Work Paper SCE13CS008

**Revision 2**

**Southern California Edison**

**Energy Star Audio Equipment**

# At-a-Glance Summary

|  |  |
| --- | --- |
| **Measure Codes** | CE-92392 Energy Star 3.0 Component Equipment replacing T20 Component Equipment  CE-25413 Energy Star 3.0 Compact Stereo replacing T20 Compact Stereo  CE-17389 Energy Star 3.0 MP3 Docking Station replacing T20 MP3 Docking Station  CE-92565 Energy Star 3.0 HTIB replacing T20 HTIB  CE-59948 Energy Star 3.0 Clock Radio replacing T20 Clock Radio |
| **Measure Description** | This work paper addresses the installation of Energy Star 3.0 Audio Equipment, which includes: Energy Star 3.0 Component Equipment, Energy Star 3.0 Compact Stereo, Energy Star 3.0 MP3 Docking Station, Energy Star 3.0 HTIB, and Energy Star 3.0 Clock Radio. |
| **Base Case Description** | The base case for the work paper is Audio Equipment that meets Title 20. |
| **Units** | Per 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** | 3 years |
| **Measure Installation Type** | Replace on Burnout (ROB) |
| **Net-to-Gross Ratio** | 0.7 All-Default<=2yrs |
| **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 | 4/26/2012 | Jared Kruzek/AESC, Inc. | Original work paper for 2013 PC |
| 1 | 3/4/2014 | Brian Gehring/AESC, Inc. | -IE and Energy Star requirements update.  -kW and kWh Savings updated with new requirements |
| 1 | 4/17/2014 | Cassie Cuaresma/SCE | -Work paper updated for reporting period effective 7/1/2014-12/31/2014 |
| 2 | 1/26/2016 | Ajay Wadhera/Solaris | -New template update for 2016 program year  -WP effective from 1/1/2016 thru 12/31/2016  -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

## Measure Description & Background

The measures in this work paper are for the purchase of Audio Equipment that meet Energy Star version 3.0 requirements. The energy savings in this work paper are calculated on a per audio device basis. The eligible Base case units are Audio Equipment that that complies with Title 20 (Section 1605.3 V) regulations which designates a maximum power usage for the standby-passive mode for compact audio products, this includes component equipment (receivers, amplifiers, subwoofers, and rack audio systems), compact stereos, MP3 docking stations, home theatres in a box (HTIB), and clock radios. Energy Star requirements are detailed in Section 1.4.2.

**Base, Standard, and Measure Cases**

|  |  |
| --- | --- |
| **Case** | **Description of Typical Scenario** |
| Measure | Energy Star 3.0 Audio Equipment. |
| Existing Condition | Audio Equipment that meets Title 20. |
| Code/Standard | Audio Equipment that meets Title 20. |
| Industry Standard Practice | N/A |

Measures and Codes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Codes** | | | | **Measure Name** |
| SCG | SDG&E | SCE | PG&E |
| N/A | N/A | CE-92392 | N/A | Energy Star 3.0 Component Equipment replacing T20 Component Equipment |
| N/A | N/A | CE-25413 | N/A | Energy Star 3.0 Compact Stereo replacing T20 Compact Stereo |
| N/A | N/A | CE-17389 | N/A | Energy Star 3.0 MP3 Docking Station replacing T20 MP3 Docking Station |
| N/A | N/A | CE-92565 | N/A | Energy Star 3.0 HTIB replacing T20 HTIB |
| N/A | N/A | CE-59948 | N/A | Energy Star 3.0 Clock Radio replacing T20 Clock Radio |

This measure only applies to Residential building types, which are Residential Mobile Home - Double-Wide, Residential Multi-family (common and dwelling areas), and Residential Single-family. Additionally, proposed Audio Equipment must satisfy Energy Star version 3.0 requirements [376] in order to be eligible for this measure. Table below shows the timeline of Energy Star publications.

