - Zone 4

Size (tons)	SEER Range					
	14.0-14.4	14.5-14.9	15.0-15.9	16.0-16.9	17.0-17.9	18+
1.5	587	763	940	1,219	1,287	1,487
2.0	783	1,018	1,253	1,625	1,716	1,982
2.5	978	1,272	1,566	2,032	2,144	2,478
3.0	1,174	1,527	1,879	2,438	2,573	2,973
3.5	1,370	1,781	2,192	2,844	3,002	3,469
4.0	1,565	2,035	2,505	3,251	3,431	3,964
5.0	1,957	2,544	3,132	4,063	4,289	4,955

Heat Pump – Energy Savings (Heating kWh Only), Climate Zone 4					
HSPF Range					
Size (tons)	8.2 - 8.3	8.4 - 8.5	8.6 - 8.7	8.8 - 8.9	9.0 - 9.1
1.5	53	71	89	107	125
2.0	70	95	119	143	166
2.5	88	118	149	178	208
3.0	105	142	178	214	249
3.5	123	166	208	250	291
4.0	140	189	238	286	332
4.5	158	213	268	321	374
5.0	175	237	297	357	416

## Ground Source Heat Pump

### Measure

The following tables present the proposed deemed savings values for ground source heat pumps for each of the four climate zones. The deemed savings are dependent upon the energy efficiency rating (EER) of the equipment, and are presented as kWh and kW savings per ton installed. Deemed savings values are calculated based on replacement of an existing 13.0 SEER air source heat pump with minimum 8.0 HSPF. These values represent all demand and energy savings that may be assigned a ground source heat pump.

### Baseline

Only ground source heat pumps that replace an existing air source heat pump, ground source heat pump system, or other combination of electric heating and cooling systems are eligible for these deemed savings. Deemed savings values are calculated based on replacement of an existing 13.0 SEER air source heat pump with minimum 8.0 HSPF.

### Installation & Efficiency Standard

The ground source heat pump must meet a minimum ENERGY STAR<sup>®</sup> criteria of 14.0 EER (ISO/ARI 13256-1) in order to be eligible for these deemed savings. The deemed savings apply to units with a capacity of  $\leq 65,000$  BTUs/Hr.

### Deemed Savings

#### Climate Zone 1 – Panhandle Region

Ground Source Heat Pumps – Climate Zone 1		
Climate Zone 1 - with desuperheaters		
GSHP Efficiency	Energy savings [kWh/ton]	Demand savings [kW/ton]
Low (less than 17 EER)	1,083	0.46
High (17 EER and above)	1,309	0.51
Climate Zone 1 - without desuperheaters		
Low (less than 17 EER)	469	0.01
High (17 EER and above)	699	0.08

## Climate Zone 2 – North Region

Ground Source Heat Pumps – Climate Zone 2		
Climate Zone 2 - with desuperheaters		
GSHP Efficiency	Energy savings [kWh/ton]	Demand savings [kW/ton]
Low (less than 17 EER)	1,064	0.50
High (17 EER and above)	1,230	0.57
Climate Zone 2 - without desuperheaters		
Low (less than 17 EER)	269	0.05
High (17 EER and above)	443	0.21

## Climate Zone 3 – South Region

Ground Source Heat Pumps – Climate Zone 3		
Climate Zone 3 - with desuperheaters		
GSHP Efficiency	Energy savings [kWh/ton]	Demand savings [kW/ton]
Low (less than 17 EER)	1,030	0.52
High (17 EER and above)	1,114	0.50
Climate Zone 3 - without desuperheaters		
Low (less than 17 EER)	218	0.06
High (17 EER and above)	322	0.15

## Climate Zone 4 – Valley Region

Ground Source Heat Pumps – Climate Zone 4		
Climate Zone 4 - with desuperheaters		
GSHP Efficiency	Energy savings [kWh/ton]	Demand savings [kW/ton]
Low (less than 17 EER)	1,015	0.49
High (17 EER and above)	1,164	0.53
Climate Zone 4 - without desuperheaters		
Low (less than 17 EER)	194	0.08
High (17 EER and above)	291	0.12

## Window Air Conditioners

### Measure

The following deemed savings values would be applicable in calculating an incentive for a room air conditioner replaced with a higher efficiency room air conditioner in a dwelling occupied by a residential energy consumer. **Deemed savings for window air conditioners are only applicable to customers under the “hard-to-reach” template.**

### Baseline

Baseline is assumed to be a new air conditioning unit with an EER rating that meets current NAECA standard. Current NAECA EER standard varies from 8.5 to 9.8 depending on the type and capacity of unit. Minimum cooling capacity is 5,000 Btu/hour, and the maximum is 25,000 Btu/hour.

### Installation & Efficiency Standard

Units meeting current ENERGY STAR<sup>®</sup> specification qualify for incentive. This specification is 10% above the new NAECA standard for all categories.

## Deemed Savings

### Demand Savings (kW) – All Climate Zones

<b>Window Air Conditioners – Demand Savings, All Climate Zones</b>					
	Federal	10% Above	kW	15% Above	kW
Size (BTU/Hr)	Standard (EER)	Standard (EER)	Savings	Standard (EER)	Savings
Less than 6,000	9.7	10.7	0.054	11.2	0.078
6,000-7,999	9.7	10.7	0.058	11.2	0.083
8,000-13,999	9.8	10.8	0.111	11.3	0.160
14,000-19,999	9.7	10.7	0.150	11.2	0.215
20,000 and above	8.5	9.4	0.257	9.8	0.368

## Energy Savings (kWh)

### Climate Zone 1: Panhandle Region

<b>Window Air Conditioners – Energy Savings, Climate Zone 1</b>					
	Federal	10% Above	kWh	15% Above	kWh
Size (BTU/Hr)	Standard (EER)	Standard (EER)	Savings	Standard (EER)	Savings
Less than 6,000	9.7	10.7	51	11.2	73
6,000-7,999	9.7	10.7	54	11.2	78
8,000-13,999	9.8	10.8	104	11.3	149
14,000-19,999	9.7	10.7	140	11.2	201
20,000 and above	8.5	9.4	240	9.8	345

### Climate Zone 2: North Region

<b>Window Air Conditioners – Energy Savings, Climate Zone 2</b>					
	Federal	10% Above	kWh	15% Above	kWh
Size (BTU/Hr)	Standard (EER)	Standard (EER)	Savings	Standard (EER)	Savings
Less than 6,000	9.7	10.7	68	11.2	97
6,000-7,999	9.7	10.7	73	11.2	104
8,000-13,999	9.8	10.8	139	11.3	199
14,000-19,999	9.7	10.7	187	11.2	269
20,000 and above	8.5	9.4	320	9.8	460

### Climate Zone 3: South Region

<b>Window Air Conditioners – Energy Savings, Climate Zone 3</b>					
	Federal	10% Above	kWh	15% Above	kWh
Size (BTU/Hr)	Standard (EER)	Standard (EER)	Savings	Standard (EER)	Savings
Less than 6,000	9.7	10.7	93	11.2	134
6,000-7,999	9.7	10.7	100	11.2	143
8,000-13,999	9.8	10.8	191	11.3	274
14,000-19,999	9.7	10.7	257	11.2	369
20,000 and above	8.5	9.4	440	9.8	632

## Climate Zone 4: Valley Region

Window Air Conditioners – Energy Savings, Climate Zone 4					
	Federal	10% Above	kWh	15% Above	kWh
Size (BTU/Hr)	Standard (EER)	Standard (EER)	Savings	Standard (EER)	Savings
Less than 6,000	9.7	10.7	98	11.2	140
6,000-7,999	9.7	10.7	104	11.2	150
8,000-13,999	9.8	10.8	200	11.3	287
14,000-19,999	9.7	10.7	269	11.2	386
20,000 and above	8.5	9.4	460	9.8	661

## Split System and Single-Package Air Conditioners Between 65,000 BTU/H and 240,000 BTU/H

### Measure

The following deemed savings values could be used to calculate an incentive for replacing an existing central air conditioner with a premium efficiency central air conditioner through a standard offer program.

### Baseline

Baseline is assumed to be a new central air conditioning system with an EER of 8.9 for units up to 135,000 Btu/h, and 8.5 for units between 135,000 Btu/h and 240,000 Btu/h.

### Installation & Efficiency Standard

Minimum standard for units up to 135,000 Btu/h is 10.0 EER and 9.5 EER for units between 135,000 Btu/h and 240,000 Btu/h.

### Deemed Savings

#### Units greater than 65,000 Btu/h and less than 135,000 Btu/h

For units greater than 65,000 Btu/h and less than 135,000 Btu/h							
Zone 1		Zone 2		Zone 3		Zone 4	
kW per	kWh per	kW per	kWh per	kW per	kWh per	kW per	kWh per
EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton
0.10	202	0.10	309	0.11	392	0.11	440

#### Units greater than 135,000 Btu/h and less than 240,000 Btu/h

For units greater than 135,000 Btu/h and less than 240,000 Btu/h							
Zone 1		Zone 2		Zone 3		Zone 4	
kW per	kWh per	kW per	kWh per	kW per	kWh per	kW per	kWh per
EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton	EER-Ton
0.12	151	0.12	242	0.12	284	0.12	324

### *Deemed Savings Example*

New unit is a 10-ton package rooftop unit with an EER of 10.5 installed in Zone 2. Baseline EER is 8.9 for units less than 135,000 Btu/h.

From the table above, select deemed savings values of 0.10 kW/ton and 309 kWh/ton.

KW savings =  $0.10 * (\text{Unit EER} - \text{Baseline EER}) * \text{tons}$

KW savings =  $0.10 * (10.5 - 8.9) * 10 = 1.6 \text{ kW}$

KWh savings =  $309 * (\text{Unit EER} - \text{Baseline EER}) * \text{tons}$

KWh savings =  $309 * 1.6 * 10 = 4,944 \text{ kWh}$

## **Split System and Single Package Heat Pump Systems Between 65,000 BTU/H AND 240,000 BTU/H**

### **Measure**

The following tables provide annual heating kWh energy savings. Additional cooling savings are based on the heat pump's EER, and are the same values as for an air conditioning system of the same cooling capacity and EER. Please refer to the Split System and Single-Package Air Conditioning System Measure for those values.

Only installations which replace an existing split system or single package heat pump system or other electric heating system are eligible to receive this annual heating savings component of the deemed energy savings.

### **Baseline**

Baseline is assumed to be a new rooftop package or split system heat pump system. For units with cooling capacities between 65,000 Btu/h and 135,000 Btu/h, the baseline is a coefficient of performance (COP) of 3.0 (current ASHRAE 90.1 standard). For units with cooling capacities between 135,000 Btu/h and 240,000 Btu/h, the baseline is a coefficient of performance (COP) of 2.9 (current ASHRAE 90.1 standard).

### **Installation & Efficiency Standard**

For units with cooling capacities between 65,000 Btu/h and 135,000 Btu/h, there are two efficiency levels for which deemed energy savings have been calculated:

- 3.2 is ASHRAE 90.1-1999 / Consortium for Energy Efficiency (CEE) Tier 1 Standard.
- 3.4 is ASHRAE 90.1-1999 / CEE Tier 2 Standard.

For units with cooling capacities between 135,000 Btu/h and 240,000 Btu/h, the two efficiency levels for which deemed energy savings have been calculated are as follows:

- 3.1 is ASHRAE 90.1-1999 / Consortium for Energy Efficiency (CEE) Tier 1 Standard.
- 3.3 is ASHRAE 90.1-1999 / CEE Tier 2 Standard.

