

# The Calculator: Detailed Information & Instructions

This document accompanies the Portfolio Emissions Calculator developed by Stewards of Affordable Housing for the Future (SAHF). Within the document, you will find descriptions of each of the Calculator's tabs. You will also find detailed instructions on how to use the Calculator, especially regarding data entry. While the Calculator itself contains an Introduction tab with instructions, this document provides a more in-depth description of the steps needed to obtain a carbon emissions estimate. The instructions may prove especially useful for users who do not have data in ENERGY STAR Portfolio Manager.

## Calculator Tab Descriptions

### Visible Tabs

The Calculator has the following tabs below that are visible and are intended to be used and modified as necessary by the user. Descriptions below:

#### Summary

This is a view-only tab. This tab provides total carbon emissions in metric tons of CO<sub>2</sub>-equivalent and carbon emissions intensity in kilograms of CO<sub>2</sub> equivalent per square foot. It provides a breakdown of Scope 1 Direct and Scope 2 Indirect carbon emissions.

#### Whole Building Data

This is an input tab. This tab is for users to provide information on properties that have at least one year's worth of actual, whole property energy use data. This data must be from the same year as selected in the Calculator. Users have the option of providing data from ENERGY STAR Portfolio Manager or from another data sources. Once data is entered, the user will be alerted of potential issues based on energy use intensity.

#### Incomplete Data

This is an input tab. This tab is for users to provide information on properties that DO NOT have at least one year's worth of actual, whole property energy use data for the year selected in the Calculator. This tab also displays the properties that were transferred from the Whole Building Data tab after being flagged as not whole building data.

#### Renewable Energy Data

This is a verification and input tab. This tab is for users to verify renewable energy production data from the Whole Building Data and Incomplete Data. This tab also provides the user an opportunity to include any renewable energy production information that was not previously included. This type of data could include on-site roof-top systems, off-site community solar gardens or other types of systems that are not recorded through data management systems,

like ENERGY STAR Portfolio Manager. The data included on this tab will be subtracted from the total carbon emissions of the portfolio depending on the metering structure of the project and the RECS ownership.

#### Direct Emissions

This is a verification and input tab. This tab is for users to verify Scope 1 Direct carbon emissions from the Whole Building Data and Incomplete Data tabs. This tab also provides the user an opportunity to include any Scope 1 Direct carbon emissions that were not previously included. The data included on this tab will be added to the total carbon emissions of the portfolio.

#### Indirect Emissions

This is a verification and input tab. This tab is for users to verify Scope 2 Indirect carbon emissions from the Whole Building Data and Incomplete Data tabs. This tab also provides the user an opportunity to include any Scope 2 carbon emissions based on water consumption that were not previously included. The data included on this tab will be added to the total carbon emissions of the portfolio.

#### Hidden Tabs

The Calculator has the following tabs below that are hidden and are not intended to be used and modified by the user. Descriptions below:

##### Additional Calculations

This is a view-only and hidden tab. This tab performs additional calculations on data from throughout the Calculator, including a state-by-state emissions breakdown and emissions projections as if the data were from 2010, to be displayed in the Summary tab.

##### Data Summary Details

This is a view-only and hidden tab. This tab aggregates emissions data on a property-by-property basis for the purpose of running more extensive analysis to be displayed on the Summary tab.

##### Incomplete Data Calculations

This is a view-only and hidden tab. This tab utilizes the engineered SAHF baseline to extrapolate the direct and indirect emissions associated with properties that were entered into the Incomplete Data tab.

##### Data Tables

This is a view-only and hidden tab. This tab contains helpful information on data and conversion factors used in calculating carbon emissions. This includes stationary combustion emissions factors, energy/mass/volume conversions, Global Warming Potentials (GWPs), and fuel type conversions.

## eGRID Values

This is a view-only and hidden tab. This tab contains all the regional grid emissions intensity information needed to calculate the scope 2 electricity emissions for the desired properties in the years 2016, 2017, 2018, 2019, 2020.

## Data Entry using ENERGY STAR Portfolio Manager

For users with access to property data in ENERGY STAR Portfolio Manager (ESPM), the necessary data inputs are available through the platform to calculate their portfolio-wide emissions.

### Collecting ESPM Data

To aggregate property data from ESPM, first log into ESPM and then click below to access the SAHF Carbon Emissions template. Select the year of interest (currently 2016-2020) and properties to include in calculations. There is no limit on the number of properties that can be selected. Users do not need to sort any data prior to collecting and entering into the Calculator. The Calculator provides users with an opportunity to sort the data within and users should include all properties that will be a part of the portfolio-wide carbon emissions calculations, regardless of the status of complete (whole building) or incomplete (such as common space only) utility data. Explicitly, properties that are not listed as whole building under the "Metered Areas (Energy)" section of ESPM can be included.

Click on link: [SAHF Carbon Emissions ENERGY STAR Portfolio Manager Template](#)

If link does not work, please copy and paste this link into your browser:

<https://portfoliomanager.energystar.gov/pm/reports/template/3698048/share/1a437a0c-b034-476e-a71f-ba317459442a>

### Sorting ESPM Data

Once the results of the template are downloaded, all properties (regardless of the results in the "Metered Areas (Energy)") will be copied and pasted into the "Whole Building Data" tab. The Calculator will then provide users with a flag where the energy use per square foot, also known as energy use intensity (EUI), of property is outside of the typical ranges expected for multifamily properties. An "atypical" EUI is defined by a range of values used by the Department of Energy's Better Buildings Challenge for Multifamily Partners. Properties are flagged if they have EUIs that are outside of the range of 50-250 kBtu/ft<sup>2</sup>. This flag is to help users determine if a property in ESPM has both a full year's worth of data and access to all utility data (whole building data).

