Work Paper SCE13HC046

**Revision 3**

**Southern California Edison**

**Commercial Economizer – Packaged DX Unit**

# At-a-Glance Summary

|  |  |
| --- | --- |
| **Measure Codes** | AC-60978, AC-64196 |
| **Measure Description** | The measure for this work paper is an air-side economizer for commercial packaged DX systems. The installed economizer should be in accordance with Title 24 2013 Table 140.4-B. |
| **Base Case Description** | The base case for this work paper is a commercial packaged DX system operating without an air-side economizer. For AC-60978, the system should be < 54 kBtu/h and for AC-64196 the system should be > 54 kBtu/h. |
| **Units** | Per ton |
| **Energy Savings** | Refer to Excel Calculation Attachment |
| **Full Measure Cost ($/unit)** | Refer to Excel Calculation Attachment |
| **Incremental Measure Cost ($/unit)** | Refer to Excel Calculation Attachment |
| **Effective Useful Life** | 5 years (DEER EUL ID: HVAC-airAC); Please note that since this measure is a retrofit add on onto an existing system the RUL of the existing system is used as the EUL for the measure |
| **Measure Installation Type** | Retrofit Add-on (REA) |
| **Net-to-Gross Ratio** | 0.6 (DEER NTGR ID: Com-Default>2yrs)  0.85 (DEER NTGR ID: Com-Default-HTR-di) |
| **Important Comments** | This work paper has a complementary Ex Ante Database data set that will be provided in a separate submission to the California Public Utilities Commission (CPUC). |

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 5/16/12 | Ritesh Nayyar/ EMCOR Energy Services | Original work paper in 2013-2014 template |
| 1 | 3/5/14 | Joseph Ling/AESC | - New template for 2015 program year.  - Changed savings source from eQUEST prototype simulations to READI 1.04 DEER run D03-058. |
| 4/23/14 | Cassie Cuaresma/SCE | -Work paper updated for reporting period effective 7/1/2014-12/31/2014  -Added new solution code for >65 kBtu/hr Package System Economizer  -Updated EUL. |
| 5/14/14 | Joseph Ling/AESC | -Included additional language for applicable measure types.  -Adjusted measure cost amounts and included additional discussion of measure cost assumptions.  -Added HVAC Optimization QM requirements for basic and enhanced functionality requirements. |
| 2 | 10/14/14 | Cassie Cuaresma/SCE | - Added language clarifying NTG for Direct Install implementations.  - Added measure requirement language for AC-64196.  - Updated calculation attachment to latest template (v5). |
| 12/15/14 | Joseph Ling/AESC | -Added AC-64196 as units >54 kBtu, Modified AC-60978 for units <54 kBtu  -Included start-up costs for measure.  -Included additional assumptions for cost estimates.  -Additional formatting revisions as appropriate.  -Added Midstream Incentive Delivery. |
| 3 | 1/27/16 | Ryan Cho/SCE | -New template update for 2016 program year  -WP effective from 1/1/2016 thru 12/31/2016  -Removed SCE building types  -No value modifications |

# Commission Staff and Cal TF Comments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rev** | **Party** | **Submittal Date** | **Comment Date** | **Comments** | **WP Developer Response** |
|  |  |  |  |  |  |

Cal TF website: <http://www.caltf.org/>

# Section 1. General Measure & Baseline Data

## 1.1 Measure Description & Background

This work paper details the energy savings achieved by installing an air side economizer on a packaged roof top unit of any capacity. Air side economizers help save energy by providing free cooling when ambient conditions are suitable to meet all or part of the space cooling load.

The measure case is any commercial building using packaged DX system with a fixed dry bulb, differential dry bulb, or enthalpy based economizer for its HVAC system. When the outside ambient dry bulb temperature is below the set point temperature (in the case of dry bulb controlled economizers), the economizer mode is activated, and the outside air dampers modulate between minimum and maximum position to bring in cool outside air.

The base case is one of the commercial building types with an HVAC system that does not have an air side economizer and therefore does not take advantage of free cooling when the ambient conditions are suitable.

