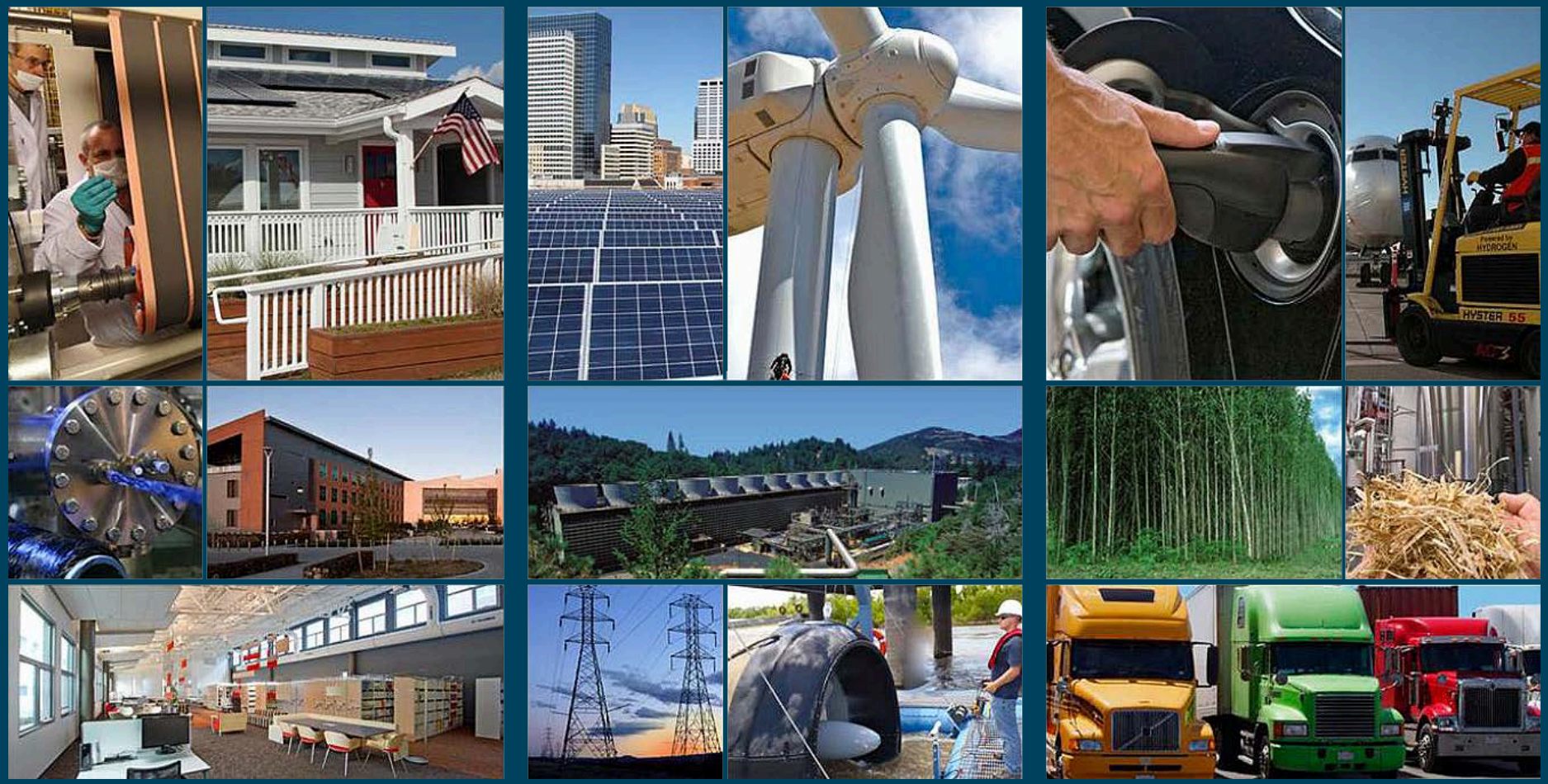
Energy Footprint Tool

Overview and Tour

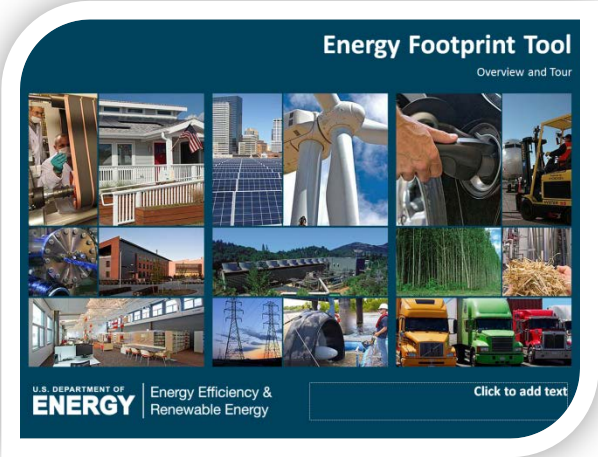


U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

How to use this Document

GO TO
Table of Contents

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:

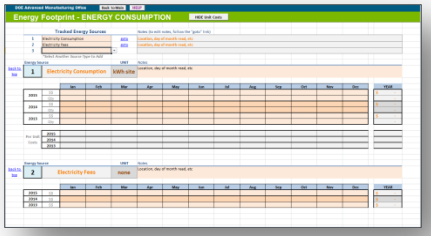
- The table of contents provides links to all of the key topics covered.
- Each page also includes a direct link back to the table of contents

How to use the Energy Footprint Tool

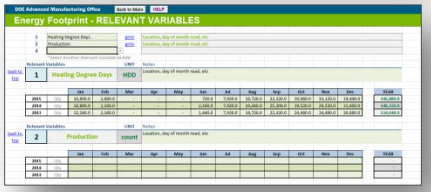
GO TO
Table of Contents

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.

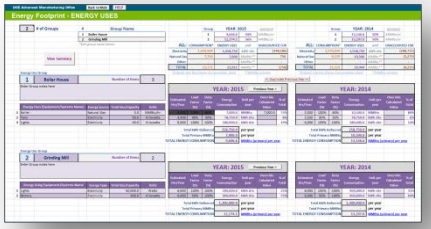
What data needs to be gathered?



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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Table of Contents (click links to jump to section)

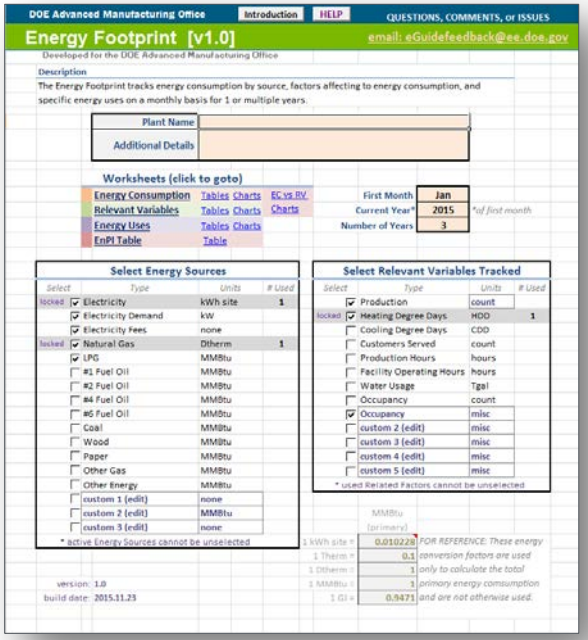
Introduction to the Energy Footprint Tool

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



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

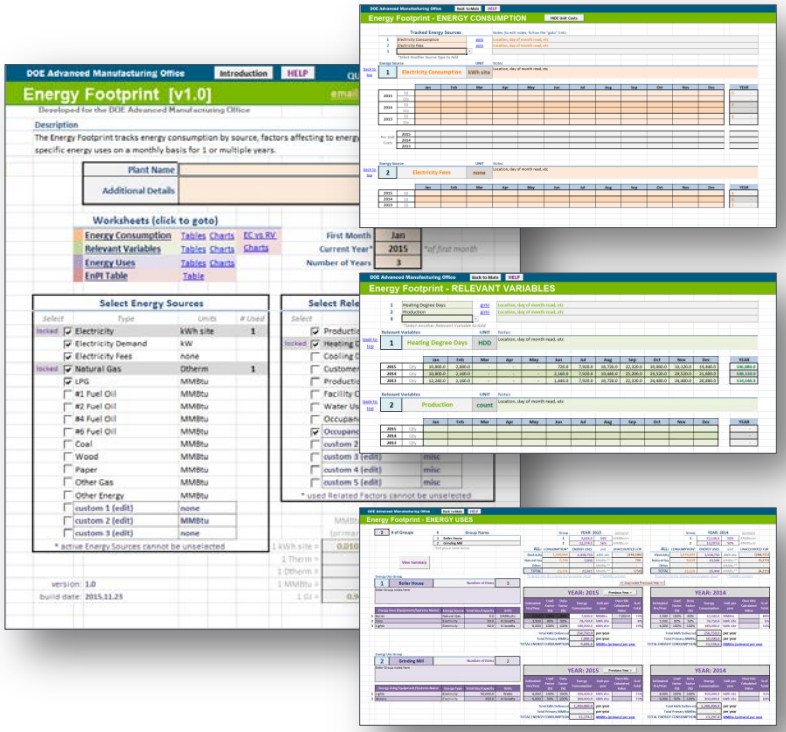
Introduction

GO TO
Table of Contents

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**



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Summary of Key Sheets

GO TO
Table of Contents

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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Key Terms

