**Work Paper PGECOREF101**

**Night Covers for Display Cases**

**Revision # 6**

**Pacific Gas & Electric Company**

**Customer Energy Solutions Department**

**Night Covers for Open Vertical and Horizontal Display Cases (Low and Medium Temperature Cases)**

**Measure Code HA66**

**PGECOREF101 R6 Night Covers**

PG&E is using the SCE work paper Work Paper SCE13RN005 ex-ante values for PG&E measure codes HA66. The ex-ante values are located in file name: SCE13RN0051 – Night Covers for Vertical and Horizontal LT and MT Display Cases.xlsm

The measure mapping is as follows:

PG&E Measure code HA66 = SCE code RF-96857

**Work Paper SCE13RN005**

**Revision 2**

**Southern California Edison Company**

**Night Covers for Open**

**Vertical and Horizontal**

**Display Cases (Low and**

**Medium Temperature Cases)**

# At-a-Glance Summary

|  |  |
| --- | --- |
| ****Applicable Measure Codes:**** | PG&E Measure code HA66 = SCE code RF-96857 |
| **Measure Description:** | Installation of night covers on existing low temperature open vertical (or multi-deck) and horizontal (or coffin type) cases, as well as medium temperature open vertical display cases |
| **Base Case Description:** | Low temperature open vertical (or multi-deck) and horizontal (or coffin type) cases, as well as medium temperature open vertical display cases with no night cover |
| **Energy Impact Common Units:** | per (linear) ft. |
| **Energy Savings :** | Refer to Excel Calculation Attachment |
| **Gross Measure Cost ($/unit)** | Refer to Excel Calculation Attachment |
| **Measure Incremental Cost ($/unit):** | Refer to Excel Calculation Attachment |
| **Effective Useful Life (years):** | Source: DEER 2014-EUL-table-update-2014-02-05  5 years |
| **Measure Application Type:** | Retrofit Add-on |
| **Net-to-Gross Ratios:** | Source: DEER2011\_NTGR\_2012-05-16.xls  0.6 or 0.85 depending of difficulty of installation |
| **Important Comments:** | This work paper document does not contain a data set in conformance with the 4/1/14 CPUC Ex Ante Database Specification; SCE will provide that data set separately.  Major changes for Revision 1 include: updated the work paper based on DEER 2014 code update, updated eQuest prototype from MASControl version 3.00.20. Also, updated the eQuest model weather files per DEER2014 CZ2010 weather data files and used READI tool version 2.0.1 for 2013-2014 cycle. |

# Document Revision History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Workpaper and Revision # | Tech. Revision | MM/DD/YY | Author/Affiliation | Summary of Changes |
| SCE13RN005  Revision 0 | No | 05/04/2012 | Yin Yin Wu/BASE Energy, Inc.  Christopher Fernandez /BASE Energy, Inc. | This is the original work paper for the bridge cycle 2013-2014 |
| SCE13RN005  Revision 1 | No | 6/23/2014 | Yin Yin Wu/BASE Energy, Inc. | -Updated the work paper based on DEER 2014 code update  -Used the updated eQuest prototype from MASControl version 3.00.20  -Updated the eQuest model weather files per DEER2014 CZ2010 weather data files  -Used READI tool version 2.0.1 for 2013-2014 cycle |
| SCE13RN005  Revision 2 | Yes | 5/20/2016 | Yin Yin Wu, P.E./  BASE Energy, Inc.  Mark Ritchie, P.E./  BASE Energy, Inc. | -Measure cost updated based on data received from vendors.  -Updated report format per the most recent Statewide Work Paper Template. |

# Commission Staff and Cal TF Comments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rev | Party | Submittal Date | Comment Date | Comments | WP Developer Response |
|  |  |  |  | N/A |  |

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

# Section 1. General Measure & Baseline Data

## 1.1 Measure Description & Background

This work paper discusses the retrofit add-on installation of night covers on existing low temperature open vertical (or multi-deck) and horizontal (or coffin type) display cases, as well as medium temperature open vertical display cases. The base case for this measure is for display cases that do not use night covers. Table 1 below summarizes the measures evaluated for this work paper.