**Base, Standard, and Measure Cases**

|  |  |
| --- | --- |
| **Case** | **Description of Typical Scenario** |
| Measure | < 54 kBtu/hr Package DX System Economizer (AC-60978)  > 54 kBtu/hr Package DX System Economizer (AC-64196) |
| Existing Condition | < 54 kBtu/hr Package DX System without an air side economizer (AC-60987)  > 54 kBtu/hr Package DX System without an air side economizer (AC-64196) |
| Code/Standard | N/A |
| Industry Standard Practice | N/A |

Measures and Codes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Codes** | | | | **Measure Name** |
| SCG | SDG&E | SCE | PG&E |
|  |  | AC-60978 |  | < 54 kBtu/hr Package System Economizer replacing System with no Economizer |
|  |  | AC-64196 |  | > 54 kBtu/hr Package System Economizer replacing System with no Economizer |

Measure Requirements for SCE’s Commercial HVAC Quality Maintenance Program

As part of an Advanced Digital Economizer Controls (ADEC) Upgrade, basic economizer functionality must be added, and/or restored as necessary. Basic economizer functionality is summarized as:

* All dampers are able to fully open and close and modulate accordingly to the appropriate positions based on ambient temperature (or enthalpy) control.
* Dampers move freely without binding.
* Return damper position is properly coordinated (e.g., interlocked) with the outside air damper.
* Economizer is capable of providing partial cooling even when additional mechanical cooling is required to meet the remainder of the cooling load in the zone(s).
* Temperature and enthalpy sensor(s) is/are calibrated and correctly positioned to measure the temperature and enthalpy of the entering air from under the hood and in the air stream and, if required, return air from the return air duct.
* Economizer operation does not increase the building heating energy use during normal operation.
* Economizer operation and controls respond and modulate adequately based on temperature limits dictated by the applicable Energy Standards based on Climate Zone.
* High limit shut off/changeover control must be set within 2°F and 2 Btu/lb of the setpoints listed in the table shown below.

Air Economizer High Limit Shut Off Control Requirements[[1]](#footnote-1)

|  |  |  |
| --- | --- | --- |
| **Device Typea** | **Climate Zones** | **Required High Limit (Economizer Off When):b** |
| Fixed Dry Bulb | 1,3,5,11-16 | TOA>75°F |
| 2,4,10 | TOA>73°F |
| 6,8,9 | TOA>71°F |
| 7 | TOA>69°F |
| Differential Dry Bulb | 1,3,5,11-16 | TOA>TRA°F |
| 2,4,10 | TOA>TRA-2°F |
| 6,8,9 | TOA>TRA-4°F |
| 7 | TOA>TRA-6°F |
| Fixed Enthalpyc + Fixed Drybulb | All | hOA>28 Btu/lbc or TOA>75°F |

* 1. Only the high limit control devices listed are allowed to be used and at the setpoints listed. Others such as Dew Point, Fixed Enthalpy, Electronic Enthalpy, and Differential Enthalpy Controls may not be used in any climate zone unless used in conjunction with the devices and setpoints listed. For example, a Fixed Enthalpy + Fixed Dry Bulb control may also use a Dew Point limit.
  2. Devices with selectable (rather than adjustable) setpoints shall be capable of being set to within 2°F and 2 Btu/lb of the setpoint listed.
  3. At altitudes substantially different than sea level, the Fixed Enthalpy limit value shall be set to the enthalpy value at 75°F and 50% relative humidity. As an example, at approximately 6,000 foot elevation, the fixed enthalpy limit is approximately 30.7 Btu/lb.

Measure AC-64196 is subject to SCE inspection to ensure that the existing package system did not require an economizer at the time of original installation (per codes/standards). The Program will require proof that the existing system did not require an economizer at the time of original installation. The Program will determine the required documentation to prove/disprove this measure’s requirement.

