Work Paper SCE13LG007

**Revision 1**

**Southern California Edison**

**Pin Based Exterior Compact Fluorescent Lamp (CFL) Fixture**

# At-a-Glance Summary

|  |  |
| --- | --- |
| **Measure Codes** | See Table 1 |
| **Measure Description** | Exterior pin based compact fluorescent lamp (CFL) fixture. |
| **Base Case Description** | Exterior incandescent fixture. This will be customer existing and code/standard equipment. |
| **Units** | Per fixture |
| **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** | 16 years (DEER EUL ID: OLtg-CFLfix)  15 years (DEER EUL ID: OLtg-CFLfix-ResCmnArea) |
| **Measure Installation Type** | Replace on Burnout (ROB) & Retrofit (RET) |
| **Net-to-Gross Ratio** | 0.55 (DEER NTGR ID: Res-Default>2yrs)  0.6 (DEER NTGR ID: Com-Default>2yrs)  0.85 (DEER NTGR ID: Res-Default-HTR-di)  0.85 (DEER NTGR ID: Com-Default-HTR-di)  0.54 (DEER NTGR ID: NonRes-sAll-mCFL)  0.9 (DEER NTGR ID: Res-sAll-mCFL-up) |
| **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 | 5/29/12 | Mike Green/Lincus | * Updated workpaper format to latest template “SP&TS Work Paper Template 2013 v0.1.docx”(based on previous version WPSCRELG0007) * Clarified base/measure cases and unit description * Updated annual operating hours of building types according to DEER 2011 * Updated NTG values * Added Midstream Program/ Midstream Incentive as delivery mechanism. * Update base case wattages for residential (single family and multi-family). * Consolidated solution codes. |
| Brian V. O’Keefe/SCE | Changes from original draft:  - Removed the Misc. Com building type from the upstream measures.  - Used savings directly from READi for the single family/upstream measures.  - Updated the template to version 2.2  - Used the previous fixture wattages for the up to 70 watt measure case measures. |
| 1 | 9/21/15 | Alfredo Gutierrez (SCE), Jason Wang (SCE) | * Updated the work paper to the 2016 template. * Removed the following building types:   + Agriculture   + Health/Medical – Clinic   + Food Store   + Industrial   + Miscellaneous Commercial   + Transportation – Communication – Utilities * Updated all labor costs * Removed several measures due to lack of use: LT-28539, LT-98777, LT-68832, LT-80192, LT-31813, LT-60844, LT-94843, LT-49483, LT-59832, LT-37434, LT-49866, LT-79853, LT-42075, LT-53951, LT-18734, LT-10741, LT-21985, LT-48737, LT-74333, LT-93845, LT-19983, LT-10297, LT-44324, LT-78430, LT-53866, LT-64881, LT-18432, LT-21651, LT-32954 |

# Commission Staff and Cal TF Comments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rev** | **Party** | **Submittal Date** | **Comment Date** | **Comments** | **WP Developer Response** |
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Cal TF website: <http://www.caltf.org/>

# Section 1. General Measure & Baseline Data

## 1.1 Measure Description & Background

This work paper details the annual energy savings and demand reduction for replacing a screw in exterior incandescent fixture with an exterior pin based (non-screw in) compact fluorescent lamp (CFL) fixture. For both RET and ROB measures, the base case is an exterior screw-in incandescent lighting fixture and the measure case will be an exterior pin based CFL fixture with photocell controls as required by the Title 24 [359] code for exterior lighting. The pin-based CFL fixtures qualify as high efficacy and therefore do not require motion (on/off) controls per Title 24 [359].

**Base, Standard, and Measure Cases**

|  |  |
| --- | --- |
| **Case** | **Description of Typical Scenario** |
| Measure | Exterior Pin Based CFL Fixture |
| Existing Condition | Screw in Exterior Incandescent Fixture |
| Code/Standard | Screw in Exterior Incandescent Fixture |
| Industry Standard Practice | N/A |

