**Work Paper PGE3PREF117**

**Compressor Retrofit Multiplex**

**Revision 2**

**PECI**

**EnergySmart Grocer**

**Refrigeration Case Compressor Retrofit**

**Measure Codes R107, R108, RF001, RF002**

**PECI EnergySmart Grocer**

# At-a-Glance Summary

|  |  |  |
| --- | --- | --- |
| **Applicable Measure Codes:** | **R107, RF001** | **R108, RF002** |
| **Measure Description:** | Replace air-cooled single-compressor system with subcooled multiplex | Replace air-cooled single-compressor system with subcooled multiplex and replace air-cooled condenser with water-cooled condenser. |
| **Energy Impact Common Units:** | Design cooling tons | Design cooling tons |
| **Base Case Description:** | Source: DEER D03-214  Air-cooled single-compressor refrigeration system. | Source: DEER D03-215  Air-cooled single-compressor refrigeration system. |
| **Base Case Energy Consumption:** | Source: DEER D03-214 generated from MAS Control V3.00.19  The base case energy consumption varies by climate zone and vintage. | Source: DEER D03-215 generated from MAS Control V3.00.19  The base case energy consumption varies by climate zone and vintage. |
| **Measure Energy Consumption:** | Source: DEER D03-214 generated from MAS Control V3.00.19  The energy efficient measure energy consumption varies by climate zone and vintage. | Source: DEER D03-215 generated from MAS Control V3.00.19  The energy efficient measure energy consumption varies by climate zone and vintage |
| **Energy Savings (Base Case – Measure)** | Source: DEER D03-214 generated from MAS Control V3.00.19  The energy savings from the implementation of this energy efficiency measure varies by climate zone and vintage. | Source: DEER D03-215 generated from MAS Control V3.00.19  The energy savings from the implementation of this energy efficiency measure varies by climate zone and vintage. |
| **Costs Common Units:** | Design cooling tons | Design cooling tons |
| **Base Case Equipment Cost ($/unit):** | Source: DEER D03-214  Varies. | Source: DEER D03-215  Varies. |
| **Measure Equipment Cost ($/unit):** | Source: DEER D03-214  Varies. | Source: DEER D03-215  Varies. |
| **Full Measure Cost ($/unit)** | Source: DEER D03-214  Varies. | Source: DEER D03-215  Varies. |
| **Measure Incremental Cost ($/unit):** | Source: DEER D03-214  Varies. | Source: DEER D03-215  Varies. |
| **Effective Useful Life (years):** | Source: DEER D03-214  10 years | Source: DEER D03-215  10 years |
| **Measure Application Type:** | Early Retirement (ER)  Replace on burnout (ROB) | Early Retirement (ER)  Replace on burnout (ROB) |
| **Net-to-Gross Ratios:** | Source: DEER2011  0.60 (Default Value) | Source: DEER2011  0.60 (Default Value) |
| **Important Comments:** |  |  |

# Work Paper Approvals

The following Manager(s) approved this workpaper through the PG&E Electronic Data Routing System under Routing Requisition # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
|  |
| **Grant Brohard**  Manager, Technical Product Support |
| **Carolyn Weiner**  Principal, CES Products and Programs |

# Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Revision # | Date | Section by Section Description of Revisions | Author (Company) |
| **Revision 0** | 08/12/2010 | Original work paper | Dennis Krieger  (PECI Engineering) |
| **Revision 1** | 5/25/2012 | Updated to PG&E 2013-2014 format  Update cost data to reflect DEER 2008  Update EUL to reflect DEER 2008 | Ben Wright  (PECI Engineering) |
| **Revision 2** | 5/14/2014 | Updated savings data according to new climate zone weather files. Formatting updated per PG&E guidelines | Eric Mullendore  (PECI Engineering)  Danielle Geers, PECI |

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# Section 1. General Measure & Baseline Data

This work paper documents the rationale for the “Refrigeration Case Compressor Retrofit” measure as part of Pacific Gas & Electronic Company’s Customer Energy Efficiency Program

## 1.1 Product Measure Description & Background

***Catalog Description –***

R107: This measure is applicable to the replacement of an existing air-cooled single-compressor system with an air-cooled multiplex system of “Title 24” efficiency; including both low and medium temperature sub-cooling.

R108: This measure is applicable to the replacement of an existing air-cooled single-compressor system with a water-cooled multiplex system of “Title 24” efficiency; including both low and medium temperature sub-cooling.

***Program Restrictions and Guidelines***

***Terms and Conditions:***

**Requirements:**

* Must replace stand-alone single compressor system with a high-efficiency multiplex compressor

system.

* Must include floating head pressure control to a minimum 70° F set point. Air-cooled condensers must use fan cycling or variable speed fans. Evaporative-cooled condensers must use two-speed or variable-speed fans.
* Only the suction groups that are mechanically subcooled to 50° F will be eligible for rebate.
* For early retirement claims: The existing compressor system must be in working order with no signs of replacement in the 12 months following the project application date.

**Exclusion:**

* An additional rebate cannot be claimed for floating head pressure control

***Market Applicability:***

These measures are applicable to low and medium temp refrigeration compressors that are found in a variety of building types: schools, groceries, restaurants, lodging, hospitals, and others. However, these measures are predominantly implemented in grocery stores and restaurants.

## 1.2 Product Technical Description

This set of measures replaces existing single-compressor systems, which were typically designed prior to 1980, with multiplex systems. The measures include the specification of floating head pressure and condenser control method.

The base case is a single-compressor system, either air-cooled or evaporative. In a single-compressor system, each display fixture or other refrigeration load has a dedicated compressor. The compressor cycles on/off according to its fixture's temperature controller. The single compressors modelled as the customer baseline for these measures have a throttling range of 6° F and a pumping efficiency comparable to partial reed style compressors. The customer baseline condenser was modeled as an air-cooled unit with 8 fans staged in pairs directly on ambient temperature with vintage-dependent size and efficiency. Backflood control was set to 93°F.

A multiplex-compressor system consists of multiple compressors drawing from a common suction header (suction-group), and serving any number of display fixtures. The suction group is controlled to satisfy the lowest temperature required by any of the attached display fixtures. For this reason the display fixtures served by a given suction group usually have similar temperature requirements; separate suction-groups are typically used for low temperature and medium-temperature demands.

The measure being implemented is the installation of a Title 24 compliant, multiplex compressor system with either an air-cooled (R107) or evap-cooled (R108) condenser. The modelled air-cooled condensers have four fans each and a rated efficiency of 85 Btu/W-hr at a 10° F TD. The modelled evap-cooled condensers have two-speed fans and a rated efficiency of 200 Btu/W-hr at 100° F SCT and 70° F wetbulb. The modelled compressors operate to a floating head pressure setpoint based on an ambient TD strategy and a throttling range of 2° F. The backflood setpoint was modelled to be 68° F. In addition, mechanical subcooling is provided for both the LT and MT liquid circuits. Subcooling is controlled to 50° F.1

This measure is set as a Title 24 baseline because there is no code that requires compressors to be configured in a multiplex arrangement. Even upon burnout, the store can choose to keep the compressors arranged as singles. Installing a multiplex that meets minimum Title 24 standards is a great leap in energy efficiency compared to retaining a single compressor system design with new compressors.