In addition to the basic requirements above, which are very similar to previous economizer functional requirements in the Program, ADEC is also intended to provide enhanced functionality beyond that of “standard” economizer controllers. The enhanced control functionality requirements for a system to qualify for ADEC incentives are as follows:

* The economizer controller shall have the capability of displaying the current value of each sensor OR be connected and able to communicate with existing Energy Management System (EMS) in facility.
* The economizer controller shall have the capability of manually initiating the cooling mode so that the operation of compressors, economizers, and exhaust fans can be independently tested and verified OR be connected and able to communicate with existing EMS in facility
* If the high-limit control is fixed dry-bulb and/or fixed enthalpy then the control shall have an adjustable (or selectable) set point.
* If installed outside of the unit cabinet economizer controller shall be housed in a weather proof NEMA 4X enclosure.

## 1.2 Technical Description

All commercial building types served by packaged DX units, 24 in total, were considered for this work paper. There is no size restriction in terms of unit cooling capacity. All of these building types are served by packaged rooftop units with DX cooling and furnace heating.

To qualify for an incentive, the HVAC system type should be a Packaged DX unit with furnace heating or heat pump system. The customer must provide documentation showing that the economizer type on the HVAC system will be controlled per the prescribed device type and high limits dictated in the table shown in Section 1.4.1, per Title 24. Also, the economizer must be capable of providing simultaneous mechanical cooling when the economizer cannot satisfy the load alone. This measure is also applicable to economizers with differential dry bulb and fixed enthalpy + fixed dry bulb control types. Savings associated with these differing control strategies are expected to be greater than those determined by DEER which assumes a single dry bulb with a minimum high limit of 68 F (e.g., Econo with Econo-Lockout=NO, DB limit = 68, Max OSA = 100%). Therefore, the DEER measure used in this work paper results in a conservative savings estimate for the alternate control types described in the table shown in Section 1.4.1.

Measure savings were determined by DEER measure D03-058, which applies to both new and existing buildings. Only existing building types were considered for this work paper.

## 1.3 Installation Types and Delivery Mechanisms

The program/install type for the above measure is:

* Retrofit Add-On (REA).

**Installation Type Descriptions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Installation Type** | **Savings** | | **Life** | |
| 1st Baseline (BL) | 2nd BL | 1st BL | 2nd BL |
| Replace on Burnout (ROB) | Above Code or Standard | N/A | EUL | N/A |
| New Construction (NEW/NC) | Above Code or Standard | N/A | EUL | N/A |
| Retrofit or Early Replacement (RET/ER) | Above Customer Existing | Above Code or Standard | RUL | EUL-RUL |
| Retrofit First Baseline Only (REF) | Above Customer Existing | N/A | EUL | N/A |
| Retrofit Add-on (REA) | Above Customer Existing | N/A | EUL | N/A |

The delivery methods for this work paper are:

* Financial Support / Down-Stream Incentive – Deemed.
* Financial Support / Direct Install
* Midstream Programs / Mid-Stream Incentive

A delivery mechanism is a delivery method paired with an incentive method. Delivery mechanisms are used by programs to obtain program participation and energy savings.

**Delivery Method Descriptions**

|  |  |
| --- | --- |
| **Delivery Method** | **Description** |
| Financial Support | The program motivates customers, through financial incentives such as rebates or low interest loans, to implement energy efficient measures or projects. |
| Mid-Stream Programs | *See Mid-Stream Incentive in the Incentive Method Descriptions table.* |

**Incentive Method Descriptions**

|  |  |
| --- | --- |
| **Incentive Method** | **Description** |
| Direct Install | The program implements energy efficiency measures for qualifying customers, at no cost to the customer. |
| Down-Stream Incentive | The customer installs qualifying energy efficient equipment and submits an incentive application to the utility program. Upon application approval, the utility program pays an incentive to the customer. Such an incentive may be deemed or customized. |
| Mid-Stream Incentive  Mid-Stream Buy Down | The program gives a financial incentive to a midstream market actor (distributor, vendor, or retailer) to encourage the promotion of efficient measures. Buy Down means that the incentive is required to be passed down to the end-use customer. |

## 1.4 Measure Parameters

### 1.4.1 DEER Data

READI 1.0.5 [26] contains a reference to the DEER 2005 measure runs for adding a commercial economizer to a packaged DX system. Measure savings are sourced from these runs for all building types and SCE climate zones.