Table 1 Base, Standard and Measure Cases

|  |  |
| --- | --- |
| Case | Description of Typical Scenario |
| **Measure #1: RF-45862** | |
| Measure | Low Temperature Open Horizontal Night Cover |
| Existing Condition | Low Temperature Open Horizontal Refrigerated Display Case Without a Night Cover |
| Code/Standard | N/A |
| Industry Standard Practice | Without a Night Cover |
| **Measure #2: RF-96857** | |
| Measure | Low Temperature Open Vertical Night Cover |
| Existing Condition | Low Temperature Open Vertical Refrigerated Display Case Without a Night Cover |
| Code/Standard | N/A |
| Industry Standard Practice | Without a Night Cover |
| **Measure #3: RF-25748** | |
| Measure | Medium Temperature Open Vertical Night Cover |
| Existing Condition | Medium Temperature Open Vertical Refrigerated Display Case Without a Night Cover |
| Code/Standard | N/A |
| Industry Standard Practice | Without a Night Cover |

Table 2 Measures and Codes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Measure Codes | | | | Measure Name |
| SCG | SDG&E | SCE | PG&E |
|  |  | RF-96857 | HA66 | Low Temperature Open Vertical Night Cover |

These measures apply to non-residential buildings that utilize a low temperature open vertical (or multi-deck) and horizontal (or coffin type), and medium temperature open vertical display case for food products. The space where display cases are located should have space cooling and heating. The night covers should be applied for a minimum of six hours per day. This measure should be implemented with a film type cover with small perforated holes to decrease moister build-up.

The rebates for these measures are a part of the Express program. To qualify for the incentive, the following requirements must be met:

* The night cover must be installed on an otherwise open display case to decrease cooling load of the refrigerated case during off hours.
* The display case temperature set point is between 4 and 24 degrees Fahrenheit for low-temp cases, and between 24 and 38 degrees Fahrenheit for medium-temp cases.
* The linear footage of the installed night cover must be properly measured as the incentive is based on the linear footage of the installed night cover.
* The night cover must be applied for an average period of at least 6 hours per day.
* The display cases which have the installed night covers must have the following:
  + Compressor capacity modulation mechanisms (such as variable-speed drive (VSD) or cylinder unloader).
  + Evaporator pressure regulators (EPR) set to higher suction temperatures when night covers are applied.
  + Resized TXVs set with higher suction pressures when covers are applied.
  + Applications must include information regarding modifications to or proof of existing refrigeration capacity modulation controls.
* The night covers must be installed by an authorized product representative where the installer can verify that the night covers are compatible with the display cases so that they do not degrade system performance.

**Pacific Gas and Electric requirements:**

* Installation address must have a commercial electric account with PG&E.
* Must install a cover on an existing open refrigerated display case to decrease cooling load of the refrigerated case during off hours.
* Case manufacturer must not object to the use of night covers.
* Rebate is based on linear footage of the installed night cover.
* Customer should consider using proper compressor capacity modulation mechanisms [such as Variable Speed Drive (VSD) or cylinder un-loader], Evaporator Pressure Regulators (EPR) and possibly resetting to higher suction temperatures when covers are applied.
* The cover must be applied for a period of at least six hours.
* This measure should be implemented with a film type cover with small perforated holes to decrease moister build-up.

## 1.2 Technical Description

This work paper discusses the retrofit add-on installation of night covers on existing low temperature open vertical (or multi-deck) and horizontal (or coffin type) display cases, as well as medium temperature open vertical display cases. It is recommended that these covers be a film type cover with small perforated holes to decrease moisture build-up and must be applied for a period of at least six hours. These types of display cases can be found in small- and medium-to-large size grocery stores. Medium-temperature display cases are used to stock dairy, deli, fish and meat. Low-temperature display cases are used to stock frozen food and ice cream. The air temperature inside medium and low temperature display cases can range from +10 to +35°F and -25 to -15°F, respectively [A]. Since the majority of the losses are due to infiltration this work paper only considers infiltration.

