
Creating a Virtual Device

The feature will allow users to upload a data set into the DECK Monitoring system which will appear as a “virtual” device. Data from this virtual device will appear alongside data from all actual devices, and the virtual data will interact with the other components of the system in application features such as analytic graphs and the System Overview page.

This feature can be used for many purposes:

- to input data for theoretical baselines which the user can compare to actual hardware-reported data
- to upload historical data into the system
- to manipulate system data with a formula or a proprietary model and compare against actual hardware-reported data
- to visualize user-entered data from devices that are not connected to the DECK Monitoring system

When to use the Virtual Device Feature?

This feature has been developed to address specific needs that O&M providers and system owners sometimes encounter as they manage system data over the life of a power system:

Historical Data:

Some of our customers operate systems that have generated energy before the DECK monitoring system was installed and properly reporting. If this applies to you, you may want to upload data for power generated before the monitoring system began reporting. This will allow you to see a full historical record of your system in the DECK application.

Downtime Data:

You may also encounter a scenario where data reporting encounters downtime due to an interruption of internet service or some other cause. If this occurs, you may want to manually enter data for kWh generated during that period of downtime.

Formula Data:

Some users may wish to take real data from their system and run it through a macro in Excel to illustrate a formula or a proprietary model, then re-upload the manipulated data into the application in order to test the formula against real system numbers.

Projection Data:

Some users may wish to create a spreadsheet of predicted data to use as a projection of system generation. The virtual device feature allows you to upload that data into the application so you can compare actual numbers to your projections with DECK graphing tools.

Non-metered Data:

Some users may wish to enter data for a variable in the real world that is not metered in the system. For example, this might be a value such as occupancy for an apartment complex, or number of widgets produced for a factory. The virtual device feature allows the user to view that data in application graphs and scatter plots.

How it Works

The link to upload virtual data appears on the System Overview page as seen below:

The screenshot shows the 'Audio Visual' system overview page. The 'Device Reporting Hierarchy' section contains a table with the following data:

Device	Latest Data	Last Reported
Audio Visual	12.14 kW power	Jun 18, 2012 at 08:00:00

An orange arrow points to the link 'Upload data to create a virtual device or baseline' located below the hierarchy table.

Clicking on this link will open the Virtual Upload page, where you must complete several fields to name your data set and determine reporting intervals. When all fields are completed, click on the "Create Device" button at the bottom of the page.

The 'Create a Virtual Device' form includes the following sections and options:

- Virtual Device Name:** A text input field for the name of the virtual device.
- Upload Data:** A button to 'Select Data File' and a link for instructions on data file formatting.
- Data Repetition:** A dropdown menu set to 'Daily'.
- Data Type:** A dropdown menu set to 'value (#)'.
- Reported As:** Radio buttons for 'Difference' (selected), 'Running Total', and 'Average'.
- Data Point Relation to Time Period:** Radio buttons for 'Point follows period' (selected) and 'Point precedes period'.

At the bottom of the form are 'Create Device' and 'Cancel' buttons, and a 'Reload Timer' button in the bottom right corner.

Please note that it is not currently possible to edit virtual data in the DECK application. If you need to correct a data set, you must delete that virtual device in the application, then re-upload the corrected data as a new virtual device.

How to Prepare Your Virtual Data

Virtual data must be prepared in .csv file format for the DECK application.

How to format your data file

You may upload data as a CSV (Comma-separated values) file. This is a text file exportable by all major spreadsheet applications. Columns are separated by commas, and rows are separated by line breaks.

Your CSV file must contain exactly two columns, and begin with a header row. The first column must contain times in one of the formats described below, and the second column must contain numeric values.

The header entry for your time column must have one of the following three values, to specify the interpretation of your time data:

utc_time: Times are specified in `YYYY-MM-DD HH:MM:SS` format, and will be interpreted as UTC times.

local_time: Times are specified in `YYYY-MM-DD HH:MM:SS` format. Times will be interpreted as local times, in the timezone of the location the Virtual Device is attached to. This format is discouraged, because Daylight Savings Time introduces ambiguities in the interpretation of some local times.

timestamp: Times are specified as numeric UTC UNIX timestamps (number of seconds since the beginning of the UNIX epoch - midnight UTC on January 1st, 1970).

For example, to represent 12 noon Pacific time on July 4th, 2012, you may use the following strings:

utc_time: `2012-07-04 19:00:00`

local_time: `2012-07-04 12:00:00`

timestamp: `1341428400`

The times in your CSV file should be of a consistent periodicity (e.g. hourly, daily, or monthly).

When uploading data to be repeated, you must ensure that you have enough data to cover the entire repeat interval. For example, if you want your data to repeat yearly, you should upload a data file with exactly one year of data and select the yearly repeat option.

The header entry for your data column may contain any name that is convenient for your purposes. It will be ignored when your CSV is parsed.