



AVERT Main Module Quick Start Guide (for Excel)

AVOIDed Emissions and geneRation Tool (AVERT) is a free tool with a simple user interface designed to meet the needs of state air quality planners and other interested stakeholders. Non-experts can use AVERT to evaluate county-level changes in emissions from electric power plants by energy efficiency (EE), renewable energy (RE), and other energy policies and programs.

This document only covers AVERT's Excel-based Main Module. Visit www.epa.gov/avert to use AVERT's web-based Main Module.

Download Instructions

AVERT's Main Module requires Excel 2007 or newer to run in Windows. The Main Module can also be used in Excel 2011 for Mac. To download AVERT's Main Module, go to www.epa.gov/avert and save the following files to the same folder on a local computer or drive:

1. AVERT's Main Module workbook.
2. The Regional Data File for the region under analysis.

Step-by-Step Instructions

To begin using AVERT's Main Module, open the **AVERT Main Module.xlsm** file.

Enable Macros

Before making any selections or beginning calculations, macros must be enabled on your computer.

To enable macros in Excel 2007 for Windows:

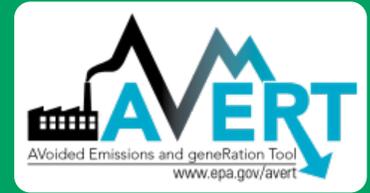
- Click the Microsoft Office Button , and then click "Excel Options."
- Click "Trust Center," click "Trust Center Settings," and then click "Macro Settings."
- Click on "Enable all Macros."

To enable macros in Excel 2010 or later for Windows:

- Click the "File" menu (Office Backstage), and then click "Options" in the left sidebar.
- Click "Trust Center" on the left, and then click the "Trust Center Settings" button in the main window.
- Click "Macro Settings" in the left sidebar, then choose the "Enable All Macros" option and hit OK.

To enable macros in Excel 2011 or later for Mac, select "Enable macros" in the dialog box that appears when opening the file.

Installation of AVERT's Statistical Module and AVERT's Future Year Scenario Template is not necessary to use AVERT's Main Module to estimate displaced emissions for EE/RE programs modeled in a historical base year. However, modeling displaced emissions with reference to user-created future years requires all three AVERT modules. Refer to the [AVERT User Manual](#) for additional installation instructions.



Begin Using AVERT

When launched in Excel, AVERT’s Main Module opens to its “Welcome” page.

1. Personalize the welcome page with details about the user, the date of use, and the energy program for which impacts are to be estimated.
2. Click on the button labeled “Click here to begin” to move on to AVERT’s first step.

AVERT

Welcome to AVERT's Main Module

AVERT is an EPA tool that quantifies the generation and emission changes of energy policies and programs in 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 higher in Windows and Excel 2011 or higher on Mac.

AVERT v.3.0
Developed by Synapse Energy Economics, Inc., September 2020

1 → Use the blue entry to describe each scenario and keep track of multiple versions of AVERT

Editor:

Date edited:

Edition name:

Edition description:

2 ← Click here to begin

Click here to hide default Excel functionality



Note: The tabs that drive the calculations for AVERT are hidden to enhance the usability and appearance of the tool. For users that prefer full Excel functionality, there is a button at the lower right-hand side of the welcome page that reads “Click here to restore default Excel functionality.” Users may complete the steps required to estimate changes in emissions regardless of whether full Excel functionality is visible.



Step 1: Import Regional Data File

AVERT regions represent relatively autonomous electricity production zones, and are based on grid balancing regions. For more detailed information on the specific boundaries of each region, consult the [AVERT User Manual](#).

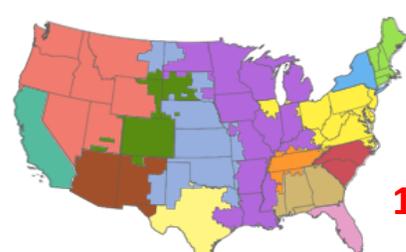
1. Select a region for analysis by either using the dropdown menu or by clicking the map. Selecting a region loads region-specific data for wind and solar capacity factors.
2. If you have not already, click the link under the map to download the corresponding Regional Data File from EPA’s website.
3. Once you have downloaded your Regional Data File, in the box labeled “Enter filepath,” double-click the blue area to navigate to its location.
4. Click the button under “Load data” that reads, “Click here to load the Regional Data File.” Clicking this button loads hourly fossil load, unit information, and typical unit performance for generation and emissions. This step may take several minutes to complete.

