This document is designed to be used as both a comprehensive presentation and a quick reference for the Energy Footprint Tool.

To use as a quick reference:

- The **table of contents** provides links to all of the key topics covered.
- Each page also includes a direct link back to the table of contents.
How to use the Energy Footprint Tool

The **Energy Footprint Tool** is designed to be easy to use with significant built-in documentation. Detailed labels and pop-up help windows on all sheets allow users quickly begin using all features.

**What data needs to be gathered?**

**Monthly Energy Bills** should provide all of the required *Energy Consumption* data.

Depending on the *Relevant Variables*, these may or may not be tracked at the plant (ex. production, operating hours) and might need to be looked up (ex. degree days)

*Energy Uses* may or may not be individually tracked by the plant and could potentially be estimated based on energy consumption or possibly directly measured.
Introduction to the Energy Footprint Tool

Summary of Key Sheets

Key Terms

Spreadsheet Details [description structure]:

- Main: Layout Notes
- Energy Consumption: Layout Notes
- EC Charts: Layout Notes
- Relevant Variables: Layout Notes
- RV Charts: Layout Notes
- EC-RV: Layout Notes
- Energy Uses: Layout Notes
- EU Charts: Layout Notes
- EnPI Table: Layout Notes
- Raw Data: Layout Notes
Introduction

The **Energy Footprint Tool** is designed to allow users to easily track energy consumption, relevant variables, and energy uses.

**Key tracking & features include:**

- **Energy Consumption**
  - Up to 20 Tracked Energy Sources
- **Relevant Variables**
  - Up to 20 Tracked Variables
- **Energy Use**
  - Up to 10 Energy Use Groups
  - Up to 30 Components Each
- **Charts for all tracked data**
- **Export to the EnPI tool**
Summary of Key Sheets

Main — Overview of footprint tool with key settings

Energy Consumption — Monthly energy consumption and cost data

EC Charts — Energy consumption charts

Relevant Variables — Monthly and yearly data for relevant variables

RV Charts — Relevant variable charts

EC-RV — Charts comparing selected energy consumption with relevant variables

Energy Uses — Yearly energy uses tracked by group and specific use

EU Charts — Charts of energy uses

EnPI Table — Exportable data table compatible with EnPI analysis tool

Raw Data — All entered energy consumption and relevant variables data in one large table
Key Terms

Energy Consumption
Defined as the “quantity of energy applied” (source ISO 50001:2011), it is the amount of energy consumed

Energy Source
The type of energy consumed: electricity, natural gas, fuel oil, etc. Electricity is broken into 3 components: electricity consumption, demand, and fees

Relevant Variables
Variables that likely contribute to energy consumption and use: production, operating hours, heating degree days, etc.

Energy Use
Defined as the “manner or kind of application of energy”, this often refers to energy use by specific equipment and applications

Load Factor
Average load relative to the full load of the equipment

Duty Factor
Average ratio of run time to operating hours

EnPI
Stands for Energy Performance Indicator and is defined as the “quantitative value or measure of energy performance” (source ISO 50001:2011)
Structure of Sheet Descriptions

**LAYOUT**

Screenshot of the sheets provide details about the layout, highlighting key components.

**NOTES**

List of functions, features, and tips related to the sheet.

- To enter a new year's worth of data, change the Current Year to the new year and increase the Number of Years by 1.
- Selected Energy Sources and Related Factors cannot be changed after they have been directly connected with data and will be grayed out and tagged with the word locked.
- The Introduction popup can be stopped from automatically opening by checking the box in the lower left of the popup.
- The links to the Energy Consumption and Related Factors charts only appear if associated data has been entered.
- Changing First Month does not adjust entered data. If the First Month is changed after the data has been entered, the data will be aligned with different months.
Main sheet

Identifying Information
add plant name and related details

Navigation
clickable links to the various spreadsheets

Energy Sources
select related energy sources and set custom sources if needed

Help Button
Critical Settings
set the first month, current year, and number of years

Relevant Variables
select relevant variables and set custom variables if needed

Conversion Factors
only used for calculating total energy consumption and by energy use
• To enter a new years worth of data, change the **Current Year** to the new year and increase the **Number of Years** by 1

• Selected **Energy Sources** and **Relevant Variables** cannot be changed after they have been directly connected with data and will be grayed out and tagged with the word *locked*.