## 1.3 Measure Application Types

The delivery method for this measure is downstream prescriptive rebate.

Table 1 Measure Application Type[[1]](#endnote-1)

*Identifies the measure application type in the Measure Implementation table in DEER2014.*

|  |  |  |
| --- | --- | --- |
| **Code** | **Description** | **Comment** |
| ER | Early retirement | *Measure is more efficient than code/std; Dual baseline, full measure costs required* |
| ROB | Replace on Burnout | *Single baseline (above code), incremental or full costs* |

## 1.4 Product Base Case and Measure Case Data

### 1.4.1 DEER Base Case and Measure Case Information

The 2008 DEER data generated from MAS Control V3.00.19 include: demand, electric and interactive gas energy savings. Also included are: equipment unit costs, equipment incremental costs, equipment useful life and Net to Gross2. MAS Control V3.00.19 uses the updated weather files and peak demand period definition used to develop measures in DEER2014. The assumptions described in section 1.2 Product Technical Description match those used to develop the DEER 2008 measure set.

The original measures and energy models were created with DEER 2005. Measure information was updated in DEER 2008. The MAS Control tool that ran the batch simulations with the new 2014 T24 weather files appear to have pulled from the D08 version of the measure. We therefore cited the DEER 2008 measure with the update generated through most up to date version of MAS Control.

**Delta Wattage Assumption (ΔW):**

The peak EUL electric savings were generated in MAS Control V3.00.19 for the measures found in DEER2008.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Electric Savings Watts** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | 312.4827 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | 165.8871 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | 270.4256 | tons | 2008 | D03-214 |

RUL Electric Savings **(ΔW):**

* The RUL electric savings were generated in MAS Control V3.00.19 for the measures found in DEER2008.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Electric Savings Watts** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | 25.2230 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | 66.5734 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | 43.2144 | tons | 2008 | D03-214 |

**Therms Savings Assumption (ΔTh)**

EUL Gas Savings **(ΔTh):** The gas savings generated in MAS Control V3.00.19 for the measures found in DEER2008 and express interactive effects only. Intuitively gas savings do not seem applicable to this measure. However, DEER models report a very small impact in therms. We understand these negligible impacts to be noise in eQuest models and not represent significant changes in facility energy use.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Interactive Only?**  **Yes / No** | **Gas Savings Therms** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | Yes | -0.3591 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | Yes | -0.3849 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | Yes | -0.4356 | tons | 2008 | D03-214 |

RUL Gas Savings **(ΔTh):**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Interactive Only?**  **Yes / No** | **Gas Savings Therms** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | Yes | -0.0671 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | Yes | -0.1540 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | Yes | -0.1855 | tons | 2008 | D03-214 |

**Base Case Costs and Measure Case Costs**

The Base Case, Measure Case and Incremental costs were downloaded from DEER directly; they match the intended measures for climate zones and building types and ages. 2nd Baseline costs were not provided in DEER and therefore obtained refrigeration equipment suppliers3. A weighting of 25% low temp compressors and 75% medium temp compressors were used to find a single price per ton. The information listed below is for the 1st baseline.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Costs ($)** | | |  |  |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Base Case** | **Measure Case** | **IMC** | **DEER Version** | **Impact IDs** |
| GRO | ALL | ALL | $0.00 | $3,120.45 | $3,120.45 | 2008 | D03-214 |
| GRO | ALL | ALL | $0.00 | $2,905.13 | $2,905.13 | 2008 | D03-215 |

**Net to Gross Value:**

**From DEER 2011 4.01**

Table 2 Net-to-Gross Ratios

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **DEER Spreadsheet** | |
| Program Approach | NTG | File name | Cell Number |
| EnergySmart Grocer | 0.60 | DEER2011\_NTGR\_2012-05-16 | T56 |

**Effective Useful Life / Remaining Useful Life:**

The Effective Useful Life estimates were downloaded from DEER directly, they match the intended measures for climate zones and building types and ages.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **EUL (yrs)** | **RUL (yrs)** | **DEER Version** | **Impact IDs** |
| GRO | ALL | ALL | 10 | N/A | 2008 | D03-214 |
| GRO | ALL | ALL | 10 | N/A | 2008 | D03-215 |

**In service rate:**

The in service rate is not listed in DEER 2011 for measure D03-214 or D03-215. PECI estimates the ISR for this measure to be 1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **In service rate** | **DEER Version** | **Impact IDs** |
| GRO | ALL | ALL | 1 | N/A | D03-214 |
| GRO | ALL | ALL | 1 | N/A | D03-215 |

### 1.4.2 Codes & Standards Requirements Base Case and Measure Information

The measure in this work paper is not governed by either state or federal codes and standards. The code/industry standard practice baseline complies with Title 24 standards for a new multiplex compressor system.

***Title 20:***

This measure does not fall under Title 20 of the California Energy Regulations. Title 20, Section 1601, p. 1; covers new appliances sold or offered for sale in California, but does not apply to compressor configurations.

***Title 24:***

The minimum requirements for the multiplex configuration of this measure adhere to Title 24 guidelines. According to p. 151 Section 120.6(b)2.,Title 24 does not mandate that compressors must be configured in a multiplex arrangement. When a new multiplex compressor system is installed it is required to use floating suction control logic and low temperature systems must have liquid subcooling to 50° F or less. Both the measure case and code baseline used to calculate savings estimates comply with these code requirements. This measure provides an incentive for the adoption of the most efficient control and configuration of refrigeration compressors.

***Federal Standards:***

This measure does not fall under Federal DOE or EPA Energy Regulations.

### 1.4.4 Assumptions and Calculations from other sources—Base and Measure Cases

There are no further data or calculations provided for the support of the measures in this workpaper.

### 1.4.5 Time-of-Use Adjustment Factor

We are required by CPUC decision 06-06-063 dated June 29, 2006 to apply time-of-use (TOU) adjustment factors on residential A/C and commercial A/C (packaged and split-system direct-expansion cooling) measures only. Since this is not an A/C measure, the TOU adjustment factor is 0. Additionally, if a measure is assigned a DEER load shape, i.e. the load shape starts with “DEER:” the TOU assigned to that measure should also be zero.

# Section 2. Calculation Methods

The saving for this measure is from 2008 DEER data generated from MAS Control V3.00.19. The information can be identified in the database as measures D03-214 and D03-215.