## Deemed Savings – Heating

### Energy Savings

#### Units greater than 65,000 Btu/h and less than 135,000 Btu/h

##### Annual Heating Savings:

For units greater than 65,000 Btu/h and less than 135,000 Btu/h				
	Zone 1	Zone 2	Zone 3	Zone 4
COP	kWh per Ton	kWh per Ton	kWh per Ton	kWh per Ton
3.2	342	121	53	38
3.4	674	232	101	72

Ton = Cooling Ton

#### Units greater than 135,000 Btu/h and less than 240,000 Btu/h

##### Annual Heating Savings:

For units greater than 135,000 Btu/h and less than 240,000 Btu/h				
	Zone 1	Zone 2	Zone 3	Zone 4
COP	kWh per Ton	kWh per Ton	kWh per Ton	kWh per Ton
3.1	372	79	30	20
3.3	730	132	58	39

Ton = Cooling Ton

### Demand Savings

For this measure, the deemed kW savings are based on the heat pump's EER, and are the same values as for a split system or single-package air conditioning system of the same capacity and EER. Please refer to the Split System and Single-Package Air Conditioning System Measure for those values.

## Ceiling Insulation

### Measure

Ceiling insulation savings are per square foot of treated ceiling area above a conditioned space. Ceiling insulation must be added only to homes with electric air conditioning or HTR homes with evaporative cooling systems to qualify for these deemed savings values.

### Baseline

In existing construction, ceiling insulation levels vary greatly depending on the age of the home, type of insulation, and activity in the attic (such as using the attic for storage and HVAC equipment). Deemed savings tables are based on the current level of ceiling insulation in the home from R-0 to R-22. The current insulation level of each home will be determined and documented by the insulation installer. Degradation due to age and density of the existing insulation should be taken into account.

In the event that existing insulation is or has been removed, the existing R-value will be based upon the R-value of the existing insulation prior to removal.

## Installation & Efficiency Standard

A ceiling insulation level of R-30 is recommended throughout Texas as prescribed by DOE. The combined R-values of the existing insulation and the insulation being added will total at least R-30. The R-value of the existing insulation can be no greater than R-22.

### Deemed Savings

Climate Zone 1 - Panhandle Region					
Ceiling Insulation					
	kWh Savings	kWh Savings	kWh Savings	Summer Peak kW Savings	
Ceiling Insulation Base R-value	Gas Heat	Electric Heat	Heat Pump	Gas Heat & Electric Heat	Heat Pump
	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)
R-0	0.86	9.99	5.04	0.000973	0.000973
R-1 to R-4	0.52	6.43	3.14	0.000608	0.000622
R-5 to R-8	0.24	3.19	1.48	0.000297	0.000311
R-9 to R-14	0.11	1.67	0.76	0.000153	0.000153
R-15 to R-22	0.05	0.71	0.31	0.000068	0.000074

Climate Zone 2 - North Region					
Ceiling Insulation					
	kWh Savings	kWh Savings	kWh Savings	Summer Peak kW Savings	
Ceiling Insulation Base R-value	Gas Heat	Electric Heat	Heat Pump	Gas Heat & Electric Heat	Heat Pump
	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)
R-0	1.22	6.71	3.16	0.001027	0.001027
R-1 to R-4	0.79	4.32	2.07	0.000622	0.000662
R-5 to R-8	0.40	2.15	1.04	0.000297	0.000311
R-9 to R-14	0.21	1.13	0.54	0.000153	0.000162
R-15 to R-22	0.09	0.47	0.23	0.000074	0.000074

<b>Climate Zone 3 - South Region</b>					
Ceiling Insulation					
	kWh Savings	kWh Savings	kWh Savings	Summer Peak kW Savings	
Ceiling Insulation Base R-value	Gas Heat	Electric Heat	Heat Pump	Gas Heat & Electric Heat	Heat Pump
	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)
R-0	1.00	4.40	2.14	0.000973	0.000973
R-1 to R-4	0.64	2.81	1.40	0.000608	0.000622
R-5 to R-8	0.32	1.38	0.70	0.000297	0.000297
R-9 to R-14	0.17	0.72	0.36	0.000153	0.000153
R-15 to R-22	0.07	0.30	0.15	0.000074	0.000074

<b>Climate Zone 4 - Valley Region</b>					
Ceiling Insulation					
	kWh Savings	kWh Savings	kWh Savings	Summer Peak kW Savings	
Ceiling Insulation Base R-value	Gas Heat	Electric Heat	Heat Pump	Gas Heat & Electric Heat	Heat Pump
	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)	(per sq. ft.)
R-0	1.30	3.64	2.10	0.001027	0.001027
R-1 to R-4	0.85	2.33	1.39	0.000622	0.000649
R-5 to R-8	0.44	1.15	0.70	0.000284	0.000297
R-9 to R-14	0.23	0.60	0.37	0.000135	0.000153
R-15 to R-22	0.10	0.25	0.15	0.000068	0.000074

## Wall Insulation

### Measure

Wall insulation savings are per square foot of treated wall area (gross wall area less window and door area), and are based on R-0 increased to R-13. Wall insulation must be added only to homes with electric air conditioning or HTR homes with evaporative cooling systems to qualify for these deemed savings values.

### Baseline

The baseline is considered to be a house with no wall insulation in the 4” wall cavity.

### Installation & Efficiency Standard

The standard throughout Texas for adding wall insulation to an existing wall cavity is R-13, as prescribed by United States Department of Energy (DOE) and Texas Department of Housing and

Community Affairs (TDHCA) programs. To qualify for the incentive, there must be no existing wall insulation.

Under the Hard-To-Reach template, wall insulation reduces the ventilation rate in the home and therefore a post-installation blower door test must be conducted. Results must comply with the Minimum Final Ventilation Rate table found in the Air Infiltration section of this document.

## Deemed Savings

### Climate Zone 1: Panhandle Region

Wall Insulation – Climate Zone 1				
Electric A/C Gas Heat kWh Savings per sq. ft.	Electric A/C Electric Heat kWh Savings per sq. ft.	Electric A/C Heat Pump kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	
			Gas Heat & Electric Heat	Heat Pump
0.33586	11.014	6.496	0.0005892	0.0005892

### Climate Zone 2: North Region

Wall Insulation – Climate Zone 2				
Electric A/C Gas Heat kWh Savings per sq. ft.	Electric A/C Electric Heat kWh Savings per sq. ft.	Electric A/C Heat Pump kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	
			Gas Heat & Electric Heat	Heat Pump
0.45875	7.043	2.990	0.0007576	0.0008418

### Climate Zone 3: South Region

Wall Insulation – Climate Zone 3				
Electric A/C Gas Heat kWh Savings per sq. ft.	Electric A/C Electric Heat kWh Savings per sq. ft.	Electric A/C Heat Pump kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	
			Gas Heat & Electric Heat	Heat Pump
0.24242	4.529	1.726	0.0006734	0.0006734

### Climate Zone 4: Valley Region

Wall Insulation – Climate Zone 4				
Electric A/C Gas Heat kWh Savings per sq. ft.	Electric A/C Electric Heat kWh Savings per sq. ft.	Electric A/C Heat Pump kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	
			Gas Heat & Electric Heat	Heat Pump
0.28199	3.273	1.310	0.0007576	0.0007576

## Floor Insulation

### Measure

Floor insulation savings are per square foot of treated floor area above a non-conditioned space. Floor insulation must be added only to existing homes with electric air conditioning or HTR homes with evaporative cooling systems to qualify for these deemed savings values.

### Baseline

The baseline is considered to be a house with pier and beam construction and no floor insulation against the floor of conditioned area.

### Installation & Efficiency Standard

A floor insulation level of R-19 is recommended for site-built homes throughout Texas as prescribed by DOE and TDHCA programs. To qualify for the incentive, there must be no existing floor insulation. Batt insulation is recommended in most cases and must have the vapor barrier installed facing up and against the floor or conditioned area. Insulation should be attached or secured so that it remains in place for at least 10 years.

Typical floor construction depth of manufactured homes usually does not allow R-19 batt to be installed within the floor joists so R-15 loose-fill insulation is recommended by TDHCA.

A minimum of 24” clearance from bottom of the insulation to the ground is required by Occupational Safety and Health Association (OSHA).

### Deemed Savings

#### Climate Zone 1: Panhandle Region

Floor Insulation - Climate Zone 1				
Electric A/C And Heating Type	Site Built Home		Manufactured Home	
	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.
Gas Heat	No Savings	0.000216	No Savings	0.000199
Electric Heat	5.00054	0.000216	4.98271	0.000199
Heat Pump	2.59838	0.000216	2.51197	0.000266

## Climate Zone 2: North Region

Floor Insulation - Climate Zone 2				
Electric A/C And Heating Type	Site Built Home		Manufactured Home	
	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.
Gas Heat	0.06486	0.000270	0.03457	0.000266
Electric Heat	2.93189	0.000270	2.90027	0.000266
Heat Pump	1.11730	0.000270	1.09707	0.000266

## Climate Zone 3: South Region

Floor Insulation - Climate Zone 3				
Electric A/C And Heating Type	Site Built Home		Manufactured Home	
	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.
Gas Heat	No Savings	0.000216	No Savings	0.000266
Electric Heat	1.70757	0.000216	1.65891	0.000266
Heat Pump	0.58324	0.000216	0.55718	0.000266

## Climate Zone 4: Valley Region

Floor Insulation - Climate Zone 4				
Electric A/C And Heating Type	Site Built Home		Manufactured Home	
	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.	kWh Savings per sq. ft.	Summer Peak kW Savings per sq. ft.
Gas Heat	0.02378	0.000270	No Savings	0.000266
Electric Heat	1.16649	0.000270	1.12832	0.000266
Heat Pump	0.42757	0.000270	0.40359	0.000266

## Energy Star® Windows

### Measure

ENERGY STAR® windows savings are per square foot of window, inclusive of frame and sash. Windows must be installed only in homes with electric air conditioning or HTR homes with evaporative cooling systems to qualify for these deemed savings values.

### Baseline

The baseline is a double-glazed (i.e., double-pane), clear window with an aluminum frame, with a U-factor of 0.87, a solar heat gain coefficient (SHGC) of 0.66, and air infiltration of 1 cfm/ft<sup>2</sup>.

## Installation & Efficiency Standard

For a window to qualify for these deemed savings, it must meet ENERGY STAR<sup>®</sup> criteria anywhere in the state, it must have a U-factor less than or equal to 0.40 and a Solar Heat Gain Coefficient (SHGC) less than or equal to 0.40.

## Deemed Savings

ENERGY STAR <sup>®</sup> WINDOWS		
	kWh Savings per sq. ft.	kW Savings per sq. ft.
Climate Zone 1: Panhandle Region		
Installed in home with non-electric heating	2.68	0.0033
Installed in home with electric resistance heating	9.50	0.0033
Installed in home with heat pump	6.85	0.0033
Climate Zone 2: North Region		
Installed in home with non-electric heating	3.46	0.0028
Installed in home with electric resistance heating	6.88	0.0028
Installed in home with heat pump	5.27	0.0028
Climate Zone 3: South Region		
Installed in home with non-electric heating	3.81	0.0024
Installed in home with electric resistance heating	6.48	0.0024
Installed in home with heat pump	5.26	0.0024
Climate Zone 4: Valley Region		
Installed in home with non-electric heating	4.72	0.0027
Installed in home with electric resistance heating	6.06	0.0027
Installed in home with heat pump	5.35	0.0027

## Air Infiltration

### Measure

This measure reduces air infiltration into the residence, using pre- and post-treatment blower door air pressure readings to confirm air leakage reduction. Homes treated for air infiltration reduction must have electric air conditioning to qualify for these deemed savings values.