AVERT

Step 1: Import Regional Data File

Select region

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



1

2

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

Enter filepath

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

3

Load data

Click here to load the Regional Data File

4

Welcome

1. Regional Data File

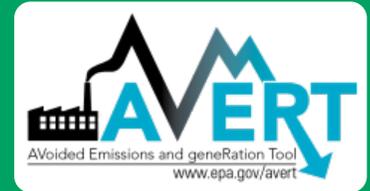
2. Set Energy Impact Profile

3. Run Impacts

4. Display Outputs

Next →

← Back



Once the Regional Data File has loaded, a pop-up box will appear. This pop-up confirms the region and data year and indicates the number of reporting fossil units. The pop-up lists the states that are fully represented in the selected region as well as those that are partially represented, as some states are divided between multiple AVERT regions. For example, parts of Illinois are considered to be in the Midwest region, while other parts are in the Mid-Atlantic Region. Consult Appendix G of the [AVERT User Manual](#) for guidance on determining the impact of energy programs and policies in states that are split across multiple AVERT regions.

Step 1: Import Regional Data File

Select region

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

Midwest

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



AVERT

Import complete.

You have loaded the 2019 Midwest (MIDW) Regional Data File. This region contains 636 fossil units.

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

Load from the following states is only partially represented in this AVERT region: AR, IA, IL, IN, KY, LA, MI, MN, MO, MS, ND, OK, SD, TX

Appendix G of the User Manual describes the methodology for assessing the impact of energy policies and programs that are represented in multiple AVERT regions.

Click the red "Next" button to continue.

OK

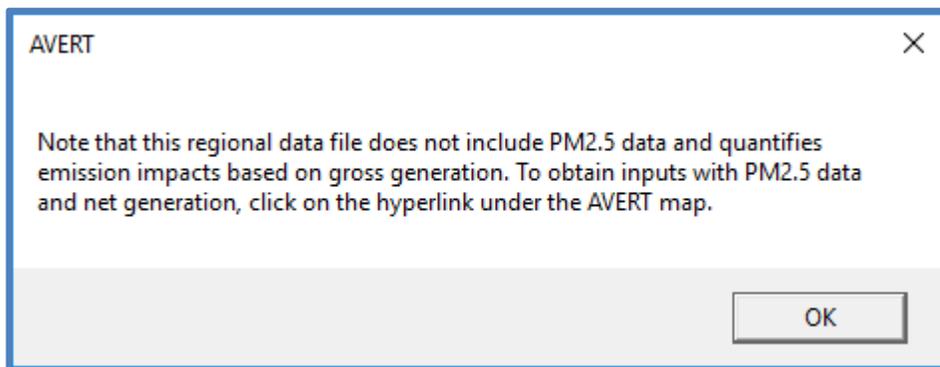
[Click here to load the Regional Data File](#)

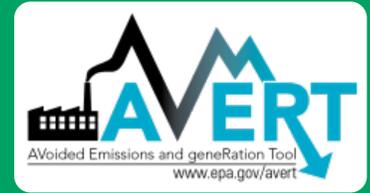
Next →

← Back



Regional Data Files released before July 2017 do not have PM_{2.5} emissions and they include net generation values to account for parasitic losses. If you are using an earlier Regional Data File with an older version of the AVERT Main Module, another pop-up box will alert you and suggest that you download a newer file from EPA's website.





Step 2: Set Energy Scenario

This page leads you through the process of creating an energy impact profile depicting the change in load expected from an energy program. It also allows you to estimate a change in load from basic characteristics:

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

Each option is described in more detail in the [AVERT User Manual](#). If more than one option (including manual entry) is chosen, the selected options will be combined into a portfolio of programs.

Midwest, 2019
AVERT

Step 2: Set Energy Impacts

DIRECTIONS: Enter the energy efficiency and/or renewable energy impacts for one or more policies and programs.
 To modify each hour manually, click the button on the right.
 Each entry is additive and will create a portfolio of energy impacts.
 For further instructions consult Section 4 of the AVERT user manual.

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:	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		
Onshore wind capacity:	2000	MW
Offshore wind not available:	0	MW
Utility solar PV capacity:	0	MW
Rooftop solar PV capacity:	0	MW

Enter detailed data by hour

Edit capacity factors

Hourly Energy Impact Profile:

The currently entered reduction profile equals 7,222 GWh, or 1.5% of regional fossil load.

Welcome

1. Regional Data File

2. Set Energy Impact Profile

3. Run Impacts

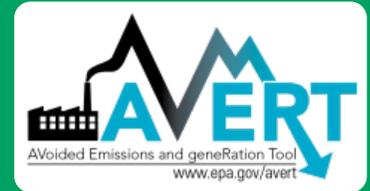
4. Display Outputs

Next →

← Back

EPA_NetGen_PM25

For hourly load changes expected from a particular energy policy, program, or measure, values can be input manually. Click the “Enter detailed data by hour” button, which will allow you to enter a manual stream of load reduction values for every hour of the year. Displacements (load reductions) should be entered as positive values, and load increases should be entered as negative values.



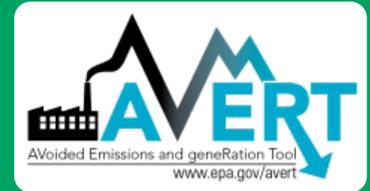
Step 3: Run Scenario

This step calculates hourly changes in generation and emissions (PM_{2.5}, SO₂, NO_x, CO₂) for each fossil unit within the selected region.

