

## FREQUENTLY ASKED QUESTIONS

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### Can I copy and paste data to and from DER-CAM?

You can currently copy data from an external spreadsheet into DER-CAM simply by using CTRL+C and CTRL-V, as you normally would in any other application. When copying a range of cells, simply select the top left cell of the intended destination and press CTRL-V.

**NOTE:** Some browsers may not support this function directly; in which case pasting the data onto DER-CAM tables can be done using the browser built-in PASTE function, commonly found in the browser's Menu options.

However, copying data from DER-CAM is currently not possible. Some of the input data will be reported in the results file, but it is not possible to copy data directly from DER-CAM project files.

### How do I model an existing technology?

DER-CAM can consider existing DER and guarantee they are part of the final technology portfolio. To do this, one of two methods should be used, depending on the type of technology.

Technologies modeled with Discrete Variables (where the decision variable is the optimal number of units) should use the *ForcedNumber* parameter and the *Existing* parameter to enable this.

Technologies modeled with Continuous Variables (where the decision variable is the optimal capacity) should use the *ForcedCapacity* parameter and the *Existing* parameter to enable this.

It should be noted that even if all new investments are disabled, the *ForcedNumber* and *ForcedCapacity* will always be included in results, allowing the creation of a reference case where existing technologies are included.

When performing investment analysis (with *DiscreteInvest* and / or *ContinuousInvest* set to 1 in the Global Settings > Options Table), the *ForcedNumber* and *ForcedCapacity* will now become the minimum capacity to be included in the solution, and as long as *ForcedInvest* is set to 0, additional capacity may be included in results, provided it is economically feasible. To force exactly *ForcedNumber* or *ForcedCapacity* in the solution the parameter *ForcedInvest* should be set to 1.

## What units are used in cooling / refrigeration loads?

DER-CAM uses two main load types: electric loads, and natural gas loads. Electric loads include loads that can only be served directly by electricity (electricity-only), and cooling and refrigeration loads that can either be met by electricity via an electric chiller, or by heat used to drive an absorption chiller. Natural gas loads include loads that can only be served by natural gas (natural-gas-only loads), and loads that can eventually be served by other heat sources, such as recovered heat from CHP units, heat collected by solar thermal panels, heat from heat pumps, or heat from boilers using other fuels.

For this reason, all cooling and refrigeration loads are defined by their electric equivalent, i.e., by the electricity needed to drive an electric chiller, and not the final thermal energy form. The electric chiller COP for both cooling and refrigeration can be defined by the user in the Central HVACR definitions, and defaults to 4.5. Under these default settings 1 unit of cooling/refrigeration load added by the user in the DER-CAM load tables represents 1 kWh of electricity needed by the electric chiller to extract 4.5 kWh of heat from the building / microgrid.

## Why do I get a result full of zeros?

Whenever you get a result file that contains a large number of zeros and blank cells this is an indication of infeasibility. Feasibility problems will occur whenever one or more constrain renders the solution space void and the problem has no solution.

The most common causes for infeasibility include:

- **Setting the BaseCaseCost too low / Not updating the BaseCaseCost.** Whenever running an investment scenario this parameter value must reflect the reference cost to which the investments are being compared. Failing to update this value is the primary cause of infeasibility.

- **Creating conditions where it is impossible to serve loads.** Whenever using DER-CAM to force utility outages one of two options must be considered: enabling DER investments, and/or enabling load shedding. Failing to enable one of these may create a situation where it is impossible to serve or shed loads during an outage, leading to an infeasible condition. In addition, even if DER investments are allowed the financial constrains may lead to an infeasible situation if the reference costs do not properly reflect the outage costs.
- **Imposing contradicting parameter values.** Certain parameters may occasionally be set to values that contradict each other and create infeasible problems. One such example would be setting storage to discrete sizes in the Options Table, and forcing it to a value that does not obey this rule in the Forced Investment Constrains.

## Why do I need a reference case?

DER-CAM finds the optimal portfolio of DER to minimize costs and / or CO<sub>2</sub> emissions at a given building or microgrid site, which involves calculating savings against a reference scenario.

The reference or base case should reflect the existing conditions at the building or microgrid under study, including existing DER, if any. The cost and CO<sub>2</sub> savings reported in results are calculated against the values obtained in the reference case.

In studies where outages are being analyzed, the reference cost should include the costs of outages what may occur given the reference set of DER. In this case, DER-CAM will find the optimal portfolio of DER that will offset the otherwise incurred outage costs.