Blower door air pressure measurements will also be used to ensure that air infiltration in a residence shall not be less than the standards set forth in the following table:

### Minimum Final Ventilation Rate\*

Shielding	Number of Stories		
	Single Story	Two Story	3 or More Stories
Well shielded	1.18	0.95	0.83
Normal	0.99	0.79	0.69
Exposed	0.89	0.71	0.62

\* Measured in cubic feet per minute at 50 Pascal per square foot of conditioned area.

Well Shielded is defined as urban areas with high buildings or sheltered areas, and building surrounded by trees, bermed earth, or higher terrain.

Normal is defined as buildings in a residential neighborhood or subdivision setting, with yard space between buildings. 80-90% of houses fall in this category.

Exposed is defined as buildings in an open setting with few buildings or trees around and buildings on top of a hill or ocean front, exposed to winds.

As an example, the minimum post-installation air exchange rate for an 1800 square foot, one-story home with normal shielding is 1782 CFM<sub>50</sub> (1800 x 0.99). In order to qualify for the air infiltration control deemed savings, there must be a minimum 10% reduction between the pre- and post-installation ventilation rate. Therefore, the pre-installation ventilation rate must be at least 1960 CFM<sub>50</sub> (1782 x 110%) in order to be considered for air infiltration control measures.

### Baseline

For residential dwellings, the winter/summer air change per hour (ACH) differential was derived from ESPRE model weather data for the Panhandle (Amarillo weather), North (Dallas weather), South (Houston weather), and Valley (Corpus Christi weather) climate zones. Electric air conditioning was assumed for all homes, with gas, electric or heat pump heating.

Air Infiltration Values (ACH)		
Region	Winter ACH	Summer ACH
Panhandle	1.25	0.96
North	0.94	0.49
South	0.86	0.54
Valley	0.95	0.94

### Installation & Efficiency Standard

To qualify for an incentive, a minimum air leakage reduction of 10% of the pre-installation reading is required. Utilities may require competency testing of personnel who will perform the blower door tests.

There is an upper limit of 4.00 CFM<sub>50</sub> per square foot of house floor area for the pre-retrofit infiltration rate on eligible projects.

## Deemed Savings

The following formula shall be used to calculate deemed savings for infiltration efficiency improvements. The formula applies to Residential and Hard-to-Reach single family and multifamily dwellings, and to all building heights and shielding factors. Only structures with electric refrigerated air conditioning systems are eligible.

Deemed Savings:  $CFM_{50} * V$

Where:

$CFM_{50}$  = Air infiltration reduction in Cubic Feet per Minute at 50 Pascal

V = the corresponding value in the following table:

Region	KWh Impact per CFM <sub>50</sub> Reduction			KW Impact per CFM <sub>50</sub> Reduction
	Gas Heat	Resistance Heat	Heat Pump Heat	
Panhandle	0.1262	1.6673	0.7933	0.00024
North	0.1929	1.0565	0.5046	0.00019
South	0.2694	0.7945	0.4438	0.00026
Valley	0.6268	0.9732	0.7368	0.00043

## Solar Screens

### Measure

**This measure is for customers with electric air conditioning or evaporative cooling under the Hard-To-Reach Program template.** Solar screen must be installed on windows facing predominately east or west and receive significant direct sun exposure. Solar screens that block at least 65% of the solar heat gain qualify for deemed savings. Deemed savings are per square foot of window or door opening.

### Baseline

The baseline prototype home modeled is similar to other deemed savings models and is 1,850 ft<sup>2</sup> with window area equal to 10.2% of the floor area. This proportion represents window area equal to approximately 14% of the wall area. The base SHGC is 0.75 representing the average from RESFEN<sup>1</sup> (0.76) and the NFRC<sup>2</sup> 900 (0.74) database for a single pane, clear glass window with an aluminum frame. This includes a factor to represent statistically average solar gain reduction for a generic house from overhangs, trees, obstructions, adjacent buildings, insect screen, interior shades, dirt on glass pane, etc.

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<sup>1</sup> Residential Fenestration software for calculating heating and cooling energy use in residential buildings.

<sup>2</sup> National Fenestration Research Council.

## Installation & Efficiency Standard

To qualify for solar screen deemed savings, windows must be facing predominately east or west and receive significant direct sun exposure. Solar screen material must reduce solar heat gain by at least 65%.

### Deemed Savings

Solar Screens				
Weather Zone	Electric AC Gas Heat Avg. kWh Savings per sq. ft.	Electric AC Electric Heat Avg. kWh Savings per sq. ft.	Electric AC Heat Pump Avg. kWh Savings per sq. ft.	Summer Peak Avg. kW Savings per sq. ft.
1	4.22938	0.45208	1.91859	0.000954
2	5.18338	2.08937	3.54039	0.002438
3	5.82998	3.78803	4.72758	0.001590
4	7.03837	6.23033	6.65677	0.002756

## DUCT EFFICIENCY IMPROVEMENT

### Measure

These deemed savings values are applicable to measures which seal leaks in supply and return ducts and repair or reinsulate ducts of existing homes and small commercial converted residences that have central electric air conditioning or heat pumps.

AEP will employ the following procedure to ensure that savings result from the duct efficiency measure. AEP may establish other requirements to ensure that savings result from the measure.

- To ensure that the deemed savings are an accurate reflection of the program's impacts, pre-retrofit leakage rates shall be limited to 35% of total fan flow<sup>3</sup> for the purposes of the savings calculation. Higher pre-retrofit leakage rates may be submitted, but savings calculations used to determine incentive payments will never use more than a 35% pre-retrofit leakage rate.
- When a majority of the supply and return is in an unconditioned space, AEP may inspect for adequate treatment, or may conduct a standard (e.g., Duct Blaster™) leakage test to verify that the total duct leakage does not exceed the applicable maximum post-installation leakage rate taken from the following table. See following definitions of "conditioned space" and "majority."
- When a majority of ducts and returns are in a conditioned space (as defined herein), or it cannot be determined that a majority of ducts and returns are in an

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<sup>3</sup>Engineering calculations show that the interior temperatures in a home with 35% duct leakage would be above 80 degrees. This is well above the "thermally acceptable" comfort levels published by ASHRAE in their 2009 Fundamentals publication. Homeowners would likely take steps to remedy the situation independent of the program long before it reaches these leakage levels. To ensure that the deemed savings are an accurate reflection of the program's impacts, duct efficiency improvements in the Standard Offer Programs target scenarios where, absent the program, leakage conditions are likely to persist unaddressed for several years. Data from nearly 28,000 single-family and mobile home duct blaster tests conducted for duct efficiency improvements in Texas between 2003 and 2006 shows that more than 70% of all pre-retrofit leakage rates (one standard deviation) fall below 38% total leakage, which would equate to a leakage-to-outside leakage rate of well below 35%.

unconditioned space, the measure is not applicable, unless the Project Sponsor documents pre- and post-installation leakage-to-outside rates, via testing conducted and documented in accordance with one of the procedures laid out below. AEP may inspect for adequate treatment, or may conduct standard leakage-to-outside tests to verify that the leakage rate from unconditioned space does not deviate from the reported post-installation leakage rate. See the following definitions of “unconditioned space,” and “leakage-to-outside tests.”

**Definitions:**

**Unconditioned space:** space within a building that is not conditioned space. See ASHRAE 90.2-2001 (Low-Rise Residential) or 90.1-1999 (Buildings Except Residential Low Rise). The definitions set forth below assume the structure meets the definition of a low-rise residential building as set forth in the ASHRAE Standard 90.2-2001 Scope (Section 2). ASHRAE Standard 90.1-1999 will be used for commercial applications.

**Conditioned Space:** cooled space, heated space, or indirectly conditioned space:

**Cooled space:** enclosed space within a building that is cooled by a cooling system whose sensible capacity exceeds 5 Btu/(h·ft<sup>2</sup>) or is capable of maintaining a space drybulb temperature of 90°F or less at design cooling conditions.

**Heated space:** enclosed space within a building that is heated by a heating system whose output capacity exceeds 10 Btu/(h·ft<sup>2</sup>) or is capable of maintaining a space drybulb temperature of 50°F or more at design heating conditions.

**Indirectly conditioned space:** enclosed space within a building that is not heated or cooled space, whose area-weighted heat transfer coefficient to heated or cooled space exceeds that to the outdoors or to unconditioned space, or through which air from heated or cooled space is transferred at a rate exceeding three air changes per hour (see heated space and cooled space).

**Majority: For purposes of determining majority of treated ducts and returns, the proportion of surface area of plenums and ducts located in an unconditioned space shall exceed 50% of the total surface area of all ducts and plenums. Examples of systems in conditioned versus unconditioned space are provided below. These examples are not inclusive.**

Single-family dwellings (defined as dwelling units in buildings with fewer than 3 dwelling units) can be treated without pre-qualification by AEP. Regardless of pre-qualification, AEP will not pay incentives for installations that do not meet the standards as described herein.

Multifamily units (defined as buildings with 3 or more dwelling units), must be pre-qualified for installation. Prior to beginning installation, Project Sponsor must contact AEP with a property description. AEP may pre-qualify, or may require AEP’s site inspection in order to determine eligibility. Regardless of pre-qualification, AEP will not pay incentives for installations that do not meet the standards as described herein.

### **Examples of Systems in Conditioned and Unconditioned Spaces**

The following examples are intended to illustrate some of the situations that will be found in the field. It is not all-inclusive.

Return/evaporator is in a closet with ceiling. The entire enclosure is considered conditioned space. This is a common installation in older homes in which central air was a post-construction retrofit, but is also utilized in new construction.

Duct is contained within, or consists of, a stud-cavity, joist cavity, or enclosed chase; evaporator is in the attic. The portion of the duct within the cavity is located within a conditioned space.

Return/evaporator in a sealed closet without ceiling that is left open to supply combustion air for a gas/propane furnace. The entire closet is considered unconditioned space.

Supply ducts are within a furr-down. This is considered indirectly conditioned space.

Supply ducts within an attic separated from the conditioned space by an insulated ceiling. This is considered an unconditioned space.

Supply ducts within an attic with finished floor, insulated roof and openings to the conditioned space. This is considered an indirectly conditioned space.

Return or supply ducts located in joist cavity in a floor over a crawlspace. If the floor under the ducts (the crawlspace ceiling) is insulated, the ducts are in a conditioned space. If the floor and walls of the crawlspace are insulated and sealed, the ducts are in a conditioned space. If the floor, walls and ceiling of the crawlspace are uninsulated, the ducts are located in an unconditioned space.

### **Baseline**

This measure uses the leakage rate of the existing duct system, as measured by a pre-retrofit duct pressurization test, as its baseline. The pre-retrofit leakage rate is a user input to the deemed savings calculation methodology. To ensure that the accuracy of savings estimates, the pre-retrofit leakage rate used to perform the savings calculation is limited to 35% of total fan flow.

### **Installation & Efficiency Standard**

Materials used should be long-lasting materials, e.g., mastics, tape-applied mastics, foil tape, and/or aerosol-based sealants, to reduce total leakage rates to less than 10% of total air handler fan flow, verified by post-retrofit duct pressurization test.

Under the Hard-To-Reach template, duct efficiency improvements reduce the ventilation rate in the home and therefore a post-installation blower door test must be conducted. Results must comply with the Minimum Final Ventilation Rate table found in the Air Infiltration section of this document.

