

AVERT Overview and Step-by-Step Instructions

U.S. Environmental Protection Agency State
Climate and Energy Program
Updated June 2016



Overview of AVERT Development for Energy Efficiency and Renewable Energy (EE/RE) Programs

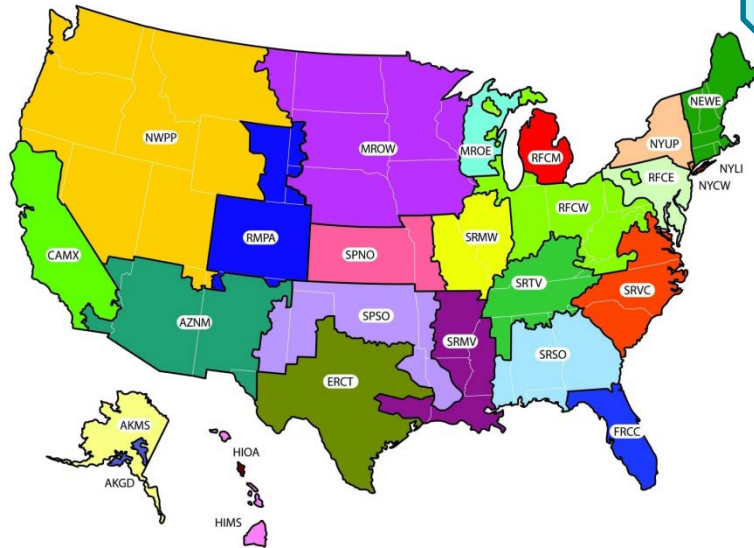
- AVERT (AVoided Emissions and geneRation Tool) translates the energy impacts of EE/RE policies and programs into emission reductions (NO_x, SO₂, and CO₂).
 - It aims to address a key reason states have not implemented previous EE/RE State Implementation Plan (SIP) guidance.
- AVERT has been thoroughly reviewed, well documented and tested. EPA has:
 - Conducted external and internal peer reviews.
 - Benchmarked AVERT against industry standard electric power sector model – PROSYM.
 - Worked with states to beta-tested tool for functionality, appropriate uses, and clarity of user manual.
- AVERT was built to be:
 - user friendly
 - transparent
 - credible

Emission Quantification Methods

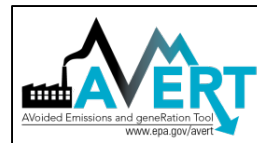
Basic to Sophisticated

Basic Method

eGRID region non-baseload
emission rates

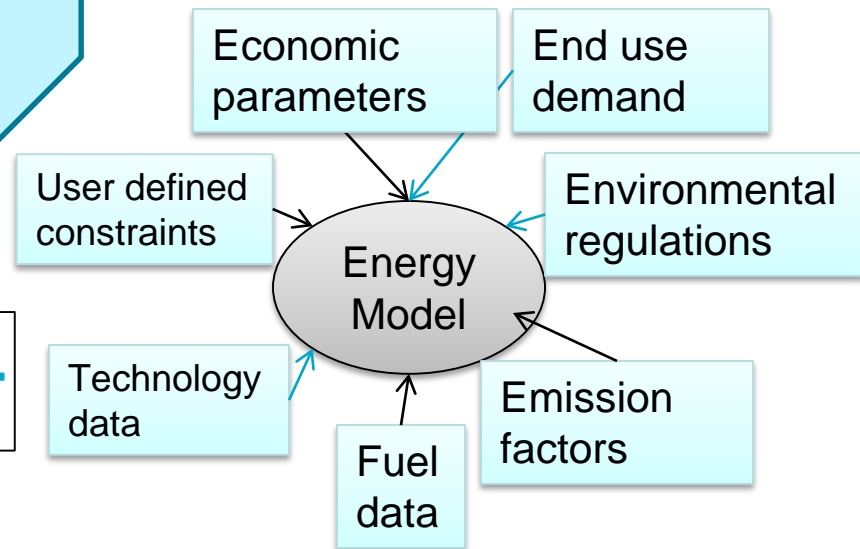


**Intermediate
Method**
Historical hourly
emission rates



Sophisticated Method

Energy Modeling



Applications for AVERT-Calculated Emissions

- SIP credit in a state's National Ambient Air Quality Standard Clean Air Act Plan
- Identify cohort of electric generating units (EGU) “on the margin” compared to baseline
- Compare emission impacts of different EE/RE programs
- Understand emission reductions during High Electric Demand Days
- This is not a projection tool, not intended for analysis more than 5 yrs from baseline

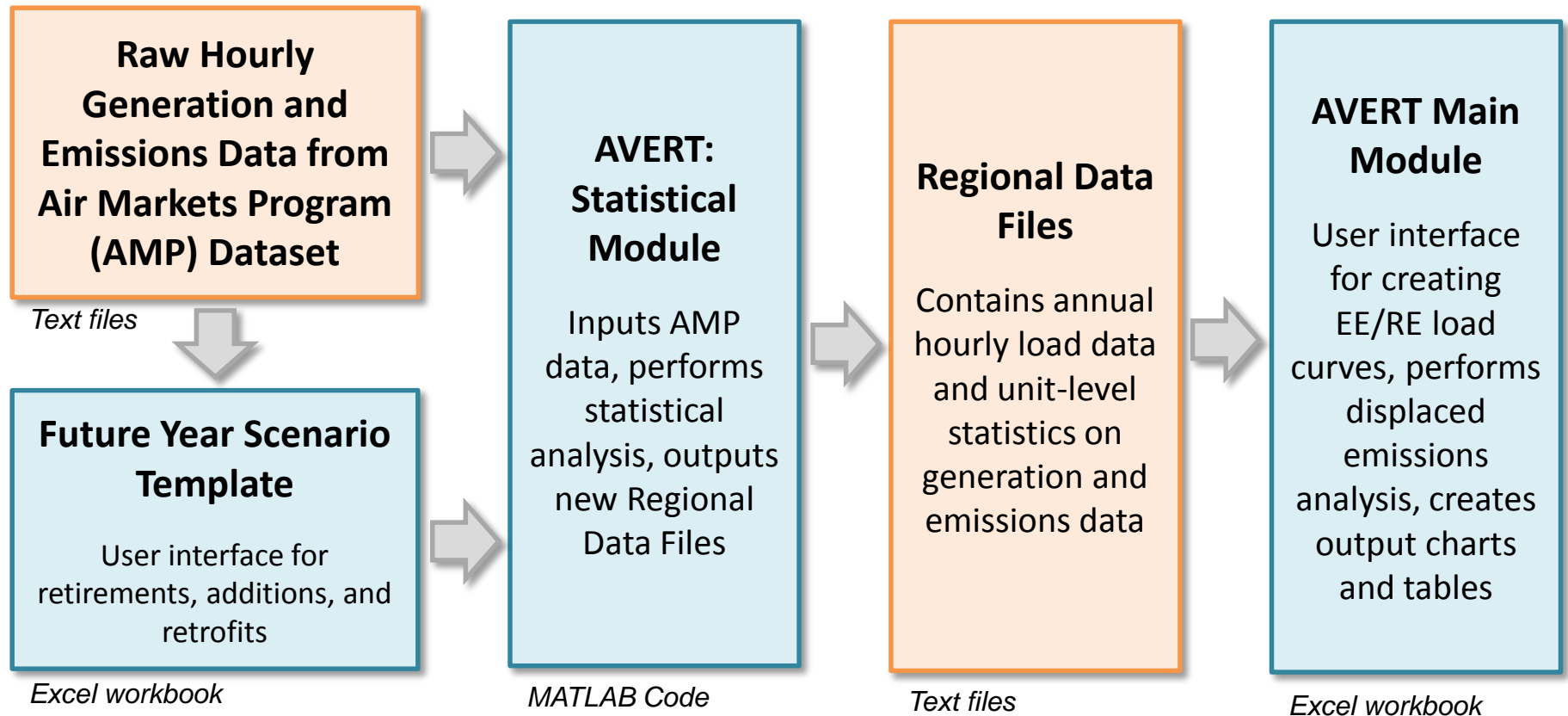
Examples Using AVERT

- The Clean Air Benefits of Wind Energy ([AWEA, May 2014](#))
- Maine Distributed Solar Valuation Study ([Maine PUC, March 2015](#))
- CarbonCount™ Green Bonds Scores ([Alliance to Save Energy, March 2015](#))
- Assessing Emission Benefits of Renewable Energy and Energy Efficiency Programs ([U.S. EPA, April 2015](#))
- U.S. EPA's Ozone Advance Program- [Clark County, NV's Paths Forward](#)
- DOE's Online Smart Grid Calculator ([PNNL, Fall 2015](#))
- Renewable Portfolio Standard (RPS) Benefits Report ([LBNL and NREL, January 2016](#))

How AVERT Works

- AVERT's Main Module simulates the hourly changes in generation and air emissions (NO_x , SO_2 , and CO_2) at EGU resulting from EE/RE policies and programs.
- User input: MWhs saved from EE programs, or wind and solar generation (MW)
 - Multiple options are built into the tool
 - EPA provides hourly profiles for some states with on-the-books EE programs not included in Energy Information Administration's Annual Energy Outlook (2013)
- User can retire, add and change emission rates of EGU and re-run simulation using AVERT's Future Year Scenario Template and Statistical Module.

AVERT's Modules and Data Files



Most users will only need to use the Regional Data Files and AVERT Main Module to calculate emissions

AVERT's Data Driven Analysis

- AVERT uses a data-driven analysis to distinguish which EGU respond to marginal changes in load reduction.
 - AVERT analyzes EGU datasets from EPA's Air Markets and Program Data (hourly, unit-by-unit generation & emissions).
 - Dataset includes EGUs with capacity of 25 MWs or greater.
 - AVERT's Statistical Module gathers statistics on EGU operations under specific load conditions, and then replicates changes through a Monte Carlo analysis.
 - AVERT's Regional Data Files contain hourly and unit-level emissions and generation data.