# Section 3. Load Shapes

The PG&E E3 Calculator “Measure Electric End Use Shape” for both the base case load shape and measure load shape is Commercial Refrigeration.

# Section 4. Base Case & Measure Costs

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Application Type** | **Measure Life Basis** | **First Baseline Period Full Measure Cost (RUL)** | **Second Baseline Period Full Measure Cost (EUL – RUL)** |
| ***ROB(replace on burnout)*** | EUL | Calculated as Incremental Measure Cost | N/A |
| ***ER (early retirement)*** | RUL/  EUL-RUL | Calculated as Full Gross Measure Cost | Calculated as Negative Full Gross Base Case Cost |

## 4.1 Base Case(s) Costs

The following Measure Application type is appropriate to this measure. The Base Case Costs are:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Measure Code*** | **Measure Application Type** | **Baseline** | **Equipment Cost** | **Labor / Installation Cost** | **Maintenance / Other Cost** | **Total Base Case Cost** |
| R107 | ER | Existing | $0 | $0 | $0 | $0 |
| R108 | ER | Existing | $0 | $0 | $0 | $0 |
| R107 | ROB | Industry Practice | $1,800 | 920.57 | $0 | $2,720.57 |
| R108 | ROB | Industry Practice | $1,800 | 920.57 | $0 | $2,720.57 |

*All costs are noted as $ per measure unit*

## 4.2 Measure Case Costs

The following Measure Application type is appropriate to this measure. The Measure Case Costs are:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Measure Code*** | **Measure Application Type** | **Baseline** | **Equipment Cost** | **Labor / Installation Cost** | **Maintenance / Other Cost** | **Total Measure Case Cost** |
| R107 | ER | Existing | $2,199.88 | $920.57 | $0 | $3,120.45 |
| R108 | ER | Existing | $1,984.56 | $920.57 | $0 | $2,905.13 |
| R107 | ROB | Industry Practice | $2,199.88 | $920.57 | $0 | $3,120.45 |
| R108 | ROB | Industry Practice | $1,984.56 | $920.57 | $0 | $2,905.13 |

*All costs are noted as $ per measure unit*

## 4.3 Incremental & Full Measure Costs

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Application Type** | **Full Measure Cost**  **(RUL Period/First Baseline)** | **Full Measure Cost**  **(EUL-RUL Period/ Second Baseline)** | **Incremental Measure Cost** |
| ER | Measure Equipment Cost  +Measure Labor Cost | (-1)x(Base Equipment Cost  + Base Labor Cost) | Measure Equipment Cost  – Base Case Equipment Cost |
| ROB | Measure Equipment Cost  – Base Case Equipment Cost | N/A | Measure Equipment Cost  – Base Case Equipment Cost |

### 4.3.1 Fullo Measure Cost

This measure Measure Application type is ROB, so the Full Measure Cost (GMC) is represented by the equation below:

FMC = Measure Equipment Cost + Measure Labor Cost) –

(Base Case Equipment Cost + Base Case Labor Cost)

\*Note: We assume that, unless stated otherwise, the measure case labor and base case labor are assumed to be the same value reducing the equation to the following:

FMC = Measure Equipment Cost – Base Case Equipment *Cost*

*FMC = $2,199.88 per ton - $1,800 per ton = $399.88 per ton*

This measure Measure Application type is also ER for the First baseline period only (RUL) so the Gross Measure Cost (GMC) is represented by the equation below:

GMC = Measure Equipment Cost + Measure Labor Cost

*GMC = $2,199.88 per ton + $920.57 per ton = $3,120.45 per ton*

For ER in the second baseline period (EUL – RUL) period, GMC is represented by the equation below:

GMC = (-1) x (Base Equipment Cost + Base Labor Cost)

*GMC = (-1) x ($1,800.00 per ton + $920.57 per ton) = $-2,720.57 per ton*

\*Note: Various complicated price fluctuations are not addressed in these equations, such as future costs due to inflation in labor, future costs due to deflation in material cost, and other variables that cannot be accurately described at this time.

### 4.3.2 Incremental Measure Costs

This measure Measure Application type is ROB and ER so the Incremental Measure Cost (IMC) is represented by the equation below:

IMC = (Measure Equipment Cost + Measure Labor Cost) –

(Base Case Equipment Cost + Base Case Labor Cost)

\*Note: Unless stated otherwise the measure case labor and base case labor are assumed to be the same value reducing the equation to the following:

IMC = Measure Equipment Cost – Base Case Equipment Cost

**Summary Table for Section 4**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Measure ID** | **Measure Application Type** | **Base Case Total Cost** | **Measure Case Total Cost** | **Gross Measure Case Cost** | **Incremental Measure Cost** |
| R107 | ER | $0 | $3,120.45 | $3,120.45 | $399.88 |
| R108 | ER | $0 | $2,905.13 | $2,905.13 | $184.56 |
| R107 | ROB | $2,720.57 | $3,120.45 | $3,120.45 | $3,120.45 |
| R108 | ROB | $2,720.57 | $2,905.13 | $2,905.13 | $2,905.13 |