Run the calculation by selecting the button entitled “Click here to calculate changes in generation and emissions.” Note that this is a processor-intensive step. When using an older computer, or when analyzing regions with many fossil units, this step may take up to ten minutes.

A pop-up box that reads “Calculation complete” will appear once the calculations are complete.

The screenshot shows the AVERT web interface for the Midwest region in 2019. The main heading is "Step 3: Run Impacts". Below the heading, there is a instruction: "Click below to calculate changes to generation and emissions." A red-bordered box contains a "NOTE" stating: "Please be patient. This calculation may take up to ten minutes to run on older machines. During this time your screen may go blank or a 'not responding' error may occur - please disregard and allow the calculation to continue." A large green button with the text "Click here to calculate changes to generation and emissions" is circled in red. On the right side, a vertical navigation menu shows the following steps: "Welcome", "1. Regional Data File", "2. Set Energy Impact Profile", "3. Run Impacts" (which is highlighted in green), "4. Display Outputs", "Next →", and "← Back". The top right corner of the interface says "AVERT" and the bottom left corner says "EPA_NetGen_PM25".



Step 4: Display Results

The data generated in Step 3 are aggregated in two major groups of charts and tables in this step: “Summary tables” and “Charts and figures”. There are eight total display output options. Each output is described in more detail in the [AVERT User Manual](#).

Midwest, 2019
AVERT

Step 4: Display Outputs

Summary tables

Annual regional impacts

Impact data for top ten peak days

Annual impact data by county

Monthly impact data by county

Daily NOx impact data by county

Charts and figures

Map of generation and emissions changes

Hourly impacts by week

Monthly impacts by selected geography

Signal-to-noise diagnostic

COBRA text file generation

Enter a filepath, then click the button to save a COBRA text file.

NOTE
Please be patient.
This calculation may take up to twenty minutes to run on older machines.

Generate COBRA text files

SMOKE text file generation

Enter a filepath, then click the button to save SMOKE text files.

NOTE
Please be patient.
This calculation may take up to twenty minutes to run on older machines.

Generate SMOKE text files

Welcome

1. Regional Data File

2. Set Energy Impact Profile

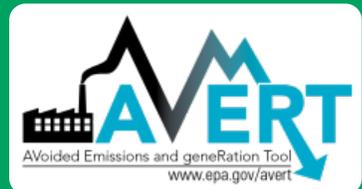
3. Run Impacts

4. Display Outputs

← Back

← Start new scenario

EPA_NetGen_PM25



Annual regional impacts

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 modeled energy impact (“Post Impact”).

Midwest, 2019 AVERT

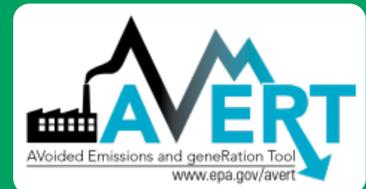
Output: Annual Regional Impacts

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

	Original	Post Impact		Impacts
Generation (MWh)	492,254,600	470,633,650	-	-21,620,950
Total Emissions from Fossil Generation Fleet				
SO ₂ (lbs)	705,939,950	672,226,070	-	-33,713,880
NO _x (lbs)	518,286,020	492,875,500	-	-25,410,520
CO ₂ (tons)	423,535,880	404,950,360	-	-18,585,530
PM _{2.5} (lbs)	82,292,060	78,922,090	-	-3,369,960
Fossil Generation Fleet Emission Rates				
SO ₂ (lbs/MWh)	1.434	1.428		
NO _x (lbs/MWh)	1.053	1.047		
CO ₂ (tons/MWh)	0.860	0.860		
PM _{2.5} (lbs/MWh)	0.167	0.168		

Negative numbers indicate displaced generation and emissions.

All results are rounded to the nearest ten. A dash (“-”) indicates a result greater than zero, but lower than the level of reportable significance.



Annual impact data by county

This table presents a summary of the changes in generation and emissions for each of the counties from each of the states contained within the region. A line for each county containing an electric generating unit (EGU) is displayed.

For each county, annual output statistics are given for:

- Peak gross generation post energy impact
- Annual gross generation post energy impact
- Annual change in generation
- Annual change in heat input, PM_{2.5}, SO₂, NO_x, and CO₂
- Ozone season change in SO₂, NO_x, and PM_{2.5}
- Ozone season, 10 peak days change in SO₂, NO_x, and PM_{2.5}