DEER Difference Summary

|  |  |
| --- | --- |
| **DEER Item** | **Used for Workpaper?** |
| Modified DEER methodology | No |
| Scaled DEER measure | No |
| DEER Base Case | Yes |
| DEER Measure Case | Yes |
| DEER Building Types | Yes |
| DEER Operating Hours | Yes |
| DEER eQUEST Prototypes | Yes |
| DEER Version | DEER 2014 1.0.5 |
| Reason for Deviation from DEER | No Deviation |
| DEER Measure IDs Used | D03-058 Economizer – Packaged System |

**Net-to-Gross Ratio**

The NTG values were obtained using the DEER READI tool. The relevant NTG values for the measures in this work paper are in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NTGR ID** | **Description** | **Sector** | **BldgType** | **Measure Delivery** | **NTGR** |
| Com-Default>2yrs, Ind-Default>2yrs, Agric-Default>2yrs | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Com | Any | Any | 0.6 |
| Com-Default-HTR-di, Ind-Default-HTR-di, Agricult-Default-HTR-di | All other EEM with no evaluated NTGR; direct install to hard-to-reach only. | Com | Any | Any | 0.85 |

Direct install measures that are not hard-to-reach will use the default NTG value.

This work paper includes measures that are offered via direct install activities into hard-to-reach (HTR) customer facilities. “Final Resolution E-4700”, dated December 18, 2014, defines specific criteria to classify customer facilities as HTR and also states that two criteria are sufficient to identify HTR customers if one of the criteria met is the geographic criteria.

SCE’s Commercial Direct Install program delivers free and low cost energy efficiency hardware retrofits through installation contractors to reduce peak demand and energy savings for small and medium commercial customers. The barriers for customer participation include limited capital resources, lack of expertise and understanding of the understanding of the benefits of energy efficiency, a suspicion of the “free offer” and its legitimacy, and language and cultural barriers. The program also addresses the ongoing concern with “split incentives”, where the customer is not the owner of the property, and therefore, lack incentive to improve their energy usage. SCE’s Commercial Direct Install program will track the following three (3) customer data points to identify direct install activities in HTR customer facilities. If geography and business size criteria are satisfied, SCE will identify the customer as HTR. If geography and language criteria are satisfied, SCE will identify the customer as HTR. Other measures in the Commercial Direct Install program will receive default NTG (NTGR\_ID: Com-Default>2), unless otherwise specified in DEER.

o **Business Size** – Customer must have less than ten employees

o **Language** – Customer’s primary language spoken is not English

o **Geography** – Businesses in areas other than the United States Office of Management and Budget (OMB) Combined Statistical Areas (CSA) of the San Francisco Bay Area, the Greater Los Angeles Area and the Greater Sacramento Area or the OBM metropolitan statistical areas or San Diego County

The “Required Corrections to Measure Level Input Parameters Identified by Commission Staff per D.14-10-046 Order Paragraph 16”, dated November 3, 2014, includes additional clarification for the geographic criteria:

“Notes on OMB CSA designations:

The OMB has designated a 12-county CSA titled the San Jose-San Francisco-Oakland, CA Combined Statistical Area which includes the nine counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma which border the San Francisco Bay plus the three counties of San Joaquin, Santa Cruz, and San Benito that are economically tied to the nine counties that that border the San Francisco Bay.”

The OMB definition of this CSA includes Los Angeles, Orange, San Bernardino, Riverside and Ventura counties.

The OMB definition of this CSA includes Sacramento, Yolo, El Dorado, Placer, Sutter, Yuba, and Nevada counties.”

**Spillage Rate**

Spillage rates are not tracked in work papers; they are tracked in an external document which will be supplied to the Commission Staff.

**Installation Rate**

The IR values were obtained using the DEER READI tool. The relevant IR values for the measures in this work paper are in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **GSIA ID** | **Description** | **Sector** | **BldgType** | **ProgDelivID** | **GSIAValue** |
| Def-GSIA | Default GSIA values | Any | Any | Any | 1 |

**Effective and Remaining Useful Life**

The EUL and RUL values were obtained using the DEER READI tool. DEER defines the RUL as 1/3 of the EUL value. The RUL value is only applicable to the first baseline period for an RET measure with an applicable code baseline. The relevant EUL and RUL values for the measures in this work paper are in the table below.