### **Duct Leakage Testing**

Measurements to determine pre-installation and post-installation leakage rates must be performed in accordance with AEP-approved procedures. In applications where a majority of the ducts is in an unconditioned space, the most commonly-used acceptable test method is the Duct Blaster™ (or equivalent) total duct leakage test. Other tests may be accepted at AEP sole option.

In applications where duct leakage to outside must be directly measured, the Project Sponsor may use one of several methods, including the blower door subtraction method, the combination duct

blaster (or equivalent) and blower door, or the Delta Q method. Other tests may be accepted at AEP sole option.

Prior to beginning any installations, the Project Sponsor must submit the intended method(s) and may be required to provide AEP with evidence of competency.

Leakage rates must be measured and reported at the average air distribution system operating pressure.

### **Deemed Savings**

Duct efficiency improvement project savings are calculated using the values from the *Addendum A: Duct Deemed Savings Lookup Tables* below and the achieved Distribution System Efficiency (DSE) improvements as calculated by *ANSI/ASHRAE Standard 152-2004: Method of Test for Determining the Design and Seasonal Efficiencies of Residential Thermal Distribution Systems* (hereinafter “ASHRAE 152”).

There are 300 different sets of deemed savings values presented in the *Addendum A: Duct Deemed Savings Lookup Tables*. The different sets of values take into account variations in weather location, building type, foundation type, and air handler location.

In order to simplify this calculation process for practical use in a demand side management (DSM) program and to ensure that calculations are done in a consistent manner, online and stand-alone spreadsheet tools (Texas Duct Efficiency Helper) have been developed that perform the ASHRAE 152 calculations, automatically select the applicable deemed savings values from the *Addendum A: Duct Deemed Savings Lookup Tables*, and return the project savings results.

### **Estimated Useful Life (EUL)**

The average lifetime of this measure is 18 years per the Commission-approved EUL values.

## **Water Heater Replacements – High Efficiency and Fuel Substitution**

### **Measure**

Water heating values are on a per-unit basis. Deemed savings variables include tank volume and installed-unit energy factor as rated in the Gas Appliance Manufacturers Association Directory of Certified Water Heating Products. The following table presents the energy savings for high efficiency electric water heaters meeting the required standards (based on tank size and final Energy Factor (EF)).

### **Baseline**

The baseline for electric and gas water heaters is the DOE energy efficiency standard (10 CFR Part 430). The method for calculating standards compliance is:

Electric:	$0.93 - 0.00132 * \text{volume}$
Gas:	$0.62 - 0.0019 * \text{volume}$

### **Efficiency Standard**

The efficiency threshold for new water heaters is 4% above baseline.

## Deemed Savings

### Energy Savings - Electric Water Heater Replacements

<b>Electric Water Heater Replacements - Energy Savings</b>			
Approximate Volume (gal) ->	80	50	30
Baseline (DOE Standard) EF	0.82	0.86	0.89
Minimum EF for Incentive Qualification	kWh Savings	kWh Savings	kWh Savings
0.86	150	NAP	NAP
0.87	190	NAP	NAP
0.88	229	NAP	NAP
0.89	267	NAP	NAP
0.90	304	138	NAP
0.91	341	175	NAP
0.92	377	210	NAP
0.93	411	245	143
0.94	446	280	177
0.95	479	313	210

### Energy Savings - Gas Water Heater Replacements

The following table presents the energy savings for high efficiency gas water heaters replacing an electric unit.

<b>Gas Water Heater Replacements - Energy Savings</b>			
Approximate Volume (gal) ER->	80	52	30
Approximate Volume (gal) Gas->	50	40	30
Federal Standard EF	0.53	0.54	0.56
4% Improvement	0.55	0.56	0.57
Annual Therms	163	160	157
Gas equivalent kWh	1,554	1,526	1,499
kWh Savings (Base less gas equivalent)	2,070	1,932	1,856

## Demand Savings

The following table presents the demand savings for high efficiency electric or fuel-substitution units.

<b>Electric Water Heater Replacements - Demand Savings</b>			
Approximate Volume (gal)->	80	50	30
Standard EF	0.82	0.86	0.89
Minimum EF for Incentive Qualification			
0.86	0.01	NAP	NAP
0.87	0.02	NAP	NAP
0.88	0.02	NAP	NAP
0.89	0.02	NAP	NAP
0.9	0.03	0.01	NAP
0.91	0.03	0.02	NAP
0.92	0.03	0.02	NAP
0.93	0.04	0.02	0.01
0.94	0.04	0.02	0.02
0.95	0.04	0.03	0.02
All Gas Units Meeting the Gas Standards (above)	0.42	0.42	0.42

## HEAT PUMP WATER HEATERS (RESIDENTIAL)

### Measure

This document presents the deemed savings methodology for the installation of heat pump water heaters (HPWH) in lieu of standard electric storage water heaters (EWH). The water heating values are on a per-unit basis. Deemed savings variables include tank volume and installed unit energy factor (EF). In addition, this measure accounts for the interactive air-conditioning energy savings and heating penalty associated with the HPWH. This measure applies to residential, electric, storage-type water heaters with storage capacities between 40 and 80 gallons, with maximum energy input of 4.5 kilowatts. Units with maximum energy input over 4.5 kW are ineligible. This measure will apply to existing homes and new construction.

### Baseline

The baseline condition is an electric storage water heater. The baseline efficiency is based on the Department of Energy (DOE) energy efficiency standard, as published in 10 CFR Part 430 of the Federal Register:<sup>4</sup>

<sup>4</sup> 10 CFR Part 430. Energy Conservation Program: Energy Conservation Standards for Residential Water Heaters, Direct Heating Equipment, and Pool Heaters; Final Rule. Online. Available: [http://www1.eere.energy.gov/buildings/appliance\\_standards/residential/pdfs/htgp\\_finalrule\\_fedreg.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/htgp_finalrule_fedreg.pdf). Accessed July 2011.

$$\text{ENERGY FACTOR}_{\text{BASE}} = 0.97 - 0.00132 \times \text{RATED STORAGE VOLUME (GAL)}$$

## Efficiency Standard

The efficient condition (i.e. equipment eligible to receive an incentive through a program) is a heat pump water heater that meets ENERGY STAR qualifications.<sup>5</sup> A base energy factor (EF) of 2.2 is used to develop the efficient condition. This EF is the average efficiency of Energy Star HPWHs as of June 2011. Since the HPWH's performance is climate specific, the base EF is adjusted according to the following factors: climate zone, ambient temperature, water heater location, and entering water temperature.

## Deemed Savings Methodology

The key variables that influence estimated savings are the hot water consumption in gallons (vol.), entering water temperature ( $T_{in}$ ), storage tank set point ( $T_{tank}$ ), and energy factor (EF). Typical hot water consumption is estimated using NREL equations relating the number of bedrooms in a home to residential hot water end uses.<sup>6</sup> The entering water temperature was adjusted based on climate zone and average annual ambient temperatures. The storage tank set point is set at a constant of 120°F based on manufacturer recommendations. The base efficiency ( $EF_{\text{Base}}$ ) is based on DOE Federal Standards. The efficient condition efficiency ( $EF_{\text{HPWH}}$ ) is based on market data and adjusted according to the climate zone's ambient temperatures and entering water temperatures. The deemed savings also account for interactive air-conditioning effects associated with the HPWH when located inside conditioned space.

## Deemed Savings Tables

Deemed savings are developed for heat pump water heaters in four size ranges: 40-49 gallon, 50-59 gallons, 60-79 gallons, and 80 or more gallon sizes. These sizes correspond to the four basic sizes of HPWHs commercially available at the time these deemed savings were developed, according to review of manufacturer data provided on the Energy Star and AHRI websites. Tables 1 through 8 present the deemed saving tables for five Texas climate zones.

### Climate Zone 1: Amarillo, TX - Residential HPWH Deemed Annual Energy Savings (kWh)

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	Gas	1,318	1,598	1,914	2,253
	Heat Pump	956	1,227	1,536	1,867
	Elec. Resistance	559	822	1,122	1,444
Unconditioned Space	All	1,183	1,455	1,764	2,095

### Climate Zone 1: Amarillo, TX - Residential HPWH Deemed Demand Savings (kW)

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	All	0.17	0.2	0.24	0.27
Unconditioned Space	All	0.13	0.17	0.2	0.24

<sup>5</sup>ENERGY STAR Requirements (as of Jan-2011) - HPWH must have a maximum current rating of 24 amperes, voltage no greater than 250 volts, and a transfer of thermal energy from one temperature to a higher temperature level for the purpose of heating water. Unit must have "integrated" or "drop-in" configuration. EF >= 2.0, first-hour rating (FHR) >= 50 gal/hr, Warranty >= 6 yrs on sealed systems, Safety UL 174 & UL 1995.

<sup>6</sup>R. Hendron et al. "Development of an Energy Savings Benchmark for All Residential End-Uses." Online. Available: <http://www.nrel.gov/docs/fy04osti/35917.pdf>. Pg. 2.

**Climate Zone 2: Dallas, TX - Residential HPWH Deemed Annual Energy Savings (kWh)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	Gas	1,119	1,346	1,603	1,878
	Heat Pump	864	1,086	1,338	1,608
	Elec. Resistance	584	801	1,048	1,312
Unconditioned Space	All	985	1,210	1,466	1,739

**Climate Zone 2: Dallas, TX - Residential HPWH Deemed Demand Savings (kW)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	All	0.13	0.15	0.18	0.2
Unconditioned Space	All	0.1	0.12	0.15	0.17

**Climate Zone 3: Houston, TX - Residential HPWH Deemed Annual Energy Savings (kWh)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	Gas	1,094	1,304	1,542	1,796
	Heat Pump	891	1,097	1,331	1,581
	Elec. Resistance	669	871	1,101	1,347
Unconditioned Space	All	925	1,136	1,375	1,630

**Climate Zone 3: Houston, TX - Residential HPWH Deemed Demand Savings (kW)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	All	0.13	0.15	0.17	0.2
Unconditioned Space	All	0.09	0.12	0.14	0.17

**Climate Zone 4: Corpus Christi, TX - Residential HPWH Deemed Annual Energy Savings (kWh)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	Gas	1,065	1,262	1,485	1,723
	Heat Pump	914	1,109	1,329	1,565
	Elec. Resistance	750	942	1,159	1,392
Unconditioned Space	All	868	1,066	1,289	1,528

**Climate Zone 4: Corpus Christi, TX - Residential HPWH Deemed Demand Savings (kW)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	All	0.12	0.14	0.16	0.19
Unconditioned Space	All	0.09	0.11	0.13	0.16

**Climate Zone 5: El Paso, TX - Residential HPWH Deemed Annual Energy Savings (kWh)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	Gas	1,152	1,387	1,653	1,938
	Heat Pump	897	1,127	1,387	1,667
	Elec. Resistance	617	842	1,097	1,371
Unconditioned Space	All	1,018	1,251	1,516	1,799

**Climate Zone 5: El Paso, TX – Residential HPWH Deemed Demand Savings (kW)**

Water Heater Location	Heating Type	HPWH Tank Size Range, Gallons			
		40-49	50-59	60-79	80 and above
Conditioned Space	All	0.14	0.16	0.19	0.22
Unconditioned Space	All	0.11	0.13	0.16	0.19

**Estimated Useful Life (EUL)**

The estimated useful life (EUL) for this measure is 10 years. This EUL is consistent with the judgment of the California Energy Commission (CEC) as listed in the 2008 Database for Energy Efficiency Resources (DEER).