GO TO
Table of Contents

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

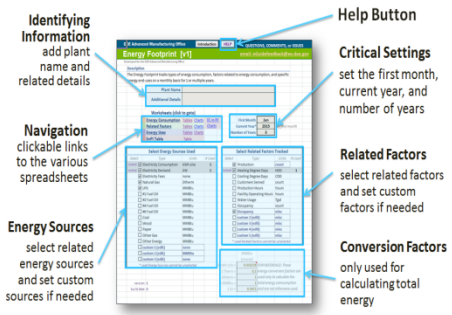
Stands for *Energy Performance Indicator* and is defined as the "quantitative value or measure of energy performance" (source ISO 50001:2011)

Structure of Sheet Descriptions

GO TO
Table of Contents

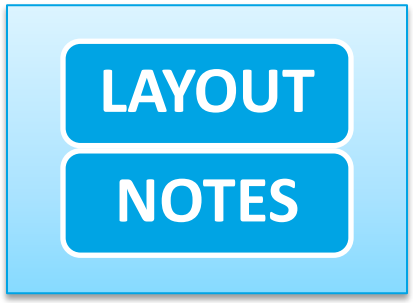
LAYOUT

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 years 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.

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Main sheet

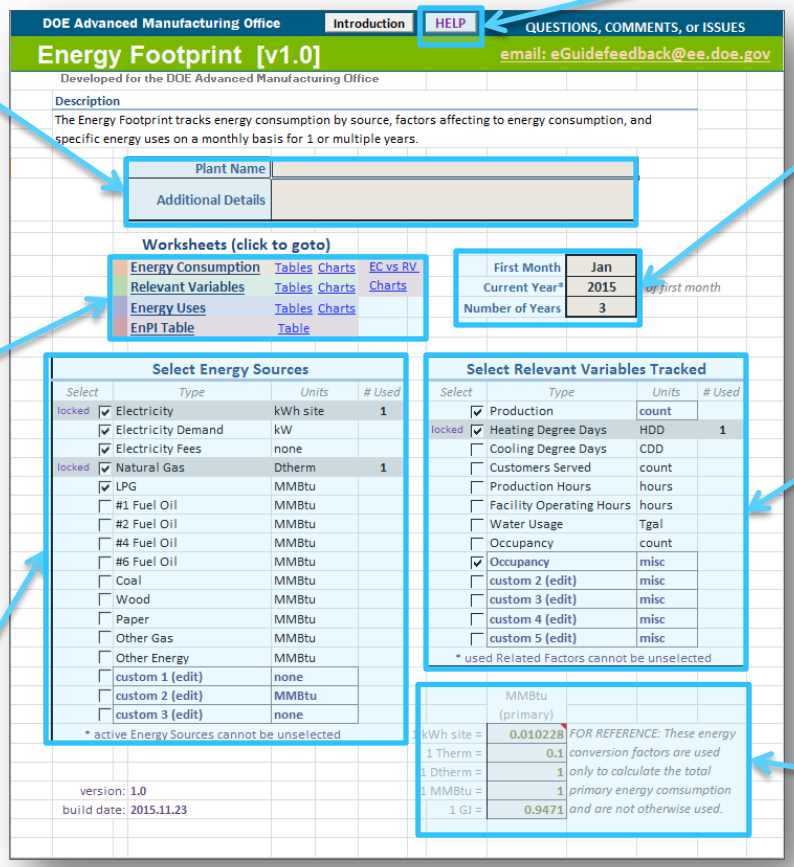
LAYOUT

GO TO
Table of Contents

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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Main sheet

NOTES

GO TO
Table of Contents

- 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.