# Appendices

## Appendix A: DEER Attributes

### *Delta Wattage Assumptions*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Electric Savings Watts** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | 312.4827 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | 165.8871 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | 270.4256 | tons | 2008 | D03-214 |
| GRO | 03 | CZ04 | 183.0361 | tons | 2008 | D03-214 |
| GRO | 03 | CZ05 | 329.8244 | tons | 2008 | D03-214 |
| GRO | 03 | CZ11 | 147.9363 | tons | 2008 | D03-214 |
| GRO | 03 | CZ12 | 157.3330 | tons | 2008 | D03-214 |
| GRO | 03 | CZ13 | 143.0948 | tons | 2008 | D03-214 |
| GRO | 03 | CZ16 | 330.9319 | tons | 2008 | D03-214 |
| GRO | 07 | CZ01 | 360.5884 | tons | 2008 | D03-214 |
| GRO | 07 | CZ02 | 225.1618 | tons | 2008 | D03-214 |
| GRO | 07 | CZ03 | 332.9456 | tons | 2008 | D03-214 |
| GRO | 07 | CZ04 | 247.4257 | tons | 2008 | D03-214 |
| GRO | 07 | CZ05 | 392.7947 | tons | 2008 | D03-214 |
| GRO | 07 | CZ11 | 171.1420 | tons | 2008 | D03-214 |
| GRO | 07 | CZ12 | 192.7112 | tons | 2008 | D03-214 |
| GRO | 07 | CZ13 | 179.2966 | tons | 2008 | D03-214 |
| GRO | 07 | CZ16 | 362.1483 | tons | 2008 | D03-214 |
| GRO | 75 | CZ01 | 368.5413 | tons | 2008 | D03-214 |
| GRO | 75 | CZ02 | 310.2114 | tons | 2008 | D03-214 |
| GRO | 75 | CZ03 | 327.4570 | tons | 2008 | D03-214 |
| GRO | 75 | CZ04 | 278.9813 | tons | 2008 | D03-214 |
| GRO | 75 | CZ05 | 377.0974 | tons | 2008 | D03-214 |
| GRO | 75 | CZ11 | 298.9872 | tons | 2008 | D03-214 |
| GRO | 75 | CZ12 | 321.1126 | tons | 2008 | D03-214 |
| GRO | 75 | CZ13 | 309.3103 | tons | 2008 | D03-214 |
| GRO | 75 | CZ16 | 361.8376 | tons | 2008 | D03-214 |
| GRO | 85 | CZ01 | 369.6144 | tons | 2008 | D03-214 |
| GRO | 85 | CZ02 | 300.7575 | tons | 2008 | D03-214 |
| GRO | 85 | CZ03 | 335.1131 | tons | 2008 | D03-214 |
| GRO | 85 | CZ04 | 278.1711 | tons | 2008 | D03-214 |
| GRO | 85 | CZ05 | 376.6763 | tons | 2008 | D03-214 |
| GRO | 85 | CZ11 | 298.9403 | tons | 2008 | D03-214 |
| GRO | 85 | CZ12 | 318.0817 | tons | 2008 | D03-214 |
| GRO | 85 | CZ13 | 305.6242 | tons | 2008 | D03-214 |
| GRO | 85 | CZ16 | 356.1166 | tons | 2008 | D03-214 |
| GRO | 96 | CZ01 | 313.8046 | tons | 2008 | D03-214 |
| GRO | 96 | CZ02 | 166.4775 | tons | 2008 | D03-214 |
| GRO | 96 | CZ03 | 261.5295 | tons | 2008 | D03-214 |
| GRO | 96 | CZ04 | 195.7273 | tons | 2008 | D03-214 |
| GRO | 96 | CZ05 | 313.8086 | tons | 2008 | D03-214 |
| GRO | 96 | CZ11 | 150.3609 | tons | 2008 | D03-214 |
| GRO | 96 | CZ12 | 158.8353 | tons | 2008 | D03-214 |
| GRO | 96 | CZ13 | 149.0950 | tons | 2008 | D03-214 |
| GRO | 96 | CZ16 | 324.3508 | tons | 2008 | D03-214 |
| GRO | 03 | CZ01 | 393.0682 | tons | 2008 | D03-215 |
| GRO | 03 | CZ02 | 466.8173 | tons | 2008 | D03-215 |
| GRO | 03 | CZ03 | 393.7843 | tons | 2008 | D03-215 |
| GRO | 03 | CZ04 | 415.2868 | tons | 2008 | D03-215 |
| GRO | 03 | CZ05 | 394.8575 | tons | 2008 | D03-215 |
| GRO | 03 | CZ11 | 452.8965 | tons | 2008 | D03-215 |
| GRO | 03 | CZ12 | 459.0005 | tons | 2008 | D03-215 |
| GRO | 03 | CZ13 | 421.2219 | tons | 2008 | D03-215 |
| GRO | 03 | CZ16 | 543.7148 | tons | 2008 | D03-215 |
| GRO | 07 | CZ01 | 501.4821 | tons | 2008 | D03-215 |
| GRO | 07 | CZ02 | 547.0155 | tons | 2008 | D03-215 |
| GRO | 07 | CZ03 | 471.6865 | tons | 2008 | D03-215 |
| GRO | 07 | CZ04 | 467.9285 | tons | 2008 | D03-215 |
| GRO | 07 | CZ05 | 549.7274 | tons | 2008 | D03-215 |
| GRO | 07 | CZ11 | 541.9484 | tons | 2008 | D03-215 |
| GRO | 07 | CZ12 | 489.4703 | tons | 2008 | D03-215 |
| GRO | 07 | CZ13 | 468.7665 | tons | 2008 | D03-215 |
| GRO | 07 | CZ16 | 625.9434 | tons | 2008 | D03-215 |
| GRO | 75 | CZ01 | 448.6874 | tons | 2008 | D03-215 |
| GRO | 75 | CZ02 | 605.4705 | tons | 2008 | D03-215 |
| GRO | 75 | CZ03 | 454.2843 | tons | 2008 | D03-215 |
| GRO | 75 | CZ04 | 507.3118 | tons | 2008 | D03-215 |
| GRO | 75 | CZ05 | 448.4121 | tons | 2008 | D03-215 |
| GRO | 75 | CZ11 | 608.4627 | tons | 2008 | D03-215 |
| GRO | 75 | CZ12 | 623.5336 | tons | 2008 | D03-215 |
| GRO | 75 | CZ13 | 590.9905 | tons | 2008 | D03-215 |
| GRO | 75 | CZ16 | 569.2761 | tons | 2008 | D03-215 |
| GRO | 85 | CZ01 | 452.6076 | tons | 2008 | D03-215 |
| GRO | 85 | CZ02 | 609.3211 | tons | 2008 | D03-215 |
| GRO | 85 | CZ03 | 458.2196 | tons | 2008 | D03-215 |
| GRO | 85 | CZ04 | 509.5473 | tons | 2008 | D03-215 |
| GRO | 85 | CZ05 | 440.8329 | tons | 2008 | D03-215 |
| GRO | 85 | CZ11 | 597.4640 | tons | 2008 | D03-215 |
| GRO | 85 | CZ12 | 620.4768 | tons | 2008 | D03-215 |
| GRO | 85 | CZ13 | 581.7488 | tons | 2008 | D03-215 |
| GRO | 85 | CZ16 | 565.7016 | tons | 2008 | D03-215 |
| GRO | 96 | CZ01 | 390.6132 | tons | 2008 | D03-215 |
| GRO | 96 | CZ02 | 458.8702 | tons | 2008 | D03-215 |
| GRO | 96 | CZ03 | 387.2557 | tons | 2008 | D03-215 |
| GRO | 96 | CZ04 | 424.9720 | tons | 2008 | D03-215 |
| GRO | 96 | CZ05 | 378.9668 | tons | 2008 | D03-215 |
| GRO | 96 | CZ11 | 437.6380 | tons | 2008 | D03-215 |
| GRO | 96 | CZ12 | 452.2150 | tons | 2008 | D03-215 |
| GRO | 96 | CZ13 | 410.5234 | tons | 2008 | D03-215 |
| GRO | 96 | CZ16 | 532.6504 | tons | 2008 | D03-215 |

