# **Addendum to Report Refrigerant Leakage Avoided Costs**

**Introduction**

Per Resolution E-5152, the reporting of refrigerant leakage avoided costs (RLAC) is required for all PY2022 (and future) Energy Efficiency claims as evaluated and reported by the CPUC’s refrigerant avoided cost calculator (RACC)[[1]](#footnote-2) for measure packages where the retrofit involves *adding* (not replacing) equipment that uses refrigerant – these include fuel substitution and electric resistance to heat pump measures - or where low-GWP refrigerant measure benefits will be claimed.

**RACC Applicability and Adaptation for Deemed Measures**

The CPUC’s RACC performs a lifecycle refrigerant leakage avoided cost (RLAC) calculation for only one device at a time. Given that deemed measure packages have multiple measures and each measure has multiple device scenarios (pre-existing, standard, and measure efficiency levels), the RACC would need to be run multiple times, and several copies of the RACC provided for each measure configuration and permutation, which is not practical. In addition, to be able to use the CPUC RACC as a whole without major modification, scenarios such as partial-lifetime required for accelerated replacement measures (AR) were not possible. With these limitations, the approach used for deemed measures was simplified as follows:

* For a single-baseline, normal replacement (NR) measure application type (MAT) the RLAC calculation is straight-forward and is calculated as the difference between the full lifecycle RLAC values for the standard baseline device and the measure device.
* For the dual-baseline accelerated replacement (AR) MAT, to use the CPUC RACC without major modification or complication, the RLAC will be simply calculated as the difference in the full lifecycle RLAC values for the pre-retrofit baseline device and the measure device, and again the lifetime is that of the measure device. Any other approach to address the dual-baseline issue would require either a major modification or manipulation and explanation of the CPUC RACC tool, which is currently not allow for deemed reporting at this time.
* For both approaches, if the lifetime (EUL) of the two devices is different, then the lifetime of the measure will be used for both calculations, consistent with the Energy Efficiency Policy Manual.[[2]](#footnote-3)

**Deemed Measure RACC Workbook**

The SCE team also developed a Deemed Dashboard workbook for deemed measures that uses the CPUC’s RACC as the core but provides a consolidated output that can be used for the eTRM, cost-effectiveness tool, and claims. This Deemed Dashboard presents the inputs that would be used for the CPUC RACC but calculates the avoided costs for several measures simultaneously. For transparency and easy comparison to the CPUC RACC, it also provides intermediate calculated values, not just the final refrigerant leakage avoided cost. For the same inputs, both dashboards will provide the same RLAC values.

The application issues that required the creation of a deemed measure calculator wrapped-around the basic CPUC RACC, and other key elements of the deemed measure RACC calculator include:

* **Equipment type names:** The RACC device type names – derived from a California Air Resources Board (ARB) study – are somewhat general while the deemed measure package and equipment names are very specific. A mapping table was developed to map the deemed workpaper names to the RACC ARB device type names.
* **Refrigerant charge amount and refrigerant type:** The CPUC RACC ARB-derived average leakage rates and average charge sizes are all specified per (typical) device but there is no contextual information for these values such as the associated average capacity or size, capacity range, or configuration specifics. The RACC also does not specify a default refrigerant type for each device type. However, almost all of the deemed measures use a capacity or size-based unit basis for savings - for example cooling is “per ton” - so the RALC values used in the CET need to be on the same basis as the savings. For deemed measures, limited research was conducted to determine the typical refrigerant types and refrigerant charge estimates on a basis consistent with each measure (e.g. per ton, per kBtuh). The values were developed from other CPUC studies such as the DNV refrigerant study. Research was also conducted to identify default refrigerant types for each device. Values and sources are cited in the deemed measure RACC workbook.
* **“User-specified” instead of “ARB average” values:** This option is available in the CPUC RACC for device lifetime, refrigerant charge in pounds and weighted average cost of capital (WACC). User-specified was used for the refrigerant charge and WACC values as explained in other bullets.
* **Modification to CPUC RACC for use as look-up tables:** Some minor modifications were made to the two CPUC RACC tabs that are the basis of the refrigerant leakage and GWP assumptions to use them as look up tables for the deemed measure RACC workbook. No values were changed.
* **RACC Leakage rates and costs used as-is:** The existing ARB average leakage rates by device type were used as-is but as previously explained the ARB device types were mapped to deemed measure names.
* **Active device lifetime (EUL):** The deemed measure EULs will be used for this input value in the calculations, but deemed measures EULs were typically the same as the Average lifetime values used in the RACC. As already stated, for consistency with fuel substitution, the EUL for the measure will be used if the baseline and measure EUL differ.
* **Statewide average WACC:** E-52152 directed the use of a “a load-share based average based on SW funding proportions”. A specific reference for these values was not provided in E-5152 but in additional communication from the CPUC directed use of the values in D.19-12-021, pages 63-64, Table 1 Electric Funding Split percentages as shown below:



Future refrigerant avoided cost measure evaluations may be supported by an improved version of CPUC’s calculator and/or other versions of the calculator consolidated with methods and/or documentation from other related tools (e.g., DNV’s prototype lifetime GWP calculator including variables impacting equipment energy operation and refrigerant emissions). The WACC values are updated with the Avoided Cost Calculator (ACC) updates.

**RACC Supporting Documentation**

Supporting documentation required for complying with referenced policy includes a copy of CPUC’s RACC documenting all assumptions, avoided cost related inputs including normalized refrigerant charge leakage per unit, and avoided cost outputs for each measure in the measure package. The program administrator’s (PA’s) measure package updates resulting from this new requirement will be addressed through this addendum and the associated workbook by December 1, 2021. Submissions will be made via the WPA. Future submissions in 2022 and beyond will likely be supported via the eTRM. The Deemed Measure RACC Workbook Template will be maintained on the Cal TF website on it’s Tools page: <http://www.caltf.org/tools>. Additionally, it will be available in deeresources.com.

For description of Energy Efficiency measures supported under this Addendum, please refer to companion Measure Package submission including RACC tool with specific description of evaluated measures and associated refrigerant avoided cost outputs.

**Deemed Measure RACC workbook and supporting documentation:**

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| CPUC RACC version | 2021 ACC Refrigerant Calculator v1b.xlsx |
| Measure evaluation description and assumptions | Refer to RACC’s “Cover Sheet” tab, which explains specific adjustments to the RACC calculator for deemed measures without deviating from CPUC’s calculation methodology and research supporting the user specified inputs in the calculator. |
| Measure Inputs | Refer to RACC’s “Refrig Type Research” tab. |
| Measure Outputs | Refer to RACC’s “Deemed Dashboard”  For “RefrigerantNPVBenefits” - Columns AX, AY, and AZ  For “RefrigerantNPVCosts” - Columns BA, BB, and BC for, and  For “Refrigerant NPV Net” - Columns BD and BE (**CET Reporting**) |
| Remarks | None |

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1. 2021 ACC Refrigerant Calculator v1b.xlsx – Source: <https://willdan.app.box.com/v/2021CPUCAvoidedCosts/folder/136593940728>. This is the official calculator reference in the Decision. As of November 2021, the version posted on the CPUC’s Cost Effectiveness web page (<https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/idsm>) is not up to date. [↑](#footnote-ref-2)
2. R.09-11-014. Energy Efficiency Policy Manual, Version 5. Page 33. July 2013 [↑](#footnote-ref-3)