**ENERGY STAR Effective Dates**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Audio/Video Product** | **Version 1.0**  **Phase 1** | **Version 1.0**  **Phase 2** | **Version 2.0**  **Tier 2** | **Version 2.0**  **Tier 3** | **Version 3.0** |
| All Products | December 31, 2002 | January 1, 2003 | July 30, 2010 | March 30, 2012 | May 1, 2013 |

## Technical Description

In order to qualify for Energy Star 3.0 labels, the Audio Equipment must have power consumption limits at different modes of operation. The detailed descriptions of all operating modes are summarized as follows:

1. *On Mode: Where the product is connected to a main power source, has been activated and is providing one or more primary functions. The common terms “active”, “in-use” and “normal operation” also describe this mode.* 
   1. *Active State: A state within On mode in which a product is performing a primary function.*
   2. *Idle State: A state within On mode in which a product is not performing a primary function and no content is actively being delivered to the end-user.*
2. *Sleep Mode: The common term “standby” may also describe this mode, where the product is connected to a main power source, is not providing a primary function, and offers one or more of the following user oriented or protective functions which may persist for an indefinite time*
   1. *to facilitate the activation of other modes (including activation or deactivation of On mode) by remote switch (including remote control), internal sensor, timer;*
   2. *continuous function: information or status displays including clocks;*
   3. *continuous function: sensor-based functions.*
3. *Off Mode: Where the product is connected to a main power source, is not providing any On mode or Sleep mode functions, and cannot be switched into any other mode except by user actuation of a manual power switch. An indicator that only shows the user that the product is in the off position is included within the classification of an Off mode.*

The tables below summarize the power consumption limits at each mode. Audio Equipment devices must meet all of the limits to be eligible. The limits specified in the tables are additive. Therefore, the power consumption for a device at each operating mode cannot exceed the sum of the limits for all applicable product functions of the device. For example, the sleep mode power consumption limit for product with in-use Wifi would be P = 1.0 + 2.0 = 3.0 watts.

**ENERGY STAR Version 3.0 Sleep Mode Power Consumption Limits**

|  |  |
| --- | --- |
| **Product Function** | **Sleep Mode Power Allowance (watts)** |
| Base Allowance For All Products | 1.0 |
| In-use Networking / Control Protocol with Wake Capability | 1.0 |
| In-use Wi-Fi or Gigabit Ethernet Protocols with Wake Capability | 2.0 |

**ENERGY STAR Version 3.0 On Mode Power Allowance**

|  |  |  |
| --- | --- | --- |
| **Product Function** | | **On Mode Power Allowance (W)** |
| High Resolution Display  (> 480x234 pixel resolution and 7 inches diagonal screen size) | | P = 6\*(R) + 0.05\*(A) + 3  Where:  R = Display resolution (x \* y)  in megapixels  A = Viewable screen area  in square inches |
| In-use Networking / Control Protocol | | 1.0 |
| In-use Wi-Fi or Gigabit Ethernet Protocols | | 2.0 |
| Audio Amplification (Where P is the output power at 1/8 Maximum Undistorted Power (MUP) with 1kHz sinusoidal input) | P≤50 W | 5.0 |
| P>50 W | 0.1\*P |

**ENERGY STAR Version 3.0 Idle State Power Consumption Limits**

|  |  |  |
| --- | --- | --- |
| **Product Function** | | **Idle State Power Allowance (watts)** |
| Base allowance for all products | | 5.0 |
| In-use Networking/Control Protocol | | 1.0 |
| In-use Wi-Fi or Gigabit Ethernet Protocols | | 2.0 |
| Audio Amplification | P≤50 W | 5.0 | |
| P>50 W | 0.1\*P | |

Additionally, in order to qualify for Energy Star 3.0 labels, devices must have Auto Power Down (APD) functionality and must meet the requirements summarized below. ENERGY STAR defines Auto Power Down (APD) as the capability to automatically switch a device from On mode to Sleep mode after a predetermined period of time has elapsed. APD functionality shall be available on all products except those that are subject to third-party performance standards that prohibit APD, including those used for Mass Notification and Emergency Communications Systems and those subject to ANSI/UL 2572.

APD functionality shall be enabled by default, with APD timing less than or equal to 2 hours, subject to the following exceptions:

1. Products may offer users the option (e.g., via system menu or physical switch) to modify APD timing in 10 minute intervals, or to disable APD entirely.
2. Products may initiate APD immediately upon receipt of authoritative control instruction via an active Networking / Control Protocol.
3. Commercial Amplifiers as defined in Section 1 may be shipped with APD disabled. If APD is disabled, the product shall meet the Idle State power requirements.

APD Timing Default Settings shall be as follows:

APD Timing ≤ 30 minutes:

This timing option is acceptable for use as a default setting. If APD timing is set by default to no more than 30 minutes and APD cannot be disabled or increased to greater than 30 minutes, products do not have to meet Idle State power requirements.