Part I

AVERT Main Module

AVERT Main Module

Step-by-Step Overview

- Enabling Macros
- Using AVERT
- Step 1. Load Regional Data File
- Step 2. Set Energy Efficiency and Renewable Energy Data
- Step 3. Run Displacement
- Step 4. Display Outputs

AVERT Main Module

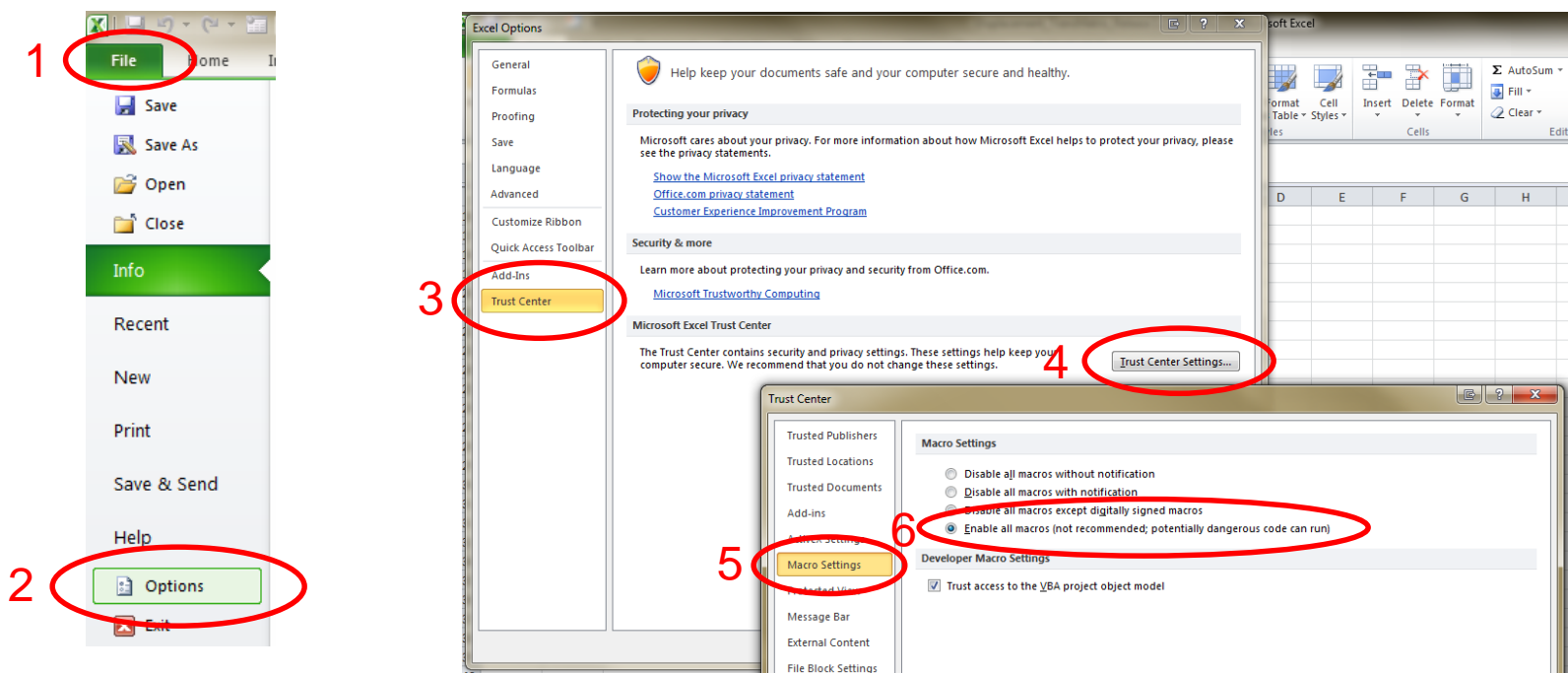
Enabling Macros

- In Windows, AVERT is compatible with Excel 2007 or newer versions.
- On a Mac, AVERT is compatible with Excel 2011.
 - Only the Main Module has been optimized for Mac. Other components (e.g., the Statistical Module) require Windows.
- You may want to revert to the default macro settings after using the model. Enabling macros in other Excel files may allow potentially dangerous code to run.

AVERT Main Module

Enabling Macros in Windows*

In Excel 2010 or 2013, click **File > Options** Next, click **Trust Center > Trust Center Settings > Macro Settings > Enable all macros**



*If using Excel 2007, click the Microsoft Office Button: .

*If using Excel on a Mac, select "Enable macros" in the dialog box that appears when opening the file.

AVERT Main Module

Using AVERT

- Add details about the user, the date, and the EE/RE program for which displacements are to be estimated.
- Click on the button labeled “Click here to begin”.

AVERT




Welcome to AVERT's Main Module

AVERT is an EPA tool that quantifies the emission impacts of energy efficiency and renewable energy policies and programs within the continental United States. Please refer to the AVERT user manual for details on step-by-step instructions, appropriate uses and assumptions built into the tool.

NOTE

Please ensure macros are enabled on your computer.
AVERT requires Excel 2007 or newer to run.

AVERT v.1.0
Developed by Synapse Energy Economics, Inc., January 2014

Editor:

Date edited:

Edition name:

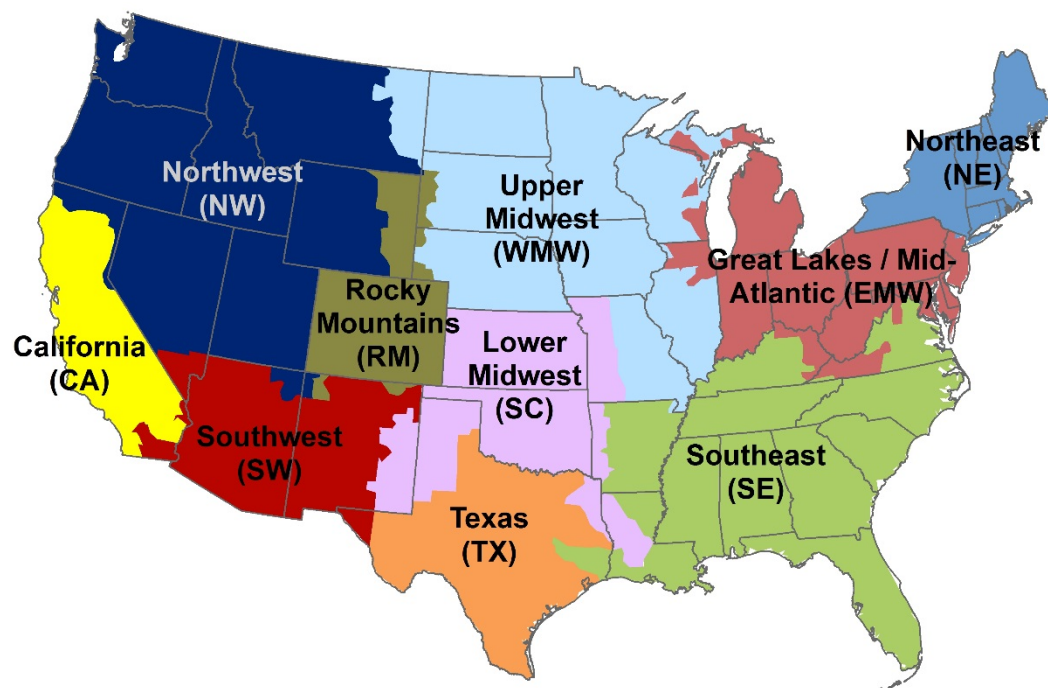
Edition description:

Click here to begin

Click here to restore default Excel functionality

AVERT Main Module

Step 1. Load Regional Data File



Regions represent relatively autonomous electricity production zones, and are based on electricity market module regions.

Regions include

- California
- Great Lakes/Mid-Atlantic
- Lower Midwest
- Northeast
- Northwest
- Rocky Mountains
- Southeast
- Southwest
- Texas
- Upper Midwest


AVERT Main Module

Step 1. Load Regional Data File

- Select a region for analysis by either using the dropdown or clicking the map.

Select region

Select a region for analysis by using the dropdown or by clicking the map.



If you haven't yet downloaded a Regional Data File, [click here.](#)

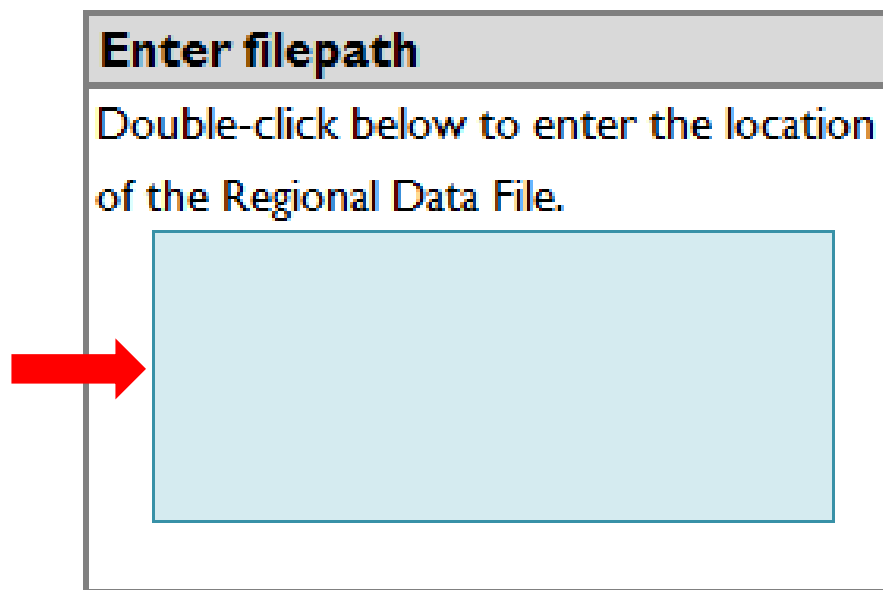
- Selecting a region loads region-specific data for wind and solar capacity factors, and dynamically creates a hyperlink to that region's data on EPA's website.