• The *Introduction* popup can be stopped from automatically opening by checking the box in the lower left of the popup.

• The links to the **Energy Consumption** and **Relevant Variables** charts only appear if associated data has been entered.

• Changing the **First Month** does not adjust entered data. If the **First Month** is changed after the data has been entered, the data will be aligned with different months.
Tracked Energy Sources include only selected Energy Source types

**Energy Sources #**
The ID number for the specific energy source data

**Energy Source Units**
Pulled from Main sheet

**Energy Source Notes**
Can include details like meter location, utility, building, etc

**Energy Source Format Repeats**
Unit fields are hidden for unit-less energy sources

**Energy Source Cost and Unit Data**
Entered by year and month

**Yearly Totals**
Unit Costs can be hidden or displayed as needed
• Up to 20 **Energy Sources** can be tracked
• Units fields only appear for **Energy Sources** that include units. For example, *Electricity Fees* do not include units
• To add a new **Tracked Energy Source**, select it from the dropdown menu in the blank space
• Only the last **Tracked Energy Source** can be removed. This can be done by deleting the **Energy Source** from the list.
• To add an **Energy Source** to the dropdown menu, go to the **Main** sheet and select the additional **Energy Source**
• **Unit Costs** can be used to quickly identify data errors
• Even when rows are hidden, the data is not deleted or overwritten
Selected Energy Source
Charts display selected energy source

Energy Source Notes
Notes pulled from Energy Consumption sheet

Related Data Tables
Tables of charted data

Monthly Data Charts
Displays monthly costs and energy consumption for each tracked year

Cost Related Charts and tables

Energy Consumption Related Charts and tables. Hidden if unit-less energy source selected

Yearly Data Charts
Displays total yearly costs and energy consumption
• The **EC Charts** sheet will be hidden until **Tracked Energy Sources** are added to the **Energy Consumption** sheet

• Change the selected **Energy Source** to change the charts

• The notes associated with the **Energy Source** will also be displayed

• Additional aggregate Energy Consumption data can be charted if applicable including; **Total Electricity**, **Total Natural Gas**, **Total Other**, and overall **Total Energy**

• The usage charts will be hidden if the selected **Energy Source** is unit-less

• Changing the selected **Energy Source** will also update the selected **Energy Source** on the **EC-RV** sheet
Tracked Relevant Variables
includes only selected Relevant Variable types

Relevant Variables Units
pulled from Main sheet

Relevant Variables Notes
Can include details like building, tracking method, source, etc

Yearly Totals

Relevant Variables Format Repeats

Relevant Variables Data
entered by year and month

Relevant Variables #
ID number of the tracked sources

Relevant Variables ID number of the tracked sources

ID number of the tracked sources

Relevant Variables Data
entered by year and month

Relevant Variables Notes
Can include details like building, tracking method, source, etc

Yearly Totals

Relevant Variables Format Repeats
• Up to 20 **Relevant Variables** can be tracked
• To add a new **Relevant Variables**, select it from the dropdown menu in the blank space
• Only the last **Relevant Variables** can be removed by deleting the Energy Source from the list
• To add a **Relevant Variables** to the dropdown menu, go to the **Main** sheet and select the additional **Relevant Variables**
• Even when rows are hidden, the data is not deleted or overwritten
RV Charts sheet

**Selected Relevant Variable**
Charts displayed selected relevant variable

**Total or Average**
Checkbox toggles between displaying yearly average and total

**Relevant Variable Notes**
Notes pulled from Relevant Variables sheet

**Monthly Data Chart**
Displays monthly costs and usage for each tracked year

**Related Data Tables**
Table of charted data

**Yearly Data Charts**
Displays yearly total or average for Relevant Variable
• The *RV Charts* sheet will be hidden until *Tracked Relevant Variables* are added to the *Relevant Variables* sheet
• Change the selected *Relevant Variables* to change the charts
• The notes associated with the *Relevant Variables* will also be displayed
• Changing the selected *Relevant Variable* will also update the selected *Relevant Variable* on the *EC-RV* sheet
• The *Show average instead of total* checkbox will change the yearly total to yearly average to better represent *Relevant Variables* that are not cumulative
**Selected Energy Source**
Charts display selected energy source