## 1.3 Installation Types and Delivery Mechanisms

This work paper addresses retrofit add-on installations of the night covers. The delivery methods are:

* Financial Support - Down Stream Incentive – Deemed
* Financial Support – On-bill Finance – loan
* Financial Support – Direct Install

**Table 3 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 |

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.

**Table 4 Delivery Method Descriptions**

|  |  |
| --- | --- |
| Delivery Method | Description |
| Appliance Turn-in and Recycling | The program motivates customers, through financial incentives, to recycle appliances that are functional but inefficient. This prevents the continued use of those appliances, by both the current owner and potential future owners. |
| Audit/Information/Testing Services | The program performs a free assessment of a customer’s facility and provides the customer with information and guidance on energy efficiency opportunities. |
| Commissioning and Retrocommissioning | The program modifies or repairs existing equipment to ensure that it works as intended. |
| Financial Support | The program motivates customers, through financial incentives such as rebates or low interest loans, to implement energy efficient measures or projects. |
| Innovative Design | The program funds new ideas that meet reasonable scientific scrutiny for potential energy savings. These innovative measures typically have small market penetration (less than 5%) or are targeted toward relatively unreached market segments. |
| New Construction | The program offers financial incentives and/or design assistance to customers involved with new building construction. This is intended is to motivate customer to exceed Title 24 building energy efficiency requirements (residential or nonresidential). |
| Partnership | The program implements projects through a partnership between the utility and an institutional, government, or community-based organization. |
| Performance Based | The program offers financial incentives that vary based on the energy efficiency performance of specific projects. |
| Up-Stream Programs | See Up-Stream Incentive and Up-Stream Buy Down in the Incentive Method table. |

**Table 5 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 | The program gives a financial incentive to a midstream market actor, such as a retailer or contractor, to encourage the promotion of efficient measures. The incentive may or may not be passed on to the end-use customer. |
| Up-Stream Incentive | The program gives a financial incentive to an upstream market actor, such as a manufacturer or distributor, to encourage the manufacture, provision, or distribution of an efficient measure. The incentive may or may not be passed on to the end-use customer. |
| Up-Stream Buy Down | The program gives a financial incentive to an upstream market actor, such as a manufacturer or distributor, with specific requirements to pass down the incentive to the end use customer. Such an incentive buys-down the cost of an efficient measure for the end-use customer by at least the amount of the financial incentive. |
| Giveaway | The program provides customers with energy efficiency equipment or services for free. |
| Exchange/Replacement | The utility program holds events where customers can trade functional equipment for similar but more energy efficient equipment, free of charge. |
| On-bill Finance/Loan | The program offers financing for the cost an efficient measure as part of the utility bill. This can be an add-on option to an existing program or can serve as an organizing principle for its own program. |

## 1.4 Measure Parameters

## 1.4.1 DEER Data

Measure ID D03-205 in the 2014 Database for Energy Efficient Resources (DEER) READI tool addresses installing night covers on medium-temperature open display cases.It does not address installing night covers on low-temperature open display cases (vertical or horizontal). The DEER 2014 savings are based on applying covers for a period of four hours and the database does not distinguish between vertical and horizontal cases. Also, the measure characteristics presents the savings due to installing infiltration barrier as 50%, this compares favorably with other studies on horizontal display cases and thus it is assumed that the database is referring to horizontal cases only. For medium-temperature display cases, existing DEER 2014 values are used.

Table 6 DEER Difference Summary

|  |  |
| --- | --- |
| DEER Item | Used for Workpaper? |
| Modified DEER methodology | Yes |
| Scaled DEER measure | No |
| DEER Base Case | No |
| DEER Measure Case | No |
| DEER Building Types | Yes |
| DEER Operating Hours | No |
| DEER eQUEST Prototypes | Yes |
| DEER Version | DEER 2014 |
| Reason for Deviation from DEER | DEER does not include installing night covers on low-temperature open display cases (vertical or horizontal). |
| DEER Measure IDs Used (Sample) | D03-205 – Medium Temperature |

**Net to Gross**

The NTG value was obtained from the “DEER2011\_NTGR\_2012-05-16.xls” on the DEER website as required by Version 5 of the California Public Utilities Commission (CPUC) Energy Efficiency Policy Manual [351]. The relevant NTGR for this measure is shown in Table 7 below.