- After selecting a region, click the link under the map to download it from EPA's website.

AVERT Main Module

Step 1. Load Regional Data File

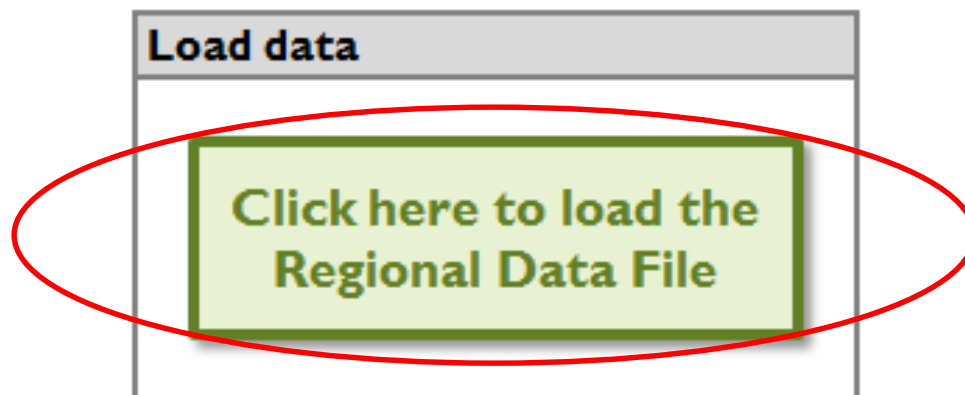
- In the box labeled “Enter filepath,” double-click the blue area to navigate to the location of the downloaded regional data file.



AVERT Main Module

Step 1. Load Regional Data File

- Click the button under “Load data” entitled:



Clicking this button loads the following information from the regional data file:

- Hourly fossil load
- EGU information (e.g., location, fuel type)
- Typical EGU performance for generation and emissions at a given regional load

AVERT Main Module

Step 1. Load Regional Data File

- A popup will indicate when the file has finished loading and remind you how to handle states that are split across multiple AVERT regions.

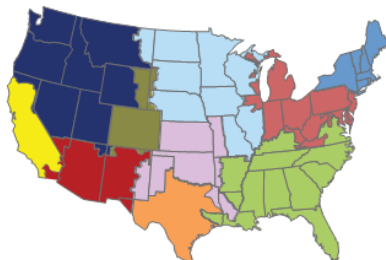
AVERT

Step 1: Import Regional Data File

Select region

Select a region for analysis by using the dropdown or by clicking the map.

Southeast



[If you haven't yet downloaded a Regional Data File, click here.](#)

Enter filepath

Double-click below to enter the filepath of the Regional Data File.

K:\AVERT\CLLEX\AVERT and data files\regional files\AVERT RDF 2015 (Southeast).xlsx

Load data

Click here to download Regional Data File

AVERT

Import complete.

You have loaded the 2015 Southeast (SE) Regional Data File. This region contains 1003 fossil units.

Generation from the following states is fully represented in this AVERT region:

- Alabama
- Florida
- Georgia
- North Carolina
- South Carolina
- Tennessee

Generation from the following states is only partially represented in this AVERT region:

- Arkansas (89%)
- Kentucky (91%)
- Louisiana (76%)
- Missouri (21%)
- Mississippi (99%)
- Oklahoma (4%)
- Texas (6%)
- Virginia (95%)
- West Virginia (12%)

Appendix G of the User Manual describes a rule of thumb that users analyzing partially represented states should consider for assessing the impact of EE/RE over multiple AVERT regions. The Southeast (SE) region may include generation from units in states with a representation too small to be considered significant for this analysis.

Click the red "Next" button to continue.

OK

AVERT Main Module

Step 2. Set EE and RE Data

- This page leads you through the process of creating a load impact profile depicting the load reductions expected from an EE/RE program.

Upper Midwest, 2012

AVERT

Step 2: Set Energy Efficiency and Renewable Energy Impacts

DIRECTIONS: Enter the EERE load for one or a group of EERE policies and programs.

To include the impacts of hourly data manually, click the green button on the right.

Each entry is additive and will create a portfolio of EE/RE impacts.

For further instructions consult Section 4 of the AVERT user manual.

Enter hourly data manually

Enter EE impacts based on the % reduction of regional fossil load

Reduce generation by a percent in some or all hours

Apply reduction to top X% of hours: % of top hours

Reduction % in top X% of hours: % reduction

And/or enter EE impacts distributed evenly throughout the year

Reduce generation by annual GWh: GWh

OR

Reduce each hour by constant MW: MW

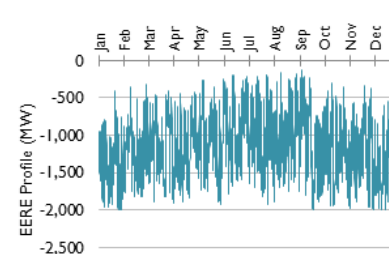
And/or enter annual capacity of RE resources

Wind Capacity: MW

Utility Solar PV Capacity: MW

Rooftop Solar PV Capacity: MW

Selected EERE Profile Portfolio:



The currently entered reduction profile equals 10,159 GWh, or 4.1% of regional fossil load.

Welcome

1. Regional Data File

2. Set EERE Profile

3. Run Displacement

4. Display Outputs

Next →

← Back

BaseEPA

AVERT Main Module

Step 2. Set EE and RE Data

- If the hourly load reductions expected from a particular EE/RE policy, program, or measure are known, a manual stream of load reduction values can be entered for every hour of the year by clicking the “Enter hourly data manually” button.

Enter hourly data manually

Northeast, 2012

AVERT

Manual EERE Data Entry

When complete, click here to return to
Step 2: Enter Energy Efficiency and Renewable Energy Data

Date	Hour	Day of Week	Regional Fossil Load (MW)	Manual EE RE Profile (MW)	Total Change (MW)
1/1/2012	1	Sunday	9,182		0
1/1/2012	2	Sunday	8,084		0
1/1/2012	3	Sunday	7,072		0
1/1/2012	4	Sunday	6,666		0
1/1/2012	5	Sunday	6,726		0
1/1/2012	6	Sunday	6,986		0
1/1/2012	7	Sunday	7,330		0
1/1/2012	8	Sunday	7,051		0
1/1/2012	9	Sunday	7,401		0
1/1/2012	10	Sunday	7,841		0
1/1/2012	11	Sunday	8,135		0
1/1/2012	12	Sunday	8,445		0
1/1/2012	13	Sunday	8,581		0
1/1/2012	14	Sunday	8,615		0

AVERT Main Module

Step 2. Set EE and RE Data

This page also allows you to estimate a load reduction from basic characteristics:

- Reduce fossil-fuel generation by a percent in some or all hours
- Reduce fossil-fuel generation by total GWh
- Reduce each hour by a constant MW
- Renewable energy proxy
- Combination of EE/RE programs including combining pre-set options with manual entry

Enter EE impacts based on the % reduction of regional fossil load

Reduce generation by a percent in some or all hours		
Apply reduction to top X% hours:	0%	% of top hours
Reduction % in top X% of hours:	0.0%	% reduction

And/or enter EE impacts distributed evenly throughout the year

Reduce generation by annual GWh:	0	GWh
OR		
Reduce each hour by constant MW:	0.0	MW

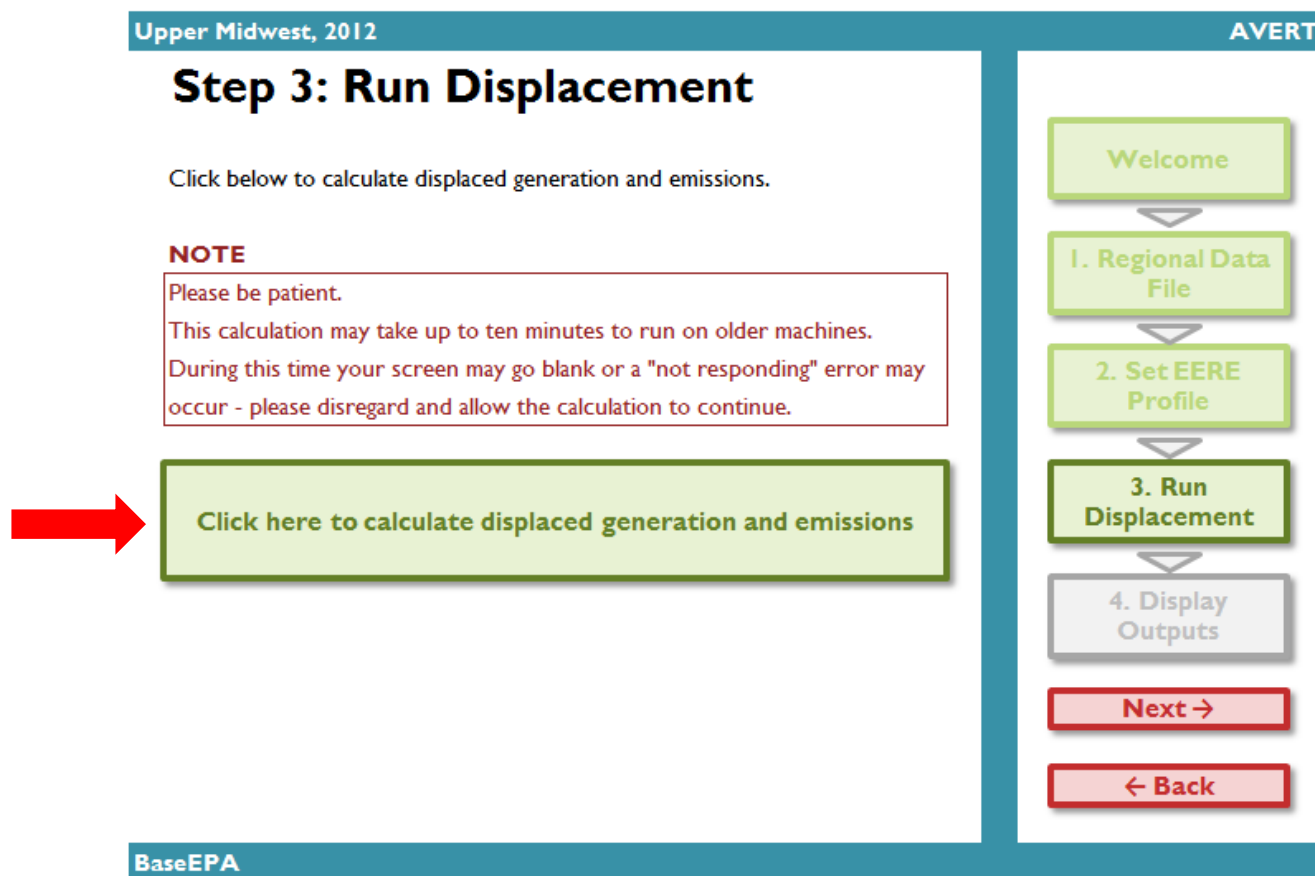
And/or enter annual capacity of RE resources

Wind Capacity:	2000	MW
Utility Solar PV Capacity:	0	MW
Rooftop Solar PV Capacity:	0	MW

AVERT Main Module

Step 3. Run Displacement

- Run displacement by selecting the button entitled “Click here to calculate displaced generation and emissions.”