Midwest, 2019

Output: Annual Impact Data by County

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

State	County	Peak Gross Generation, Post-Impact (MW)	Annual Gross Generation, Post-Impact (MWh)	Annual Change in Generation (MWh)	Annual Change in SO ₂ (lbs)	Annual Change in NO _x (lbs)	Annual Change in CO ₂ (tons)
AR	Craighead County	79	21,770	-4,930	-60	-7,610	-3,140
AR	Hot Spring County	1,235	4,533,950	-276,470	-1,010	-96,520	-123,540
AR	Independence County	1,392	5,151,660	-463,980	-2,522,200	-634,160	-536,000
AR	Jefferson County	1,715	8,063,330	-581,510	-2,871,550	-784,660	-626,350
AR	Mississippi County	1,147	6,916,010	-264,030	-274,700	-157,570	-235,530
AR	Pulaski County	402	303,070	-60,070	-90	-77,430	-28,140
AR	Union County	1,793	10,673,540	-422,730	-1,400	-138,420	-171,790
IA	Allamakee County	212	406,970	-54,340	-28,140	-23,860	-60,350
IA	Audubon County	82	96,310	-15,200	-1,250	-15,260	-9,390
IA	Black Hawk County	9	3,820	-850	-10	-4,140	-880
IA	Cerro Gordo County	468	2,362,450	-184,830	-670	-7,160	-81,400
IA	Des Moines County	193	1,103,240	-34,750	-201,490	-59,740	-42,700
IA	Louisa County	676	2,948,820	-355,970	-1,135,600	-609,040	-381,400
IA	Marshall County	712	3,550,760	-229,010	-750	-21,070	-100,050
IA	Muscatine County	150	909,640	-38,440	-51,400	-108,120	-45,960
IA	Polk County	312	252,960	-43,290	-290	-6,050	-28,930
IA	Pottawattamie County	1,350	7,429,940	-508,250	-1,040,620	-806,550	-540,800
IA	Scott County	37	4,220	-1,340	-	-2,340	-850
IA	Story County	26	126,920	-7,990	-780	-11,250	-5,470
IA	Union County	32	4,700	-1,460	-20	-15,280	-1,360
IA	Wapello County	647	3,500,700	-241,580	-189,480	-252,850	-285,050
IA	Woodbury County	1,089	2,780,240	-408,270	-1,433,310	-815,630	-434,630
IL	Ford County	156	64,290	-13,710	-120	-10,910	-8,750
IL	Fulton County	384	2,169,500	-94,330	-8,310	-138,020	-108,030
IL	Grundy County	111	647,470	-11,430	-	-7,820	-6,980
IL	Jackson County	340	906,160	-76,400	-300	-43,590	-36,570
IL	Jasper County	563	3,023,000	-211,480	-716,730	-203,770	-206,750



Monthly impact data by county

This table shows a summary of the change in generation and emissions for each of the counties from each of the states contained within the region, broken out by month and with an annual total.

Midwest, 2019 AVERT

Output: Monthly Impact Data by County

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

Negative numbers indicate displaced generation and emissions. All results are rounded to the nearest ten. A dash (“—”) indicates a result greater than zero, but lower than the level of reportable significance. Counties are displayed only if they contain power plants.

State	County	Month	Change in Generation (MWh)	Change in SO ₂ (lbs)	Change in NO _x (lbs)	Change in CO ₂ (tons)	Change in PM _{2.5} (lbs)
AR	Craighead County	1	-410	—	-430	-260	-30
AR	Craighead County	2	-280	—	-300	-180	-20
AR	Craighead County	3	-270	—	-290	-170	-20
AR	Craighead County	4	-150	—	-160	-90	-10
AR	Craighead County	5	-220	—	-340	-140	-20
AR	Craighead County	6	-430	-10	-710	-280	-30
AR	Craighead County	7	-1,360	-30	-2,720	-870	-100
AR	Craighead County	8	-820	-10	-1,430	-520	-60
AR	Craighead County	9	-340	—	-520	-220	-20
AR	Craighead County	10	-280	—	-310	-180	-20
AR	Craighead County	11	-180	—	-200	-120	-10
AR	Craighead County	12	-180	—	-190	-120	-10
AR	Craighead County	Annual	-4,930	-60	-7,610	-3,140	-350
AR	Hot Spring County	1	-34,880	-110	-12,320	-15,100	-2,790
AR	Hot Spring County	2	-23,450	-70	-9,500	-10,230	-1,850
AR	Hot Spring County	3	-18,240	-50	-6,950	-7,870	-1,420
AR	Hot Spring County	4	-22,980	-70	-4,700	-10,010	-1,630
AR	Hot Spring County	5	-24,480	-100	-6,210	-10,960	-1,850
AR	Hot Spring County	6	-26,220	-120	-9,480	-12,120	-2,150
AR	Hot Spring County	7	-17,840	-90	-9,210	-8,510	-1,540
AR	Hot Spring County	8	-18,120	-80	-8,680	-8,540	-1,540
AR	Hot Spring County	9	-26,240	-120	-10,570	-12,240	-2,200

Impact 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.