**Selected Relevant Variable**
Charts display selected Relevant Variable

**Yearly Data Comparison**
Compares energy source yearly energy consumption with Relevant Variable yearly total or average

**Monthly Data Comparison**
Compares energy source consumption with Relevant Variable by month

**Direct Comparison**
Energy consumption is directly plotted against the Relevant Variable

**Selected Year**
Current year used for comparison charts below. Change to update

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**Energy Footprint - Energy Consumption compared to Relevant Variables**

**Yearly Comparison**

**Monthly Comparison for Year: 2013**

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**U.S. DEPARTMENT OF ENERGY**
Energy Efficiency & Renewable Energy
• The *EC-RV Charts* sheet will be hidden until both *Energy Consumption* and *Tracked Relevant Variables* have been added

• Change the selected *source* or *factor* to update the charts

• Changing the selected *source* or *factor* will also update the selected *source* or *factor* on the related sheet

• Changing the *Year* will update both monthly comparison charts

• The *Show average instead of total* checkbox will change the yearly total to yearly average to better represent *Relevant Variables* that are not cumulative
Energy Uses sheet

Number # of Groups
The number # selected controls the number of groups displayed below.

Number # of Items
This controls the number of items included in this group.

Duplicate Previous Year
Copies previous years data to current year.

Energy Use Group Total Yearly Energy Consumption
Total for each group's yearly energy end-use.

Yearly Energy Source Breakdown
Yearly energy consumption for each energy use group and overall by energy source.

Energy Use
Energy consumption by energy use estimated or directly entered.

Group Energy Source Breakdown
Energy use group total energy consumption by energy source.

Group Name and Notes
Enter group name and descriptive details about the group.

Group Item List
List of equipment and other energy uses that are included in this group.

Current Selected Year

Previous Year

2 # of Groups

Number of Groups

Group Name

Enter group name and descriptive details about the group.

Group Item List

List of equipment and other energy uses that are included in this group.

View Summary

Energy Footprint - ENERGY USES

# of Groups

Group Name

Numerical data for energy use group total yearly consumption.

Current

Selected Year

Previous Year

Duplicate

Duplicate Previous Year

Copies previous years data to current year.

Energy Use Group Total Yearly Energy Consumption

Total for each group's yearly energy end-use.

Yearly Energy Source Breakdown

Yearly energy consumption for each energy use group and overall by energy source.

Energy Use

Energy consumption by energy use estimated or directly entered.

Group Energy Source Breakdown

Energy use group total energy consumption by energy source.
• The **Energy Uses** sheet uses navigation buttons to switch the current year displayed

• Only 2 years are displayed at a time, the current selected year and the year previous to that

• A previous years Energy End-Use data can be copied to the current selected year by clicking the *Duplication Previous Year* button and typing “*confirm*” into the confirm popup

• The **Energy Uses** sheet attempts to estimate the equipment energy consumption by using load factor, duty factor, and operating hours. If the actual energy consumption is known, it can be entered in the override field and other will be ignored

• A *Summary* of the equipment, group, and total energy consumption by year can be displayed by clicking the *View Summary* button
EU Charts sheet

Total Yearly Energy Use
Comparing all groups

Total Yearly Energy Use and Energy Consumption Comparison

Group Specific Charts
Charts for each active energy use group

Selected Year
Pie charts display data for selected year. Change any selected year to update all

Pie Chart of Energy Use
• Changing any of the selected *Years* will update all select *Years* and associated pie charts

• The charts display groups and items based on the *number of groups/items* selected on the **Energy Uses** sheet. This means blank rows will still be charted if they are visible. To correct this, adjust the *number of groups/items* on the **Energy Uses** sheet to match the number of groups/items with data.