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Energy Consumption sheet

LAYOUT

GO TO
Table of Contents

Tracked Energy Sources
includes only selected Energy Source types

Energy Source Units
pulled from Main sheet

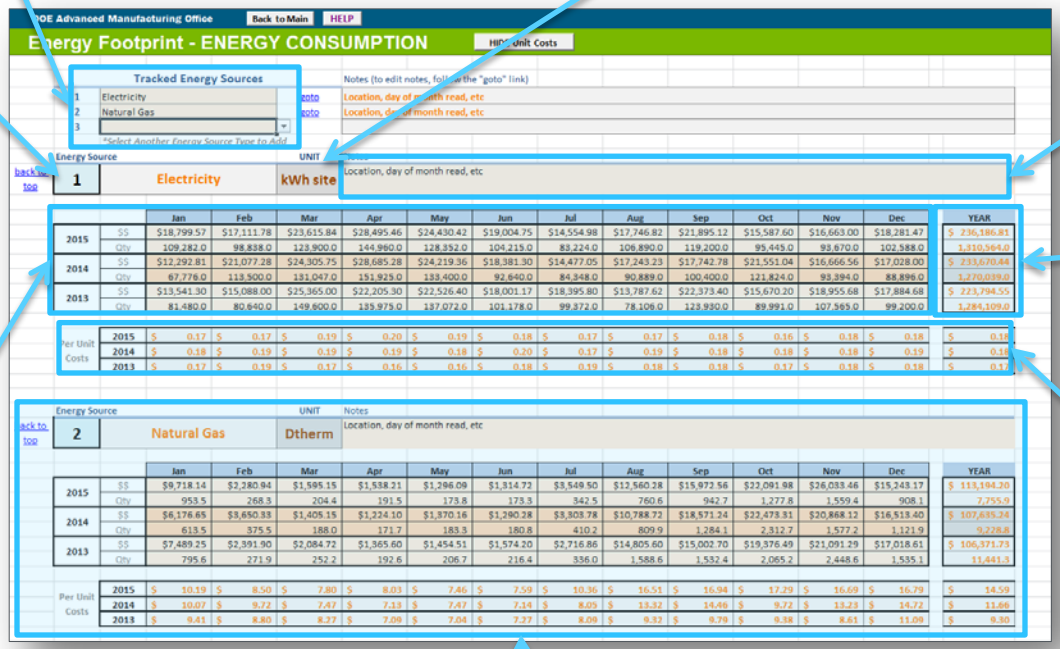
Energy Sources #
the ID number for the specific energy source data

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

Yearly Totals

Energy Source Cost and Unit Data
entered by year and month

Unit Costs
can be hidden or displayed as needed



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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Energy Consumption sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EC Charts sheet

LAYOUT

GO TO
Table of Contents

Selected Energy Source

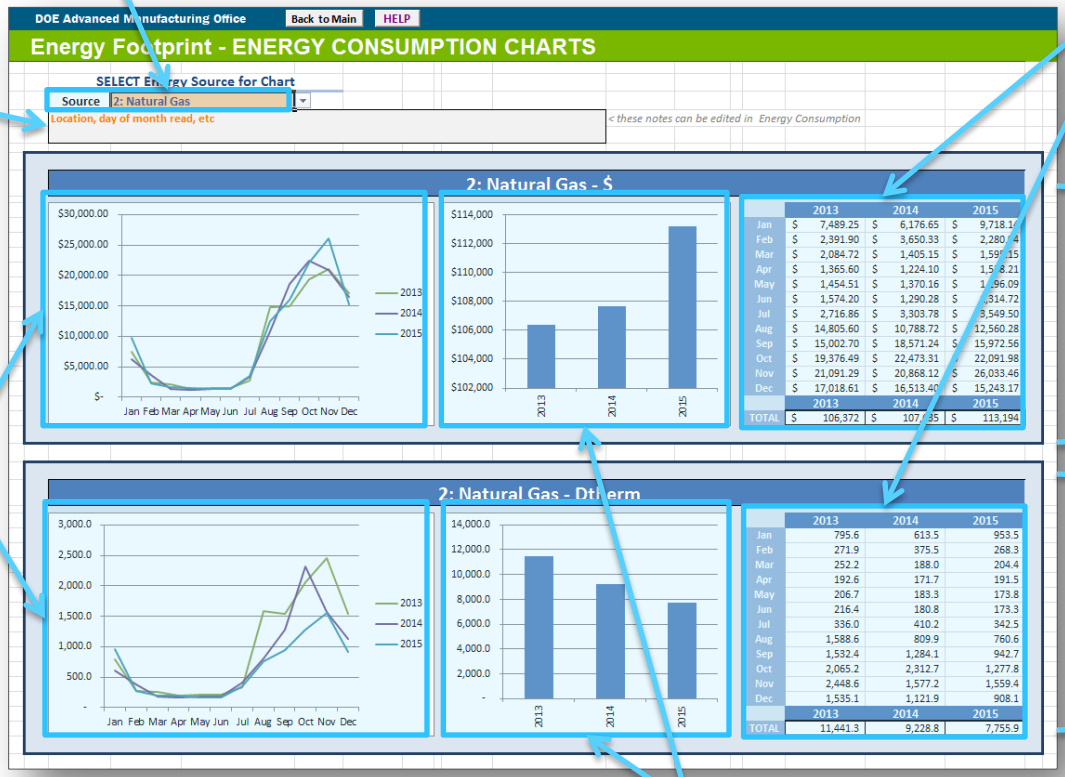
Charts display selected energy source

Energy Source Notes

Notes pulled from Energy Consumption sheet

Monthly Data Charts

Displays monthly costs and energy consumption for each tracked year



Related Data Tables

Tables of charted data

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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EC Charts sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Relevant Variables sheet