AVERT Main Module

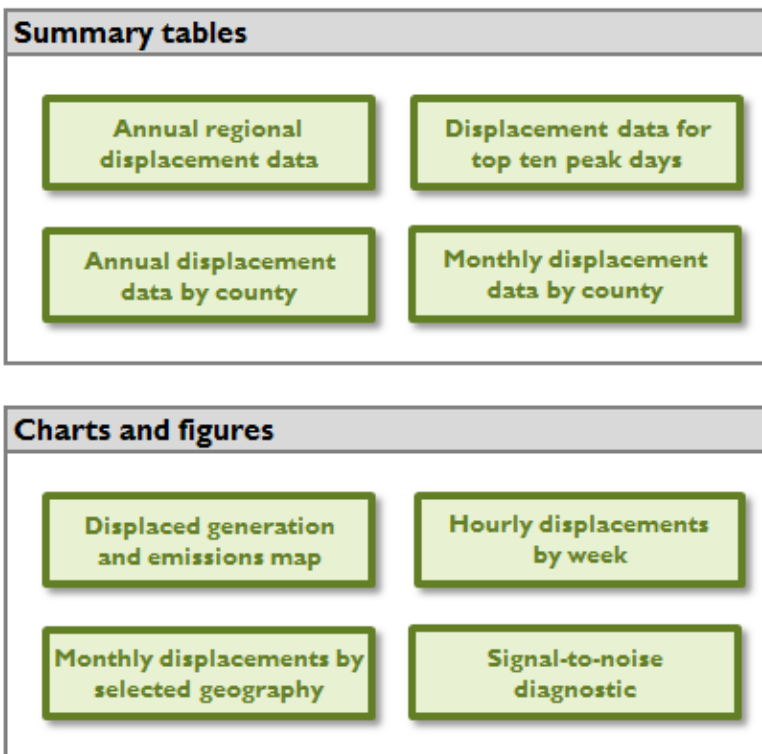
Step 3. Run Displacement

- This step calculates hourly displaced generation and emissions (SO_2 , NO_x , CO_2) for each fossil EGU within the selected region.
- Note that this is a processor-intensive step. When using an older computer, or when analyzing regions with many fossil EGU, this step may take up to ten minutes.

AVERT Main Module

Step 4. Display Outputs

- The data generated in Step 3 are aggregated in two groups of charts and tables in Step 4.



AVERT Main Module

Step 4. Display Outputs

Annual regional displacements

- This table displays the total annual generation and emissions as reported for the region in the base year ("Original") and as calculated by AVERT's Main Module after the EE/RE reduction ("Post-EERE").

Upper Midwest, 2012

AVERT

Output: Annual Regional Displacements

[Click here to return to Step 4: Display Outputs](#)

	Original	Post-EERE	Impacts
Generation (MWh)	245,694,500	235,514,500	- 10,180,000
Total Emissions			
SO ₂ (lbs)	956,871,300	921,132,200	- 35,739,100
NO _x (lbs)	416,259,200	400,349,300	- 15,909,900
CO ₂ (tons)	246,098,700	236,856,400	- 9,242,300
Emission Rates			
SO ₂ (lbs/MWh)	3.895	3.911	
NO _x (lbs/MWh)	1.694	1.700	
CO ₂ (tons/MWh)	1.002	1.006	

All results are rounded to the nearest hundred. A dash ("—") indicates a result greater than zero, but lower than the level of reportable significance.

AVERT Main Module

Step 4. Display Outputs

Annual displacement data by county

- This table presents a summary of the displaced generation and emissions for each of the counties from each of the states contained within the region. A line for each county containing an EGU is displayed.

Upper Midwest, 2012

Output: Annual Displacement Data by County

[Click here to return to Step 4: Display Outputs](#)

State	County	Peak Gross	Annual Gross	Annual Displaced	Annual Displacement
		Generation, Post- EERE (MW)	Generation, Post- EERE (MWh)		
IA	Allamakee	250	1,152,800	-91,800	-639,700
IA	Appanoose	17	2,700	-600	-5,300
IA	Audubon	125	39,100	-8,800	-
IA	Black Hawk	109	42,300	-8,900	-30,700
IA	Cerro Gordo	522	772,800	-154,400	-600
IA	Clay	30	11,000	-2,300	-21,000
IA	Clinton	143	583,900	-30,500	-195,700
IA	Des Moines	210	1,195,400	-58,200	-438,500
IA	Dubuque	42	91,300	-1,600	-500
IA	Louisa	770	5,304,300	-197,800	-642,500
IA	Marshall	57	32,500	-1,700	-200
IA	Muscatine	262	960,200	-79,200	-353,300
IA	Polk	481	343,100	-59,900	-2,100

For each county, annual output statistics are given for:

- Peak Gross Generation Post-EE/RE
- Annual Gross Generation Post-EE/RE
- Capacity Factor
- Annual Change in Generation
- Annual Change in Heat Input/
SO₂/NO_x/CO₂
- Ozone Season Change in
SO₂/NO_x
- Ozone Season, 10 Peak Days
Change in SO₂/NO_x

AVERT Main Module

Step 4. Display Outputs

Displacement data for top ten peak days

- This table displays a summary of the ten days in the region featuring the highest level of fossil fuel load.

Upper Midwest, 2012

AVERT

Output: Displacement Data for Top Ten Peak Days

[Click here to return to Step 4: Display](#)

Day Rank	Date	Total Fossil Generation (MWh)	Expected Displaced Generation (MWh)	Displaced Generation (MWh)	Displaced NO _x (lbs)	Displaced SO ₂ (lbs)	Displaced CO ₂ (Tons)
1	Jul 26	990,200	-32,800	-32,000	-56,500	-58,900	-23,300
2	Jul 27	966,700	-26,300	-26,300	-57,000	-42,500	-19,800
3	Jul 25	963,900	-35,800	-35,900	-69,600	-62,700	-27,100
4	Jul 14	963,400	-21,800	-21,800	-42,400	-36,800	-16,500
5	Aug 01	954,200	-16,500	-16,400	-35,900	-27,700	-12,800
6	Jul 06	953,600	-16,000	-16,000	-37,400	-26,700	-12,600
7	Jul 13	950,100	-17,000	-16,400	-37,800	-29,900	-13,100
8	Jul 07	928,900	-19,000	-19,100	-41,100	-29,600	-14,600
9	Jul 10	927,500	-18,400	-18,500	-42,700	-31,400	-14,400
10	Aug 12	923,200	-15,500	-15,500	-34,200	-21,500	-12,000

Negative numbers indicate displaced generation and emissions.

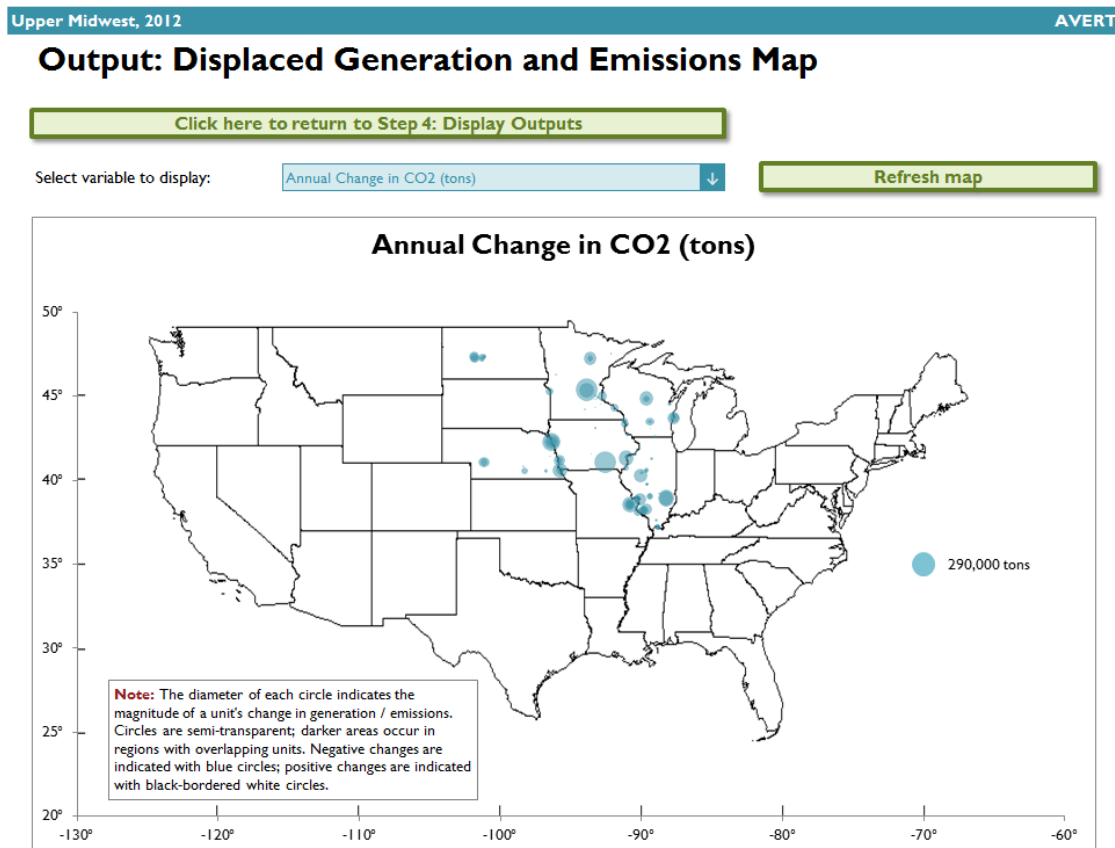
All results are rounded to the nearest hundred. A dash ("—") indicates a result greater than zero, but lower than the level of reportable significance.