Measures and Codes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Codes** | | | | **Measure Name** |
| SCG | SDG&E | SCE | PG&E |
| N/A | N/A | LT-57633 | N/A | 13 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-69223 | N/A | 13 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-59488 | N/A | 18 Watt Exterior Fixture CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-27654 | N/A | 18 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-38956 | N/A | 18 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-43988 | N/A | 20 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-57223 | N/A | 20 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-19247 | N/A | 22 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-21431 | N/A | 22 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-72431 | N/A | 23 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-81042 | N/A | 23 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-10832 | N/A | 26 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-24983 | N/A | 26 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-75483 | N/A | 27 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-83742 | N/A | 27 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-71631 | N/A | 36 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-84213 | N/A | 36 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-43854 | N/A | 50 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-53851 | N/A | 50 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-19831 | N/A | 55 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-21096 | N/A | 55 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-83098 | N/A | 65 Watt Exterior Fixture (Common Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-91873 | N/A | 65 Watt Exterior Fixture (Dwelling Area) CFL replacing Incandescent Total Watts = 2.84 x Msr Watts |
| N/A | N/A | LT-10121 | N/A | Up to 70 Watt Exterior Fixture CFL replacing less than 100 Watt lamp base case |

**Eligibility Requiremnts**

LT-10121 is the only non-residential measure in this work paper and is eligible for all non-residential building types. SCE’s Express program provides the following requirements for this measure:

* The compact fluorescent fixture being installed must be new
* The new fixture must have a lower wattage than the fixture being replaced without exceeding the maximum wattage listed in the measure name
* The new fixture must be equipped with compact fluorescent lamps (CFLs) and electronic ballasts
* The CFL ballasts must be programmed-start or programmed rapid-start with a power factor (PF) of greater than or equal to 0.90 and total harmonic distortion (THD) of less than or equal to 20%
* The new fixtures must replace, one for one, existing incandescent, mercury vapor, High Output/Very High Output linear fluorescent, standard probe-start metal halide, or high-pressure sodium fixtures
* Existing pulse-start metal halide installations do not qualify
* All replacement fixtures must be hardwired
* New fixtures have a lower wattage than the fixtures being replaced without exceeding the 70 Watts for CFL <70 Watts
* This must be the only Express Solution category under which the fixtures are receiving incentives

LT-59488 is eligible for the Residential Single Family building type only.

All measures indicated as “Dwelling Area” or “Common Area” are eligible for Residential Multi-family and Double-wide Mobile Home building types only.

## 1.2 Technical Description

The measures in this work paper involve the installation of a screw in compact fluorescent lamp fixture with an integrated ballast in exterior applications.

## 1.3 Installation Types and Delivery Mechanisms

The install types and delivery methods are:

**Replace On Burnout (ROB)**

* Financial Support - Down-Stream Incentive – Deemed
  + LT-27654 (Multifamily Energy Efficiency Rebate Program)
  + LT-10121 (multiple Commercial Downstream and Midstream Programs)
* Financial Support - Upstream Buy Down – Deemed
  + LT-38956 (Energy Star Manufactured Homes Program)

**Retrofit (RET)**

* Financial Support - Direct Install
  + LT-57633, LT-69223, LT-27654, LT-38956, LT-59488, LT-43988, LT-57223, LT-19247, LT-21431, LT-72431, LT-81042, LT-10832, LT-24983, LT-75483, LT-83742, LT-71631, LT-84213, LT-43854, LT-53851, LT-19831, LT-21096, LT-83098, LT-91873 (Multifamily Energy Efficiency Rebate Program, Middle Income Direct Install Program, Comprehensive Manufactured Home Program)

**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.

**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. |
| 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.* |
| Partnership | The program implements projects through a partnership between the utility and an institutional, government, or community-based organization. |
| Up-Stream Programs | *See Up-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. |
| Exchange - Replacement | The utility program holds events where customers can trade functional equipment for similar but more energy efficient equipment, free of charge. |
| Giveaway | The program provides customers with energy efficiency equipment or services for free. |
| 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. |
| On-bill Finance – Loan (OBF) | The program offers financing for the cost of 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. |
| Up-Stream Incentive  Up-Stream Buy Down | The program gives a financial incentive to an upstream market actor (manufacturer or distributor) to encourage the manufacture, provision, or distribution 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

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 | No |
| DEER Version | DEER 2016, READI v2.3.0 |
| Reason for Deviation from DEER | DEER contained outdoor lamps while this work paper was for outdoor fixtures. |
| 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** |
| Res-Default>2 | All other EEM with no evaluated NTGR; existing EEM with same delivery mechanism for more than 2 years | Res | Any | Any | 0.55 |
| Res-Default-HTR-di | All other EEM with no evaluated NTGR; direct install hard-to-reach only. | Res | Any | DirInstall | 0.85 |
| Com-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 | All other EEM with no evaluated NTGR; direct install to hard-to-reach only. | Com | Any | DirInstall | 0.85 |
| Res-sAll-mCFL-up | CFL-screw in,All. | Res | Any | PreRebUp | 0.9 |

Note: 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 homes. “Final Resolution E-4700”, dated December 18, 2014, defines specific criteria to classify customer homes as HTR. 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.

