Work Paper SCE13CC014

**Revision 3**

**Southern California Edison**

**Commercial Hand Wrap Machines**

# At-a-Glance Summary

|  |  |
| --- | --- |
| **Measure Codes** | FS-77556 |
| **Measure Description** | On-demand commercial electric hand wrap machine |
| **Base Case Description** | Always-on commercial electric hand wrap machine |
| **Units** | Unit |
| **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** | FoodHandWrap: 10 years |
| **Measure Installation Type** | Replace on Burnout (ROB) |
| **Net-to-Gross Ratio** | ET-Default: 0.85 |
| **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 | 1/19/2015 | Jason Wang (SCE) | New work paper based on ET study. |
| 1 | 5/6/2015 | Jason Wang (SCE) | Resubmitting work paper in response to CPUC Preliminary Review. No values are changed in this revision. |
| 2 | 01/15/2016 | Ajay Wadhera/Solaris | -New template update for 2016 program year  -WP effective from 1/1/2016 thru 12/31/2016  -Removed SCE building types |
| 3 | 04/22/2016 | Ajay Wadhera/Solaris | -Added Office Small building type |

# 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

## Measure Description & Background

This work paper details the replacement of always-on commercial electric hand wrap machines with on-demand commercial electric hand wrap machines.

**Base, Standard, and Measure Cases**

|  |  |
| --- | --- |
| **Case** | **Description of Typical Scenario** |
| Measure | Always-on commercial electric hand wrap machine |
| Existing Condition | On-demand commercial electric hand wrap machine |
| Code/Standard | N/A |
| Industry Standard Practice | N/A |

Measures and Codes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Codes** | | | | **Measure Name** |
| SCG | SDG&E | SCE | PG&E |
| N/A | N/A | FS-77556 | N/A | On-demand Hand Wrap Machine replacing Always-on Hand Wrap Machine |

**Eligibility Requirements**

* Measure case hand wrap machine must use either a mechanical or optical control system.
* All climate zones are eligible.
* Grocery, Food Store, and Misc. Commercial building types are eligible.

**Implementation Requirements**

The hand wrap machine should be installed by a manufacturer-recommended service technician.

## Technical Description

Food items such as meat and cheese are often placed in trays and wrapped in plastic film before being put on display. This protects the food from airborne organisms and dust, allows customers to view the product, and provides a surface for pasting information labels. A hand wrap machine consists of a heating bar and a heating platform, rated at approximately 50 W and 0.55 kW, respectively. The heating bar is used to cut the wrapping film as it comes in contact with the heating bar. The heating platform is used to heat up the wrapping film. When the wrapping film is heated, the film sticks to the package and seals the product. With conventional (always-on) hand wrap machines, both heating elements are kept at a constant temperature of 280 °F.

An on-demand hand wrap machine is similar to a conventional one, but it has a more powerful heating platform (rated at approximately 2 kW) which is switched on/off by a controller. By default, the heating platform is OFF. The two types of controllers are:

* A mechanical system where pressure must be applied down onto the heating platform. Applying pressure to the heating platform engages a switch, which activates the 2 kW heating platform until the switch is disengaged, or for a maximum of 3 seconds.
* An optical system which uses an optical eye to detect that an item is being sealed. The optical eye is placed in the front center of the heating platform. When a package is set on the heating platform, light is reflected into the eye, which activates the heating platform until the item is removed, or for a maximum of 3 seconds.

  
Figure 1: Always-on (left) and On-demand (right) hand wrap machines



Figure 2: Hand wrapping

## Installation Types and Delivery Mechanisms

The delivery method is Financial Support - Down-Stream Incentive – Deemed.

The install type is ROB (Replace-on-Burnout).

**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 |

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. |

**Incentive Method Descriptions**

|  |  |
| --- | --- |
| **Incentive Method** | **Description** |
| 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. |

## 1.4 Measure Parameters

### 1.4.1 DEER Data

DEER 2015 does not contain measures for hand wrap machines.

DEER Difference Summary

|  |  |
| --- | --- |
| **DEER Item** | **Used for Workpaper?** |
| Modified DEER methodology | No |
| Scaled DEER measure | No |
| DEER Base Case | No |
| DEER Measure Case | No |
| DEER Building Types | No |
| DEER Operating Hours | No |
| DEER eQUEST Prototypes | No |
| DEER Version | N/A |
| Reason for Deviation from DEER | DEER does not contain this type of measure. |
| DEER Measure IDs Used | N/A |

**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** |
| ET-Default | Emerging Technologies approved by ED through work paper review | Any | Any | Any | 0.85 |

**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.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** |
| FoodHandWrap | Hand Wrap Machine | Com | FoodServ | 10 | 3.3 |

### 1.4.2 Codes and Standards Analysis

**Title 24 (2013) [355]:** These measures do not fall under Title 24 of the California Energy Regulations.

**Title 20 (2015) [493]:** The Title 20 Appliance Efficiency Regulations have a category for cooking appliances, but hand wrap machines are not included.