The EUL of the measure is capped at the remaining useful life of split and package equipment (DEER EUL\_ID’s HVAC-airAC and HVAC-airHP) , or a third of 15 years, as it is likely that the economizer would be removed with the equipment once it reaches the end of its remaining useful life.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** |
| HVAC-airAC | Air Conditioners (air-cooled, split and unitary) | Com | HVAC | 15 | 5 |

### 1.4.2 Codes and Standards Analysis

An air-side economizer is mandated by Title 24 2013 for any cooling fan system with a total mechanical cooling capacity over 54,000 Btu/hr. Although Title 24 2013 standards require air-side economizers for these system types, Title 24 2013 standards are not invoked by the installation of this retrofit add-on measure.

Code Summary

|  |  |  |
| --- | --- | --- |
| **Code** | **Reference** | **Effective Dates** |
| Title 24 (2013) | Section 144 (1) | July 1, 2014 |

## 1.5 EM&V, Market Potential, and Other Studies – Base Case and Measure Case Information

N/A

## 1.6 Data Quality and Future Data Needs

N/A

# Section 2. Calculation Methodology

The following table indicates which measures are taken directly from or created with the DEER READI tool.

READI Data Used

|  |  |  |
| --- | --- | --- |
| **Measure Code** | **Measure Name** | **READI Data** |
| AC-60978 | < 54 kBtu/hr Package System Economizer replacing System with no Economizer |  |
| AC-64196 | > 54 kBtu/hr Package System Economizer replacing System with no Economizer |  |

# Section 3. Load Shapes

The ideal load shape for net benefits estimates would represent the difference between the base case and measure case. The closest load shapes that are applicable to the measures in this work paper are listed in the table below.

Building Types and Load Shapes

|  |  |  |
| --- | --- | --- |
| **Building Type** | **Load Shape** | **E3 Alternate Building Type** |
| Assembly | Economy\_cycle-Ret | Large\_Office |
| Education - Community College | Economy\_cycle-Ret | College\_University |
| Education - Primary School | Economy\_cycle-Ret | Small\_Office |
| Education - Relocatable Classroom | Economy\_cycle-Ret | Small\_Office |
| Education - Secondary School | Economy\_cycle-Ret | Small\_Office |
| Grocery | Economy\_cycle-Ret | Small\_Office |
| Health/Medical - Hospital | Economy\_cycle-Ret | College\_University |
| Health/Medical - Nursing Home | Economy\_cycle-Ret | Small\_Office |
| Lodging - Hotel | Economy\_cycle-Ret | Small\_Office |
| Manufacturing - Bio/Tech | Economy\_cycle-Ret | Large\_Office |
| Manufacturing - Light Industrial | Economy\_cycle-Ret | Large\_Office |
| Office - Small | Economy\_cycle-Ret | Small\_Office |
| Restaurant - Fast-Food | Economy\_cycle-Ret | Restaurant |
| Restaurant - Sit-Down | Economy\_cycle-Ret | Restaurant |
| Retail - Single-Story Large | Economy\_cycle-Ret | Large\_Retail\_Store |
| Retail - Small | Economy\_cycle-Ret | Small\_Retail\_Store |
| Storage - Conditioned | Economy\_cycle-Ret | Large\_Retail\_Store |
| Warehouse - Refrigerated | Economy\_cycle-Ret | Large\_Retail\_Store |

# Section 4. Costs

The 2010-2012 WO017 Ex Ante Measure Cost Study – Itron was reviewed and evaluated for cost source on measure; however, this study does not support the subject measure. Hence, all cost documentation on measure was obtain from the 2014 RS Means Mechanical Cost Data [413] and 2014 RS Means Commercial Renovation Cost Data [414].

## 4.1 Base Case Cost

Since this is an REA application for a retrofit on existing equipment, the base case cost is zero.