SCE’s Multi-Family Energy Efficiency Rebate (MFEER) program addresses the ongoing concern with “split incentives”, where the residents are not the owners of the property, so they lack incentive to improve their energy usage. Similarly, the property owners do not live on-site and pay higher utility expenses due to inefficient appliances, thus lack any incentive to upgrade. The MFEER is designed to drive this customer segment toward participation by offering property owners a variety of energy efficiency measures and services. The MFEER program will offer and track measure installations in both common and dwelling areas of multifamily complexes and common areas of mobile home parks and condominiums. Measures offered via direct install activities in both common and dwelling areas of multifamily complexes and common areas of mobile home parks and condominiums will receive the HTR NTG. Other measures in the MFEER program will receive default NTG (NTGR\_ID: Res-Default>2), unless otherwise specified in DEER.

**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 |
| Com-CFL-SCE | Non-Res CFL; Non-Upstream Program; Annual Installation Rate | Com | Any | NonUpStrm | 0.61 |
| MFm-ExtCF-SCE | Exterior Compact Fluorescent fixture; Annual Installation Rate; Multi-family | Res | MFm | NonUpStrm | 0.87 |

**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. Since there is no EUL value listed for Non-residential Outdoor CFL fixture in the DEER READI tool, the same EUL valid is used for Non-residential application of this measure.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** |
| OLtg-CFLfix | CFL Fixtures - Outdoor - Residential | Res, Com | Lighting | 16 | 5.3 |
| OLtg-CFLfix-ResCmnArea | CFL Fixtures - Outdoor - Residential Common Area | Res | Lighting | 15 | 5 |

### 1.4.2 Codes and Standards Analysis

This work paper uses ED-specified wattages and wattage ratios to determine code case wattages; these satisfy or exceed any energy consumption requirements mentioned below.

Title 24 (2013) [359] does not apply to screw-in CFLs or any other general service lamps.

The Title 20 (2015) Appliance Efficiency Regulations [493] include standards for medium base CFLs (Table K-5), federally-regulated general service incandescent lamps (Table K-6), and state-regulated general service lamps (Table K-10, Table K-11).

Code Summary

|  |  |  |
| --- | --- | --- |
| **Code** | **Reference** | **Effective Dates** |
| Title 20 (2015) | Tables K-5, K-6, K-10, K-11 | July 1, 2015 |

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

There have been no additional studies used for the measures within this work paper.

## 1.6 Data Quality and Future Data Needs

The methodology used for this work paper comes directly from the latest DEER READI tool, version 2.3.0.

# Section 2. Calculation Methodology

Commercial exterior measures use a Wattage Reduction Ratio (WRR) of 3.57 to calculate the baseline Watts.

Residential exterior measures use WRR of 2.84 to calculate the baseline Watts, however, all residential measures in this work paper are taken from DEER READI.

The following is a sample energy savings calculation of 13 Watt Exterior Fixture (Common Area) CFL Fixture replacing Incandescent (LT-57633) in Residential – Double Wide Mobile Home Building Type in Climate Zone 6.



Note that measure LT-10121 “Up to 70 Watt Exterior Fixture CFL replacing less than 100 Watt lamp base case” does not use a WRR. It uses specific wattages specified in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Solution Code** | **Description** | **Assumed Base Case Standard MH Wattage, including ballast (Watts)** | **Assumed CFL Fixture Replacement Wattage (Watts)** |
| LT-10121 | Up to 70 Watt Exterior Fixture CFL replacing less than 100 Watt lamp base case | 95W (based on a 70W MH lamp) – MH70/1 | 56W (based on a 2x26W CFL lamps) |