LAYOUT

GO TO
Table of Contents

Tracked Relevant Variables
includes only selected Relevant Variable types

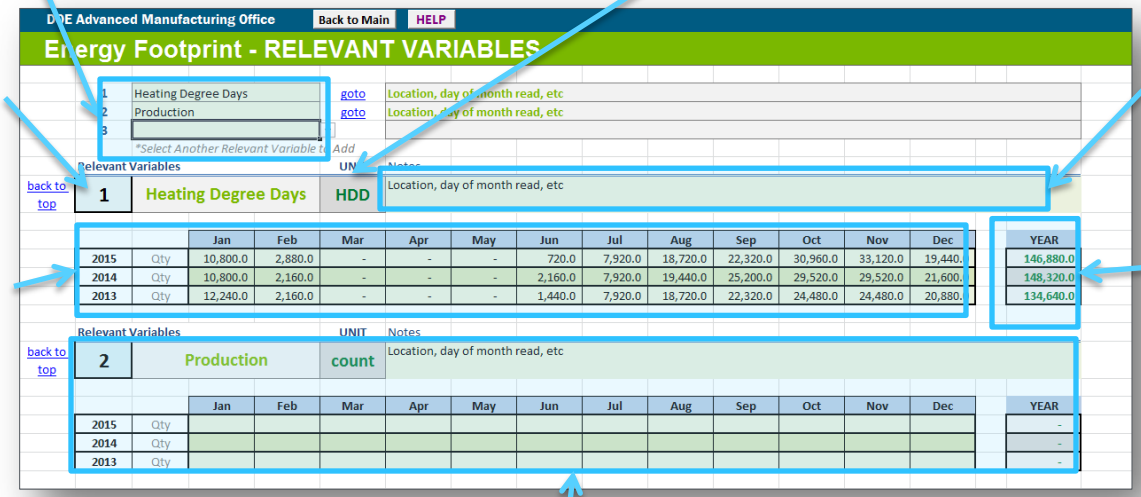
Relevant Variables Units
pulled from Main sheet

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

Relevant Variables #
ID number of the tracked sources

Relevant Variables Data
entered by year and month

Yearly Totals



Relevant Variables Format Repeats

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Relevant Variables sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

RV Charts sheet

LAYOUT

GO TO
Table of Contents

Selected Relevant Variable

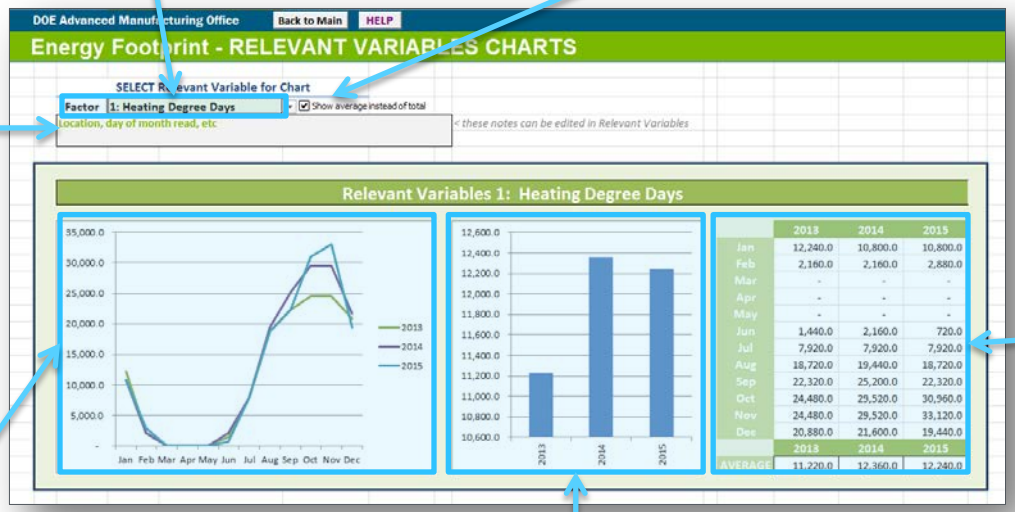
Charts displayed selected relevant variable

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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