Table 7 Net-to-Gross Ratio

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NTGR\_ID\* | Description\* | Sector\* | BldgType\* | Measure Delivery\* | NTG\* |
| Com-Default>2yr | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Com | Any | All | 0.6 |
| Com-Default-HTG-di | All other EEM with no evaluated NTGR; direct install to hard-to-reach only. | Com | Any | DirInstall | 0.85 |

\*Denotes that the column is taken from the DEER NTG Table.

**Spillage Rate**

Spillage rate will also be applied to measures however the values will not be tracked in the workpapers. The spillage rate will be tracked in an external table to be supplied to the Energy Division.

**Installation Rate**

The installation rate (IR) is identified in the calculation attachment. This value is obtained from the support table available in READi. Currently there is no versioning on the installation rate table. To address appropriate selection of the installation rate the date of the workpaper will serve as the last date checked for updated IR values. The installation rate varies by end use, sector, technology, application, and delivery method. The relevant IR values for this measure are shown in Table 8.

Table 8 Installation Rate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| GSIA\_ID | Description | Sector | BldgType | ProgDelivID | GSIAValue |
| Def-GSIA | Default GSIA values | Any | Any | Any | 1 |

**Effective and Remaining Useful Life**

DEER14 update documentation provides EUL and RUL information to be used for the 2015 program cycle extension on [www.deeresources.com](http://www.deeresources.com). The DEER documentation “Summary of EUL-RUL Analysis for the April 2008 Update to DEER” provides the RUL value as a flat 1/3 of the EUL value. The RUL value will only be applied to the first baseline period for retrofit measures that have applicable code that will affect the energy savings. In all other installation types and retrofit with no applicable code that affects the energy savings, the RUL is not applicable to either the first or second baseline period.

To obtain the EUL value the DEER14 update documentation, DEER2014-EUL-table-update-2014-02-05.xls [213], was consulted. Table 9 below identifies the value/methodology used for the measures in this work paper.

Table 9 DEER14 EUL Value/Methodology

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| READi EUL ID | Market | Enduse | Measure | EUL (Years) | RUL (Years) |
| GrocDisp-DispCvrs | Non-Residential | Refrigeration | Night Covers for vertical and horizontal refrigerated display cases | 5 | N/A |

### 1.4.2 Codes and Standards Analysis

This measure is not governed by either State, such as Title 24 (2013) [355] and Title 20 (2014) [C], or Federal codes and standards.

Table 10 Code Summary

|  |  |  |
| --- | --- | --- |
| Code | Applicable Code Reference | Effective Dates |
| N/A | N/A | N/A |

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

This section is not applicable

## 1.6 Data Quality and Future Data Needs

This section is not applicable

# Section 2. Calculation Methodology

Table 11 contains the data files for measures that are taken directly from the DEER 2014 READI Tool version 2.0.1 or were created using the READI Tool. These results have not been modified and are only being included in the workpaper for reference.

Table 11 READi Tool Outputs

|  |  |  |
| --- | --- | --- |
| Solution Code | Measure Name | READi Results |
| RF-25748 | Medium Temperature Open Vertical Night Cover | Attachment B |

The following assumptions were made for the calculations of this work paper:

* The building simulation models were generated for a Grocery Store with multiplex-compressor systems for the refrigeration display cases. Single-compressor systems are less efficient than multiplex-compressor systems. According to the DEER Report [26], single-compressor systems were typically designed prior to 1980. To be conservative, it is assumed that the generated energy savings of this work paper will also be applied to display cases with single-compressor systems.
* This work paper is applied to display cases located inside a space which has space heating and space cooling. The unit energy savings is represented per linear-foot of the display case. The resulted savings involve savings of refrigeration load reduction and space heating load reduction. Note that there is also a slight increase to the space cooling energy consumption. The building simulation models were generated for a Grocery Store. Since the heat gain to a display case mainly depends on the temperature maintained for the display case and the surrounding space temperature, it is assumed that the building types would not have significant impact on the energy savings. Thus, the resulted savings of Grocery Store is applied to all other building types considered in this work paper with building vintage weights.