Midwest, 2019 AVERT

Output: Impact Data for Top Ten Peak Days

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

Day Rank	Date	Total Fossil Generation (MWh)	Expected Change in Generation (MWh)	Change in Generation (MWh)	Change in NO _x (lbs)	Change in SO ₂ (lbs)	Change in CO ₂ (tons)	Change in PM _{2.5} (lbs)
1	Jul 19	1,902,830	-51,560	-51,290	-67,740	-60,930	-41,340	-8,060
2	Jan 30	1,868,580	-71,950	-71,560	-57,720	-84,490	-51,030	-10,970
3	Jul 02	1,835,170	-28,530	-28,870	-40,140	-33,990	-23,220	-4,450
4	Jan 31	1,833,870	-88,140	-87,310	-72,690	-98,070	-60,620	-14,470
5	Jul 17	1,833,710	-46,270	-46,430	-63,550	-55,220	-39,680	-7,440
6	Jul 18	1,825,060	-40,470	-40,120	-49,940	-47,280	-33,710	-6,560
7	Aug 06	1,818,660	-30,790	-30,720	-40,540	-37,510	-25,340	-5,180
8	Aug 12	1,808,150	-23,450	-23,300	-31,790	-26,880	-19,960	-3,940
9	Aug 07	1,781,340	-25,550	-25,120	-35,030	-29,680	-22,010	-4,160
10	Aug 19	1,780,230	-28,520	-28,420	-38,730	-33,420	-23,770	-3,960

Negative numbers indicate displaced generation and emissions. All results are rounded to the nearest ten. A dash (“—”) indicates a result greater than zero, but lower than the level of reportable significance.



Daily NO_x impact data by county

This table displays change in NO_x emissions for each county in the region, broken out by day along with a daily average, for up to 10 days specified by the user.

Midwest, 2019 AVERT

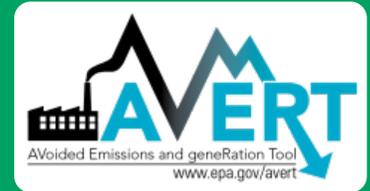
Output: Daily NO_x Impacts (lbs)

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

Negative numbers indicate displaced generation and emissions. All results are rounded to the nearest ten. A dash (—) indicates a result greater than zero, but lower than the level of reportable significance. Counties are displayed only if they contain power plants.

Enter up to ten dates in the header column. This page will calculate the NO_x impacts associated with each day in each county, as well as the average for each county. Use the filters to select individual states or counties.

State	County	Enter dates of interest (MM/DD)										Average
		8-Aug	9-Sep	10-Oct	11-May	12-Aug	13-Nov	14-Apr	15-Feb	16-Jan	17-Dec	
AR	Craighead County	-38	-31	-3	-12	-155	-19	-4	-15	-29	-6	-31
AR	Hot Spring County	-270	-402	-189	-116	-66	-858	-179	-421	-529	-422	-345
AR	Independence County	-1,436	-1,073	-1,344	-1,432	-695	-4,272	-1,631	-1,588	-3,697	-1,578	-1,875
AR	Jefferson County	-833	-1,522	-1,707	-1,646	-595	-4,175	-2,413	-3,053	-3,735	-2,104	-2,178
AR	Mississippi County	-144	-280	-391	-668	-97	-175	-804	-629	-307	-174	-367
AR	Pulaski County	-386	-229	-90	-33	-350	-435	-42	185	-536	-145	-206
AR	Union County	-22	-52	58	-153	-6	85	-1,280	115	-409	-196	-186
IA	Allamakee County	-67	-43	-48	-214	-17	-22	-18	-103	-52	-98	-68
IA	Audubon County	-49	-37	-4	-70	-38	-81	-59	-1	-99	-38	-48
IA	Black Hawk County	-26	-6	-6	-1	1	27	0	2	-10	-11	-3
IA	Cerro Gordo County	-12	-1	-11	-43	-11	-23	-85	-31	-28	-15	-26
IA	Des Moines County	-45	-188	-182	-523	-98	-276	-526	-200	-173	-82	-229
IA	Louisa County	-667	-682	-2,295	-1,976	-253	-1,267	-2,365	-2,156	-2,283	-1,504	-1,545
IA	Marshall County	-121	-28	-2	-24	-182	-129	13	-25	-176	-79	-75
IA	Muscatine County	-90	-71	-219	67	24	-373	-247	-601	-363	-589	-246
IA	Polk County	-44	-8	-4	-12	-25	-29	-19	17	-17	-23	-16
IA	Pottawattamie County	-374	-1,261	-2,462	-4,162	-92	-1,487	-4,845	-2,235	-1,055	-1,525	-1,950
IA	Scott County	-16	-2	0	0	-78	-3	0	-1	-3	0	-11
IA	Story County	-15	-25	-21	-69	-5	-31	-39	-27	-55	-8	-29
IA	Union County	-79	-6	-9	0	-301	-93	-2	-24	-152	-49	-79
IA	Wapello County	-245	-543	-668	-1,445	-310	-212	-958	-470	-476	-505	-583
IA	Woodbury County	-970	-835	-2,315	-1,158	-824	-2,748	-2,181	-3,482	-3,021	-2,904	-2,044
IL	Ford County	-95	-10	2	-3	-60	-42	-9	-36	-43	-36	-33
IL	Fulton County	-90	-182	-354	-574	-137	-469	-772	-145	-374	-183	-328
IL	Grundy County	-8	-11	-22	-29	-6	-20	-35	-21	-25	-25	-20
IL	Jackson County	-110	-79	-88	-295	-42	-287	-407	-101	-210	-151	-177
IL	Jasper County	-145	-266	-599	-361	-102	-611	-760	-350	-781	-411	-439