# 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 | OutdoorLt | Misc. Commercial |
| Education – Community College | OutdoorLt | Misc. Commercial |
| Education – Primary School | OutdoorLt | Misc. Commercial |
| Education – Relocatable Classroom | OutdoorLt | Misc. Commercial |
| Education – Secondary School | OutdoorLt | Misc. Commercial |
| Education – University | OutdoorLt | Misc. Commercial |
| Grocery | OutdoorLt | Misc. Commercial |
| Lodging – Guest Rooms | OutdoorLt | Misc. Commercial |
| Health/Medical – Hospital | OutdoorLt | Misc. Commercial |
| Lodging – Hotel | OutdoorLt | Misc. Commercial |
| Manufacturing – Bio/Tech | OutdoorLt | Misc. Commercial |
| Manufacturing – Light Industrial | OutdoorLt | Misc. Commercial |
| Lodging – Motel | OutdoorLt | Misc. Commercial |
| Health/Medical – Nursing Home | OutdoorLt | Misc. Commercial |
| Office – Large | OutdoorLt | Misc. Commercial |
| Office – Small | OutdoorLt | Misc. Commercial |
| Restaurant – Fast-Food | OutdoorLt | Misc. Commercial |
| Restaurant – Sit-Down | OutdoorLt | Misc. Commercial |
| Retail – Multistory Large | OutdoorLt | Misc. Commercial |
| Retail – Single-Story Large | OutdoorLt | Misc. Commercial |
| Retail – Small | OutdoorLt | Misc. Commercial |
| Storage – Conditioned | OutdoorLt | Misc. Commercial |
| Storage – Unconditioned | OutdoorLt | Misc. Commercial |
| Warehouse – Refrigerated | OutdoorLt | Misc. Commercial |
| Residential – Single family | OutdoorLt | Misc. Commercial |
| Residential – Double Wide Mobile Home | OutdoorLt | Misc. Commercial |
| Residential – Multi-Family | OutdoorLt | Misc. Commercial |

# Section 4. Costs

## 4.1 Base Case Cost

Pricing was gathered for Base Case Material and Measure Material Cost from a lighting vendor. Base equipment is an exterior lighting fixture that can be wall or ceiling mounted and can use incandescent lamps up to and including 150 Watts. In addition, the cost for a combination photo control and motion sensor for the base case to meet current code is included in the base equipment cost. The cost of several wattages of pin-based CFL fixtures were found and the remainder were extrapolated. Documentation for cost and specifications are available upon request. Labor cost is taken from RSMeans Electrical 2010, section 26 56 23 Exterior Fixtures: $49.00.

Base Case Cost

|  |  |  |
| --- | --- | --- |
| **Measure Name** | **Base Equipment Cost ($)** | **Base Labor Cost ($)** |
| 13W CFL Fixture | $39.51 | $49.00 |
| 18W CFL Fixture | $39.51 | $49.00 |
| 20W CFL Fixture | $39.51 | $49.00 |
| 22W CFL Fixture | $39.51 | $49.00 |
| 23W CFL Fixture | $39.51 | $49.00 |
| 26W CFL Fixture | $39.51 | $49.00 |
| 27W CFL Fixture | $39.51 | $49.00 |
| 36W CFL Fixture | $39.51 | $49.00 |
| 50W CFL Fixture | $39.51 | $49.00 |
| 55W CFL Fixture | $39.51 | $49.00 |
| 65W CFL Fixture | $39.51 | $49.00 |
| Up to 70 Watt Exterior Fixture CFL | $39.51 | $49.00 |

## 4.2 Measure Case Cost

The measure equipment includes a fixed position photo controller to meet Title 24 code for exterior lighting. The measure equipment cost is the sum of the fixture cost and the photo controller cost.

Measure Cost

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Name** | **Measure Equipment Cost ($)** | **Measure Labor Cost ($)** | **Material Source** |
| 13W CFL Fixture | $71.59 | $49.00 | Vendor Pricing |
| 18W CFL Fixture | $81.59 | $49.00 | Vendor Pricing |
| 20W CFL Fixture | $81.59 | $49.00 | Extrapolated from Vendor Pricing |
| 22W CFL Fixture | $81.59 | $49.00 | Extrapolated from Vendor Pricing |
| 23W CFL Fixture | $81.59 | $49.00 | Extrapolated from Vendor Pricing |
| 26W CFL Fixture | $81.59 | $49.00 | Vendor Pricing |
| 27W CFL Fixture | $81.59 | $49.00 | Extrapolated from Vendor Pricing |
| 36W CFL Fixture | $81.59 | $49.00 | Vendor Pricing |
| 50W CFL Fixture | $86.59 | $49.00 | Vendor Pricing |
| 55W CFL Fixture | $86.59 | $49.00 | Extrapolated from Vendor Pricing |
| 65W CFL Fixture | $126.59 | $49.00 | Vendor Pricing |
| Up to 70 Watt Exterior Fixture CFL | $126.59 | $49.00 | Extrapolated from Vendor Pricing |