### Property Flag Instructions

For each flagged property, users will have two choices:

- **Keep:** If user finds that the property’s EUI is accurate and the property has a full year’s worth of utility bills and and whole building data, the user can select to keep it within the whole building tab. Carbon emissions calculations will utilize the property data as is. An example of this scenario may be a recently constructed property that achieved a green building certification or was built to a net-zero energy code.
- **Move:** If the user finds that the property’s EUI is not accurate and that some data is missing, the user can select to move the property to the “Incomplete Data” tab. All properties that are selected to be moved will be automatically transferred. When transferred, all property-specific utility data will be disregarded, and the property’s carbon emissions will be calculated based on the SAHF engineered baseline.
  - If “move” is selected, users will then select if the property is all-electric or not; this will affect what baseline estimate will be applied to the property.

### Data Entry from Other Resources

Alternatively, if you do not have data in ESPM, it is still possible to enter property data to obtain a carbon emissions calculation. If you have a year’s worth of whole building energy data for your properties, follow the instructions regarding Alternate Whole Building Data Entry Below. If you have incomplete property data, follow the instructions regarding Incomplete Data Entry below, acknowledging that your carbon emissions calculation will be estimated using the SAHF engineered baseline which is an estimate of your building emissions.

### Alternate Whole Building Data Entry Instructions

If you have access to a year’s worth of whole building energy data from another energy tracking resource, data should be entered into the *Whole Building Data* tab. Each property should be a separate row in the table. You must enter the data indicated in Table 1 below, where each Data Input corresponds to a row in the Whole Building Data table, for each property. Ensure that you have accurate, whole building data for each of the categories in Table 1. All columns not explicitly called out in Table 1 can be left blank unless applicable (for example, if you wish to enter a property ID #). After entering the data, review the flags (see Property Flag Instructions above)

Table 1. Whole Building Data Entry Requirements	
Data Input	Definition
Postal Code	Postal/ZIP Code
Property Gross Floor Area (GFA)	The total square footage area of the property of interest

Electricity Use – Grid Purchase (kWh)	The total kWh of electricity used by the property from grid-purchased electricity
Natural Gas Use (kBtu)	The total kBtu of natural gas used onsite at the property
Other Fuel Use (kBtu)	The total kBtu of other fuels used on property (e.g. Fuel Oil, Propane, etc., enter if applicable)
Electricity Use – Generated from Onsite Renewable Systems and Used Onsite (kWh)	The total electricity generated and used from an onsite renewable system (if applicable)
Green Power - Offsite (kWh)	The total electricity generated and used from an offsite renewable energy system for which RECS are owned (if applicable)
Percent RECs retained	The percentage of RECs that are kept/own by the property (if applicable)
Water Use (All Water Sources) (kgal)	All water consumed by the property (if you do not have this information, the calculator will still obtain an estimate)

### Incomplete Data Entry Instructions

For properties that you do not have a full year's worth of whole building data, properties can still be included within the carbon emissions calculations to obtain an emissions estimate based on the engineered SAHF baseline. For these properties, navigate to the *Incomplete Data* Tab and locate the User Entry Table. Each property should be entered as a separate row in the table. Enter accurate data for each property for each of the categories found in Table 2 below, corresponding to the columns in the table. After entering the data, review the accuracy of the characteristics that are populated on the left side of the sheet. The calculator will make assumptions about the building size, heating energy type, and hot water energy type in columns B-D based on the information entered. This information will be used in a future version of the calculator to obtain a carbon emissions estimate.

Table 2. Incomplete Data Entry Requirements	
Data Input	Definition
Property Name	Name of the property
Postal Code	Postal/ZIP Code
Property GFA - Self-Reported (ft <sup>2</sup> )	The total square footage area of the property of interest

All Electric Building?	Enter "Not all electric" or "All electric"
Year Built	The year the property was built
Total Number of Residential Living Units	Number of living units on the property
Number of Bedrooms	Total number of bedrooms on the property (optional)
Number of Residential Living Units in a Low-rise Building (1-4 Stories)	Units in low-rise buildings on the property
Number of Residential Living Units in a Mid-Rise Building (5-9 Stories)	Units in mid-rise buildings on the property
Number of Residential Living Units in a High-Rise Building (10 or more Stories)	Units in mid-rise buildings on the property

### Custom Emissions Factors

A user of the Calculator may manage properties that get electricity from sources with unique emissions factors, making the default eGRID emissions factors inaccurate. Such cases may include power procurement through a Community Choice Aggregation agreement or the use of electricity from a jurisdiction that has its own emissions factors. It is possible to override the use of eGRID emissions factors for electricity use in the calculator to reflect true emissions factors on a property-by-property basis. First, navigate to the Whole Building Data tab. Unhide columns B-D to reveal the emissions factors used in the calculations. Unlock the sheet by selecting the "review" ribbon tab, then selecting "unprotect sheet". For each property with a unique emissions factor, delete the existing emissions factor in column C and enter the updated factor (ensuring that it is in units of (lb CO<sub>2</sub>e/MWh)).

### Renewable Energy Tab

The *Renewable Energy* tab consolidates information on the green power procurement listed in the *Whole Building Data* tab and provides an opportunity to enter additional green power procurement associated with your portfolio. First, review the Section 1 table to confirm the project information drawn from the *Whole Building Data* tab is accurate. To enter additional agreements, navigate to Section 2. Enter each asset as a separate line, enter the ZIP code it is associated with, select the project structure type, enter the property it is associated with if necessary, enter the total kWh of generated electricity, and indicate the percent of RECs that are

maintained for that project. For more information on how projects will impact your emissions, refer to the Methodology document.