30 minutes < APD Timing ≤ 2 hours:

This timing option is acceptable for use as a default setting. If APD can be disabled, or if APD timing can be set to greater than 30 minutes, products shall meet Idle State power requirements.

APD Timing > 2 hours:

This timing option may only be enabled by the end user and is not available for use as a default setting. If APD can be disabled, or if APD timing can be set to greater than 30 minutes, products shall meet Idle State power requirements.

Products that offer audio amplification must meet the amplifier efficiency requirements based on the equation and table below:

Where:

η is the amplifier efficiency;

 is the output power at 1/8 MUP with 1 kHz sinusoidal input, in watts;

 is the input power at 1/8 MUP with 1 kHz sinusoidal input, in watts; and

 is the power consumption from the Optical Disc Player, as measured in Section 8.2 of the test procedure, for products without AV inputs.

**ENERGY STAR Minimum Amplifier Efficiencies**

|  |  |
| --- | --- |
| **Amplifier Input Power at 1/8 MUP**  **with 1 kHz Sinusoidal Input, PIN**  **(W)** | **Version 3.0**  **Minimum Amplifier**  **Efficiency, η** |
| < 20 | N/A |
| 20 ≤ < 100 | 0.44 |
| ≤ 100 | 0.55 |

## Installation Types and Delivery Mechanisms

The program/install type for the above measures is:

* Replace on Burn-out (ROB)

The delivery method that is available for the measures is:

* Midstream Programs / Mid-Stream Incentive

**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** |
| Mid-Stream Programs | *See Mid-Stream Incentive in the Incentive Method Descriptions table.* |

**Incentive Method Descriptions**

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

This specific measure is not included in the Database for Energy Efficient Resources (DEER) 2014 version 4.0 [49], either non-residential or residential. Furthermore, DEER does not include any measures that describe savings for Audio Equipment.

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 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** |
| All-Default<=2yrs | All other EEM with no evaluated NTGR; new technology in program for 2 or fewer years | All | Any | Any | 0.70 |

**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.

DEER does not include a EUL\_ID for this measure. Therefore, this work paper consults other sources to establish measure effective useful life.

To obtain the EUL value, Energy Star Consumer Electronics Calculator [377] was consulted. The calculator utilizes equipment lifetime of 3 years, which was taken from a survey [377]. There is no RUL for this measure because the new device is replacing equipment that has been assumed to have failed or replaced at the end of its life. Table 12 below identifies the value/methodology used for the measures in this work paper.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** |
| AppPlug-AllEquip-Audio | Energy Star Audio Equipment | Res | AppPlug | 3 | 1 |

### 1.4.2 Codes and Standards Analysis

This measure is governed by Title-20 “Appliance Efficiency Code”, which mandates Compact Audio Products to have a power usage not greater than 2 W in Audio standby-passive mode for those without a permanently illuminated clock display and 4 W in Audio standby-passive mode for those with a permanently illuminated clock display.

Code Summary

|  |  |  |
| --- | --- | --- |
| **Code** | **Reference** | **Effective Dates** |
| Title 20 (2012) | Section 1605.3(v) Table V-1 | February 1, 2013 |

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

### 1.5.1 Non-DEER Study Review

The estimated hours of operation for component equipment, compact stereos, home theatres in a box (HTIB), and clock radios during On/Active Mode and Idle Mode come from a survey conducted by TIAX in 2007 [380].

## 1.6 Data Quality and Future Data Needs

N/A

# Section 2. Calculation Methodology

Savings are estimated sourcing data and assumptions from Title 20, Energystar, and the TIAX study [380]. The calculation results can be found in tables below.

**Base Case Power Draws**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Power Draw**  **[W]** | **Description** | **Usage Mode** | | |
| **On/Active** | **Idle** | **Sleep** |
| Component Equipment | 34.23 | 25.7 | 2.0 |
| Compact Stereo | 14.62 | 11.0 | 2.0 |
| MP3 Docking Station | 7.80 | 5.9 | 2.0 |
| HTIB | 25.64 | 19.2 | 2.0 |
| Clock Radio | 6.90 | 5.2 | 2.0 |