### RUL Delta Wattage Assumptions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Electric Savings Watts** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | 25.2230 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | 66.5734 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | 43.2144 | tons | 2008 | D03-214 |
| GRO | 03 | CZ04 | 68.9614 | tons | 2008 | D03-214 |
| GRO | 03 | CZ05 | -2.0926 | tons | 2008 | D03-214 |
| GRO | 03 | CZ11 | 65.7761 | tons | 2008 | D03-214 |
| GRO | 03 | CZ12 | 67.6389 | tons | 2008 | D03-214 |
| GRO | 03 | CZ13 | 78.6157 | tons | 2008 | D03-214 |
| GRO | 03 | CZ16 | 0.5877 | tons | 2008 | D03-214 |
| GRO | 07 | CZ01 | -17.2973 | tons | 2008 | D03-214 |
| GRO | 07 | CZ02 | 57.7185 | tons | 2008 | D03-214 |
| GRO | 07 | CZ03 | 13.9140 | tons | 2008 | D03-214 |
| GRO | 07 | CZ04 | 49.9591 | tons | 2008 | D03-214 |
| GRO | 07 | CZ05 | -29.9065 | tons | 2008 | D03-214 |
| GRO | 07 | CZ11 | 56.0626 | tons | 2008 | D03-214 |
| GRO | 07 | CZ12 | 61.1449 | tons | 2008 | D03-214 |
| GRO | 07 | CZ13 | 58.3884 | tons | 2008 | D03-214 |
| GRO | 07 | CZ16 | -51.0727 | tons | 2008 | D03-214 |
| GRO | 75 | CZ01 | 35.2019 | tons | 2008 | D03-214 |
| GRO | 75 | CZ02 | 70.8833 | tons | 2008 | D03-214 |
| GRO | 75 | CZ03 | 47.5230 | tons | 2008 | D03-214 |
| GRO | 75 | CZ04 | 62.2393 | tons | 2008 | D03-214 |
| GRO | 75 | CZ05 | 2.1599 | tons | 2008 | D03-214 |
| GRO | 75 | CZ11 | 69.8560 | tons | 2008 | D03-214 |
| GRO | 75 | CZ12 | 76.4528 | tons | 2008 | D03-214 |
| GRO | 75 | CZ13 | 76.8888 | tons | 2008 | D03-214 |
| GRO | 75 | CZ16 | 2.7949 | tons | 2008 | D03-214 |
| GRO | 85 | CZ01 | 33.6312 | tons | 2008 | D03-214 |
| GRO | 85 | CZ02 | 62.5588 | tons | 2008 | D03-214 |
| GRO | 85 | CZ03 | 52.4528 | tons | 2008 | D03-214 |
| GRO | 85 | CZ04 | 60.7271 | tons | 2008 | D03-214 |
| GRO | 85 | CZ05 | 2.3367 | tons | 2008 | D03-214 |
| GRO | 85 | CZ11 | 71.5291 | tons | 2008 | D03-214 |
| GRO | 85 | CZ12 | 78.9945 | tons | 2008 | D03-214 |
| GRO | 85 | CZ13 | 71.6180 | tons | 2008 | D03-214 |
| GRO | 85 | CZ16 | 2.4994 | tons | 2008 | D03-214 |
| GRO | 96 | CZ01 | 29.4770 | tons | 2008 | D03-214 |
| GRO | 96 | CZ02 | 64.3482 | tons | 2008 | D03-214 |
| GRO | 96 | CZ03 | 40.2451 | tons | 2008 | D03-214 |
| GRO | 96 | CZ04 | 69.3594 | tons | 2008 | D03-214 |
| GRO | 96 | CZ05 | -6.4146 | tons | 2008 | D03-214 |
| GRO | 96 | CZ11 | 67.0178 | tons | 2008 | D03-214 |
| GRO | 96 | CZ12 | 75.8178 | tons | 2008 | D03-214 |
| GRO | 96 | CZ13 | 76.8107 | tons | 2008 | D03-214 |
| GRO | 96 | CZ16 | 7.7676 | tons | 2008 | D03-214 |
| GRO | 03 | CZ01 | 105.8085 | tons | 2008 | D03-215 |
| GRO | 03 | CZ02 | 367.5036 | tons | 2008 | D03-215 |
| GRO | 03 | CZ03 | 166.5731 | tons | 2008 | D03-215 |
| GRO | 03 | CZ04 | 301.2120 | tons | 2008 | D03-215 |
| GRO | 03 | CZ05 | 62.9405 | tons | 2008 | D03-215 |
| GRO | 03 | CZ11 | 370.7364 | tons | 2008 | D03-215 |
| GRO | 03 | CZ12 | 369.3064 | tons | 2008 | D03-215 |
| GRO | 03 | CZ13 | 356.7428 | tons | 2008 | D03-215 |
| GRO | 03 | CZ16 | 213.3706 | tons | 2008 | D03-215 |
| GRO | 07 | CZ01 | 105.8085 | tons | 2008 | D03-215 |
| GRO | 07 | CZ02 | 367.5036 | tons | 2008 | D03-215 |
| GRO | 07 | CZ03 | 166.5731 | tons | 2008 | D03-215 |
| GRO | 07 | CZ04 | 301.2120 | tons | 2008 | D03-215 |
| GRO | 07 | CZ05 | 62.9405 | tons | 2008 | D03-215 |
| GRO | 07 | CZ11 | 370.7364 | tons | 2008 | D03-215 |
| GRO | 07 | CZ12 | 369.3064 | tons | 2008 | D03-215 |
| GRO | 07 | CZ13 | 356.7428 | tons | 2008 | D03-215 |
| GRO | 07 | CZ16 | 213.3706 | tons | 2008 | D03-215 |
| GRO | 75 | CZ01 | 115.3480 | tons | 2008 | D03-215 |
| GRO | 75 | CZ02 | 366.1424 | tons | 2008 | D03-215 |
| GRO | 75 | CZ03 | 174.3502 | tons | 2008 | D03-215 |
| GRO | 75 | CZ04 | 290.5698 | tons | 2008 | D03-215 |
| GRO | 75 | CZ05 | 73.4746 | tons | 2008 | D03-215 |
| GRO | 75 | CZ11 | 379.3315 | tons | 2008 | D03-215 |
| GRO | 75 | CZ12 | 378.8738 | tons | 2008 | D03-215 |
| GRO | 75 | CZ13 | 358.5689 | tons | 2008 | D03-215 |
| GRO | 75 | CZ16 | 210.2334 | tons | 2008 | D03-215 |
| GRO | 85 | CZ01 | 116.6244 | tons | 2008 | D03-215 |
| GRO | 85 | CZ02 | 371.1224 | tons | 2008 | D03-215 |
| GRO | 85 | CZ03 | 175.5593 | tons | 2008 | D03-215 |
| GRO | 85 | CZ04 | 292.1033 | tons | 2008 | D03-215 |
| GRO | 85 | CZ05 | 66.4933 | tons | 2008 | D03-215 |
| GRO | 85 | CZ11 | 370.0527 | tons | 2008 | D03-215 |
| GRO | 85 | CZ12 | 381.3896 | tons | 2008 | D03-215 |
| GRO | 85 | CZ13 | 347.7426 | tons | 2008 | D03-215 |
| GRO | 85 | CZ16 | 212.0844 | tons | 2008 | D03-215 |
| GRO | 96 | CZ01 | 106.2856 | tons | 2008 | D03-215 |
| GRO | 96 | CZ02 | 356.7409 | tons | 2008 | D03-215 |
| GRO | 96 | CZ03 | 165.9713 | tons | 2008 | D03-215 |
| GRO | 96 | CZ04 | 298.6041 | tons | 2008 | D03-215 |
| GRO | 96 | CZ05 | 58.7435 | tons | 2008 | D03-215 |
| GRO | 96 | CZ11 | 354.2950 | tons | 2008 | D03-215 |
| GRO | 96 | CZ12 | 369.1975 | tons | 2008 | D03-215 |
| GRO | 96 | CZ13 | 338.2391 | tons | 2008 | D03-215 |
| GRO | 96 | CZ16 | 216.0672 | tons | 2008 | D03-215 |