**Water Heater Jackets**

**Measure**

Water heater jackets must have an R-value of at least R-6.7 and must be installed on electric water heaters. These estimates apply to all weather regions.

**Baseline**

Baseline is assumed to be the post-1991, storage-type, electric resistance water heater, with no water heater jacket.

**Installation & Efficiency Standard**

Water heater jackets must have an R-value of at least R-6.7 and must be installed on electric water heaters. Manufacturer’s instructions of the water heater jacket and the water heater itself should be followed. Thermostat and heating element access panels must be left uncovered.

**Deemed Savings**

Water Heater Jacket	
KWh Savings per home	Peak kW Savings per home
100	0.010

## Water Heater Pipe Insulation

### Measure

Water heater pipe insulation must have a minimum thickness of 3/4". Water heaters plumbed with heat traps are not eligible to receive incentives for this measure. The pipe insulation must be installed in a home with electric water heating in order to qualify for an incentive.

### Baseline

Baseline is assumed to be the typical electric water heater with no heat traps and no insulation on water heater pipes.

### Installation & Efficiency Standard

Water heater pipe insulation must have a minimum thickness of 3/4". All hot and cold vertical lengths of pipe should be insulated, plus the initial length of horizontal hot and cold water pipe, up to three feet from the transition, or until wall penetration, whichever is less.

### Deemed Savings

Water Heater Pipe Insulation	
KWh Savings per home	Peak kW Savings per home
40	0.004

## Low-flow Showerheads

### Measure

**Low-flow showerheads are only eligible in the Hard-To-Reach SOP.** Showerhead savings are per household and for retrofit installations only.

The retrofit low-flow showerhead installation must have a rated flow of no more than 2.0 gallons per minute (gpm) and removal of the existing showerhead with a rated flow of no less than 2.5 gpm.<sup>7</sup> The source of the heated water flowing through the showerhead must be an electric water heater. These estimates apply to all weather regions.

### Baseline

The baseline average flow rate of existing stock of showerheads is assumed to be 2.5 gpm.

### Installation & Efficiency Standard

The incentive is for residential, retrofit-only installation of existing showerhead(s) with a pre-installation flow rate of no less than 2.5 gpm. Existing showerheads that have been defaced so as to make the flow rating illegible are not eligible for replacement.

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<sup>7</sup> All flow rate requirements listed here are the rated flow of the showerhead measured at 80 pounds per square inch of pressure (psi).

Replacement showerheads shall have a rated flow of no more than 2.0 gpm. Only showerheads that are not easily modified to increase flow rate shall be allowed.

All showerheads removed shall be collected by Project Sponsor and submitted to the utility with each project implementation report.

The showerhead must be installed in a home with electric water heating in order to qualify for an incentive.

## Deemed Savings

Low Flow Showerheads	
KWh Savings per home	Peak kW Savings per home
186	0.022

Deemed savings were calculated assuming that all showerheads in a home were retrofit with low-flow showerheads. Therefore, all showerheads in a home must be replaced in order to be eligible for the full deemed savings incentive.

If all showerheads in a home are not replaced, then the following table should be used to calculate the deemed savings for energy and peak demand savings:

kWh savings	Showerheads per Household			
	One	Two	Three	Four
One Showerhead	186	70	51	40
Two Showerheads		186	102	80
Three Showerheads			186	120
Four Showerheads				186

kW savings	Showerheads per Household			
	One	Two	Three	Four
One Showerhead	0.022	0.008	0.006	0.005
Two Showerheads		0.022	0.012	0.010
Three Showerheads			0.022	0.015
Four Showerheads				0.022

As examples, if a Project Sponsor retrofits one showerhead in a household with two showerheads, the deemed savings would be 70 kWh and 0.008 kW. If a Project Sponsor retrofits two showerheads in a household with four showerheads, the deemed savings would be 80 kWh and 0.010 kW.

## Faucet Aerators

### Measure

**Faucet aerator savings are only eligible in the Hard-To-Reach SOP.** Faucet aerator savings are per household and for retrofit installations only. The incentive is for residential, retrofit-only installation of a faucet aerator with a rated flow of no more than 1.5 gallons per minute (gpm). The source of the heated water flowing through the faucet must be an electric water heater. These estimates apply to all weather regions.

## Baseline

The baseline is assumed to be 2.5 gpm.

## Installation & Efficiency Standard

The incentive is for residential, retrofit-only installation of existing faucet aerator(s) with a pre-installation flow rate of no less than 2.5 gpm. Aerators that have been defaced so as to make the flow rating illegible are not eligible for replacement.

A faucet aerator installed in a retrofit situation must have a labeled maximum flow rate of 1.5 gpm at 80 psi. The aerator must be installed in a home with electric water heating in order to qualify for an incentive.

All aerators removed shall be collected by Project Sponsor and submitted to the utility with each project implementation report.

## Deemed Savings

Faucet Aerators	
KWh Savings per home	Peak kW Savings per home
48	0.0067

## ENERGY STAR CEILING FANS

### Measure

Purchase an ENERGY STAR ceiling fan and light kit.

### Baseline

The baseline is a conventional non-ENERGY STAR labeled ceiling fan and light kit.

### Installation & Efficiency Standard

The table below displays the ENERGY STAR requirements for eligible ceiling fans.

ENERGY STAR Specifications for Ceiling Fans
1. Specification defines residential ceiling fan airflow efficiency on a performance basis: CFM* of airflow per watt of power consumed by the motor and controls. Efficiency is measured on each of 3 speeds.
2. At low speed, fans must have a minimum airflow of 1,250 CFM* and an efficiency of 155 CFM/Watt
3. Qualifying ceiling fan models must come with a minimum 30-year motor warranty; one-year component(s) warranty; and 2-year light kits warranty.
4. At high speed, fans must have a minimum airflow of 5,000 CFM* and an efficiency of 75 CFM/Watt
5. Integral or attachable lighting, including separately sold ceiling fan light kits, must meet certain requirements of the RLF specification. See QPI form for specific requirements.

## Deemed Savings

<b>ENERGY STAR<sup>®</sup> Ceiling Fan</b>	
Energy (kWh)	Peak (kW)
Savings	Savings
141	0.011

## Estimated Useful Life

The estimated useful life (EUL) is established at 10 years.

## ENERGY STAR CLOTHES WASHERS

### Measure

Purchase an ENERGY STAR clothes washer.

### Baseline

The baseline is the department of Energy (DOE) minimum efficiency standard for clothes washers.

### Installation & Efficiency Standard

The table below displays the ENERGY STAR requirements for eligible clothes washers through 2011.

<b>ENERGY STAR Clothes Washer</b>		
Criteria/Product Type	Current Criteria (as of July 1, 2009)	Proposed Changes for January 1, 2011
ENERGY STAR top and front loading	MEF $\geq$ 1.8 WF $\leq$ 7.5	MEF $\geq$ 2.0 WF $\leq$ 6.0
Federal Standard top and front loading	MEF $\geq$ 1.26	MEF $\geq$ 1.26 WF $\leq$ 9.5

### Deemed Savings

<b>ENERGY STAR Clothes Washer – Annual Energy Savings</b>				
Type	Modified Energy Factor, MEF (Cu.Ft. / kWh / cycle)	Annual Washer kWh	Annual Elec. DHW kWh	Annual Elec. Dryer kWh
DOE 2007 Std.	1.26	52.1	310	509
2009 ENERGY STAR	1.8	44.7	145	420
Savings		7	165	89

<b>ENERGY STAR Clothes Washer – Peak Demand Savings</b>				
Type	Modified Energy Factor, MEF (Cu.Ft. / kWh / cycle)	Washer Peak kW	Elec. DHW Peak kW	Elec. Dryer Peak kW
DOE 2007 Std.	1.26	0.0071	0.0424	0.0697
2009 ENERGY STAR	1.8	0.0061	0.0199	0.0575
Savings		0.0010	0.0226	0.0122

## ENERGY STAR DISHWASHERS

### Measure

Purchase an ENERGY STAR dishwasher.

### Baseline

The baseline is the department of Energy (DOE) minimum efficiency standard for dishwashers.

## Installation & Efficiency Standard

The table below displays the ENERGY STAR requirements for eligible dishwashers through 2011.

<b>ENERGY STAR<sup>®</sup> Dishwasher</b>		
Standard Sized Models		
Criteria/Product Type	January 1, 2010	July 1, 2011
ENERGY STAR	≤ 324 kWh/year ≤ 5.8 gallons/cycle	≤ 307 kWh/year ≤ 5.0 gallons/cycle
Federal Standard	≤ 355 kWh/year ≤ 6.5 gallons/cycle	
Compact Sized Models		
Criteria/Product Type	January 1, 2010	July 1, 2011
ENERGY STAR	≤ 234 kWh/year ≤ 4.0 gallons/cycle	≤ 222 kWh/year ≤ 3.5 gallons/cycle
Federal Standard	≤ 260 kWh/year ≤ 4.5 gallons/cycle	

## Deemed Savings

<b>ENERGY STAR Dishwasher Savings</b>			
With Electric Water Heating		Without Electric Water Heating	
kWh Savings	Peak kW Savings	kWh Savings	Peak kW Savings
74	0.00801	33	0.00297

## ENERGY STAR REFRIGERATORS

### Measure

Purchase an ENERGY STAR refrigerator in a residential or small commercial application.

### Baseline

The baseline is the department of Energy (DOE) minimum efficiency standard for refrigerators.

### Installation & Efficiency Standard

The table below displays the ENERGY STAR requirements for eligible refrigerators, which went into effect April 28, 2008.

<b>ENERGY STAR<sup>®</sup> Refrigerator</b>		
<b>Product Type</b>	<b>Volume</b>	<b>Criteria as of April 28, 2008</b>
Full Size Refrigerators	7.75 cubic feet or greater	At least 20% more energy efficient than the minimum federal government standard (NAECA)

## Deemed Savings

<b>ENERGY STAR Refrigerator Savings</b>					
Replace on Burnout/New Construction kWh Savings	Replace on Burnout/New Construction Peak kW Savings	Multifamily Retrofit kWh Savings	Multifamily Retrofit Peak kW Savings	Single-Family Retrofit kWh Savings	Single-Family Retrofit Peak kW Savings
123	0.017	713	0.097	743	0.101

## Compact Fluorescent Lamps

### Measure

Deemed savings are calculated based on an average daily usage of 2.2 hours per day.<sup>8</sup> **CFL incentives are for customers under the Hard-To-Reach template only.**

### Baseline

Standard incandescent or halogen lamps are the baseline. As EISA 2007 phases out the old standard allowed wattages of incandescent lamps, the new maximum wattages will become the baseline.

**Table 11: New Maximum Wattages for General Service Lamps, 2012-2014**

<b>New Maximum Wattage</b>	<b>Old Standard Incandescent Wattage</b>	<b>Rated Lumens</b>	<b>Effective Date</b>
29	40	310 – 749	1/1/2014
43	60	750 - 1049	1/1/2014
53	75	1050 - 1489	1/1/2013
72	100	1490 - 2600	1/1/2012

### Installation & Efficiency Standard

For an incentive, the CFL must be an ENERGY STAR-approved CFL.

The ENERGY STAR CFL specification includes:

<sup>8</sup> "Evaluation of 2008 Texas 'Make Your Mark' Statewide CFL Program Report." Frontier Associates. June 2009.

- Starting time of approximately one second
- Efficiency level for lamps of 15 watts or more is 60 lumens/watt
- Efficiency level for lamps of less than 15 watts is 45 lumens/watt

The fixture wattage rating dictates the maximum CFL wattage installed. If there is no fixture wattage rating shown on the fixture, the fixture wattage shall be assumed to be 60 watts, or, after January 1, 2014, 43 watts. For example, when replacing an incandescent lamp in a fixture rated for 60 watts (or 43 watts after January 1, 2014), the maximum wattage CFL that may be installed is 16 watts.