**Measure Case Power Draws**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Power Draw**  **[W]** | **Description** | **Usage Mode** | | |
| **On/Active** | **Idle** | **Sleep** |
| Component Equipment | 34.23 | 9.34 | 0.53 |
| Compact Stereo | 14.62 | 4.68 | 0.34 |
| MP3 Docking Station | 7.80 | 5.35 | 0.40 |
| HTIB | 25.64 | 4.60 | 0.22 |
| Clock Radio | 6.90 | 3.25 | 0.50 |

**Usage Estimates**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Usage**  **[hr/yr]** | **Type** | **Usage Mode** | | | | | **Total** |
| **On/Active** | **Idle** | | | **Sleep\*** |
| Component Equipment | 1580 | | 730 | 6450 | | 8760 |
| Compact Stereo | 840 | | 730 | 7,190 | | 8760 |
| MP3 Docking Station | 840 | | 730 | 7,190 | | 8760 |
| HTIB | 1580 | | 730 | 6,450 | | 8760 |
| Clock Radio | 88 | | 0 | 8672 | | 8760 |

\*Off time in TIAX report corresponds to the description of Sleep time in Energystar. The unit remains plugged in, but inactive.

On mode power consumption is assumed to be equivalent in both the baseline and proposed scenarios. Savings are assumed to be a result of more efficient sleep and idle state power consumption. “On Mode” power consumption can be found referenced in tables shown above.

Idle mode power consumption differs between the base and measure case. The base case idle mode power requirements were determined using the estimate of 75% of On Mode power draw, as proposed by the TIAX study. The measure case idle mode power consumption is taken from the average idle mode power draw of the products in the Energystar qualified products list.

Sleep mode power consumption also differs between the base and measure case. The base case sleep mode power requirements are limited to the maximum allowed by Title 20. The measure case sleep mode power usage is taken from the average sleep mode power draw of the products in the Energystar qualified products list.

The TIAX report includes hours of usage estimates by modes, which come from the survey data collected in 2007 [380]. MP3 docking stations were assumed to have the same usage as compact stereos since the TIAX report does not address MP3 docking stations. The estimated hours of usage were used to calculate both base and measure Audio Equipment’s annual energy usage. The off time designated by the TIAX report was found to correspond to the description of sleep time in Energystar. The unit remains plugged in, but in an inactive power state.

**Energy Savings**

Annual energy savings for consumer electronic equipment is typically calculated by comparing the annual electricity consumption (AEC) of the base equipment with the measure equipment. In order to calculate the total AEC for Audio Equipment, the average power draw in three modes (On/Active, Idle, and Sleep) is multiplied by the corresponding hours of usage. Total energy use in each mode is then summed to calculate total energy consumption:

*AEC (kWh/yr) = (PActive \* TActive) + (PIdle\* TIdle)* + *(PSleep \* TSleep)*

*Where P = Power draw (kW) and T = operating hours (hours per year)*

The energy savings were calculated by subtracting each measure energy use from the corresponding base case energy use. Sample calculations are shown below.

An example calculation for Energy Star 3.0 Compact Stereo replacing base case Compact Stereo is as follows:

* 1. Base case = (0.0146 kW \*840 hours/yr + 0.011kW\*730 hours/yr + 0.002 kW \* 7190 hours/year) = 34.67 kWh / year.
  2. Measure case = (0.0146 kW \*840 hours/yr + 0.00468 kW\*730 hours/yr + 0.00034 kW \* 7190 hours/year) = 18.14 kWh / year.
  3. Energy Savings (Base – Measure) = 34.67 kWh/yr – 18.14 kWh/yr = 16.52 kWh/yr

**Demand Savings**

The above break down of operating hours indicates that the Audio Equipment is in Sleep Mode for more than 86% of the time. Therefore, it was assumed that the units are in Sleep Mode during CPUC defined DEER peak period. The demand savings were calculated by subtracting each measure case power draw from the corresponding base case power draw.

An example calculation for Energy Star 3.0 Compact Stereo replacing a base case Compact Stereo is as follows:

Demand Savings = 0.0002 kW – 0.00034 kW = 0.00166 kW

Table below summarizes the Annual Energy and Demand Savings for Audio Equipment measures. The detailed calculations can be found in the attached excel sheet [4].