AVERT Main Module

Step 4. Display Outputs

Displaced generation and emissions map

- This dynamic map allows the user to view where emissions have been displaced within the selected region. Users can view changes in generation, heat input, SO₂, NO_x, and CO₂.



AVERT Main Module

Step 4. Display Outputs

Displacement data by month

Monthly output can be viewed over the entire region, or a specific state or county within the region.

- First select region, state, or county in the top dropdown menu.
- If selecting a state, choose the state in the next dropdown menu.
- If selecting a county, choose both the state and the county in the next two dropdown menus.

Upper Midwest, 2012

AVERT

Output: Monthly Displacements by Selected Geography

[Click here to return to Step 4: Display Outputs](#)

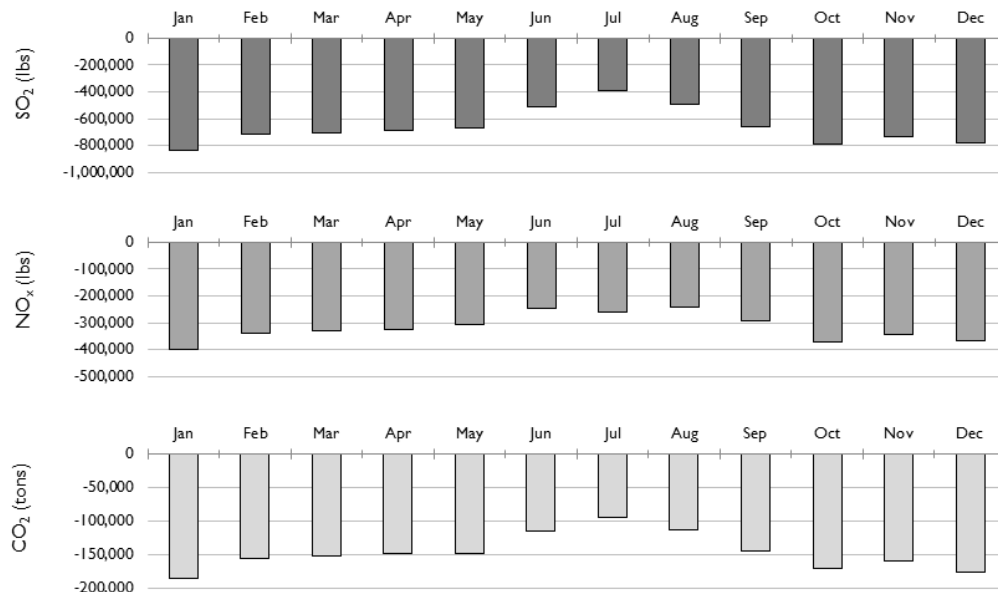
Select level of aggregation:

State

Select state:

IA

Monthly Emission Changes, Upper Midwest (IA)

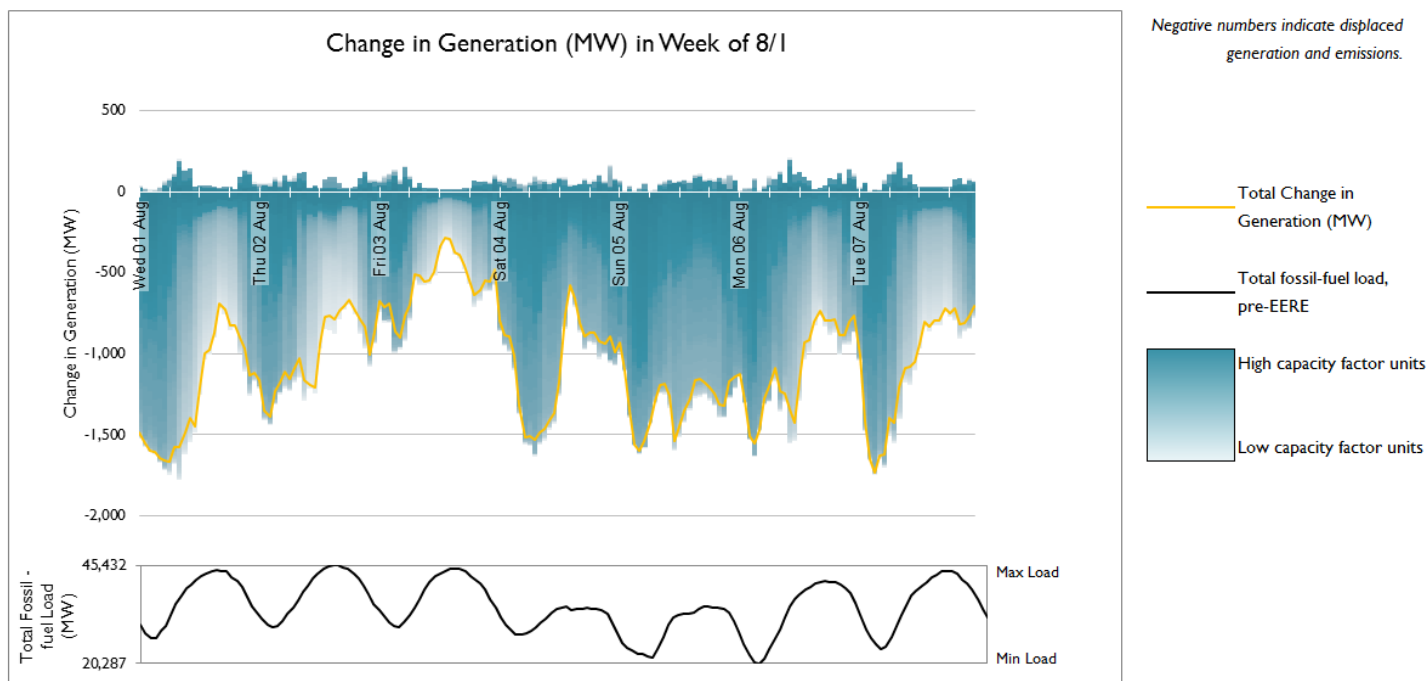


AVERT Main Module

Step 4. Display Outputs

Hourly displacements by week

- This graph displays a dynamic representation of hourly displacement from each EGU in a region. Individual plants are stacked as gradated bar plots.

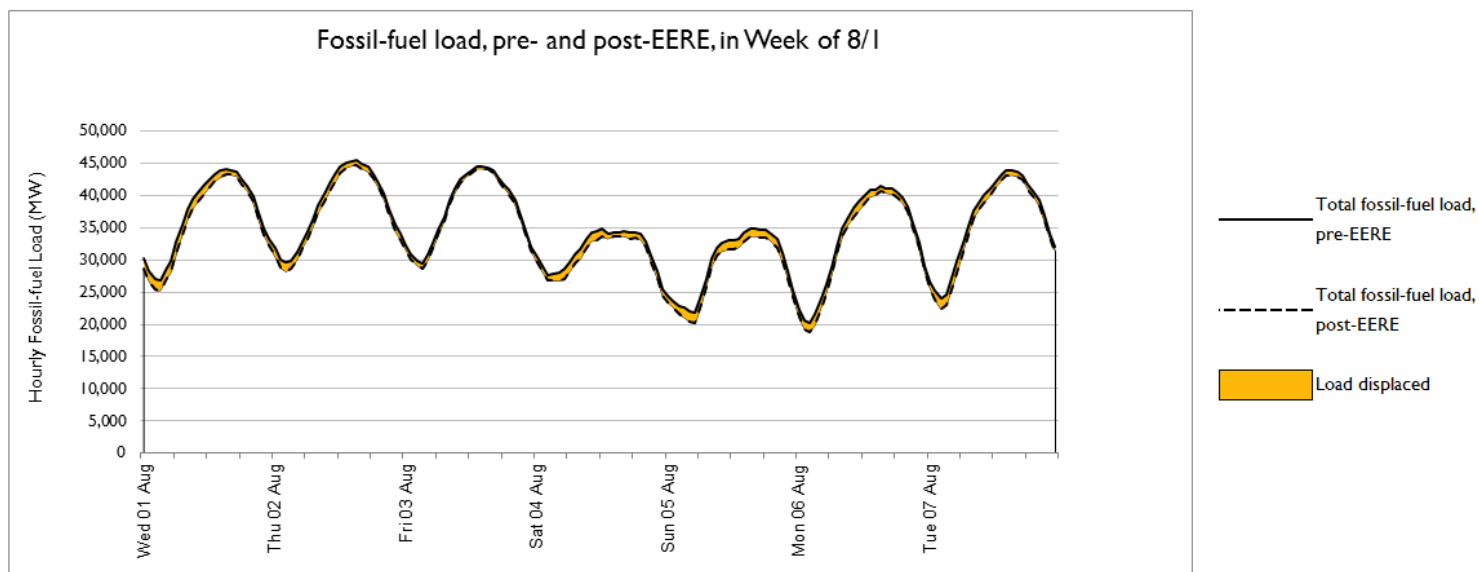


AVERT Main Module

Step 4. Display Outputs

Hourly displacements by week

- The second figure shows the same week-long load impact profile, but presents the displaced load in reference to the total fossil-fuel load to illustrate the degree of change represented by the EE/RE program relative to the baseline.