• The chart comparing **Energy Use** with **Energy Consumption** only displays energy consumption for energy use groups and overall by year. To compare energy consumption by energy use in more detail, review the summary tables in the **Energy Uses** sheet
### Export Data
Generate EnPI tool compatible workbook

### Preview Table
This table approximately matches the data and format of the EnPI data input table

#### EnPI Table sheet

<table>
<thead>
<tr>
<th>Date</th>
<th>Electricity (KWh/lb)</th>
<th>Electricity Cost</th>
<th>Natural Gas (GJ)</th>
<th>Natural Gas Cost</th>
<th>Other Energy (MMBtu)</th>
<th>Other Energy Cost</th>
<th>Degree Days (FDD)</th>
</tr>
</thead>
<tbody>
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<td>15,745.30</td>
<td>$2,496.17</td>
<td>795.00</td>
<td>$2,809.17</td>
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<td>$2,140.00</td>
<td>-</td>
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<tr>
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<td>15,088.60</td>
<td>$2,191.90</td>
<td>231.20</td>
<td>$2,084.72</td>
<td>19,244.00</td>
<td>$2,140.00</td>
<td>-</td>
</tr>
<tr>
<td>3/1/20</td>
<td>15,363.00</td>
<td>$2,346.40</td>
<td>152.40</td>
<td>$1,160.60</td>
<td>19,244.00</td>
<td>$2,140.00</td>
<td>-</td>
</tr>
<tr>
<td>4/1/20</td>
<td>15,579.50</td>
<td>$2,400.00</td>
<td>152.40</td>
<td>$1,160.60</td>
<td>19,244.00</td>
<td>$2,140.00</td>
<td>-</td>
</tr>
<tr>
<td>5/1/20</td>
<td>13,752.40</td>
<td>$2,154.40</td>
<td>206.70</td>
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<td>19,244.00</td>
<td>$2,140.00</td>
<td>-</td>
</tr>
<tr>
<td>6/1/20</td>
<td>13,691.00</td>
<td>$2,004.20</td>
<td>214.00</td>
<td>$1,574.20</td>
<td>19,244.00</td>
<td>$2,140.00</td>
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<td>$1,726.10</td>
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<tr>
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<td>1,580.60</td>
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<td>$2,140.00</td>
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<tr>
<td>9/1/20</td>
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<td>$1,625.00</td>
<td>19,244.00</td>
<td>$2,140.00</td>
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<tr>
<td>10/1/20</td>
<td>12,671.00</td>
<td>$1,780.00</td>
<td>2,065.20</td>
<td>$1,376.49</td>
<td>19,244.00</td>
<td>$2,140.00</td>
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<tr>
<td>11/1/20</td>
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<td>$1,930.40</td>
<td>2,460.60</td>
<td>$2,191.29</td>
<td>19,244.00</td>
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<tr>
<td>12/1/20</td>
<td>13,900.00</td>
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<td>$1,664.65</td>
<td>19,244.00</td>
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<tr>
<td>1/1/21</td>
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<td>2,168.00</td>
<td>$1,664.65</td>
<td>19,244.00</td>
<td>$2,140.00</td>
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<tr>
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<td>12,536.00</td>
<td>$1,641.00</td>
<td>2,168.00</td>
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<td>19,244.00</td>
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<td>$1,664.65</td>
<td>19,244.00</td>
<td>$2,140.00</td>
<td>-</td>
</tr>
</tbody>
</table>
EnPI Table sheet

- EnPI stands for *Energy Performance Indicator*
- The *EnPI Table* sheet formats the entered data for use with the *EnPI tool* (v5)
- The *EnPI tool* establishes a normalized baseline of energy consumption and tracks annual progress of energy intensity improvements.
- To use this table with the *EnPI tool*, the table must first be exported to a separate workbook. This can be done automatically by clicking the *Export Table* button
- For more information and to download the EnPI tool, goto: [https://www.energy.gov/eere/amo/articles/energy-performance-indicator-tool](https://www.energy.gov/eere/amo/articles/energy-performance-indicator-tool)
General Settings
Current Year, First Month, Number of Years, Plant Name, and Additional Details

Energy Consumption Data

Relevant Variables Data
• The *Raw Data* table provides all of the entered *Energy Consumption* and *Relevant Variables* data in one large table.
• This allows advanced users to easily analyze and work with this data outside of the *Footprint Tool* as needed.
• All data, including hidden data, is included.