RV Charts sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EC-RV sheet

LAYOUT

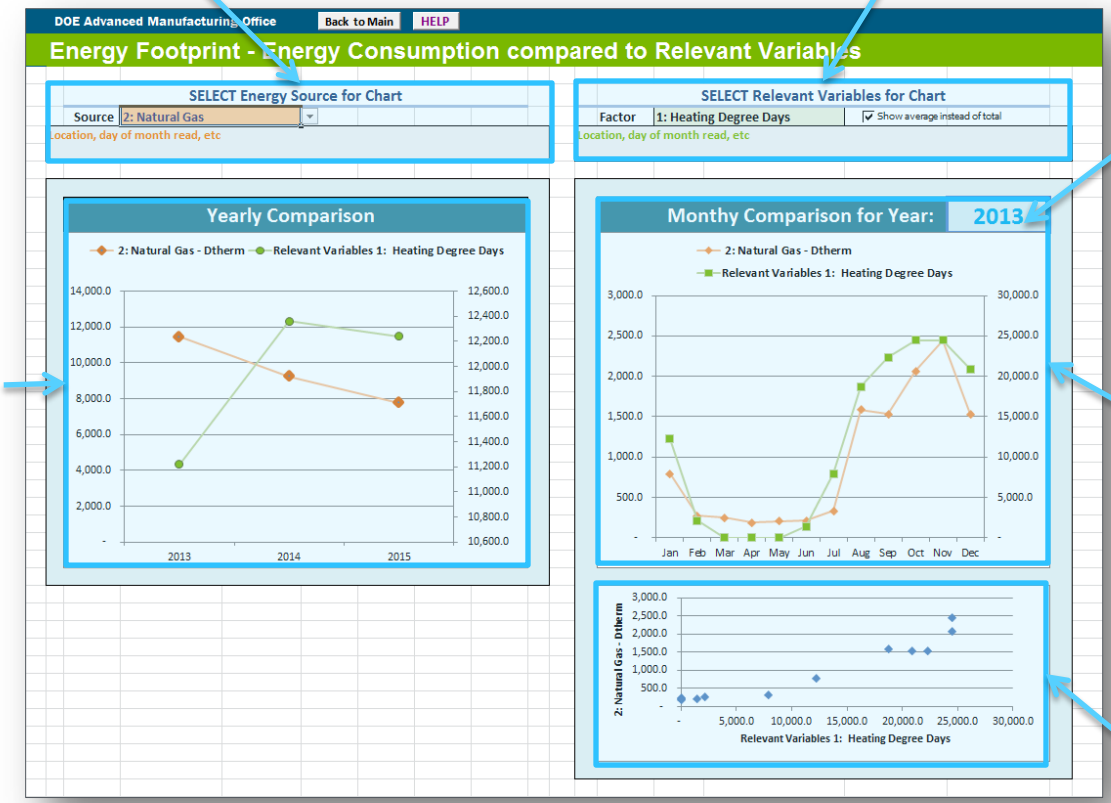
GO TO
Table of Contents

Selected Energy Source
Charts display selected energy source

Selected Relevant Variable
Charts display selected Relevant Variable

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

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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EC-RV sheet

NOTES

GO TO
Table of Contents

- 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 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Energy Uses sheet

LAYOUT

GO TO
Table of Contents

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 groups yearly energy end-use

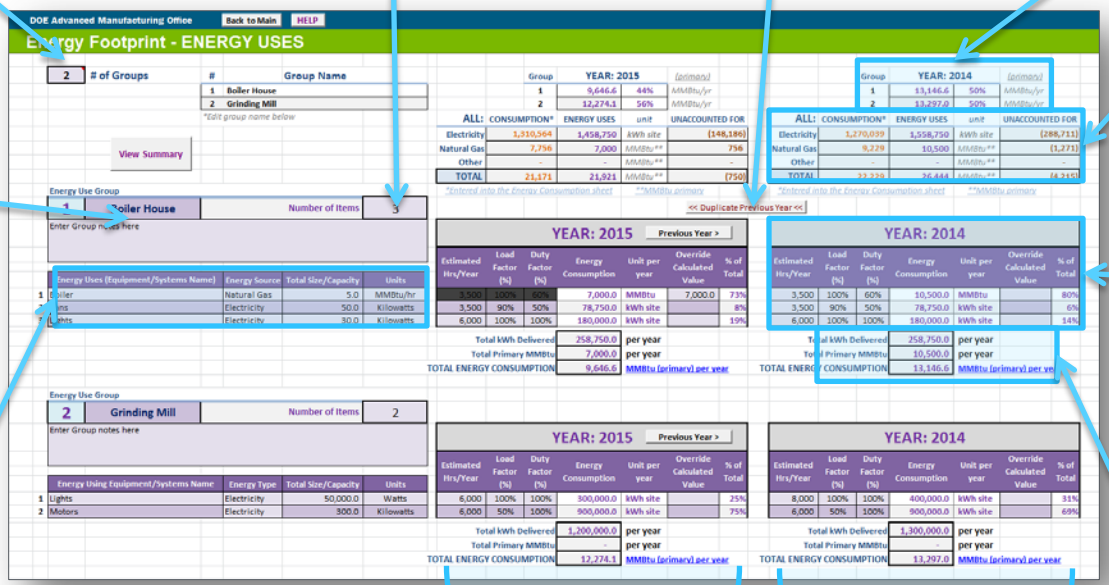
Yearly Energy Source Breakdown
Yearly energy consumption for each energy use group and overall by energy source

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

Energy Use
Energy consumption by energy use estimated or directly entered

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

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



Current Selected Year

Previous Year

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Energy Uses sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EU Charts sheet