AVERT Main Module

Step 4. Display Outputs

Signal-to-noise diagnostic

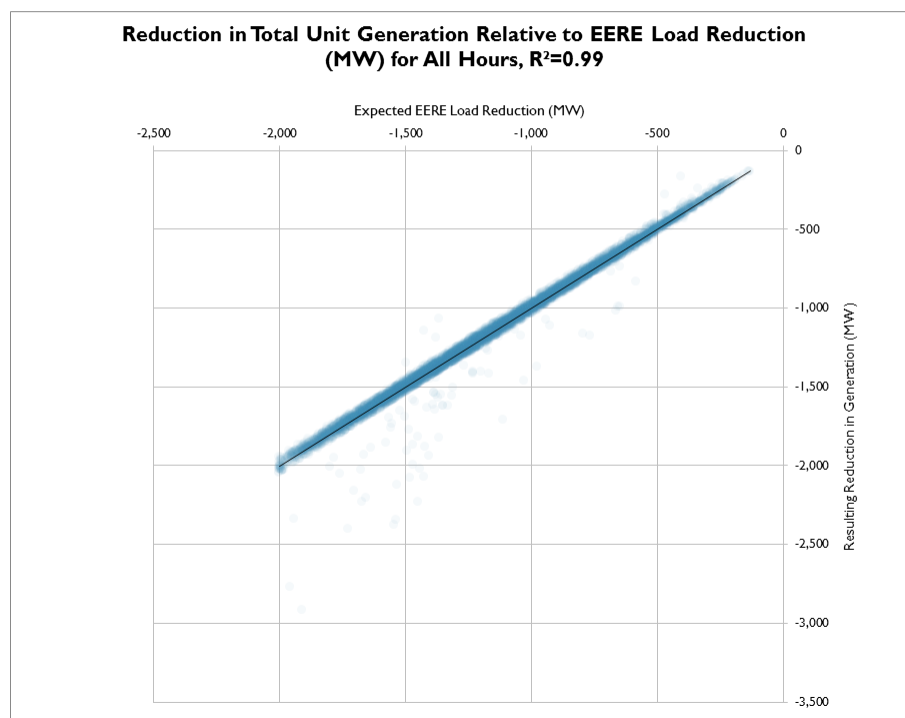
- This chart is a scatterplot of every hour of the year, showing calculated total generation reduction in each hour (y-axis) against the user-input EE/RE load reduction in each hour (x-axis).
- Ideally, AVERT perfectly matches unit generation reductions to the amount of EE/RE load reduction requested by the user.
- This graphic shows where that assumption holds, where it does not hold, and to what extent.

Upper Midwest, 2012

AVERT

Output: Signal-to-noise diagnostic

[Click here to return to Step 4: Display Outputs](#)



Part II

AVERT Statistical Module Operation

AVERT Statistical Module

Overview

- Purpose
 - Basis of AVERT analysis
 - Processes raw CAMD data to determine behavioral characteristics of fossil-fired EGU
 - Returns expected generation and emissions behavior to AVERT Main Module
 - Allows users to alter EGU characteristics, retire and add EGU with Future Year Template
- Advanced use of AVERT
 - Most users will not require the Statistical Module
 - Based in MATLAB
 - Executable version available for public use
 - Requires MATLAB Compiler Runtime (MCR) to be installed (free from Mathworks)
 - Requires Windows
- Output file can be used directly in Main Module

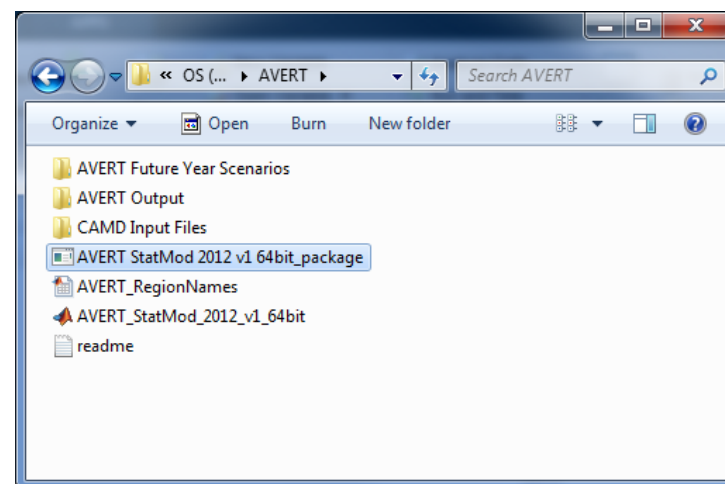
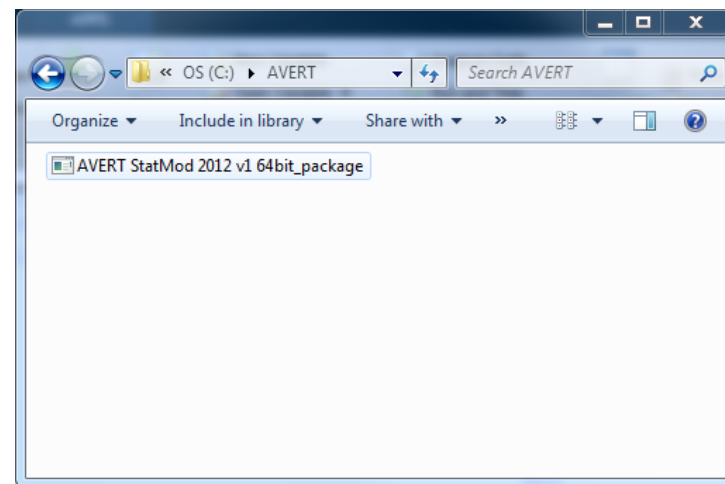
AVERT Statistical Module

Obtain Correct Version

- AVERT Statistical Module requires is sensitive to PC specifications.
- 32-bit and 64-bit operating system versions available.
- Obtain correct version of AVERT Statistical Module.
- Obtain correct version of MCR from Mathworks: **R2012b (8.0)**.
 - Use the exact version noted on the AVERT website and in the user guide. An older or newer version will give you an error when you try to run the analysis.
- Determine if your Windows system operates in a 32-bit or 64-bit environment.
 - Find this information in “properties” of “My Computer” in Windows XP, or “Computer” in Windows Vista, Windows 7, or Windows 8.
 - Follow these instructions: <http://windows.microsoft.com/en-us/windows7/find-out-32-or-64-bit>.

AVERT Statistical Module Unpacking and Startup

- Download the AVERT Statistical Module package.
- Run the executable to decompress the package to three files and three subfolders.



To obtain historic base years, visit <http://epa.gov/statelocalclimate/resources/avert-download.html> and obtain both the CAMD input file and the Future Year Scenario Template for that same year.

AVERT Statistical Module File Structure

- **AVERT Future Year Scenarios**

- Excel-based input files for altering EGU

- **AVERT Output**

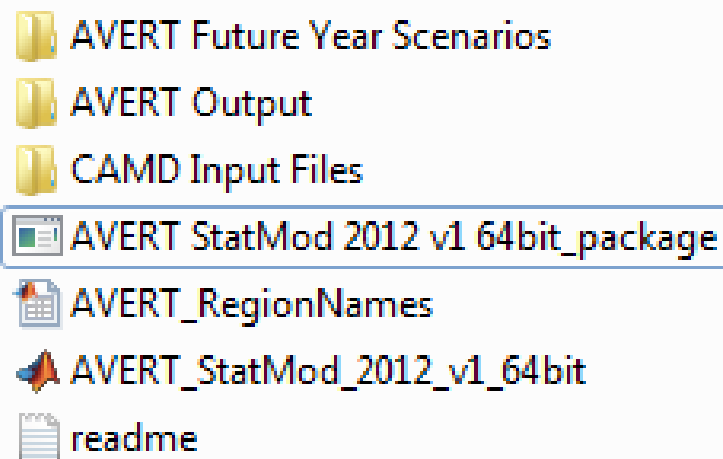
- Statistical Module output files
- These become Main Module input files

- **CAMD Input Files**

- Processed CAMD data files
- New versions expected 2nd quarter annually

- **AVERT_StatMod_2012_v1_64bit**

- Executable

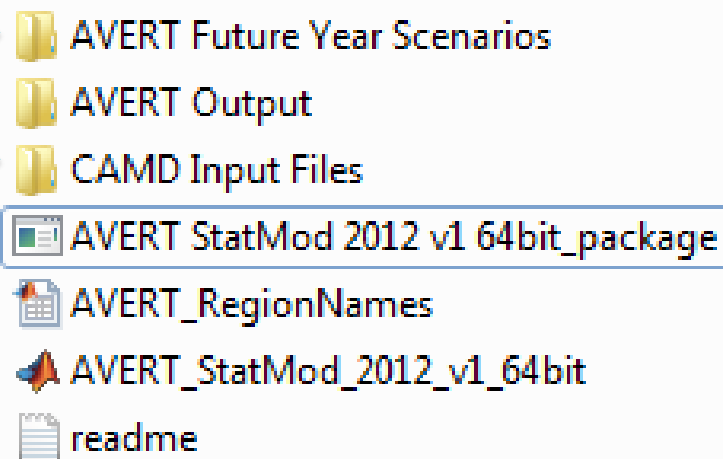


Obtaining Other Base Years

To obtain additional historic base year data, visit:

<http://epa.gov/statelocalclimate/resources/avert-download.html>.