Map of generation and emissions changes

This dynamic map allows the user to view where emissions change within the selected region. Users can view annual changes in generation, heat input, PM_{2.5}, SO₂, NO_x, and CO₂; ozone season changes in PM_{2.5}, SO₂, and NO_x; and ozone season, top 10 days changes in PM_{2.5}, SO₂, and NO_x.

Midwest, 2019

AVERT

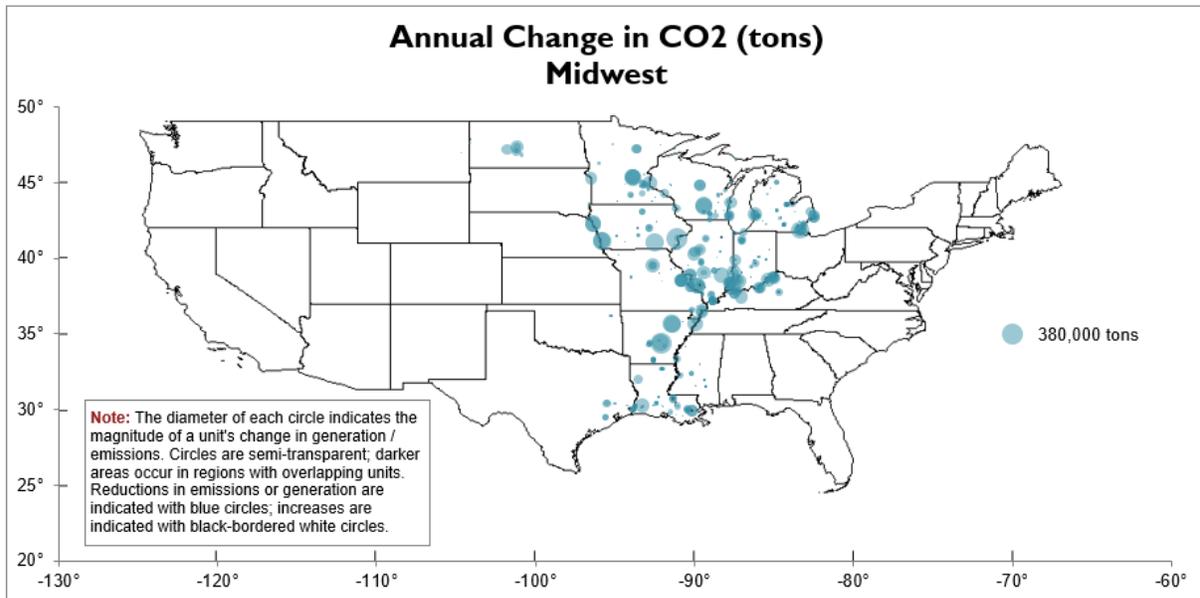
Output: Map of Generation and Emissions Changes

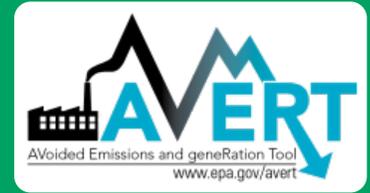
[Click here to return to Step 4: Display Outputs](#)

Select variable to display:

Annual Change in CO₂ (tons)

[Refresh map](#)





Impacts 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.