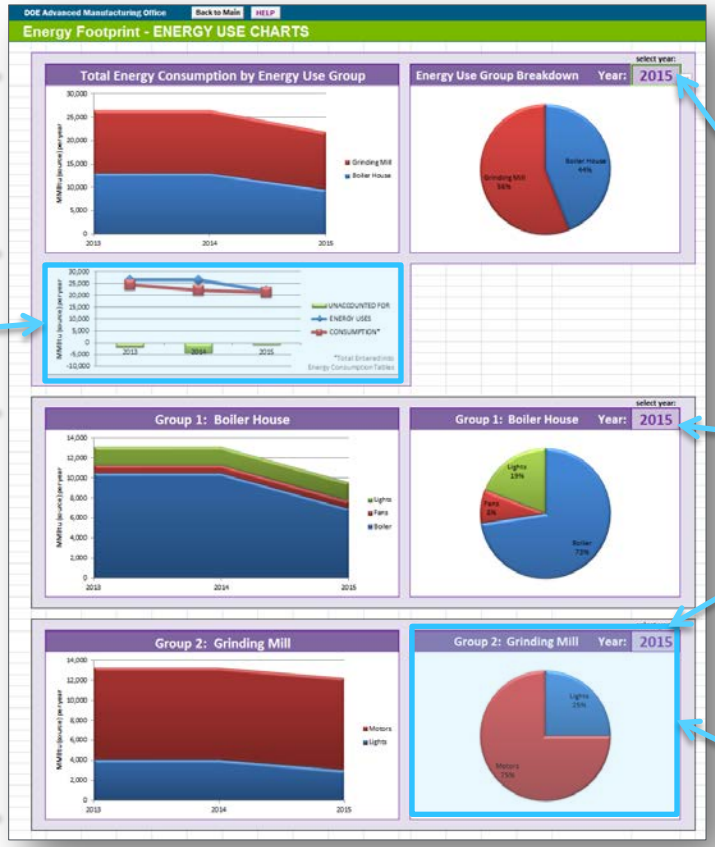
LAYOUT

GO TO
Table of Contents

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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EU Charts sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EnPI Table sheet

LAYOUT

GO TO
Table of Contents

DOE Advanced Manufacturing Office | Back to Main | HELP

Energy Footprint - EnPI Compatible Table

The following table provides the entered energy and related factors data in a format compatible with the DOE EnPI tool. NOTE: The EnPI Tool MUST FIRST be downloaded and installed.

download: https://ecenter.ee.doe.gov/EM/tools/Pages/EnPI.aspx

Once the EnPI has been installed, click the "EXPORT TABLE" button to export this table for use with the EnPI tool