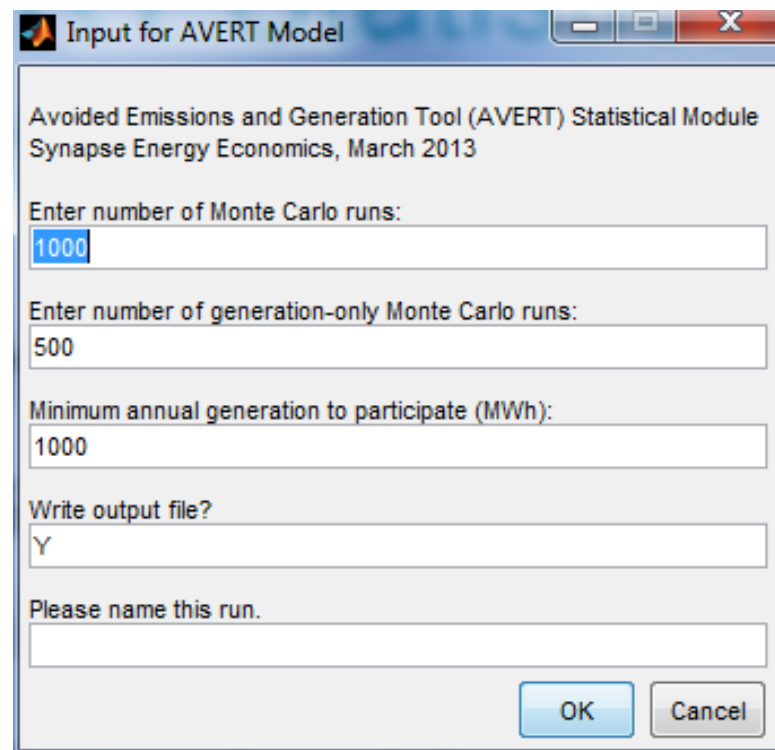
- Download AVERT Future Year Scenario for the same historic base year.
 - Place the file in “AVERT Future Year Scenarios”
- Download the CAMD input file for the historic base year.
 - Place the file in “CAMD Input Files”



AVERT Statistical Module

Input Parameters

- Higher number of Monte Carlo (MC) runs reduces noise.
 - For test runs, use a low number of MC runs (10) and generation-only MC runs (5).
 - For final runs, use a high number of MC runs (1,000) and generation-only MC runs (500).
- Select “Y” to write output and save runs.



Input for AVERT Model

Avoided Emissions and Generation Tool (AVERT) Statistical Module
Synapse Energy Economics, March 2013

Enter number of Monte Carlo runs:
1000

Enter number of generation-only Monte Carlo runs:
500

Minimum annual generation to participate (MWh):
1000

Write output file?
Y

Please name this run.

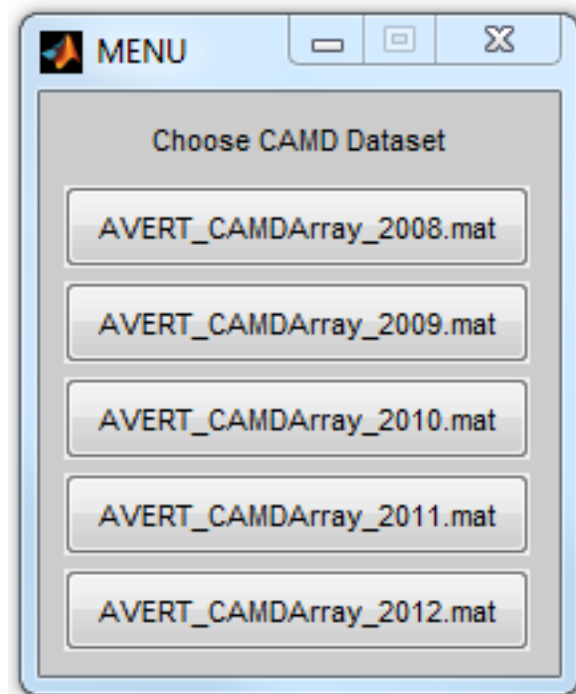
OK Cancel

*Use letters and numbers only.
No special characters and no spaces.*

AVERT Statistical Module

Choose Data File

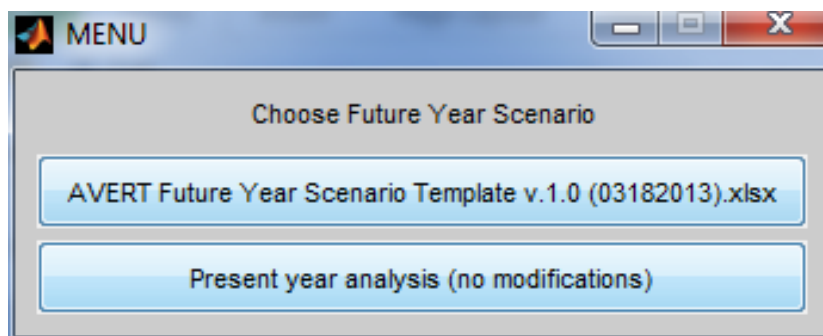
- Choose base year for analysis.
 - Data from 2007 through 2015 are available.
 - New data will be ready by the second quarter of the next year.
 - Requires data to be vetted by EPA and post-processed.



AVERT Statistical Module

Choose Future Year Scenario

- Select either
 - Saved future year scenario (see slide 41)
 - Present year analysis

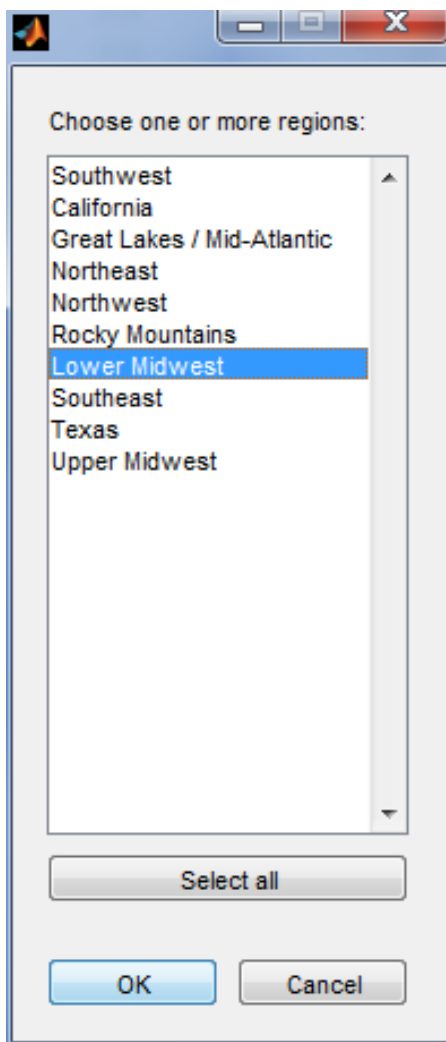


Present year analysis makes no modifications to the AVERT dataset.

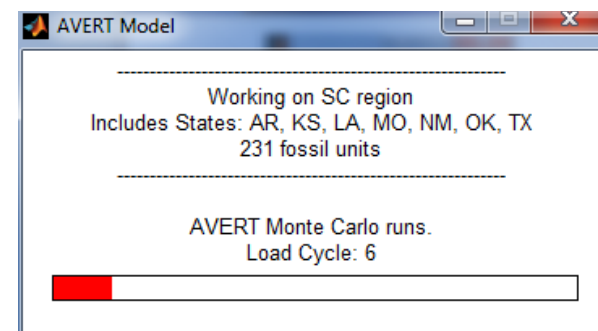
- Uses EGU that exist in data year
- No changes in emissions rates

AVERT Statistical Module

Choose Region(s) of Interest



- Choose region (or multiple regions) of interest.
- Same regions as in AVERT Main Module
- Once you hit "OK", the program will run uninterrupted until completion.
 - Program returns updated run status on a regular basis.
 - Output graphic and file indicate successful completion.



Part III

AVERT Future Year Scenario Template

AVERT Future Year Scenario Overview

- Purpose
 - AVERT is not forward-looking: cannot predict EGU retirements, new additions, or emissions modifications.
 - Future Year Scenarios allow users to
 - Remove EGU from analysis.
 - Include additional proxy EGU.
 - Modify emissions characteristics.
- Advanced use of AVERT
 - Excel spreadsheet
 - Read into AVERT Statistical Module
- Each spreadsheet becomes a scenario.
 - Spreadsheet becomes input file for AVERT Statistical Module.
 - Each future year scenario template is specifically designed to match the same historic base year.

Use AVERT Future Year Scenario in Statistical Module

- Obtain Future Year Scenario Template (slides 33-36).
- Modify Future Year Scenario Template (slides 44-46).
- Save Future Year Scenario Template with a meaningful name.
- Run Statistical Module (slides 37-40).
 - Provide a unique name for the statistical module run (slide 37).
 - Choose saved future year scenario (slide 39).