“Hollywood-style” incandescent fixtures with four or more lamps may not be retrofitted with screw-in CFLs. These fixtures may be retrofitted with hard-wired fluorescent fixtures only. The addition of a disk device to a screw-in CFL to prevent its removal does not qualify it as a hard-wired fixture.

To compensate for the fact that the life of this measure is less than 10 years, the incentive amounts paid are based on 75% of the following deemed savings.

### Deemed Savings

#### Deemed Savings for 2012

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Incandescent Light (Watt)	Lumen Output	Daily Usage (Hrs/Day)	Annual Energy Savings (kWh)	Demand Savings (kW)
11	9-11	40	310 - 749	2.2	23.3	0.002
13	12-16	60	750 - 1049	2.2	37.7	0.004
20	17-21	75	1050 - 1489	2.2	44.2	0.004
23	22-27	72	1490 - 2600	2.2	39.3	0.004

#### Deemed Savings for 2013

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Incandescent Light (Watt)	Lumen Output	Daily Usage (Hrs/Day)	Annual Energy Savings (kWh)	Demand Savings (kW)
11	9-11	40	310 - 749	2.2	23.3	0.002
13	12-16	60	750 - 1049	2.2	37.7	0.004
20	17-21	53	1050 - 1489	2.2	26.5	0.003
23	22-27	72	1490 - 2600	2.2	39.3	0.004

#### Deemed Savings for 2014

Measure CFL (Watt)	Measure CFL (Range of Watts)	Comparable Incandescent Light (Watt)	Lumen Output	Daily Usage (Hrs/Day)	Annual Energy Savings (kWh)	Demand Savings (kW)
11	9-11	29	310 - 749	2.2	14.5	0.001
13	12-16	43	750 - 1049	2.2	24.1	0.002
20	17-21	53	1050 - 1489	2.2	26.5	0.003
23	22-27	72	1490 - 2600	2.2	39.3	0.004

## Water Heating Replacements - Solar Water Heating

### Measure

Solar water heating deemed savings values are calculated based on the Solar Rating and Certification Corporation's (SRCC) test for solar water heaters (test OG-300).

### Installation & Efficiency Standard

Only solar water heaters meeting the SRCC OG-300 standard (based on tank size and final Solar Energy Factor-SEF) qualify for these deemed savings estimates.

### Deemed Savings

The following table presents the energy savings for solar water heaters based on tank size and final Solar Energy Factor (SEF).

### Demand Savings

	kW
<b>Solar Water Heating Demand Savings</b>	0.42

## Energy Savings

<b>Water Heating Replacements – Solar Water Heating Energy Savings</b>			
Approximate Volume (gal) ->	80	50	30
Baseline (DOE Standard) EF	0.82	0.86	0.89
SRCC OG-300 Solar Energy Factor	kWh Savings	kWh Savings	kWh Savings
1.0	637	471	368
1.1	909	743	640
1.2	1,135	969	866
1.3	1,326	1,160	1,057
1.4	1,490	1,324	1,221
1.5	1,633	1,467	1,364
1.6	1,757	1,591	1,488
1.7	1,867	1,701	1,598
1.8	1,965	1,799	1,696
1.9	2,052	1,886	1,783
2.0	2,131	1,965	1,862
2.1	2,202	2,036	1,933
2.2	2,266	2,100	1,997
2.3	2,325	2,159	2,056
2.4	2,379	2,213	2,110
2.5	2,429	2,263	2,160
2.6	2,475	2,309	2,206
2.7	2,518	2,352	2,249
2.8	2,557	2,391	2,288
2.9	2,594	2,428	2,325
3.0	2,628	2,462	2,359
3.1	2,660	2,494	2,391
3.2	2,691	2,525	2,422
3.3	2,719	2,553	2,450
3.4	2,745	2,579	2,476
3.5	2,771	2,605	2,502
3.6	2,794	2,628	2,525
3.7	2,817	2,651	2,548
3.8	2,838	2,672	2,569
3.9	2,858	2,692	2,589
4.0	2,877	2,711	2,608
4.1	2,895	2,729	2,626
4.2	2,913	2,747	2,644
4.3	2,929	2,763	2,660
4.4	2,945	2,779	2,676
4.5	2,960	2,794	2,691
4.6	2,975	2,809	2,706
4.7	2,988	2,822	2,719
4.8	3,002	2,836	2,733
4.9	3,014	2,848	2,745
5.0	3,027	2,861	2,758

7.5.

# Solar Electric (Photovoltaic) Energy Systems

## Measure

Solar electric (photovoltaic) energy systems deemed savings values are calculated based on the system's rated watts  $DC_{STC}$ <sup>9</sup>. Only photovoltaic systems that result in net reductions of the customer's purchased energy and peak demand qualify for these deemed savings estimates. These deemed savings values apply to all customer classes and all weather regions in Texas.

## Installation & Efficiency Standard

The installation must also meet the following requirements in order to be eligible for these deemed savings values:

1. The system shall be installed by a licensed electrical contractor or, in the case of a residential installation by the homeowner, with the approval of the electrical inspector in accordance with the National Electric Code (NEC 690, "Solar Photovoltaic Systems") or local building codes.
2. If the system is utility interactive the inverter shall be listed by national testing laboratory (see, for example, UL 1741, "Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems") and meet the requirements of the Institute of Electrical and Electronics Engineers (IEEE) Standard 929-2000 "Recommended Practice for Utility Interface of Photovoltaic (PV) Systems".
3. The array azimuth shall be within +/- 20 degrees of south; the tilt angle shall be between 0 (horizontal) and latitude + 15 degrees.
4. The estimated annual energy generation from the PV system shall not exceed the customer's annual energy consumption.

## Deemed Savings

### Energy Savings

The following formula calculates the energy savings for solar electric photovoltaic energy systems based on the rated watts  $DC_{STC}$ .

$$\text{Deemed Energy Savings (kWh)} = 1.60 * \text{watts } DC_{STC} \text{ installed}$$

### Demand Savings

The following formula calculates the demand savings for solar electric photovoltaic energy systems based on the rated watts  $DC_{STC}$ .

$$\text{Deemed Demand Savings (kW)} = 0.83 * \text{kW } DC_{STC} \text{ installed}$$

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<sup>9</sup> Watts  $DC_{STC}$  refers to the system's factory rated output at standard test conditions, which assumes 1,000 w/m<sup>2</sup> of solar radiation and 25 degree Celsius cell operating temperature.

## **ADDENDUM A: DUCT DEEMED SAVINGS LOOKUP TABLES**

This section contains the deemed savings values for Duct Efficiency Improvements. In order to select the appropriate value from the Lookup Table, one needs to know the applicable weather location, building type, foundation type, and air handler location. Deemed savings were developed for only the most common configurations, so users will need to select from the configuration that most closely matches their project. The Lookup Tables are organized first by weather zone, then by building type, and finally by heating equipment type.

The four weather zones used for Texas are:

- ***Climate Zone 1: Panhandle Region, Amarillo weather data***
- ***Climate Zone 2: North Region, Dallas weather data***
- ***Climate Zone 3: South Region, Houston weather data***
- ***Climate Zone 4: Valley Region, Corpus Christi weather data***

There are seven main building types:

- 1) Single-family, 1-story
- 2) Single-family, Multi-story, Entire structure
- 3) Single-family, Multi-story, Upper Floor(s) only
- 4) Single-family, Multi-story, Lower Floor(s) only
- 5) Multifamily, Upper Floor(s) only
- 6) Multifamily, Lower Floor(s) only
- 7) Mobile Home

There are three different heating equipment types:

- Gas Furnace
- Electric Resistance
- Electric Heat Pump

Each weather zone has a separate page for each of the seven building types. That page contains a table with the values for all three heating equipment types and each of the different foundation type and air handler location configurations.

## ZONE 1: PANHANDLE REGION

### Zone 1: Panhandle Region – Single-family, 1-story (1)

Building >>>	Heating Type	Savings Value	SF: All or Part of Single-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 1	Gas	Demand (kW)	0.0307	0.0112	0.0370	0.0295	0.0373
		Energy Cool (kWh)	16.4	7.4	27.3	27.5	29.4
		Energy Heat (kWh)	4.00	3.77	3.68	4.98	5.23
	Electric Resistance	Demand (kW)	0.0307	0.0112	0.0370	0.0295	0.0373
		Energy Cool (kWh)	16.4	7.4	27.3	27.5	29.4
		Energy Heat (kWh)	261	159	245	212	318
	Electric Heat Pump	Demand (kW)	0.0307	0.0112	0.0370	0.0295	0.0373
		Energy Cool (kWh)	16.4	7.4	27.3	27.5	29.4
		Energy Heat (kWh)	203	109	193	146	240

\* Deemed Savings Values are given in either kW or kWh per percentage point change in the corresponding DSE value

**Zone 1: Panhandle Region – Single-family, Multi-story, Entire structure (2)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: All of Multi-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 1	Gas	Demand (kW)	0.0376	0.0138	0.0426	0.0195	0.0428
		Energy Cool (kWh)	24.0	11.6	32.3	18.8	35.1
		Energy Heat (kWh)	4.11	3.93	3.85	3.82	5.69
	Electric Resistance	Demand (kW)	0.0376	0.0138	0.0426	0.0195	0.0428
		Energy Cool (kWh)	24.0	11.6	32.3	18.8	35.1
		Energy Heat (kWh)	296	183	280	178	376
	Electric Heat Pump	Demand (kW)	0.0376	0.0138	0.0426	0.0195	0.0428
		Energy Cool (kWh)	24.0	11.6	32.3	18.8	35.1
		Energy Heat (kWh)	235	132	224	126	288

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 1: Panhandle Region – Single-family, Multi-story, Upper Floor(s) only (3)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Upper Floor(s) of Multi-Story*	
			Conditioned	Conditioned
			Attic/Garage	Interior
Zone 1	Gas	Demand (kW)	0.0300	0.0107
		Energy Cool (kWh)	20.6	9.8
		Energy Heat (kWh)	2.21	2.15
	Electric Resistance	Demand (kW)	0.0300	0.0107
		Energy Cool (kWh)	20.6	9.8
		Energy Heat (kWh)	144	89
	Electric Heat Pump	Demand (kW)	0.0300	0.0107
		Energy Cool (kWh)	20.6	9.8
		Energy Heat (kWh)	121	67

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 1: Panhandle Region – Single-family, Multi-story, Lower Floor(s) only (4)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Lower Floor(s) of Mult-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 1	Gas	Demand (kW)	0.0067	0.0054	0.0115	0.0189	0.0257
		Energy Cool (kWh)	3.5	3.0	11.5	17.4	19.7
		Energy Heat (kWh)	2.95	2.50	3.44	4.37	4.53
	Electric Resistance	Demand (kW)	0.0067	0.0054	0.0115	0.0189	0.0257
		Energy Cool (kWh)	3.5	3.0	11.5	17.4	19.7
		Energy Heat (kWh)	149	91	208	165	282
	Electric Heat Pump	Demand (kW)	0.0067	0.0054	0.0115	0.0189	0.0257
		Energy Cool (kWh)	3.5	3.0	11.5	17.4	19.7
		Energy Heat (kWh)	105	58	157	106	212

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 1: Panhandle Region – Multifamily, Upper Floor(s) only (5)**