The energy savings and demand reduction for this work paper is based on applying night covers on the following display case types: low temperature open horizontal, low temperature open vertical and medium temperature open vertical. The display cases are applicable to, but not limited to, grocery stores. According to the DEER Report [26], the majority of heat gain of an open display fixture is via infiltration. Covering open fixtures during hours the store is closed can reduce convection by 50% or more during this time, resulting in refrigeration load reductions.

The Medium Temperature Open Vertical Night Cover measure of this work paper is addressed in both the 2014 DEER READI Tool and the 2004-2005 Database for Energy Efficiency Resources (DEER) Update Study final Report of measure ID D03-205. Please refer to the DEER Report Section 6 for details of DEER Building Prototypes generated by eQuest (a graphical interface to DOE-2.2), Section 7.3 for general description for grocery refrigeration measures, and Page 7-74 for detail descriptions of this measure. The unit energy savings of this measure is obtained from READI, a DEER2014 Database Tool. The DEER measure ID D03-205 assumes constant infiltration for all hours as the base case, and the measure case applies a multiplier of 0.50 to the infiltration for night cover application. The energy savings reported in DEER 2014 are given per climate zone and per vintage for grocery store buildings. The savings for medium temperature night covers is taken from the DEER READI Tool for 2014 vintage (which is a conservative assumption). The finals savings can be found in Attachment A.

The measures are weather sensitive and the building energy simulation tool eQuest V3.65 was used to determine the annual impacts. The built-in, Code 2013 DEER building prototypes of grocery store, generated by MASControl version 3.00.20, were used for simulations of the other two measures: Low Temperature Open Horizontal Night Cover and Low Temperature Open Vertical Night Cover. The DEER building prototypes consider multiplex-compressor systems as the refrigeration type. Using the same methodology as the DEER measure ID D03-205, the simulation modes assume constant infiltration for all hours as the base case, and the measure case applies a multiplier of 0.50 to the infiltration for 6 hours per day between mid-night to 6 A.M. with night covers applications on the low temperature open horizontal and vertical display cases.

The DEER building prototypes have built-in refrigeration fixtures for low temperature open horizontal display cases. These fixture models were used for the Low Temperature Open Horizontal Night Cover measure simulations. Since no built-in refrigeration fixtures are available for low temperature open vertical display cases, a low temperature open vertical display case was added in the DEER building prototypes for the Low Temperature Open Vertical Night Cover measure simulations. Components of the low temperature open vertical display case model are included in Table 12 .

Table 12 Summary of Modeled Low Temperature Open Vertical Display Case

|  |  |
| --- | --- |
| **Component** | **Values** |
| Evaporator Fan Power | 0.0251 (kW/ft) \* |
| Lighting Power | 0.0199 (kW/ft) \* |
| Defrost | 2,474 (Btu/hr-ft) |
| Anti-Sweat Power | 0.05 (kW/ft) |
| Infiltration Load | 1303.5 (Btu/hr-ft) |
| Conduction Load | 248.8 (Btu/hr-ft)\* |
| Total Refrigeration Load | 1918.9 (Btu/hr-ft) \* |
| Saturated Evaporator Temperature | -16.9 (°F) \* |
| Line-Up Length | 24 (ft) |

Source: DOE 2009a, Appendix D [B]

\* Average value of all efficiency levels considered for low temperature open vertical display cases.

Once the base case and measure case model simulations were completed, the energy demand savings could be determined. Comparing the total energy consumption (electricity and natural gas) of both models, the total energy savings were determined. The unit energy savings, in kWh/yr-ft2 for electricity and therm/yr-ft2 for natural gas, were calculated by dividing the total energy consumptions by the total line-up length of the display cases. Refer to Attachment [C] for summary of savings outputs.

Since the night covers will be applied during hours the store is closed, which are in the night time, implementing this measure will not impact the energy demand during peak period. Thus, it will not result in any demand reduction.