AVERT Future Year Scenario Retires and Modifications

AVERT Future Year Scenario Template v.1.0 (03182013) - Microsoft Excel

FileHomeInsertPage LayoutFormulasDataReviewViewPDFAcrobat

G1088No

Retiring Units / Emission Modifications6733

	Facility Name	ORSP	UnitID	Retire?	Retire (binar)	Revise Emissions Rates?	Revise (binar)	Revised SO2 Rate (lbs/MWh)	Revised NOx Rate (lbs/MWh)	Revised CO2 Rate (Tons/MWh)	Region	capaci	unit ty	CF	State
59	Dolet Hills Power Station	51	1	No	0	No	0	0.000	0.000	0.000	SC	720 Coal	81%	LA	
76	Holcomb	108	SGU1	No	0	No	0	0.000	0.000	0.000	SC	389 Coal	86%	KS	
112	Grand River Dam Authority	165	1	No	0	No	0	0.000	0.000	0.000	SC	519 Coal	78%	OK	
113	Grand River Dam Authority	165	2	No	0	No	0	0.000	0.000	0.000	SC	557 Coal	77%	OK	
733	Riverton	1239	39	No	0	No	0	0.000	0.000	0.000	SC	27 Coal	36%	KS	
734	Riverton	1239	40	No	0	No	0	0.000	0.000	0.000	SC	58 Coal	39%	KS	
740	La Cygne	1241	1	No	0	Yes	1	1.000	1.000	0.000	SC	815 Coal	62%	KS	
741	La Cygne	1241	2	No	0	Yes	1	1.000	1.000	0.000	SC	717 Coal	71%	KS	
752	Lawrence Energy Center	1250	3	No	0	No	0	0.000	0.000	0.000	SC	57 Coal	70%	KS	
753	Lawrence Energy Center	1250	4	No	0	No	0	0.000	0.000	0.000	SC	125 Coal	68%	KS	
754	Lawrence Energy Center	1250	5	No	0	No	0	0.000	0.000	0.000	SC	383 Coal	82%	KS	
755	Tecumseh Energy Center	1252	9	No	0	No	0	0.000	0.000	0.000	SC	79 Coal	73%	KS	
756	Tecumseh Energy Center	1252	10	No	0	No	0	0.000	0.000	0.000	SC	141 Coal	61%	KS	
759	Quindaro	1295	1	Yes	1	No	0	0.000	0.000	0.000	SC	76 Coal	72%	KS	
760	Quindaro	1295	2	Yes	1	No	0	0.000	0.000	0.000	SC	110 Coal	58%	KS	
1069	Asbury	2076	1	No	0	No	0	0.000	0.000	0.000	SC	208 Coal	70%	MO	
1074	Hawthorn	2079	5A	No	0	No	0	0.000	0.000	0.000	SC	590 Coal	76%	MO	
1075	Montrose	2080	1	No	0	No	0	0.000	0.000	0.000	SC	182 Coal	57%	MO	
1076	Montrose	2080	2	Yes	1	No	0	0.000	0.000	0.000	SC	176 Coal	50%	MO	
1077	Montrose	2080	3	Yes	1	No	0	0.000	0.000	0.000	SC	190 Coal	67%	MO	
1088	Sibley	2094	1	No	0	No	0	0.000	0.000	0.000	SC	50 Coal	68%	MO	
1089	Sibley	2094	2	No	0	No	0	0.000	0.000	0.000	SC	50 Coal	56%	MO	
1090	Sibley	2094	3	No	0	No	0	0.000	0.000	0.000	SC	356 Coal	62%	MO	
1091	Lake Road	2098	6	No	0	No	0	0.000	0.000	0.000	SC	100 Coal	53%	MO	
1117	Blue Valley	2132	3	No	0	No	0	0.000	0.000	0.000	SC	53 Coal	16%	MO	
1118	James River	2161	3	No	0	No	0	0.000	0.000	0.000	SC	46 Coal	45%	MO	
1119	James River	2161	4	No	0	No	0	0.000	0.000	0.000	SC	64 Coal	47%	MO	

Retires ModificationsAdditionsEPA FacilitiesEPA_AMPeGRID PLNT09CapacityGen

ReadyFilter Mode85%

- Find EGU of interest, or filter by state or region.
- To retire, select "Yes" in the "Retire?" column.
- To change emissions rate, select "Yes" in the "Revise Emissions Rates?" column and enter new rate(s) in columns I, J, or K.

AVERT Future Year Scenario Additions

AVERT Future Year Scenario Template v.1.0 (03182013) - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View PDF Acrobat

J7 250

Additions												Dropdown builder (fill down this section with e					
#	Region	Fuel Type	Unit Type	Unit	ORSPL	UNIT ID	Description (Note that "0 MW" units did not run in 2011.)	Capacity (MW)	State	County	Lat - County	Lon - County	Region Ref 1	Region Ref 2	Fuel Select Range	Fuel Ref 1	Fuel Ref 2
1	SC	Gas	CC	Redbud Power Plant CT-01	55463	CT-01	This is a 332 MW unit. It is located in Oklahoma County, OK. In 2011, it ran for 1155 GWh at a capacity factor of 40%.	250	OK	Oklahoma	35.510	-97.497	2599	282	Dropdowns\G2 599-G2880	2665	2878
2	SC	Gas	CC	Redbud Power Plant CT-02	55463	CT-02	This is a 328 MW unit. It is located in Oklahoma County, OK. In 2011, it ran for 1267 GWh at a capacity factor of 44%.	250	OK	Oklahoma	35.510	-97.497	2599	282	Dropdowns\G2 599-G2880	2665	2878
3	SC	Gas	CC	Mustang Station 1	55065	1	This is a 243 MW unit. It is located in Yoakum County, TX. In 2011, it ran for 1297 GWh at a capacity factor of 61%.	250	TX	Potter	35.257	-101.842	2599	282	Dropdowns\G2 599-G2880	2665	2878
4	SC	Gas	CT	John Twitty Energy Center CT2A	6195	CT2A	This is a 28 MW unit. It is located in Greene County, MO. In 2011, it ran for 1 GWh at a capacity factor of 0%.	35	OK	Tulsa	36.125	-95.939	2599	282	Dropdowns\G2 599-G2880	2665	2878
5	SC	Gas	CT	John Twitty Energy Center CT1B	6195	CT1B	This is a 24 MW unit. It is located in Greene County, MO. In 2011, it ran for 1 GWh at a capacity factor of 0%.	35	OK	Tulsa	36.125	-95.939	2599	282	Dropdowns\G2 599-G2880	2665	2878
6	SC	Gas	CT	West Gardner Generating Station 1	7929	1	This is a 81 MW unit. It is located in Johnson County, KS. In 2011, it ran for 15 GWh at a capacity factor of 2%.	75	KS	Labette	37.216	-95.259	2599	282	Dropdowns\G2 599-G2880	2665	2878
7	SC	Gas	CT	West Gardner Generating Station 2	7929	2	This is a 71 MW unit. It is located in Johnson County, KS. In 2011, it ran for 14 GWh at a capacity factor of 2%.	75	KS	Labette	37.216	-95.259	2599	282	Dropdowns\G2 599-G2880	2665	2878
8					0	#N/A	#N/A				#N/A	#N/A	#N/A	0	#N/A	#N/A	#N/A

Retires_Modifications Additions EPA_Facilities EPA_AMP eGRID PLNT09 CapacityGen

Ready 85%

In order

1. Select region
2. Select fuel type
3. Select generator type

4. Select specific EGU (unit)

Description will appear about EGU type automatically.

AVERT Future Year Scenario Additions

AVERT Future Year Scenario Template v1.0 (03182013) - Microsoft Excel

FileHomeInsertPage LayoutFormulasDataReviewViewPDFAcrobat

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#	Region	Fuel Type	Unit Type	Unit	ORSPL	UNIT ID	Description (Note that "0 MW" units did not run in 2011.)	Capacity (MW)	State	County	Lat - County	Lon - County	Region Ref 1	Region Ref 2	Fuel Select Range	Fuel Ref 1	Fuel Ref 2
1	SC	Gas	CC	Redbud Power Plant CT-01	55463	CT-01	This is a 332 MW unit. It is located in Oklahoma County, OK. In 2011, it ran for 1155 GWh at a capacity factor of 40%.	250	OK	Oklahoma	35.510	-97.497	2599	282	Dropdowns\G2 599:G2880	2665	2878
2	SC	Gas	CC	Redbud Power Plant CT-02	55463	CT-02	This is a 328 MW unit. It is located in Oklahoma County, OK. In 2011, it ran for 1267 GWh at a capacity factor of 44%.	250	OK	Oklahoma	35.510	-97.497	2599	282	Dropdowns\G2 599:G2880	2665	2878
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8					0	#N/A	#N/A				#N/A	#N/A	#N/A	0	#N/A	#N/A	#N/A

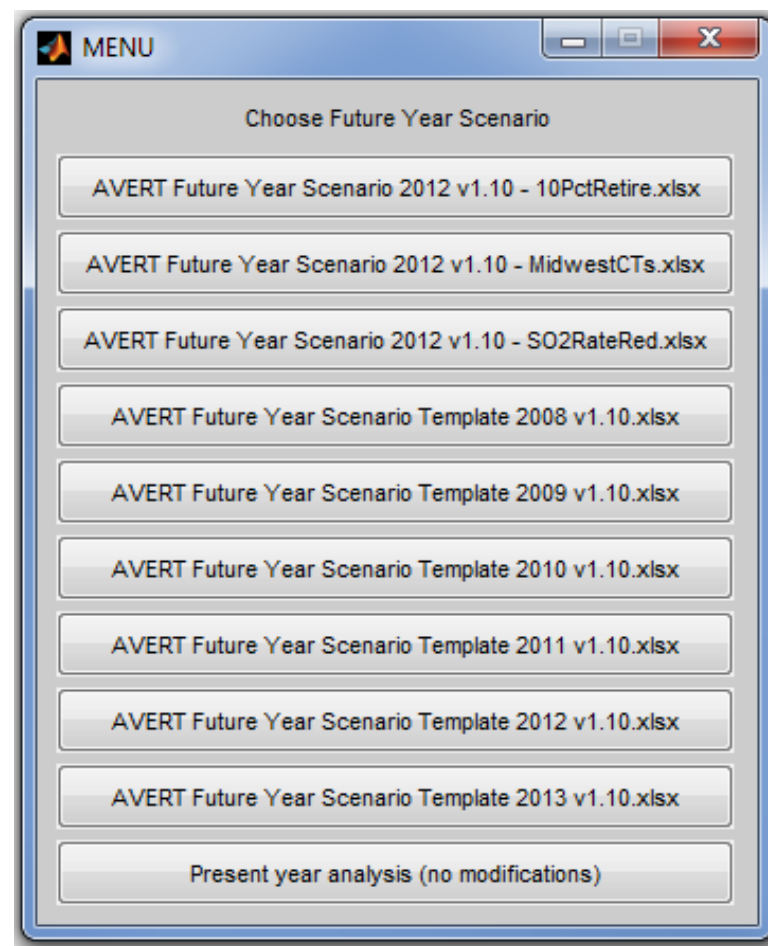
Retires_ModificationsAdditionsEPA_FacilitiesEPA_AMPeGRID PLNT09CapacityGen

Ready85%

- Choose proxy unit capacity (will scale all other factors)
- Choose state (within region)
- Choose county (within region)
- Save file

Use AVERT Future Year Scenario in Statistical Module

- Run Statistical Module (slides 37-40).
- Provide a unique name for the statistical module run (slide 37).
- Choose saved future year scenario (slide 39).



For More Information

- Visit the AVERT website at www.epa.gov/avert.
- Contact EPA's State and Local Climate and Energy Program at avert@epa.gov.