### Therms Savings Assumptions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Interactive Only?**  **Yes / No** | **Gas Savings Therms** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | Yes | -0.3591 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | Yes | -0.3849 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | Yes | -0.4356 | tons | 2008 | D03-214 |
| GRO | 03 | CZ04 | Yes | -0.4221 | tons | 2008 | D03-214 |
| GRO | 03 | CZ05 | Yes | -0.4980 | tons | 2008 | D03-214 |
| GRO | 03 | CZ11 | Yes | -0.2774 | tons | 2008 | D03-214 |
| GRO | 03 | CZ12 | Yes | -0.3102 | tons | 2008 | D03-214 |
| GRO | 03 | CZ13 | Yes | -0.3237 | tons | 2008 | D03-214 |
| GRO | 03 | CZ16 | Yes | -0.3372 | tons | 2008 | D03-214 |
| GRO | 07 | CZ01 | Yes | -0.5069 | tons | 2008 | D03-214 |
| GRO | 07 | CZ02 | Yes | -0.3923 | tons | 2008 | D03-214 |
| GRO | 07 | CZ03 | Yes | -0.3818 | tons | 2008 | D03-214 |
| GRO | 07 | CZ04 | Yes | -0.3185 | tons | 2008 | D03-214 |
| GRO | 07 | CZ05 | Yes | -0.3860 | tons | 2008 | D03-214 |
| GRO | 07 | CZ11 | Yes | -0.2789 | tons | 2008 | D03-214 |
| GRO | 07 | CZ12 | Yes | -0.2784 | tons | 2008 | D03-214 |
| GRO | 07 | CZ13 | Yes | -0.3437 | tons | 2008 | D03-214 |
| GRO | 07 | CZ16 | Yes | -0.3308 | tons | 2008 | D03-214 |
| GRO | 75 | CZ01 | Yes | -0.3422 | tons | 2008 | D03-214 |
| GRO | 75 | CZ02 | Yes | -0.2631 | tons | 2008 | D03-214 |
| GRO | 75 | CZ03 | Yes | -0.3482 | tons | 2008 | D03-214 |
| GRO | 75 | CZ04 | Yes | -0.2772 | tons | 2008 | D03-214 |
| GRO | 75 | CZ05 | Yes | -0.3519 | tons | 2008 | D03-214 |
| GRO | 75 | CZ11 | Yes | -0.2358 | tons | 2008 | D03-214 |
| GRO | 75 | CZ12 | Yes | -0.2628 | tons | 2008 | D03-214 |
| GRO | 75 | CZ13 | Yes | -0.2565 | tons | 2008 | D03-214 |
| GRO | 75 | CZ16 | Yes | -0.2897 | tons | 2008 | D03-214 |
| GRO | 85 | CZ01 | Yes | -0.3522 | tons | 2008 | D03-214 |
| GRO | 85 | CZ02 | Yes | -0.2934 | tons | 2008 | D03-214 |
| GRO | 85 | CZ03 | Yes | -0.3730 | tons | 2008 | D03-214 |
| GRO | 85 | CZ04 | Yes | -0.3423 | tons | 2008 | D03-214 |
| GRO | 85 | CZ05 | Yes | -0.3738 | tons | 2008 | D03-214 |
| GRO | 85 | CZ11 | Yes | -0.2203 | tons | 2008 | D03-214 |
| GRO | 85 | CZ12 | Yes | -0.2937 | tons | 2008 | D03-214 |
| GRO | 85 | CZ13 | Yes | -0.2290 | tons | 2008 | D03-214 |
| GRO | 85 | CZ16 | Yes | -0.2929 | tons | 2008 | D03-214 |
| GRO | 96 | CZ01 | Yes | -0.3545 | tons | 2008 | D03-214 |
| GRO | 96 | CZ02 | Yes | -0.3206 | tons | 2008 | D03-214 |
| GRO | 96 | CZ03 | Yes | -0.4487 | tons | 2008 | D03-214 |
| GRO | 96 | CZ04 | Yes | -0.3861 | tons | 2008 | D03-214 |
| GRO | 96 | CZ05 | Yes | -0.4521 | tons | 2008 | D03-214 |
| GRO | 96 | CZ11 | Yes | -0.2646 | tons | 2008 | D03-214 |
| GRO | 96 | CZ12 | Yes | -0.3131 | tons | 2008 | D03-214 |
| GRO | 96 | CZ13 | Yes | -0.2845 | tons | 2008 | D03-214 |
| GRO | 96 | CZ16 | Yes | -0.3078 | tons | 2008 | D03-214 |
| GRO | 03 | CZ01 | Yes | -0.3591 | tons | 2008 | D03-215 |
| GRO | 03 | CZ02 | Yes | -0.2933 | tons | 2008 | D03-215 |
| GRO | 03 | CZ03 | Yes | -0.3630 | tons | 2008 | D03-215 |
| GRO | 03 | CZ04 | Yes | -0.3071 | tons | 2008 | D03-215 |
| GRO | 03 | CZ05 | Yes | -0.3742 | tons | 2008 | D03-215 |
| GRO | 03 | CZ11 | Yes | -0.1981 | tons | 2008 | D03-215 |
| GRO | 03 | CZ12 | Yes | -0.2343 | tons | 2008 | D03-215 |
| GRO | 03 | CZ13 | Yes | -0.2189 | tons | 2008 | D03-215 |
| GRO | 03 | CZ16 | Yes | -0.2575 | tons | 2008 | D03-215 |
| GRO | 07 | CZ01 | Yes | -0.4916 | tons | 2008 | D03-215 |
| GRO | 07 | CZ02 | Yes | -0.3313 | tons | 2008 | D03-215 |
| GRO | 07 | CZ03 | Yes | -0.3590 | tons | 2008 | D03-215 |
| GRO | 07 | CZ04 | Yes | -0.2939 | tons | 2008 | D03-215 |
| GRO | 07 | CZ05 | Yes | -0.3686 | tons | 2008 | D03-215 |
| GRO | 07 | CZ11 | Yes | -0.2590 | tons | 2008 | D03-215 |
| GRO | 07 | CZ12 | Yes | -0.2691 | tons | 2008 | D03-215 |
| GRO | 07 | CZ13 | Yes | -0.2920 | tons | 2008 | D03-215 |
| GRO | 07 | CZ16 | Yes | -0.2919 | tons | 2008 | D03-215 |
| GRO | 75 | CZ01 | Yes | -0.3515 | tons | 2008 | D03-215 |
| GRO | 75 | CZ02 | Yes | -0.2181 | tons | 2008 | D03-215 |
| GRO | 75 | CZ03 | Yes | -0.3198 | tons | 2008 | D03-215 |
| GRO | 75 | CZ04 | Yes | -0.2308 | tons | 2008 | D03-215 |
| GRO | 75 | CZ05 | Yes | -0.3110 | tons | 2008 | D03-215 |
| GRO | 75 | CZ11 | Yes | -0.1899 | tons | 2008 | D03-215 |
| GRO | 75 | CZ12 | Yes | -0.2218 | tons | 2008 | D03-215 |
| GRO | 75 | CZ13 | Yes | -0.1952 | tons | 2008 | D03-215 |
| GRO | 75 | CZ16 | Yes | -0.2180 | tons | 2008 | D03-215 |
| GRO | 85 | CZ01 | Yes | -0.3603 | tons | 2008 | D03-215 |
| GRO | 85 | CZ02 | Yes | -0.2549 | tons | 2008 | D03-215 |
| GRO | 85 | CZ03 | Yes | -0.3229 | tons | 2008 | D03-215 |
| GRO | 85 | CZ04 | Yes | -0.2674 | tons | 2008 | D03-215 |
| GRO | 85 | CZ05 | Yes | -0.3197 | tons | 2008 | D03-215 |
| GRO | 85 | CZ11 | Yes | -0.1881 | tons | 2008 | D03-215 |
| GRO | 85 | CZ12 | Yes | -0.2039 | tons | 2008 | D03-215 |
| GRO | 85 | CZ13 | Yes | -0.1717 | tons | 2008 | D03-215 |
| GRO | 85 | CZ16 | Yes | -0.2432 | tons | 2008 | D03-215 |
| GRO | 96 | CZ01 | Yes | -0.3613 | tons | 2008 | D03-215 |
| GRO | 96 | CZ02 | Yes | -0.2612 | tons | 2008 | D03-215 |
| GRO | 96 | CZ03 | Yes | -0.3862 | tons | 2008 | D03-215 |
| GRO | 96 | CZ04 | Yes | -0.2916 | tons | 2008 | D03-215 |
| GRO | 96 | CZ05 | Yes | -0.3705 | tons | 2008 | D03-215 |
| GRO | 96 | CZ11 | Yes | -0.1938 | tons | 2008 | D03-215 |
| GRO | 96 | CZ12 | Yes | -0.2471 | tons | 2008 | D03-215 |
| GRO | 96 | CZ13 | Yes | -0.2009 | tons | 2008 | D03-215 |
| GRO | 96 | CZ16 | Yes | -0.2339 | tons | 2008 | D03-215 |