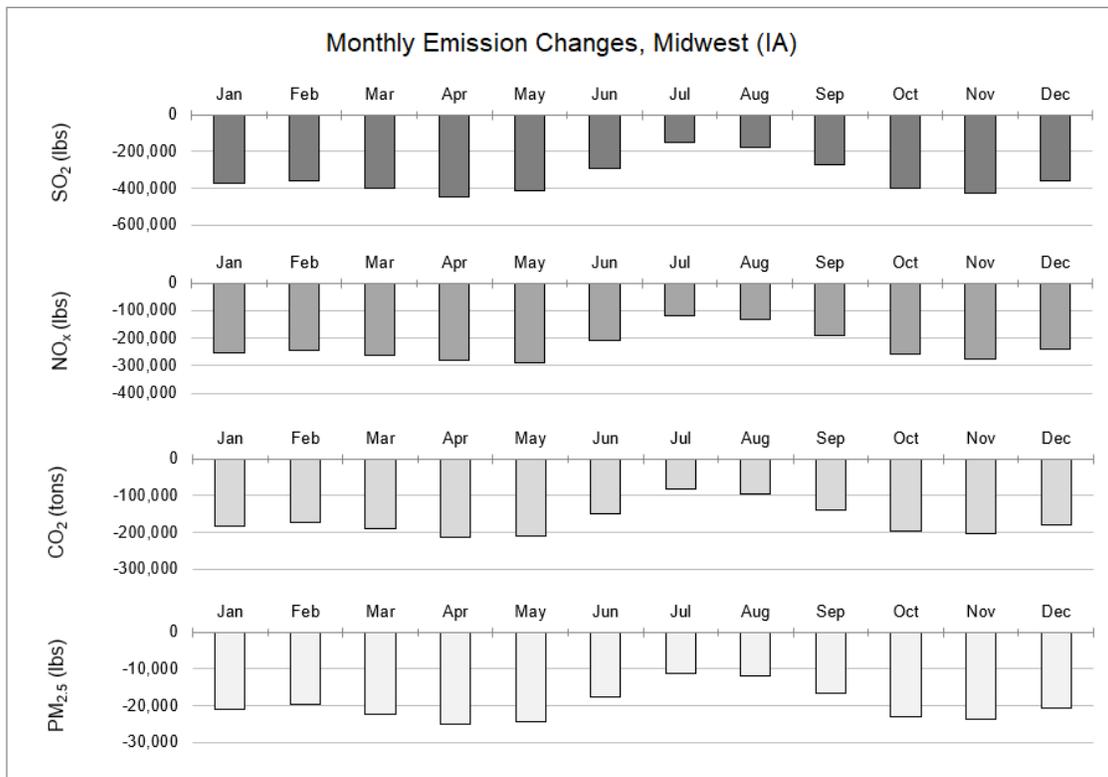
Midwest, 2019 AVERT

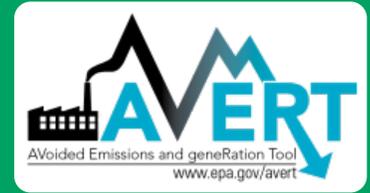
Output: Monthly Impacts by Selected Geography

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

Counties are displayed only if they contain power plants

Select level of aggregation: State
 Select state: IA





Hourly impacts by week

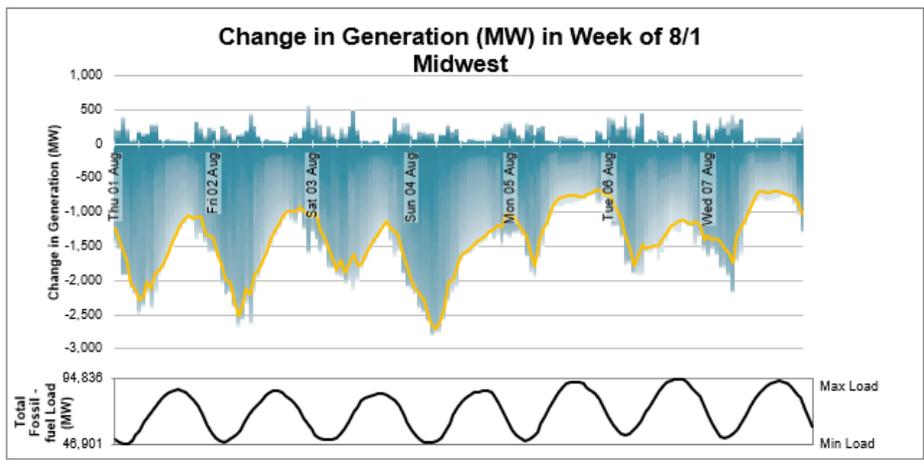
This option includes two figures. The first displays a dynamic representation of hourly impacts to each EGU in a region. Individual plants are stacked as gradated bar plots. The second figure shows the same week-long load impact profile, but presents the change in generation in reference to the total fossil-fuel load to illustrate the degree of change represented by the energy policy relative to the baseline.

Output: Hourly Impacts by Week

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

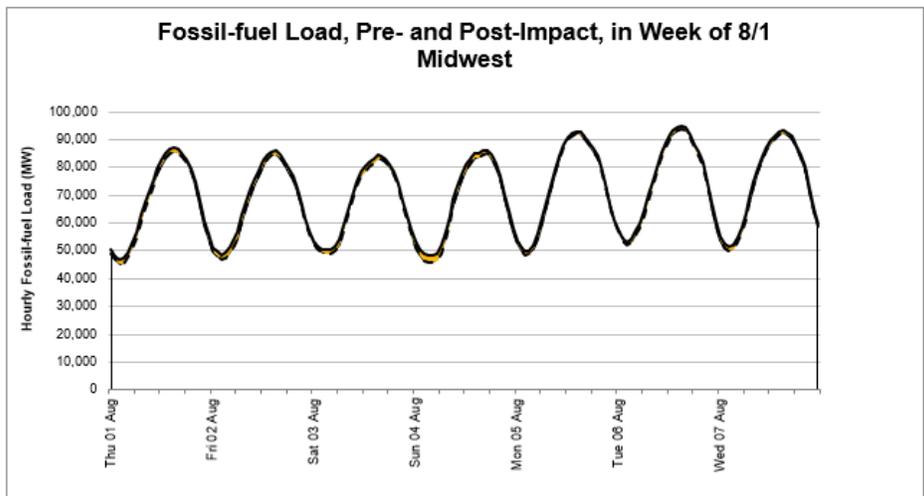
Select variable to display:
 First day to display (MM-DD):