## 4.2 Measure Case Cost

The proposed costs are based on the following assumptions: 1) the control system assumes that the room air temperature equivalent to the return air temperature. As a result, the installation of a new return air sensor is not included. 2) Metal work and modifications are not needed to retrofit the AC or HP unit and/or to accommodate economizer module onto existing package equipment. 3) Costs are assumed for a unitary economizer with no connection to existing controller. 4) Wiring is assumed to be integrated into the below cost and controller is assumed to be wired into retrofit system. 5) Start-up includes both functional testing and calibration of the installed equipment.

Labor and Equipment Costs for Economizer Installation

Equipment Cost

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Location** | **Unit Cost ($)** | **Unit** | **Qnty** | **Total Cost ($)** | **Resources** |
| Variable Volume Modulating Motorized Damper, including Electric Motor | Outdoor Air Dampers - 24" x 12" | $143.00 | Ea | 2 | $286.00 | 2014 RSMeans Commercial Renovation Cost Data, 23 33 13.13 7560 & 7564 – Bare Material Cost |
| Return Air Dampers - 24" x 24" | $160.00 | Ea | 1 | $160.00 |
| Temperature Sensors | (Analog Input) Sensor for the Outdoor Air | $167.00 | Ea | 1 | $167.00 | 2014 RSMeans Mechanical Cost Data, 23 09 53.10 3560 – Bare Material Cost |
| Controller | Unitary Economizer Controller | $495.50 | Ea | 1 | $495.50 | 2014 RSMeans Mechanical Cost Data, 23 09 53.10 0890 – Bare Material Cost |
| Materials Subtotal | | | | | $1,108.50 |  |
| **Normalized equipment cost for a 65,000 Btu/hr (5.41 ton) unit** | | | | | **$204.90/ton** |  |
| Labor Cost | | | | | | |
| Variable Volume Modulating Motorized Damper, including Electric Motor | Outdoor Air Dampers - 24" x 12" | $54.50 | Ea | 2 | $109.00 | 2014 RSMeans Commercial Renovation Cost Data, 23 33 13.13 7560 & 7564 – Bare Material Cost |
| Return Air Dampers - 24" x 24" | $73.00 | Ea | 1 | $73.00 |
| Temperature Sensors | (Analog Input) Sensor for the Outdoor Air | $38.50 | Ea | 1 | $38.50 | 2014 RSMeans Mechanical Cost Data, 23 09 53.10 3560 – Bare Labor Cost |
| Controller | Unitary Economizer Controller | $53.50 | Ea | 1 | $53.50 | 2014 RSMeans Mechanical Cost Data, 23 09 53.10 0890 – Bare Labor Cost |
| Economizer Start-Up | Validate economizer operation and economizer damper modulation per temp. limits under cooling/heating | $105.00 | Ea | 1 | $105.00 | 2014 RSMeans Mechanical Cost Data, 23 09 23.10 4700 – Total Cost |
| *Labor Subtotal* | | | | | *$379.00* |  |
| ***Normalized labor cost for a 65,000 Btu/hr (5.41 ton) unit*** | | | | | ***$70.06/ton*** |  |

## 4.3 Full and Incremental Measure Cost

**Full and Incremental Measure Cost Equations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | |
| **1st Baseline** | **2nd Baseline** |
| ROB | (MEC + MLC) – (BEC + BLC) | (MEC + MLC) – (BEC + BLC) | N/A |
| NEW/NC |
| RET/ER | (MEC + MLC) – (BEC + BLC) | MEC + MLC | (MEC + MLC) – (BEC + BLC) |
| REF | (MEC + MLC) – (BEC + BLC) | MEC + MLC | N/A |
| REA | MEC + MLC | MEC + MLC | N/A |

MEC = Measure Equipment Cost; MLC = Measure Labor Cost

BEC = Base Case Equipment Cost; BLC = Base Case Labor Cost

**Full and Incremental Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure** | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | |
| **1st Baseline** | **2nd Baseline** |
| AC-60978 | REA | $274.96 | $274.96 | N/A |
| AC-64196 | REA | $274.96 | $274.96 | N/A |

# Attachments

1. 

# References



[26]

[413]

[414]

1. Table adapted from: 2013 Building energy Efficiency Standards Table 140.4-B Air Economizer High Limit Shut Off Control Requirements [↑](#footnote-ref-1)