### RUL Therms Savings Assumptions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Building type** | **Bldg Vintage** | **Climate Zone** | **Interactive Only?**  **Yes / No** | **Gas Savings Therms** | **Deer units** | **DEER Version** | **Impact IDs** |
| GRO | 03 | CZ01 | Yes | -0.0671 | tons | 2008 | D03-214 |
| GRO | 03 | CZ02 | Yes | -0.1540 | tons | 2008 | D03-214 |
| GRO | 03 | CZ03 | Yes | -0.1855 | tons | 2008 | D03-214 |
| GRO | 03 | CZ04 | Yes | -0.2043 | tons | 2008 | D03-214 |
| GRO | 03 | CZ05 | Yes | -0.2394 | tons | 2008 | D03-214 |
| GRO | 03 | CZ11 | Yes | -0.0959 | tons | 2008 | D03-214 |
| GRO | 03 | CZ12 | Yes | -0.1225 | tons | 2008 | D03-214 |
| GRO | 03 | CZ13 | Yes | -0.1366 | tons | 2008 | D03-214 |
| GRO | 03 | CZ16 | Yes | -0.0574 | tons | 2008 | D03-214 |
| GRO | 07 | CZ01 | Yes | 0.0269 | tons | 2008 | D03-214 |
| GRO | 07 | CZ02 | Yes | -0.0267 | tons | 2008 | D03-214 |
| GRO | 07 | CZ03 | Yes | -0.0133 | tons | 2008 | D03-214 |
| GRO | 07 | CZ04 | Yes | -0.0019 | tons | 2008 | D03-214 |
| GRO | 07 | CZ05 | Yes | 0.0077 | tons | 2008 | D03-214 |
| GRO | 07 | CZ11 | Yes | 0.0145 | tons | 2008 | D03-214 |
| GRO | 07 | CZ12 | Yes | 0.0224 | tons | 2008 | D03-214 |
| GRO | 07 | CZ13 | Yes | -0.0203 | tons | 2008 | D03-214 |
| GRO | 07 | CZ16 | Yes | 0.0331 | tons | 2008 | D03-214 |
| GRO | 75 | CZ01 | Yes | -0.0623 | tons | 2008 | D03-214 |
| GRO | 75 | CZ02 | Yes | -0.0821 | tons | 2008 | D03-214 |
| GRO | 75 | CZ03 | Yes | -0.1199 | tons | 2008 | D03-214 |
| GRO | 75 | CZ04 | Yes | -0.1109 | tons | 2008 | D03-214 |
| GRO | 75 | CZ05 | Yes | -0.1186 | tons | 2008 | D03-214 |
| GRO | 75 | CZ11 | Yes | -0.0546 | tons | 2008 | D03-214 |
| GRO | 75 | CZ12 | Yes | -0.0679 | tons | 2008 | D03-214 |
| GRO | 75 | CZ13 | Yes | -0.0881 | tons | 2008 | D03-214 |
| GRO | 75 | CZ16 | Yes | -0.0433 | tons | 2008 | D03-214 |
| GRO | 85 | CZ01 | Yes | -0.0696 | tons | 2008 | D03-214 |
| GRO | 85 | CZ02 | Yes | -0.0935 | tons | 2008 | D03-214 |
| GRO | 85 | CZ03 | Yes | -0.1518 | tons | 2008 | D03-214 |
| GRO | 85 | CZ04 | Yes | -0.1537 | tons | 2008 | D03-214 |
| GRO | 85 | CZ05 | Yes | -0.1466 | tons | 2008 | D03-214 |
| GRO | 85 | CZ11 | Yes | -0.0384 | tons | 2008 | D03-214 |
| GRO | 85 | CZ12 | Yes | -0.1142 | tons | 2008 | D03-214 |
| GRO | 85 | CZ13 | Yes | -0.0700 | tons | 2008 | D03-214 |
| GRO | 85 | CZ16 | Yes | -0.0255 | tons | 2008 | D03-214 |
| GRO | 96 | CZ01 | Yes | -0.0720 | tons | 2008 | D03-214 |
| GRO | 96 | CZ02 | Yes | -0.1112 | tons | 2008 | D03-214 |
| GRO | 96 | CZ03 | Yes | -0.2003 | tons | 2008 | D03-214 |
| GRO | 96 | CZ04 | Yes | -0.1944 | tons | 2008 | D03-214 |
| GRO | 96 | CZ05 | Yes | -0.1993 | tons | 2008 | D03-214 |
| GRO | 96 | CZ11 | Yes | -0.0932 | tons | 2008 | D03-214 |
| GRO | 96 | CZ12 | Yes | -0.1151 | tons | 2008 | D03-214 |
| GRO | 96 | CZ13 | Yes | -0.1120 | tons | 2008 | D03-214 |
| GRO | 96 | CZ16 | Yes | -0.0520 | tons | 2008 | D03-214 |
| GRO | 03 | CZ01 | Yes | -0.0671 | tons | 2008 | D03-215 |
| GRO | 03 | CZ02 | Yes | -0.0624 | tons | 2008 | D03-215 |
| GRO | 03 | CZ03 | Yes | -0.1129 | tons | 2008 | D03-215 |