[Refresh impact chart and load chart](#)

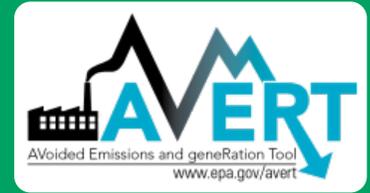


Negative numbers indicate displaced generation and emissions.

- Total Change in Generation (MW)
- Total fossil-fuel load, pre impact
- High capacity factor units
- Low capacity factor units



- Total fossil-fuel load, pre impact
- - - Total fossil-fuel load, post impact
- Change in load



Signal-to-noise diagnostic

This chart is a scatterplot of every hour of the year, showing calculated total change in generation in each hour (y-axis) against the energy impacts in each hour (x-axis).

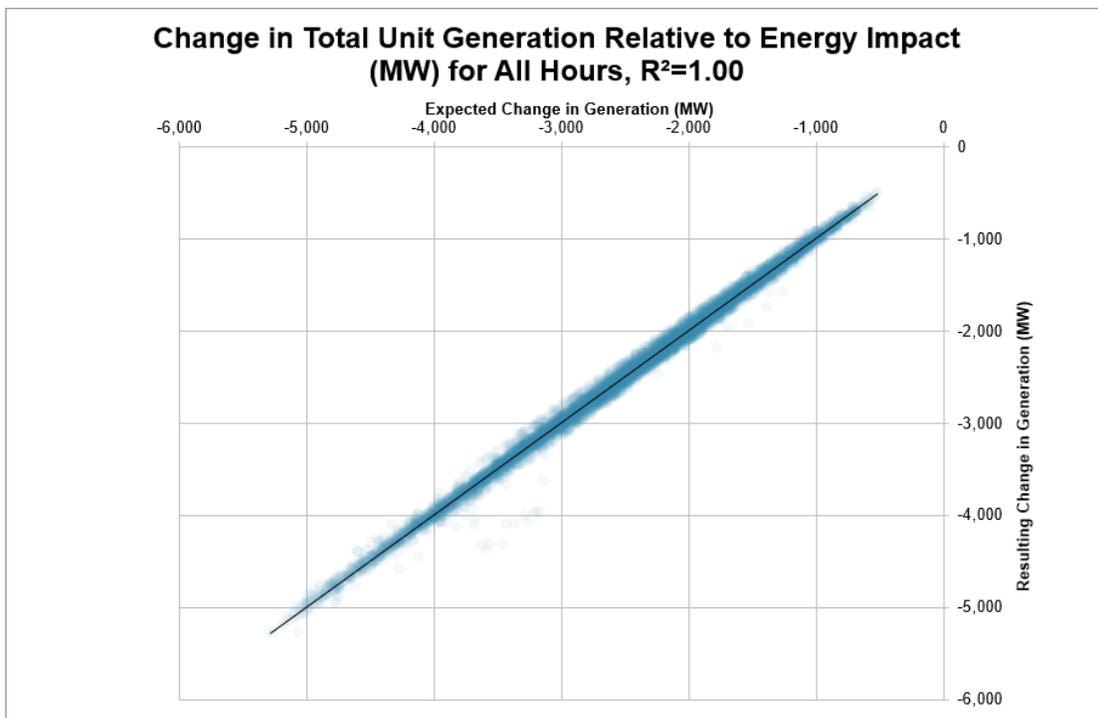
Ideally, AVERT perfectly matches change in unit generation to the amount of energy impacts requested by the user. The signal-to-noise diagnostic chart shows where that assumption holds, where it does not hold, and to what extent.

Midwest, 2019

AVERT

Output: Signal-to-noise diagnostic

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



The above chart is a scatterplot of every hour of the year; it contains either 8,760 or 8,784 data points, one for each hour. Charted points show the total change in generation (y-axis) versus the user-input energy impact (x-axis). Ideally, AVERT perfectly matches unit generation changes to the amount of energy impact requested by the user. If the generation changes are well-matched to the energy impact, the graphic will show a straight line with little scatter. If the changes are not well-matched, the line will have significant scatter. Overall, the quality of fit (i.e., how well the change in generation captures the energy impact) can be judged from the R² metric shown in the chart's title. Consult the user manual for further details.