# Section 3. Load Shapes

The difference between the base case load shape and the measure load shape would be the most appropriate load shape; however, only end-use profiles are available. Therefore, the closest load shape chosen for this measure is the Refrigeration load shape. See Table 13 for a list of all Building Types and Load Shapes. See the KEMA report [31] for a more thorough discussion regarding the load shapes for this measure.

Table 13 Building Types and Load Shapes

|  |  |  |
| --- | --- | --- |
| Building Type | E3 Alt. Building Type | Load Shape |
| Assembly | Assembly | Refrigeration |
| Grocery | Grocery\_Store | Refrigeration |
| Food Store | Food\_Store | Refrigeration |
| Restaurant - Fast-Food | Fast\_Food\_Restaurant | Refrigeration |
| Restaurant - Sit-Down | Sit\_Down\_Restaurant | Refrigeration |
| Retail - Multistory Large | Retail - Multistory Large | Refrigeration |
| Retail - Single-Story Large | Retail - Single-Story Large | Refrigeration |
| Retail - Small | Retail - Small | Refrigeration |

# Section 4. Costs

The methodology from the 2010-2012 WO017 Ex Ante Measure Cost Study Final Report [D] is adopted to develop the measure case cost data, which is based on a survey of vendors.

## 4.1 Base Case Cost

As these measures are Retrofit – Add-Ons, the base case assumes the refrigerated display cases are not equipped with night covers. Hence, there is no cost ($0.00 per unit) associated with the base case.

## 4.2 Measure Case Cost

The method used in WO017 is based on a survey of vendors. Also, a contractor margin of 0.34 was added to the material cost in WO017. Considering the same vendor survey method and using the same general labor rate as WO017, the average material and labor costs for both medium and low temperature night covers for open horizontal and vertical refrigerated display cases are calculated to be $72.59 and $5.00 per linear foot of night cover, respectively. Hence, the total measure cost = $72.59 (material) + $5.00 (labor) = $77.59 per linear foot. Refer to Attachment-E for the measure case cost supporting document.

## 4.3 Full and Incremental Measure Cost

**Table 14 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

**Table 15 Full and Incremental Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Measure | Installation Type | Incremental Measure Cost | Full Measure Cost | |
| **1st Baseline** | **2nd Baseline** |
| **RF-45862**:  Low Temperature Open Horizontal Night Cover | REA | $77.59/ft | $77.59/ft | N/A |
| **RF-96857**:  Low Temperature Open Vertical Night Cover | REA | $77.59/ft | $77.59/ft | N/A |
| **RF-25748**:  Medium Temperature Open Vertical Night Cover | REA | $77.59/ft | $77.59/ft | N/A |

# Attachments

The attachment files are saved separately and not embedded in the Word document.

[Attachment-A]

Calculation Template 2015 v3\_SCE13RN005.xlsm

[Attachment-B]

READi-EnergyImpacts\_D03-205\_SCE13RN005

[Attachment-C]

SCE13RN005 - Savings Summary

[Attachment-D]

SCE13RN005 – eQuest Models

[Attachment-E]

Night Cover Costs

# References

The Reference file has been saving separately and not embedded in the Word Document.

[26]

[31]

[132]

[213]

[215]

[355]

[A] ASHRAE 2006. Refrigeration Handbook. Atlanta, Georgia. pp. 46.2, Table 1.

[B] DOE 2009a. Energy Conservation Standards for Commercial Refrigeration Equipment:

Technical Support Document, U.S. Department of Energy, January 2009.

<http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/commercial_refrig_report_10-09.pdf>

APPENDIX D. ANNUAL ENERGY SIMULATION INPUTS AND RESULTS FOR COMMERCIAL REFRIGERATION EQUIPMENT: <http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/cre_tsd_appendixd.pdf>

[C] 2014 Appliance Efficiency Regulations (Title 20), CEC-400-2014-019-CMF (2014).

[D] “2010-2012 WO017 Ex Ante Measure Cost Study Final Report”, prepared for California Public

Utilities Commission, prepared by Itron, Inc., May 27, 2014.