### ASTM Standards: There are not ASTM standards for hand wrap machines.

**Federal Standards:** These measures do not fall under Federal DOE or EPA Energy Regulations.

Code Summary

|  |  |  |
| --- | --- | --- |
| **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

### 1.5.1 Non-DEER Study Review

Emerging Products study ET13SCE1190 “Vacuum-Sealing and Packaging Machines for Food Service Applications Field Test” [483] was used as the source of savings for this work paper.

## 1.6 Data Quality and Future Data Needs

N/A

# Section 2. Calculation Methodology

## 2.1 Electric Energy Savings Estimation Methodologies

Measure savings are the result of eliminating standby losses. Using on-demand controls prevents the heating platform from being maintained at an elevated temperature when not in use. Although an on-demand hand wrap machine has a more powerful heating element than an always-on machine (2 kW compared to 0.55 kW), its total hours of operation are much less. Typical operating hours are 20 hours/day for always-on machines. Since hand wrap machines are not frequently used, there is substantial savings potential.

The Emerging Products study involved field tests with four major supermarket chains found throughout SCE’s service territory. Monitoring was performed at a total of 10 supermarkets, in the bakery, deli and meat departments. Both baseline and measure case hand wrap machines were monitored for six weeks, at a 10 second interval. Table below shows the results for each chain, and for all chains averaged. For each chain, first an average is taken for all bakery and deli departments, and then another average is taken for all meat departments. Then these two are averaged together. This is done because stores are expected to buy one machine for the bakery and deli, and one for the meat department.

Hand Wrap Machine Savings Calculations

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Chain 1** | **Chain 2** | **Chain 3** | **Chain 4** | **Average** |
| Baseline Annual Usage (kWh) | 2,310.55 | 1,809.70 | 1,697.20 | 1,983.14 |  |
| Measure Annual Usage (kWh) | 411.64 | 395.10 | 452.30 | 361.21 |  |
| **Annual Savings per unit (kWh)** | 1,898.91 | 1,414.60 | 1,323.90 | 1,621.93 | **1,564.83** |
| Baseline Peak kW | 0.26716 | 0.22722 | 0.19166 | 0.22906 |  |
| Measure Peak kW | 0.05378 | 0.04266 | 0.05930 | 0.04332 |  |
| **Peak kW savings** | 0.21338 | 0.18456 | 0.14214 | 0.18574 | **0.18146** |

See Attachment 2 for all calculations. See Attachment 1 for a complete list of savings.

## 2.2. Demand Reduction Estimation Methodologies

The Peak kW measurements in Table 8 are from the DEER peak period of 2–5 PM, so no coincidence factors are applied. The demand reduction is 0.18146 kW.

# 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** |
| Grocery | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Office - Small | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |

# Section 4. Costs

## 4.1 Base Case Cost

Equipment prices for this work paper were compiled from a number of sources including quotes, equipment sales representatives, and manufacturer sources. Manufacturer published list prices were discounted by an industry standard 50% to determine final cost. Since equipment pricing in the food service industry is closely held information and prices vary widely according to buying volume and other factors, the sources for prices cannot be listed explicitly.

The cost of the baseline always-on hand wrap machine is $350, from the ET study [483].

Installation of a hand wrap machine involves removing the existing machine and plugging in the new machine. Therefore the labor is estimated at 0.5 hours, and using the default non-residential DEER 2008 labor rate of $67.88/hr yields a labor cost of $33.94. The labor cost is assumed to be the same in the base and measure cases.

## 4.2 Measure Case Cost

The measure case costs are also from the sources mentioned in Section 4.1.

The cost of the measure case on-demand hand wrap machine is $550, from the ET study [483].

## 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

Table below shows the calculation of gross measure cost:

Full and Incremental Measure Cost

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure** | **Baseline Equipment Cost** | **Measure Equipment Cost** | **Labor Cost** | **Full and Incremental Measure Cost** |
| Hand Wrap Machine | $350 | $550 | $33.94 | $200 |

The incremental cost is the same as the gross measure cost and is shown in table above.

**Full and Incremental Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure** | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | |
| **1st Baseline** | **2nd Baseline** |
| Hand Wrap Machine | ROB | $200 | $200 | N/A |

# Attachments

1. 

1. 
2. 

1. 

# References



[355]

[493]

[483]