<b>Building &gt;&gt;&gt;</b>	<b>Heating Type</b>	<b>Savings Value</b>	<b>MF: Multifamily Top Floor*</b>	
<b>Foundation &gt;&gt;&gt;</b>			<b>Conditioned</b>	<b>Conditioned</b>
<b>Air Handler &gt;&gt;&gt;</b>			<b>Attic/Garage</b>	<b>Interior</b>
<b>Zone 1</b>	<b>Gas</b>	<b>Demand (kW)</b>	0.0191	0.0066
		<b>Energy Cool (kWh)</b>	11.8	5.4
		<b>Energy Heat (kWh)</b>	1.51	1.44
	<b>Electric Resistance</b>	<b>Demand (kW)</b>	0.0191	0.0066
		<b>Energy Cool (kWh)</b>	11.8	5.4
		<b>Energy Heat (kWh)</b>	85	53
	<b>Electric Heat Pump</b>	<b>Demand (kW)</b>	0.0191	0.0066
		<b>Energy Cool (kWh)</b>	11.8	5.4
		<b>Energy Heat (kWh)</b>	67	37

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding *DSE* value

**Zone 1: Panhandle Region – Multifamily, Lower Floor(s) only (6)**

<b>Building &gt;&gt;&gt;</b>	<b>Heating Type</b>	<b>Savings Value</b>	<b>MF: Multifamily Lower Floor*</b>			
<b>Foundation &gt;&gt;&gt;</b>			<b>Slab</b>	<b>Crawl/Bsmt</b>	<b>Crawl/Bsmt</b>	<b>Conditioned</b>
<b>Air Handler Location &gt;&gt;&gt;</b>			<b>Interior</b>	<b>Interior</b>	<b>Crawl/Bsmt</b>	<b>Interior</b>
<b>Zone 1</b>	<b>Gas</b>	<b>Demand (kW)</b>	0.0041	0.0107	0.0135	0.0047
		<b>Energy Cool (kWh)</b>	2.0	11.5	12.4	3.9
		<b>Energy Heat (kWh)</b>	1.41	1.41	1.48	0.92
	<b>Electric Resistance</b>	<b>Demand (kW)</b>	0.0041	0.0107	0.0135	0.0047
		<b>Energy Cool (kWh)</b>	2.0	11.5	12.4	3.9
		<b>Energy Heat (kWh)</b>	51	65	97	32
	<b>Electric Heat Pump</b>	<b>Demand (kW)</b>	0.0041	0.0107	0.0135	0.0047
		<b>Energy Cool (kWh)</b>	2.0	11.5	12.4	3.9
		<b>Energy Heat (kWh)</b>	32	46	74	23

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 1: Panhandle Region – Mobile Home (7)**

Building >>>	Heating Type	Savings Value	Mobile Home*	
			Crawl/Bsmt	Crawl/Bsmt
			Interior	Crawl/Bsmt
Zone 1	Gas	Demand (kW)	0.0257	0.0316
		Energy Cool (kWh)	24.7	26.0
		Energy Heat (kWh)	4.96	5.24
	Electric Resistance	Demand (kW)	0.0257	0.0316
		Energy Cool (kWh)	24.7	26.0
		Energy Heat (kWh)	188	284
	Electric Heat Pump	Demand (kW)	0.0257	0.0316
		Energy Cool (kWh)	24.7	26.0
		Energy Heat (kWh)	127	210

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

## ZONE 2: NORTH REGION

### Zone 2: North Region – Single-family, 1-story (1)

Building >>>	Heating Type	Savings Value	SF: All or Part of Single-Story*				
Foundation >>>			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
Air Handler >>>			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 2	Gas	Demand (kW)	0.0312	0.0132	0.0279	0.0292	0.0424
		Energy Cool (kWh)	38.8	19.2	45.6	47.3	54.9
		Energy Heat (kWh)	2.76	2.66	2.74	3.31	4.06
	Electric Resistance	Demand (kW)	0.0312	0.0132	0.0279	0.0292	0.0424
		Energy Cool (kWh)	38.8	19.2	45.6	47.3	54.9
		Energy Heat (kWh)	247	163	246	197	339
	Electric Heat Pump	Demand (kW)	0.0312	0.0132	0.0279	0.0292	0.0424
		Energy Cool (kWh)	38.8	19.2	45.6	47.3	54.9
		Energy Heat (kWh)	156	92	160	114	215

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 2: North Region – Single-family, Multi-story, Entire structure (2)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: All of Multi-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 2	Gas	Demand (kW)	0.0373	0.0160	0.0360	0.0201	0.0498
		Energy Cool (kWh)	49.6	25.4	54.8	32.8	65.1
		Energy Heat (kWh)	2.80	2.72	2.84	2.80	4.27
	Electric Resistance	Demand (kW)	0.0373	0.0160	0.0360	0.0201	0.0498
		Energy Cool (kWh)	49.6	25.4	54.8	32.8	65.1
		Energy Heat (kWh)	279	184	280	181	386
	Electric Heat Pump	Demand (kW)	0.0373	0.0160	0.0360	0.0201	0.0498
		Energy Cool (kWh)	49.6	25.4	54.8	32.8	65.1
		Energy Heat (kWh)	179	107	183	105	246

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 2: North Region – Single-family, Multi-story, Upper Floor(s) only (3)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Upper Floor(s) of Multi-Story*	
			Conditioned	Conditioned
			Attic/Garage	Interior
Zone 2	Gas	Demand (kW)	0.0257	0.0118
		Energy Cool (kWh)	38.2	20.1
		Energy Heat (kWh)	1.59	1.56
	Electric Resistance	Demand (kW)	0.0257	0.0118
		Energy Cool (kWh)	38.2	20.1
		Energy Heat (kWh)	154	103
	Electric Heat Pump	Demand (kW)	0.0257	0.0118
		Energy Cool (kWh)	38.2	20.1
		Energy Heat (kWh)	105	65

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 2: North Region – Single-family, Multi-story, Lower Floor(s) only (4)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Lower Floor(s) of Mult-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 2	Gas	Demand (kW)	0.0117	0.0074	0.0164	0.0200	0.0317
		Energy Cool (kWh)	15.2	10.8	27.2	33.3	41.4
		Energy Heat (kWh)	2.00	1.71	2.81	3.18	3.26
	Electric Resistance	Demand (kW)	0.0117	0.0074	0.0164	0.0200	0.0317
		Energy Cool (kWh)	15.2	10.8	27.2	33.3	41.4
		Energy Heat (kWh)	147	90	237	196	279
	Electric Heat Pump	Demand (kW)	0.0117	0.0074	0.0164	0.0200	0.0317
		Energy Cool (kWh)	15.2	10.8	27.2	33.3	41.4
		Energy Heat (kWh)	85	47	154	90	182

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 2: North Region – Multifamily, Upper Floor(s) only (5)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	MF: Multifamily Top Floor*	
			Conditioned	Conditioned
			Attic/Garage	Interior
Zone 2	Gas	Demand (kW)	0.0191	0.0079
		Energy Cool (kWh)	27.2	13.5
		Energy Heat (kWh)	1.17	1.14
	Electric Resistance	Demand (kW)	0.0191	0.0079
		Energy Cool (kWh)	27.2	13.5
		Energy Heat (kWh)	97	63
	Electric Heat Pump	Demand (kW)	0.0191	0.0079
		Energy Cool (kWh)	27.2	13.5
		Energy Heat (kWh)	60	35

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 2: North Region – Multifamily, Lower Floor(s) only (6)**

Building >>> Foundation >>> Air Handler Location >>>	Heating Type	Savings Value	MF: Multifamily Lower Floor*			
			Slab	Crawl/Bsmt	Crawl/Bsmt	Conditioned
			Interior	Interior	Crawl/Bsmt	Interior
Zone 2	Gas	Demand (kW)	0.0081	0.0124	0.0182	0.0083
		Energy Cool (kWh)	11.2	22.5	26.0	12.7
		Energy Heat (kWh)	0.94	1.16	1.20	0.67
	Electric Resistance	Demand (kW)	0.0081	0.0124	0.0182	0.0083
		Energy Cool (kWh)	11.2	22.5	26.0	12.7
		Energy Heat (kWh)	52	77	114	36
	Electric Heat Pump	Demand (kW)	0.0081	0.0124	0.0182	0.0083
		Energy Cool (kWh)	11.2	22.5	26.0	12.7
		Energy Heat (kWh)	26	47	75	20

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding *DSE* value

**Zone 2: North Region – Mobile Home (7)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	Mobile Home*	
			Crawl/Bsmt	Crawl/Bsmt
			Interior	Crawl/Bsmt
Zone 2	Gas	Demand (kW)	0.0252	0.0360
		Energy Cool (kWh)	42.1	48.7
		Energy Heat (kWh)	3.74	3.88
	Electric Resistance	Demand (kW)	0.0252	0.0360
		Energy Cool (kWh)	42.1	48.7
		Energy Heat (kWh)	194	284
	Electric Heat Pump	Demand (kW)	0.0252	0.0360
		Energy Cool (kWh)	42.1	48.7
		Energy Heat (kWh)	113	182

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

## ZONE 3: SOUTH REGION

### Zone 3: South Region – Single-family, 1-story (1)

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: All or Part of Single-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 3	Gas	Demand (kW)	0.0348	0.0136	0.0287	0.0288	0.0370
		Energy Cool (kWh)	36.7	19.4	44.8	47.3	52.5
		Energy Heat (kWh)	1.97	1.92	2.08	2.88	2.99
	Electric Resistance	Demand (kW)	0.0348	0.0136	0.0287	0.0288	0.0370
		Energy Cool (kWh)	36.7	19.4	44.8	47.3	52.5
		Energy Heat (kWh)	166	111	176	162	230
	Electric Heat Pump	Demand (kW)	0.0348	0.0136	0.0287	0.0288	0.0370
		Energy Cool (kWh)	36.7	19.4	44.8	47.3	52.5
		Energy Heat (kWh)	109	68	123	103	155

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 3: South Region – Single-family, Multi-story, Entire structure (2)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: All of Multi-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 3	Gas	Demand (kW)	0.0418	0.0165	0.0369	0.0201	0.0430
		Energy Cool (kWh)	47.3	26.0	53.5	32.9	62.8
		Energy Heat (kWh)	2.04	2.00	2.17	2.13	3.20
	Electric Resistance	Demand (kW)	0.0418	0.0165	0.0369	0.0201	0.0430
		Energy Cool (kWh)	47.3	26.0	53.5	32.9	62.8
		Energy Heat (kWh)	194	128	204	130	268
	Electric Heat Pump	Demand (kW)	0.0418	0.0165	0.0369	0.0201	0.0430
		Energy Cool (kWh)	47.3	26.0	53.5	32.9	62.8
		Energy Heat (kWh)	134	83	146	84	186

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 3: South Region – Single-family, Multi-story, Upper Floor(s) only (3)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Upper Floor(s) of Multi-Story*	
			Conditioned	Conditioned
			Attic/Garage	Interior
Zone 3	Gas	Demand (kW)	0.0237	0.0123
		Energy Cool (kWh)	38.4	20.9
		Energy Heat (kWh)	1.20	1.18
	Electric Resistance	Demand (kW)	0.0237	0.0123
		Energy Cool (kWh)	38.4	20.9
		Energy Heat (kWh)	114	76
	Electric Heat Pump	Demand (kW)	0.0237	0.0123
		Energy Cool (kWh)	38.4	20.9
		Energy Heat (kWh)	82	52