## 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** |
| LT-10121 | ROB | $75.76 | $75.76 | $0.00 |
| LT-10832 | RET | $36.61 | $123.51 | $36.61 |
| LT-10832 | ROB | $36.61 | $36.61 | $0.00 |
| LT-19247 | RET | $36.61 | $123.51 | $36.61 |
| LT-19247 | ROB | $36.61 | $36.61 | $0.00 |
| LT-19831 | RET | $40.96 | $127.86 | $40.96 |
| LT-19831 | ROB | $40.96 | $40.96 | $0.00 |
| LT-21096 | RET | $40.96 | $127.86 | $40.96 |
| LT-21096 | ROB | $40.96 | $40.96 | $0.00 |
| LT-21431 | RET | $36.61 | $123.51 | $36.61 |
| LT-21431 | ROB | $36.61 | $36.61 | $0.00 |
| LT-24983 | RET | $36.61 | $123.51 | $36.61 |
| LT-24983 | ROB | $36.61 | $36.61 | $0.00 |
| LT-27654 | RET | $36.61 | $123.51 | $36.61 |
| LT-27654 | ROB | $36.61 | $36.61 | $0.00 |
| LT-38956 | RET | $36.61 | $123.51 | $36.61 |
| LT-38956 | ROB | $36.61 | $36.61 | $0.00 |
| LT-38956 | ROB | $36.61 | $36.61 | $0.00 |
| LT-43854 | RET | $40.96 | $127.86 | $40.96 |
| LT-43854 | ROB | $40.96 | $40.96 | $0.00 |
| LT-43988 | RET | $36.61 | $123.51 | $36.61 |
| LT-43988 | ROB | $36.61 | $36.61 | $0.00 |
| LT-53851 | RET | $40.96 | $127.86 | $40.96 |
| LT-53851 | ROB | $40.96 | $40.96 | $0.00 |
| LT-57223 | RET | $36.61 | $123.51 | $36.61 |
| LT-57223 | ROB | $36.61 | $36.61 | $0.00 |
| LT-57633 | RET | $27.91 | $114.81 | $27.91 |
| LT-57633 | ROB | $27.91 | $27.91 | $0.00 |
| LT-59488 | RET | $36.61 | $123.51 | $36.61 |
| LT-59488 | ROB | $36.61 | $36.61 | $0.00 |
| LT-69223 | RET | $27.91 | $114.81 | $27.91 |
| LT-69223 | ROB | $27.91 | $27.91 | $0.00 |
| LT-71631 | RET | $36.61 | $123.51 | $36.61 |
| LT-71631 | ROB | $36.61 | $36.61 | $0.00 |
| LT-72431 | RET | $36.61 | $123.51 | $36.61 |
| LT-72431 | ROB | $36.61 | $36.61 | $0.00 |
| LT-75483 | RET | $36.61 | $123.51 | $36.61 |
| LT-75483 | ROB | $36.61 | $36.61 | $0.00 |
| LT-81042 | RET | $36.61 | $123.51 | $36.61 |
| LT-81042 | ROB | $36.61 | $36.61 | $0.00 |
| LT-83098 | RET | $75.76 | $162.66 | $75.76 |
| LT-83098 | ROB | $75.76 | $75.76 | $0.00 |
| LT-83742 | RET | $36.61 | $123.51 | $36.61 |
| LT-83742 | ROB | $36.61 | $36.61 | $0.00 |
| LT-84213 | RET | $36.61 | $123.51 | $36.61 |
| LT-84213 | ROB | $36.61 | $36.61 | $0.00 |
| LT-91873 | RET | $75.76 | $162.66 | $75.76 |
| LT-91873 | ROB | $75.76 | $75.76 | $0.00 |

# Attachments



# References

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