| GRO | 03 | CZ04 | Yes | -0.0893 | tons | 2008 | D03-215 |
| GRO | 03 | CZ05 | Yes | -0.1156 | tons | 2008 | D03-215 |
| GRO | 03 | CZ11 | Yes | -0.0166 | tons | 2008 | D03-215 |
| GRO | 03 | CZ12 | Yes | -0.0466 | tons | 2008 | D03-215 |
| GRO | 03 | CZ13 | Yes | -0.0318 | tons | 2008 | D03-215 |
| GRO | 03 | CZ16 | Yes | 0.0224 | tons | 2008 | D03-215 |
| GRO | 07 | CZ01 | Yes | 0.0422 | tons | 2008 | D03-215 |
| GRO | 07 | CZ02 | Yes | 0.0343 | tons | 2008 | D03-215 |
| GRO | 07 | CZ03 | Yes | 0.0095 | tons | 2008 | D03-215 |
| GRO | 07 | CZ04 | Yes | 0.0228 | tons | 2008 | D03-215 |
| GRO | 07 | CZ05 | Yes | 0.0251 | tons | 2008 | D03-215 |
| GRO | 07 | CZ11 | Yes | 0.0344 | tons | 2008 | D03-215 |
| GRO | 07 | CZ12 | Yes | 0.0318 | tons | 2008 | D03-215 |
| GRO | 07 | CZ13 | Yes | 0.0314 | tons | 2008 | D03-215 |
| GRO | 07 | CZ16 | Yes | 0.0720 | tons | 2008 | D03-215 |
| GRO | 75 | CZ01 | Yes | -0.0716 | tons | 2008 | D03-215 |
| GRO | 75 | CZ02 | Yes | -0.0372 | tons | 2008 | D03-215 |
| GRO | 75 | CZ03 | Yes | -0.0916 | tons | 2008 | D03-215 |
| GRO | 75 | CZ04 | Yes | -0.0645 | tons | 2008 | D03-215 |
| GRO | 75 | CZ05 | Yes | -0.0778 | tons | 2008 | D03-215 |
| GRO | 75 | CZ11 | Yes | -0.0087 | tons | 2008 | D03-215 |
| GRO | 75 | CZ12 | Yes | -0.0269 | tons | 2008 | D03-215 |
| GRO | 75 | CZ13 | Yes | -0.0268 | tons | 2008 | D03-215 |
| GRO | 75 | CZ16 | Yes | 0.0284 | tons | 2008 | D03-215 |
| GRO | 85 | CZ01 | Yes | -0.0777 | tons | 2008 | D03-215 |
| GRO | 85 | CZ02 | Yes | -0.0551 | tons | 2008 | D03-215 |
| GRO | 85 | CZ03 | Yes | -0.1016 | tons | 2008 | D03-215 |
| GRO | 85 | CZ04 | Yes | -0.0788 | tons | 2008 | D03-215 |
| GRO | 85 | CZ05 | Yes | -0.0925 | tons | 2008 | D03-215 |
| GRO | 85 | CZ11 | Yes | -0.0062 | tons | 2008 | D03-215 |
| GRO | 85 | CZ12 | Yes | -0.0244 | tons | 2008 | D03-215 |
| GRO | 85 | CZ13 | Yes | -0.0127 | tons | 2008 | D03-215 |
| GRO | 85 | CZ16 | Yes | 0.0242 | tons | 2008 | D03-215 |
| GRO | 96 | CZ01 | Yes | -0.0788 | tons | 2008 | D03-215 |
| GRO | 96 | CZ02 | Yes | -0.0517 | tons | 2008 | D03-215 |
| GRO | 96 | CZ03 | Yes | -0.1378 | tons | 2008 | D03-215 |
| GRO | 96 | CZ04 | Yes | -0.0998 | tons | 2008 | D03-215 |
| GRO | 96 | CZ05 | Yes | -0.1177 | tons | 2008 | D03-215 |
| GRO | 96 | CZ11 | Yes | -0.0224 | tons | 2008 | D03-215 |
| GRO | 96 | CZ12 | Yes | -0.0492 | tons | 2008 | D03-215 |
| GRO | 96 | CZ13 | Yes | -0.0283 | tons | 2008 | D03-215 |
| GRO | 96 | CZ16 | Yes | 0.0219 | tons | 2008 | D03-215 |

# References

12004-2005 Database for Energy Efficiency Resources (DEER) Update Study Final Report. Prepared For: Southern California Edison By Itron, Inc. December 2005.

22004-2005 Database for Energy Efficiency Resources, Version 2.01, October 26, 2005, EEM D03-214, D03-215 <http://eega.cpus.ca.gov/deer>.

3 ILLCO Copeland Products Distributor and Wholesale Supplier, Elk Grove Village, Illinois

1. The DEER Measure Cost Data Users Guide found on [www.deeresources.com](http://www.deeresources.com) under *DEER2011 Database Format* hyperlink, DEER2011 for 13-14, spreadsheet *SPTdata\_format-V0.97.xls.* [↑](#endnote-ref-1)