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 3: South Region – Single-family, Multi-story, Lower Floor(s) only (4)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Lower Floor(s) of Multi-Story*				
			Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 3	Gas	Demand (kW)	0.0096	0.0071	0.0148	0.0187	0.0261
		Energy Cool (kWh)	13.8	11.3	27.5	34.1	40.4
		Energy Heat (kWh)	1.38	1.20	2.14	2.32	2.37
	Electric Resistance	Demand (kW)	0.0096	0.0071	0.0148	0.0187	0.0261
		Energy Cool (kWh)	13.8	11.3	27.5	34.1	40.4
		Energy Heat (kWh)	96	60	168	135	187
	Electric Heat Pump	Demand (kW)	0.0096	0.0071	0.0148	0.0187	0.0261
		Energy Cool (kWh)	13.8	11.3	27.5	34.1	40.4
		Energy Heat (kWh)	58	33	115	90	128

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 3: South Region – Multifamily, Upper Floor(s) only (5)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	MF: Multifamily Top Floor*	
			Conditioned	Conditioned
			Attic/Garage	Interior
Zone 3	Gas	Demand (kW)	0.0221	0.0083
		Energy Cool (kWh)	26.8	14.3
		Energy Heat (kWh)	0.88	0.85
	Electric Resistance	Demand (kW)	0.0221	0.0083
		Energy Cool (kWh)	26.8	14.3
		Energy Heat (kWh)	71	46
	Electric Heat Pump	Demand (kW)	0.0221	0.0083
		Energy Cool (kWh)	26.8	14.3
		Energy Heat (kWh)	47	28

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 3: South Region – Multifamily, Lower Floor(s) only (6)**

Building >>> Foundation >>> Air Handler Location >>>	Heating Type	Savings Value	MF: Multifamily Lower Floor*			
			Slab	Crawl/Bsmt	Crawl/Bsmt	Conditioned
			Interior	Interior	Crawl/Bsmt	Interior
Zone 3	Gas	Demand (kW)	0.0081	0.0113	0.0147	0.0082
		Energy Cool (kWh)	13.2	24.1	26.5	15.6
		Energy Heat (kWh)	0.63	0.88	0.89	0.44
	Electric Resistance	Demand (kW)	0.0081	0.0113	0.0147	0.0082
		Energy Cool (kWh)	13.2	24.1	26.5	15.6
		Energy Heat (kWh)	33	54	76	25
	Electric Heat Pump	Demand (kW)	0.0081	0.0113	0.0147	0.0082
		Energy Cool (kWh)	13.2	24.1	26.5	15.6
		Energy Heat (kWh)	18	36	52	15

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 3: South Region – Mobile Home (7)**

Building >>>	Heating Type	Savings Value	Mobile Home*	
			Crawl/Bsmt	Crawl/Bsmt
			Interior	Crawl/Bsmt
Zone 3	Gas	Demand (kW)	0.0254	0.0322
		Energy Cool (kWh)	41.8	46.4
		Energy Heat (kWh)	2.75	2.84
	Electric Resistance	Demand (kW)	0.0254	0.0322
		Energy Cool (kWh)	41.8	46.4
		Energy Heat (kWh)	133	190
	Electric Heat Pump	Demand (kW)	0.0254	0.0322
		Energy Cool (kWh)	41.8	46.4
		Energy Heat (kWh)	85	127

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

## ZONE 4: VALLEY REGION

### Zone 4: Valley Region – Single-family, 1-story (1)

Building >>>	Heating Type	Savings Value	SF: All or Part of Single-Story*					
			Foundation >>>	Slab	Slab	Crawl/Bsmt	Crawl/Bsmt	Crawl/Bsmt
			Air Handler >>>	Attic/Garage	Interior	Attic/Garage	Interior	Crawl/Bsmt
Zone 4	Gas	Demand (kW)	0.0278	0.0120	0.0297	0.0255	0.0345	
		Energy Cool (kWh)	46.6	26.6	53.8	60.0	69.7	
		Energy Heat (kWh)	1.22	1.18	1.33	1.79	1.86	
	Electric Resistance	Demand (kW)	0.0278	0.0120	0.0297	0.0255	0.0345	
		Energy Cool (kWh)	46.6	26.6	53.8	60.0	69.7	
		Energy Heat (kWh)	87	60	95	89	120	
	Electric Heat Pump	Demand (kW)	0.0278	0.0120	0.0297	0.0255	0.0345	
		Energy Cool (kWh)	46.6	26.6	53.8	60.0	69.7	
		Energy Heat (kWh)	40	26	47	41	57	

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 4: Valley Region – Single-family, Multi-story, Entire structure (2)**

<b>Building &gt;&gt;&gt;</b>	<b>Heating Type</b>	<b>Savings Value</b>	<b>SF: All of Multi-Story*</b>				
<b>Foundation &gt;&gt;&gt;</b>			<b>Slab</b>	<b>Slab</b>	<b>Crawl/Bsmt</b>	<b>Crawl/Bsmt</b>	<b>Crawl/Bsmt</b>
<b>Air Handler &gt;&gt;&gt;</b>			<b>Attic/Garage</b>	<b>Interior</b>	<b>Attic/Garage</b>	<b>Interior</b>	<b>Crawl/Bsmt</b>
<b>Zone 4</b>	<b>Gas</b>	<b>Demand (kW)</b>	0.0335	0.0145	0.0341	0.0175	0.0403
		<b>Energy Cool (kWh)</b>	57.9	33.3	61.4	39.8	80.3
		<b>Energy Heat (kWh)</b>	1.20	1.17	1.33	1.29	1.90
	<b>Electric Resistance</b>	<b>Demand (kW)</b>	0.0335	0.0145	0.0341	0.0175	0.0403
		<b>Energy Cool (kWh)</b>	57.9	33.3	61.4	39.8	80.3
		<b>Energy Heat (kWh)</b>	98	67	107	71	135
	<b>Electric Heat Pump</b>	<b>Demand (kW)</b>	0.0335	0.0145	0.0341	0.0175	0.0403
		<b>Energy Cool (kWh)</b>	57.9	33.3	61.4	39.8	80.3
		<b>Energy Heat (kWh)</b>	48	31	54	33	66

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 4: Valley Region – Single-family, Multi-story, Upper Floor(s) only (3)**

Building >>> Foundation >>> Air Handler >>>	Heating Type	Savings Value	SF: Upper Floor(s) of Multi-Story*	
			Conditioned	Conditioned
			Attic/Garage	Interior
Zone 4	Gas	Demand (kW)	0.0243	0.0105
		Energy Cool (kWh)	44.1	25.5
		Energy Heat (kWh)	0.68	0.67
	Electric Resistance	Demand (kW)	0.0243	0.0105
		Energy Cool (kWh)	44.1	25.5
		Energy Heat (kWh)	60	42
	Electric Heat Pump	Demand (kW)	0.0243	0.0105
		Energy Cool (kWh)	44.1	25.5
		Energy Heat (kWh)	31	21

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 4: Valley Region – Single-family, Multi-story, Lower Floor(s) only (4)**

<b>Building &gt;&gt;&gt;</b>	<b>Heating Type</b>	<b>Savings Value</b>	<b>SF: Lower Floor(s) of Multi-Story*</b>				
<b>Foundation &gt;&gt;&gt;</b>			<b>Slab</b>	<b>Slab</b>	<b>Crawl/Bsmt</b>	<b>Crawl/Bsmt</b>	<b>Crawl/Bsmt</b>
<b>Air Handler &gt;&gt;&gt;</b>			<b>Attic/Garage</b>	<b>Interior</b>	<b>Attic/Garage</b>	<b>Interior</b>	<b>Crawl/Bsmt</b>
<b>Zone 4</b>	<b>Gas</b>	<b>Demand (kW)</b>	0.0095	0.0069	0.0143	0.0175	0.0255
		<b>Energy Cool (kWh)</b>	20.1	15.9	35.9	42.7	53.3
		<b>Energy Heat (kWh)</b>	0.80	0.69	1.26	1.36	1.39
	<b>Electric Resistance</b>	<b>Demand (kW)</b>	0.0095	0.0069	0.0143	0.0175	0.0255
		<b>Energy Cool (kWh)</b>	20.1	15.9	35.9	42.7	53.3
		<b>Energy Heat (kWh)</b>	48	32	86	73	96
	<b>Electric Heat Pump</b>	<b>Demand (kW)</b>	0.0095	0.0069	0.0143	0.0175	0.0255
		<b>Energy Cool (kWh)</b>	20.1	15.9	35.9	42.7	53.3
		<b>Energy Heat (kWh)</b>	20	13	42	35	47

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 4: Valley Region – Multifamily, Upper Floor(s) only (5)**

<b>Building &gt;&gt;&gt;</b>	<b>Heating Type</b>	<b>Savings Value</b>	<b>MF: Multifamily Top Floor*</b>	
<b>Foundation &gt;&gt;&gt;</b>			<b>Conditioned</b>	<b>Conditioned</b>
<b>Air Handler &gt;&gt;&gt;</b>			<b>Attic/Garage</b>	<b>Interior</b>
<b>Zone 4</b>	<b>Gas</b>	<b>Demand (kW)</b>	0.0163	0.0069
		<b>Energy Cool (kWh)</b>	30.7	17.6
		<b>Energy Heat (kWh)</b>	0.50	0.49
	<b>Electric Resistance</b>	<b>Demand (kW)</b>	0.0163	0.0069
		<b>Energy Cool (kWh)</b>	30.7	17.6
		<b>Energy Heat (kWh)</b>	36	24
	<b>Electric Heat Pump</b>	<b>Demand (kW)</b>	0.0163	0.0069
		<b>Energy Cool (kWh)</b>	30.7	17.6
		<b>Energy Heat (kWh)</b>	17	11

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding *DSE* value

**Zone 4: Valley Region – Multifamily, Lower Floor(s) only (6)**

Building >>> Foundation >>> Air Handler Location >>>	Heating Type	Savings Value	MF: Multifamily Lower Floor*			
			Slab	Crawl/Bsmt	Crawl/Bsmt	Conditioned
			Interior	Interior	Crawl/Bsmt	Interior
Zone 4	Gas	Demand (kW)	0.0077	0.0103	0.0141	0.0077
		Energy Cool (kWh)	19.9	29.6	34.2	21.4
		Energy Heat (kWh)	0.35	0.48	0.49	0.24
	Electric Resistance	Demand (kW)	0.0077	0.0103	0.0141	0.0077
		Energy Cool (kWh)	19.9	29.6	34.2	21.4
		Energy Heat (kWh)	17	28	37	13
	Electric Heat Pump	Demand (kW)	0.0077	0.0103	0.0141	0.0077
		Energy Cool (kWh)	19.9	29.6	34.2	21.4
		Energy Heat (kWh)	7	13	18	6

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value

**Zone 4: Valley Region – Mobile Home (7)**

Building >>>	Heating Type	Savings Value	Mobile Home*	
			Crawl/Bsmt	Crawl/Bsmt
			Interior	Crawl/Bsmt
Zone 4	Gas	Demand (kW)	0.0221	0.0295
		Energy Cool (kWh)	50.5	58.8
		Energy Heat (kWh)	1.65	1.72
	Electric Resistance	Demand (kW)	0.0221	0.0295
		Energy Cool (kWh)	50.5	58.8
		Energy Heat (kWh)	72	97
	Electric Heat Pump	Demand (kW)	0.0221	0.0295
		Energy Cool (kWh)	50.5	58.8
		Energy Heat (kWh)	33	46

\* Deemed Savings Values are given in either *kW* or *kWh* per percentage point change in the corresponding DSE value