**Annual Energy and Demand Savings**

|  |  |  |  |
| --- | --- | --- | --- |
| **Solution**  **Code** | **Description** | **Annual Electric Savings (kWh/unit)** | **Annual Demand Savings (kW/unit)** |
| CE-92392 | Energy Star 3.0 Component Equipment replacing T20 Component Equipment | 21.40 | 0.00147 |
| CE-25413 | Energy Star 3.0 Compact Stereo replacing T20 Compact Stereo | 16.52 | 0.00166 |
| CE-17389 | Energy Star 3.0 MP3 Docking Station replacing T20 MP3 Docking Station | 11.87 | 0.00160 |
| CE-92565 | Energy Star 3.0 HTIB replacing T20 HTIB | 22.16 | 0.00178 |
| CE-59948 | Energy Star 3.0 Clock Radio replacing T20 Clock Radio | 13.01 | 0.00150 |

For final savings numbers, interactive effects were applied to the energy and demand savings above using the CFL Interactive Effect Schedule. The calculations are performed in Attachment 1.

# 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** |
| Residential Mobile Home - Double-Wide | DEER:Indoor\_Non-CFL\_Ltg | RES |
| Residential Multi-family | DEER:Indoor\_Non-CFL\_Ltg | RES |
| Residential Single Family | DEER:Indoor\_Non-CFL\_Ltg | RES |

# Section 4. Costs

## 4.1 Base Case Cost

Within each category of audio equipment, the pricing can vary significantly depending on what additional features are included or if high end components are used. For the cost analysis below, an average cost was determined for each product (where available) from a range of products in order to account for pricing differences.

Base Case Cost for component equipment was calculated using an average of the costs taken from multiple online retailers and summarized in table below. There is no labor cost for this measure because installations are administered by end-users [4].

**Base Case Cost**

|  |  |  |
| --- | --- | --- |
| **Description** | **Base Case Cost** | |
| Component Equipment | $ 126.33 |
| Compact Stereo | $ 167.00 |
| MP3 Docking Station | $ 34.00 |
| HTIB | $ 213.33 |
| Clock Radio | $ 37.50 |

\*Based on a limited number of sources

## 4.2 Measure Case Cost

Measure Case Costs were calculated using an average of the costs taken from multiple online retailers and summarized in table below [4]. The devices were chosen from the list of Energy Star 3.0 Qualified Products List. There is no labor cost for this measure because installations are also administered by end-users.

**Measure Case Cost**

|  |  |
| --- | --- |
| **Description** | **Measure Case Cost** |
| Component Equipment | $ 218.25 |
| Compact Stereo | $ 231.25 |
| MP3 Docking Station | $ 129.99 |
| HTIB | $ 229.40 |
| Clock Radio | $ 58.00 |

\*Based on a limited number of sources

## 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 summarizes the Full Measure Cost calculated for the measures.

**Full Measure Cost (FMC)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Solution Code** | **Description** | **Measure**  **Cost** | **Base**  **Cost** | **FMC** |
| CE-92392 | Energy Star 3.0 Component Equipment replacing T20 Component Equipment | 218.25 | 126.33 | 91.92 |
| CE-25413 | Energy Star 3.0 Compact Stereo replacing T20 Compact Stereo | 231.25 | 167.00 | 64.24 |
| CE-17389 | Energy Star 3.0 MP3 Docking Station replacing T20 MP3 Docking Station | 129.00 | 34.00 | 95.00 |
| CE-92565 | Energy Star 3.0 HTIB replacing T20 HTIB | 229.40 | 213.33 | 16.07 |
| CE-59948 | Energy Star 3.0 Clock Radio replacing T20 Clock Radio | 58.00 | 37.50 | 20.50 |

For ROB measures, the Incremental Measure Cost (IMC) is equal to the gross measures cost (FMC).

**Full and Incremental Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure** | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | |
| **1st Baseline** | **2nd Baseline** |
| Energy Star 3.0 Component Equipment replacing T20 Component Equipment | ROB | 91.92 | 91.92 | N/A |
| Energy Star 3.0 Compact Stereo replacing T20 Compact Stereo | ROB | 64.24 | 64.24 | N/A |
| Energy Star 3.0 MP3 Docking Station replacing T20 MP3 Docking Station | ROB | 95.00 | 95.00 | N/A |
| Energy Star 3.0 HTIB replacing T20 HTIB | ROB | 16.07 | 16.07 | N/A |
| Energy Star 3.0 Clock Radio replacing T20 Clock Radio | ROB | 20.50 | 20.50 | N/A |

# Attachments

1. 
2. 
3. 

1. 

# References



[49]

[376]

[377]

[380]