EXPORT TABLE

Date	Electricity (kWh site)	Electricity Cost	Natural Gas (Dtherms)	Natural Gas Cost	Other Energy (MMBtu)	Other Energy Cost	Heating Degree Days (HDD)	Production (count)
4/1/2013	81,480.00	$ 13,541.30	795.60	$ 7,489.25	-	$ -	12,240.00	-
5/1/2013	80,640.00	$ 15,088.00	271.87	$ 2,391.90	-	$ -	2,160.00	-
6/1/2013	149,600.00	$ 25,365.00	252.19	$ 2,084.72	-	$ -	-	-
7/1/2013	135,975.00	$ 22,205.30	192.60	$ 1,365.60	-	$ -	-	-
8/1/2013	137,072.00	$ 22,526.40	206.65	$ 1,454.51	-	$ -	-	-
9/1/2013	101,178.00	$ 18,001.17	216.44	$ 1,574.20	-	$ -	1,440.00	-
10/1/2013	99,372.00	$ 18,395.80	336.02	$ 2,716.86	-	$ -	7,920.00	-
11/1/2013	78,106.00	$ 13,787.62	1,588.63	$ 14,805.60	-	$ -	18,720.00	-
12/1/2013	123,930.00	$ 22,373.40	1,532.35	$ 15,002.70	-	$ -	22,320.00	-
1/1/2014	89,991.00	$ 15,670.20	2,065.25	$ 19,376.49	-	$ -	24,480.00	-
2/1/2014	107,565.00	$ 18,955.68	2,448.60	$ 21,091.29	-	$ -	24,480.00	-
3/1/2014	99,200.00	$ 17,884.68	1,535.07	$ 17,018.61	-	$ -	20,880.00	-
4/1/2014	67,776.00	$ 12,292.81	613.51	$ 6,176.65	-	$ -	10,800.00	-
5/1/2014	113,500.00	$ 21,077.28	375.54	$ 3,650.33	-	$ -	2,160.00	-
6/1/2014	131,047.00	$ 24,305.75	188.01	$ 1,405.15	-	$ -	-	-
7/1/2014	151,925.00	$ 28,685.28	171.74	$ 1,224.10	-	$ -	-	-
8/1/2014	133,400.00	$ 24,219.36	183.33	$ 1,370.16	-	$ -	-	-
9/1/2014	92,640.00	$ 18,381.30	180.79	$ 1,290.28	-	$ -	2,160.00	-
10/1/2014	84,348.00	$ 14,477.05	410.24	$ 3,303.78	-	$ -	7,920.00	-
11/1/2014	90,889.00	$ 17,243.23	809.88	$ 10,788.72	-	$ -	19,440.00	-
12/1/2014	100,400.00	$ 17,742.78	1,284.12	$ 18,571.24	-	$ -	25,200.00	-
1/1/2015	121,824.00	$ 21,551.04	2,312.66	$ 22,473.31	-	$ -	29,520.00	-
2/1/2015	93,394.00	$ 16,666.56	1,577.22	$ 20,868.12	-	$ -	29,520.00	-
3/1/2015	88,896.00	$ 17,028.00	1,121.90	$ 16,513.40	-	$ -	21,600.00	-
4/1/2015	109,282.00	$ 18,799.57	953.54	$ 9,718.14	-	$ -	10,800.00	-
5/1/2015	98,838.00	$ 17,111.78	268.32	$ 2,280.94	-	$ -	2,880.00	-
6/1/2015	123,900.00	$ 23,615.84	204.43	$ 1,595.15	-	$ -	-	-
7/1/2015	144,960.00	$ 28,495.46	191.52	$ 1,538.21	-	$ -	-	-
8/1/2015	128,352.00	$ 24,430.42	173.76	$ 1,296.09	-	$ -	-	-
9/1/2015	104,215.00	$ 19,004.75	173.28	$ 1,314.72	-	$ -	720.00	-
10/1/2015	83,224.00	$ 14,554.98	342.51	$ 3,549.50	-	$ -	7,920.00	-
11/1/2015	106,890.00	$ 17,746.82	760.62	$ 12,560.28	-	$ -	18,720.00	-
12/1/2015	119,200.00	$ 21,895.12	942.69	$ 15,972.56	-	$ -	22,320.00	-
1/1/2016	95,445.00	$ 15,587.60	1,277.78	$ 22,091.98	-	$ -	30,960.00	-
2/1/2016	93,670.00	$ 16,663.00	1,559.38	$ 26,033.46	-	$ -	33,120.00	-
3/1/2016	102,588.00	$ 18,281.47	908.11	$ 15,243.17	-	$ -	19,440.00	-

EXPORT DATA

Generate EnPI tool compatible workbook

Preview Table

This table approximately matches the data and format of the EnPI data input table

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EnPI Table sheet

NOTES

GO TO
Table of Contents

- EnPI stands for *Energy Performance Indicator*
- The ***EnPI Table*** sheet formats the entered data for use with the *EnPI tool* (v4)
- 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://ecenter.ee.doe.gov/EM/tools/Pages/EnPI.aspx

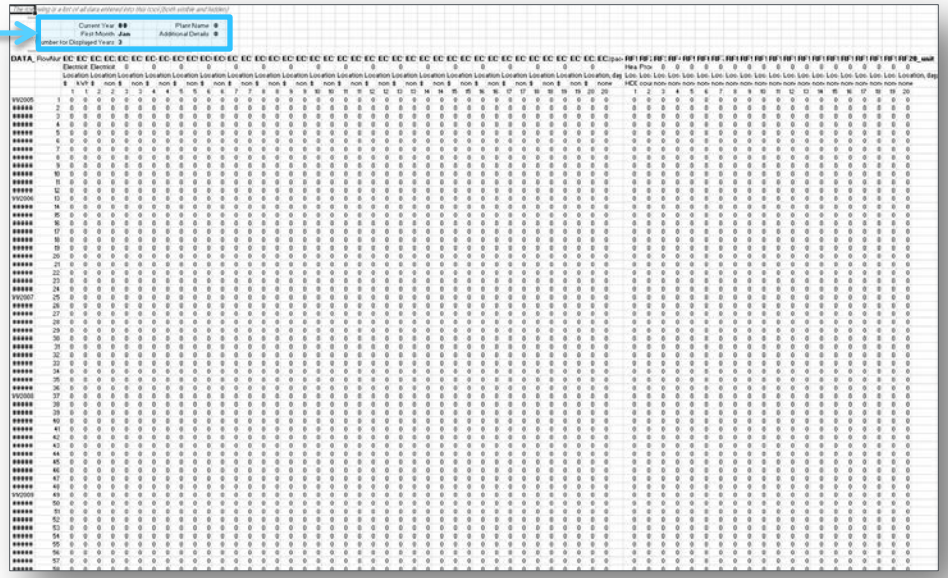
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Raw Data sheet

LAYOUT

GO TO
Table of Contents

General Settings
Current Year, First Month, Number of Years, Plant Name, and Additional Details



Energy Consumption Data

Relevant Variables Data

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Raw Data sheet

NOTES

GO TO
Table of Contents

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy