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# **USER'S GUIDE FOR STATES USING THE GREENHOUSE GAS PROJECTION TOOL**

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This section of the User's Guide provides instruction on using the Projection Tool module of the State Inventory Tool (SIT), and the methodology used for projecting emissions.

This manual provides instruction on using EPA's State Greenhouse Gas Projection Tool (hereafter referred to as the Projection Tool). It contains detailed guidance on employing the Projection Tool to project greenhouse gas emissions at the state level for the time period from 2022 to 2050. Estimates generated in the Projection Tool are extrapolated from historical emission estimates obtained using methods and data sources consistent with EPA's *Emission Inventory Improvement Program Volume VIII: Estimating Greenhouse Gas Emissions* (hereafter, State Guidance), a guide for states conducting greenhouse gas emission inventories.<sup>1</sup>

This guide to using the Projection Tool is organized as follows:

- 1.1 Introduction to the Projection Tool
  - 1.2 Using the Projection Tool
  - 1.3 Frequently Asked Questions
  - 1.4 For More Information

## 1.1 INTRODUCTION TO THE PROJECTION TOOL

The Projection Tool was designed as a companion to EPA's State Inventory Tool (SIT), which estimates state-level emissions for 1990 to 2021. These tools can be used either in conjunction with, or independently of, one another. Users who have completed the historical emission estimation process using the SIT can import the historical emissions into the Projection Tool to obtain a complete time series of emissions from 1990 through 2050. In some instances, SIT estimates can also be used as a basis for 2022 to 2050 projections. Users who have not used the SIT to estimate historical emissions can still project emissions for some sectors, although creating a historical timeline of emissions by sector using the SIT is preferred.

Both the Projection Tool and the SIT are based on EPA's Emissions Inventory Improvement Program's (EIIP) State Guidance. Due to the limitations inherent in estimating future emissions and the need to contain all sectors in a single workbook, the Projection Tool does not present the calculations in the easy-to-follow and instructive format found in the SIT. For users seeking more information on GHG emission estimation methodologies, refer to the State Inventory Tools and User's Guides, and EPA's U.S. Inventory of Greenhouse Gas Emissions and Sinks. EPA recognized that methodologies outlined in the State Guidance were lengthy and complex, and projecting emissions based on these methodologies further increased the required resources. The Projection Tool was developed with the purpose of reducing the time and resources necessary to project state greenhouse gas emissions. By reducing the time and budget barriers that states face in developing projections, the Projection Tool encourages states to estimate their future emissions using the best widely available methodologies and data sources. The Projection Tool allows for states to estimate projected emissions at a high-level and provides information to states looking to calculate a rough estimate by sector. The tool should not be used for regulatory compliance, as it is an estimation tool and more rigorous calculations should be applied for regulatory analyses.

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<sup>1</sup> See Section 1.4 for information on obtaining the Projection Tool, the State Inventory Tool (SIT), and the State Guidance.

The Projection Tool was developed with the following goals in mind:

- 1) Allow states to analyze their emission trends between 2022 and 2050, with the additional option to analyze trends between 1990 and 2050;
- 2) Allow states to easily import data from the SIT so that states can take advantage of existing inventory estimates;
- 3) Provide default data wherever possible while still allowing states to enter their own data;
- 4) Be as user-friendly as possible without sacrificing functionality; and
- 5) Provide high-level estimation methodologies so that states can develop a rough estimate by sector.

Because this is a model for projecting emissions, there are some inherent limitations of the tool. These limitations are discussed further in section 1.1.3.

### 1.1.1 SECTORS AND DATA PRESENT IN THE PROJECTION TOOL

The Projection Tool covers all major emissions sectors present in the State Guidance and the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*. Because data inputs and calculation methodologies vary among the different sectors, and sometimes among different subsectors, the Projection Tool is divided into 20 different sections. Each section differs in the amount of default data available, the ability to automatically import data from the SIT, and the options for inputting or forecasting data. These sections, and their corresponding data inputs, are described in Figure 1.

### 1.1.2 METHODOLOGIES EMPLOYED BY THE PROJECTION TOOL

The Projection Tool forecasts emissions in one of two ways:

- 1) **Forecasting Activity Data.** Activity data are forecasted based on historical activity data or obtained from publicly available forecasts (i.e., Census reports, the Energy Information Administration's Annual Energy Outlook), and future emissions are in turn calculated using this predicted activity data; or
- 2) **Forecasting Emissions.** Historical emissions are estimated based on known activity data, and future emissions are then forecasted based on this historical trend.

**Figure 1: Projection Tool Sections and Data Options**

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options From SIT	User Data Input Options	
		Historical	Projected		Historical	Projected
1	FF Consumption	Not necessary	Based on EIA regional projections and 2021 state-level consumption (see Box 1 for description of the methodology)	No auto import	Not necessary	User may enter non-SIT data
	Wood and Waste	Not available	Not available	No auto import	User may enter historical data to project future data. Historical data can be found in the Bulk Data worksheets in the CO2FFC and/or the Stationary Combustion module.	User may enter data for 2022 to 2050 or use a linear trend of historical data

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options From SIT	User Data Input Options	
		Historical	Projected		Historical	Projected
2	Population	US Census data	US Census projections for 2025 and 2030; interpolated for other years. 2031 to 2050 population data is based on national projections from U.S. Census Bureau, apportioned to states based on 2030	No auto import	User may enter non-SIT data	User may enter non-SIT data
	Gross State Product (GSP)	US Census data 1990 to 2021	Projected based on historical values	No auto import	User may enter non-SIT data	User may enter non-SIT data
3	Livestock	Not necessary	Based on USDA national projections and state populations in 2022	No auto import	Not necessary	User may enter non-SIT data
4	CO <sub>2</sub> from fossil fuel consumption	Not available	Fossil fuel consumption (entered elsewhere) is multiplied by default emission factors	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options From SIT	User Data Input Options	
		Historical	Projected		Historical	Projected
5-6	Stationary N <sub>2</sub> O and CH <sub>4</sub>	Not available	Fossil fuel consumption (entered elsewhere) is multiplied by default emission factors	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts
7	Electricity Consumption	Not available	Based on EIA regional projections and 2021 state-level consumption (see Box 1 for description of the methodology)	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts
8	Mobile N <sub>2</sub> O and CH <sub>4</sub>	Not available	State-level defaults calculated using data from FHWA, EIA	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options From SIT	User Data Input Options	
		Historical	Projected		Historical	Projected
9	Coal Mining and Abandoned Coal Mines	Coal Mining: National emissions multiplied by state's share of national emissions (determined by SIT default values) Abandoned Coal Mines: Based on state default data	Coal Mining: National projections multiplied by state's share of national emissions (determined by SIT default values) Abandoned Coal Mines: Based on future calculations of state default data	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts
10	Natural Gas and Petroleum Systems	Natural Gas and Petroleum Systems: National emissions data multiplied by state's share of national emissions (determined by SIT default values)	Natural Gas: Implied emission factor multiplied by projected consumption Petroleum Systems: National projections multiplied by state's share of national emissions (determined by SIT default values)	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options From SIT	User Data Input Options	
		Historical	Projected		Historical	Projected
11	Industrial Processes	Not available	State-level defaults provided for ODS Substitutes and Electric Power Systems, all other sectors projected using a linear trend of historical data entered by the user.	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other emissions forecasts
12	Enteric Fermentation	Not available	Default emission factors are provided and multiplied by projected livestock population (entered elsewhere)	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emission factors
13	Manure Management	Not available	Default emission factors are multiplied by projected livestock population (entered elsewhere)	User may import historical emissions for comparison purposes	User may enter non-SIT historical emissions data for comparison purposes	User may enter other emissions forecasts



Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options From SIT	User Data Input Options	
		Historical	Projected		Historical	Projected
14	Rice Cultivation	Default emissions based on US EPA data	Projected emissions are based on USDA forecasts	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other emissions forecasts
15	Ag Soils	Default emissions based on US EPA data	Default projections are a linear trend of historical data	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other emissions forecasts
16	Liming	Default emissions based on US EPA data	Default projections are a linear trend of historical data	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other emissions forecasts
17	Urea	Default emissions based on US EPA data	Default projections are a linear trend of historical data	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other emissions forecasts

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options	User Data Input Options	
		Historical	Projected	From SIT	Historical	Projected
18	Ag Residue Burning	Default emissions based on US EPA data	Default projections are a linear trend of national historical data multiplied by the state proportion of national emissions in 2021.	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other emissions forecasts or project using a linear trend of historical state data
19	State Waste Disposal	Calculated based on EPA data and user inputs on waste control worksheet	Calculated based on EPA data and user inputs on waste control worksheet. Emissions calculated using the first-order decay model.	No auto import	User may enter non-SIT historical data	User may enter other emissions projections or use a linear trend of historical data
20	Flaring and LFGTE	Calculated based on EPA data	Calculated based on EPA data	No auto import	User may enter non-SIT historical data	User may enter other emissions data and projection
21	Waste Combustion	Defaults equal national emissions for historical multiplied by a state's proportion of national population	Default 2022 to 2050 projections are a linear trend of national historical data multiplied by the state proportion of national population in 2021	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other projected data or use a linear forecast of historical data entered

Input Worksheet Number	Projection Tool Section	Default Data		Data Import Options	User Data Input Options	
		Historical	Projected	From SIT	Historical	Projected
22	Wastewater	Defaults equal national emissions for historical multiplied by a state's proportion of national population	Default 2022 to 2050 projections are a linear trend of national historical data multiplied by the state proportion of national population in 2021	User may import historical emissions data to be projected using linear trend	User may enter non-SIT historical emissions data to be projected using linear trend	User may enter other projected data or use a linear forecast of historical data entered

Details of the methodology used in each section of the Projection Tool can be viewed by clicking the yellow button “Click Here for Description of the Projection Methodology,” which is located on all the data input worksheets. Users will notice that some sectors employ much more detailed estimation techniques than others. The level of effort spent to forecast emissions for a given source was dictated by a) the magnitude of the source (i.e., the effort expended to collect data and implement projection methodologies was proportional to the magnitude of emissions from each source), b) the availability of activity data, and c) other resource constraints.

### **Box 1: Projecting Energy Consumption Estimates**

The Projection Tool utilizes the Energy Information Administration’s (EIA) State Energy Data in combination with EIA’s Annual Energy Outlook, in order to arrive at state-level energy consumption estimates. A companion Energy Consumption Projections Excel file is available to assist with projecting energy consumption by state. Results from this Excel file can be copied and pasted into the Projection Tool.

To estimate projected energy consumption, the following tables are downloaded from EIA:

1. EIA’s Annual Energy Outlook- Supplemental tables for Regional Detail
2. EIA’s State Energy Data- State consumption tables in BTU (at the bottom of the page, expand “Data Files” and download “All Consumption Estimates in Btu”): <http://www.eia.gov/state/seds/>.

The energy consumption for each region in the Annual Energy Outlook is disaggregated to state-level estimates by applying the state’s proportion of consumption in 2020 from EIA’s State Energy Data, to future consumption from the Annual Energy Outlook out to 2050. Energy consumption projections remain in Btu, whereas electricity consumption estimates are converted to kWh. The electricity consumption estimates are then multiplied by the most recent emission rate and grid loss factors available from eGRID.

## **1.1.3 Limitations of the Projection Tool**

Although the Projection Tool was designed to be as accurate and comprehensive as possible, there are several limitations to the tool design. These limitations are discussed below.

### **Historical Estimates**

The projection tool is not intended to estimate historical emissions. Some sectors of the Projection Tool contain sufficient default data to back-cast emissions (i.e., to estimate emissions before 2022); however, these estimates are only intended to provide a rough comparison of historical and projected emission trends. There is a large degree of uncertainty associated with these “historical” estimates, as calculated in the projection tool. In addition, several sectors of the Projection Tool do not contain sufficient data to estimate historical emissions.

### **Default Activity Data**

The Projection Tool contains a large amount of default activity data. These data allow states to estimate greenhouse gas emissions even when they are unable to obtain the required data from in-state sources. However, EPA encourages users to be discriminating when selecting

default data. Although these data may be provided at the state level, they are often taken from national sources and are associated with a large degree of uncertainty. In addition, attempts to account for future changes in activity – such as changes in economic, political, or social situations that may affect the consumption of certain fuels, livestock population, etc. – are based on highly uncertain assumptions. State experts should always try to review the default data to ensure that it is consistent with or superior to any other state-generated data.

### User-Entered Data

While the Projection Tool describes the methodology and default data used to project emissions, it does not provide suggestions for obtaining state-specific activity data. For suggested resources for activity data, users should consult the recommended data sources presented in the SIT and data sources in EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks*. These data sources are only recommendations, and users will likely need to tailor their data gathering strategies based upon available state-specific resources.

### Equations

In order to streamline the Projection Tool as much as possible, most of the calculations are not visible. However, summaries of the methodologies can be viewed by clicking on the yellow ovals in the top right-hand corner of each worksheet.

## 1.2 USING THE PROJECTION TOOL

This section provides an overview for using the Projection Tool and provides an example from the Natural Gas and Petroleum Systems worksheet. Although EPA attempted to make the input worksheets for each section consistent, differences in input data and methodologies necessitate variations on each worksheet. Because the input worksheets are sufficiently similar between worksheets, a step-by-step explanation for each sector is not necessary.

### 1.2.1 Getting Started

The Projection Tool was first developed using Microsoft® Excel 2000. While the module will operate with older versions of Excel, it functions best with Excel 2000 or later. If you are using Excel 2007 or later, instructions for opening the module will vary as outlined in the Excel basics below. Before you use the Projection Tool, make sure your computer meets the system requirements. In order to install and run the Projection Tool, you must have:

- IBM-PC compatible computer with the Windows 95 operating system or greater;
- Microsoft® Excel 1997 or greater, with calculation set to automatic and macros enabled;
- Hard drive with at least 20MB free; and
- Monitor display setting of 800 x 600 or greater.

### Microsoft Excel Settings

**Excel 2003 and Earlier:** For the SIT modules to function properly, Excel must be set to automatic calculation. To check this setting, launch Microsoft Excel before opening the CO<sub>2</sub>FFC module. Go to the Tools menu and select "Options..." Click on the "Calculations"

tab and make sure that the radio button next to "Automatic" is selected, and then click on "OK" to close the window. The security settings (discussed next) can also be adjusted at this time.

**Excel 2007 and Later:** For the SIT modules to function properly, Excel must be set to automatic calculation. Go to the Formulas ribbon and select "Calculation Options." Make sure that the box next to the "Automatic" option is checked from the pop-up menu.

### Microsoft Excel Security

**Excel 2003 and Earlier:** Because the SIT employs macros, you must have Excel security set to medium (recommended) or low (not recommended). To change this setting, launch Microsoft Excel before opening the Projection Tool. Once in Excel, go to the Tools menu, click on the Macro sub-menu, and then select "Security" (see Figure 1). The Security pop-up box will appear. Click on the "Security Level" tab and select medium. When set to high, macros are automatically disabled; when set to medium, Excel will give you the choice to enable macros; when set to low, macros are always enabled.

When Excel security is set to medium, users are asked upon opening the module whether to enable macros. Macros must be enabled in order for the Projection Tool to work. Once they are enabled, the module will open to the control worksheet. A message box will appear welcoming the user to the module. Clicking on the "x" in the upper-right-hand corner of the message box will close it.

**Excel 2007 and Later:** If Excel's security settings are set at the default level a Security Warning appears above the formula box in Excel when the Projection Tool is initially opened. The Security Warning lets the user know that some active content from the spreadsheet has been disabled, meaning that Excel has prevented the macros in the spreadsheet from functioning. Because SIT needs macros in order to function properly, the user must click the "Options" button in the security message and then select, "Enable this content" in the pop-up box. Enabling the macro content for the SIT in this way only enables macros temporarily in Excel but does not change the macro security settings. Once macros are enabled, a message box will appear welcoming the user to module. Click on the "x" in the upper right-hand corner to close the message box.

If the Security Warning does not appear when the module is first opened, it may be necessary to change the security settings for macros. To change the setting, first exit out of the Projection Tool and re-launch Microsoft Excel before opening the Projection Tool. Next, click on the File button in the top left of the screen. Scroll to the bottom of the menu and select the "Options" button to the right of the main menu. When the Excel Options box appears, select "Trust Center" in left hand menu of the box. Next, click the gray "Trust Center Settings" button. When the Trust Center options box appears, click "Macro Settings" in the left-hand menu and select "Disable all macros with notification." Once the security level has been adjusted, open the Projections Tool and enable macros in the manner described in the preceding paragraph.

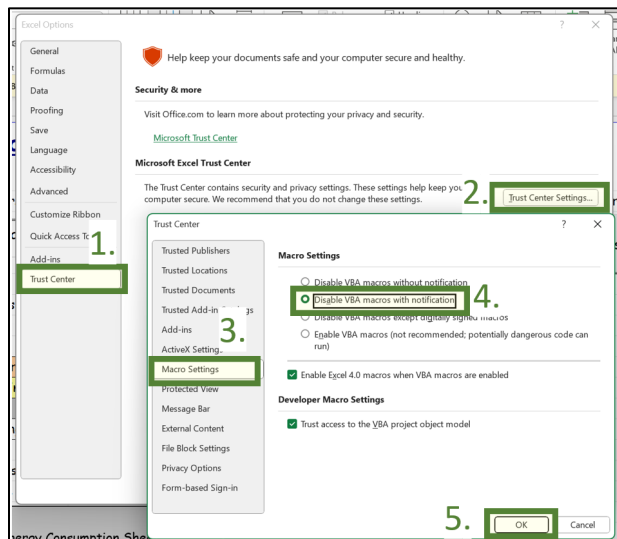
### Viewing and Printing Data and Results

The Projection Tool contains some features to allow users to adjust the screen view and the appearance of the worksheets when they are printed. Once a module has been opened, you can adjust the zoom by going to the Module Options Menu, and either typing in a zoom percentage or selecting one from the drop-down menu. In addition, data may not all

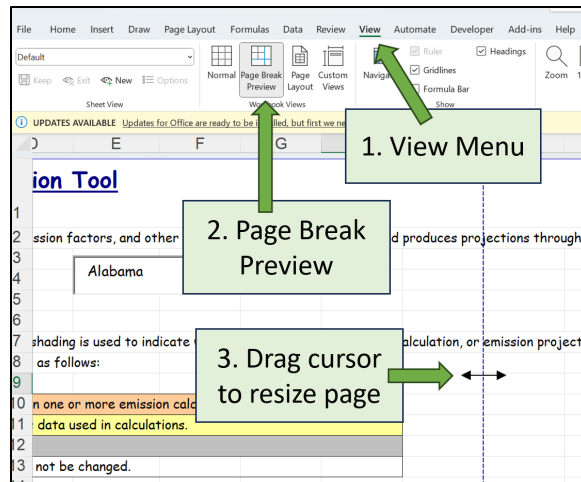
appear on a single screen within each worksheet; if not, you may need to scroll up or down to view additional information.

You may also adjust the print margins of the worksheets to ensure that desired portions of the Projection Tool are printed. To do so, go to the View menu, click on "Page Break Preview" and drag the blue lines to the desired positions (see Figure 2). To print this view, go to the File menu, and click "Print." To return to the normal view, go to the View menu, and then click "Normal".

**Figure 2. Changing Security Settings**



**Figure 3. Adjusting Print Margins**



### 1.2.2 The Control Worksheet

The Projection Tool opens to the control worksheet, which is used to navigate to the different worksheets in the tool. Aside from the selection of a state, no data are entered on the control worksheet. Rather, the control worksheet serves as a jumping-off point from which users may access data input worksheets and summary worksheets. The control worksheet contains a color key that describes different cells used throughout the tool and will assist in data entry. On the input worksheets, the colors indicate the data input options explained in Figure 4 and shown on control worksheet in Figure 5.

The control worksheet is organized into numbered steps. It is important that users follow these steps in order, as data inputted in one step may affect data requested in subsequent steps.

**Figure 4: Explanation of Color-Coding Used in the Projection Tool**

(tan)	Activity data that must be input by users and are used in one or more emission calculation worksheets.
(yellow)	Historical emissions data that must be input by the user and are used in calculations.
(grey)	Projected emissions.
(white)	Data or calculations that may not be changed.

The first step is to select a state from the drop-down menu. Selecting a state automatically selects the state-specific default data and emission factors, where available. For the purposes of this example, North Carolina has been selected.

Users should then click on the arrows to move through the various data input worksheets. The first three input worksheets are for entering historical/projected activity data that will be used in calculations on one or more of the sector-specific worksheets. The subsequent worksheets are the calculation worksheets, in which future data are entered and emissions are calculated for specific sectors. Once the necessary data has been entered into each worksheet, users should return to the control worksheet in order to proceed to the next section. As mentioned above, it is important that each worksheet is completed in order. The following section uses the Natural Gas and Petroleum Systems worksheet as an example as it provides a good overview of the various input options users will encounter.



**Figure 5: Projection Tool Control Worksheet**

**State Inventory Projection Tool**  
Version 2024.1

This tool contains default activity data, emission factors, and other relevant metrics for 1990-2021 and produces projections through 2050. You may enter historic data through 2025.

1. Choose a state: Alabama [Reset Tool]

In the sheets that follow, cell shading is used to indicate whether a cell is for user inputs, calculation, or emission projections. The key to this color scheme is as follows:

- User-entered activity data used in one or more emission calculation sheets.
- User-entered historical emissions data used in calculations.
- Projected emissions.
- Data or calculation cells that may not be changed.

2. Enter projected energy consumption. Users may select default data or enter their own. No defaults are available for wood and waste fuel consumption.

Go to the Energy Consumption Sheet

3. Enter human population data and projections. Users may select default data or enter their own.

Go to the Population Sheet

4. Enter livestock population data and projections. Users may select default data or enter their own.

Go to the Livestock Sheet

5. Proceed to sector pages. Directions for each sector are located on sector sheets.

- Go to the CO<sub>2</sub>FFC Sheet
- Go to the N<sub>2</sub>O from Stationary Combustion Sheet
- Go to the CH<sub>4</sub> from Stationary Combustion Sheet

Control | Projected Consumption | Projected Population | Livestock Population | CO<sub>2</sub>FFC | Stationary N<sub>2</sub>O | Stationary CH<sub>4</sub> | Electricity C

### 1.2.3 The Calculation Worksheets

From the control worksheet, users can click on the arrow labeled “Go to the Natural Gas and Petroleum Systems Sheet.” The user will automatically be taken to the data input worksheet, displayed in Figure 6.

The numbered steps in the left-hand corner of the input worksheets explain the necessary data inputs by the users. Box 2 provides additional information regarding data entry in the Projection Tool. Supplemental information that is used in the calculations, but that does not change, is also explained in the steps on each worksheet. In this case, the Natural Gas and Petroleum Systems worksheet contains tables on historical and projected national emissions, as well as each state’s proportion of national production and consumption. This information is used to calculate each state’s default emissions for this section.

In some sections, users have the option of altering the years for which the Projection Tool calculates emissions. For most sectors, the Projection Tool can be set to estimate emissions starting as early as 2001 and as late as 2021. Users may wish to adjust the projection years depending on which years they wish to import emissions from the SIT. To make this adjustment, click on the gray box labeled

#### Box 2: Entering Data

Users can enter their own data in any tan or yellow cell. Users may also choose to use imported or default data for specific years but input their own values for other years. The imported or default data should be entered first. Clicking on the import or default buttons will reset and overwrite the values entered in the cells.

"Change Projection Year," select the latest year for which the SIT was used, and click "Submit." The tables in the calculation worksheets will automatically adjust to reflect this selection. Note that changing the projection year may clear data entered on the worksheet.

Users need to enter historical state emission data into the yellow cells. Users have three options when entering these data:

- 1) manually enter the emission estimates,
- 2) import estimates generated by the SIT, by clicking on the button "Import Historic Data" (see Box 3 for instructions on importing data), or
- 3) use the tool's default data, by clicking on the button "Use Default Historic Data."

Once historical data has been entered into the yellow cells, users should either manually enter their own emissions estimates or click on the "Use Default Projections" button.

Users may clear entered and calculated data by clicking on the gray buttons labeled "Clear Projections" or "Clear Historic Data."

Once the calculations are completed on each input worksheet, users should click on the button in the top right corner, labeled "Return to Control Sheet." Users will then be able to proceed to the next input worksheet or to a summary worksheet.

Some sections of the tool do not provide all three options for entering data. In some cases, default data might not be available, or the sector might require data that cannot be imported from the SIT.

### **Box 3: Importing Data**

Upon completion of each SIT module, users should export their data (see the SIT users' guide for instructions), taking care not to modify the file in any way. When users click on the "Import Data" buttons in the Projection Tool, they will be prompted to locate the appropriate export files. Users need only to locate and open this file (following the prompts), and the data will be automatically imported into the Projection Tool.

Be sure to use the latest version of each SIT module with the latest version of the Projection Tool so the data can be imported correctly.

**Figure 6: Natural Gas and Petroleum Systems Data Input Worksheet**

**Projected Emissions from Natural Gas and Petroleum Systems in Alabama**

1. National emission data and projections are presented in Table 1.

2. Alabama's proportion of U.S. natural gas and petroleum production in 2021, as reported by the EIA, appears in Table 2.

3. Enter historic state data below on the percentage of national production plus 60% of the state's proportion of national production. Users may change your year selection at any time by clicking on the "Change Projection Year" button. Please note that clicking on this button will clear all default and user-entered data on this sheet.

4. To project future emissions, click the "Use Default Projections" button below on the right. The "Change Projection Year" button will overwrite manually entered data on this sheet.

Please note: Pressing the "Submit" button will overwrite manually entered data on this sheet.

Return to the

State Projection Tool

If you used the State Inventory Tool (SIT) to calculate historical emissions, please select the last year for which you used the SIT to estimate emissions. If you did not use the SIT, or do not wish to import the SIT results, please select 2003.

The SIT was used to calculate emissions through:

Based on your selection, the Projection Tool will calculate emissions for this sector beginning with the year 2004.

You may change your year selection at any time by clicking on the "Change Projection Year" button. Please note that clicking on this button will clear all default and user-entered data on this sheet.

Submit

Default emissions, click the "Use Historic Defaults" button. Defaults are determined by multiplying national emissions by your state's proportion of national production plus 60% of the state's proportion of national production.

Click the "Use Default Projections" button below on the right. The "Change Projection Year" button will overwrite manually entered data on this sheet.

Table 1

**National CH<sub>4</sub> Emissions from Natural Gas and Petroleum Systems (MMTCO<sub>2</sub>E)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Natural Gas	215.05	218.55	217.25	217.93	220.13	213.99	210.82	211.47	207.27	203.57	206.21	207.59
Petroleum	51.31	51.59	50.80	50.83	49.84	50.40	52.76	53.97	51.59	49.29	50.01	50.82

Table 2

**Alabama's Proportion of National Production and Consumption in 2021**

	2021	Proportion of All Emissions
Natural Gas Production	0.3%	1.5%
Petroleum Consumption	2.3%	
Petroleum Production	0.1%	

Table 3

**State Emissions CH<sub>4</sub> (MMTCO<sub>2</sub>E)**

Import Historic Data      Use Default Historic Data      Clear Historic Data

Change Projection Year      Use Default Projections      Clear Projections

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Natural Gas												
Petroleum												
Total	-	-	-	-	-	-	-	-	-	-	-	-

Projected Emissions from Oil and Natural Gas Systems

Stationary N2O   Stationary CH4   Electricity Consumption   Mobile Combustion   Coal Mining   IP   Enteric Fermentation   **NG&P**

### 1.2.4 The Projection Methodologies Worksheet

In the top right-hand corner of each input worksheet, there is a yellow oval prompting users to "Click here for a description of projection methodology." Clicking on this button will take users to another worksheet that details the methodologies and data sources used to project emissions in all sectors, as shown in Figure 7. Users may then click on the "Return" button to be taken back to the input worksheet.

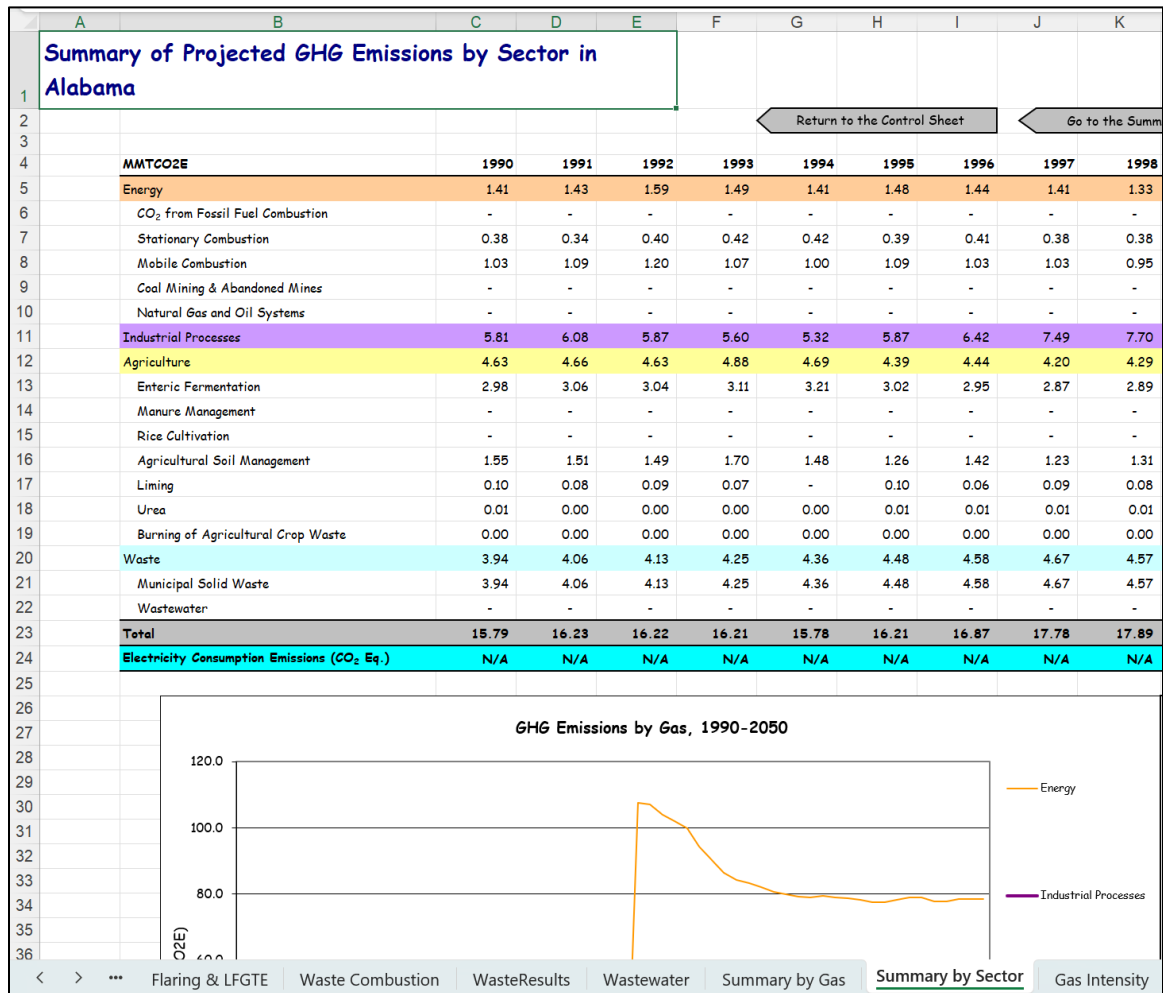
**Figure 7: Projection Methodologies Worksheet**

Projection Methodologies	
Return	
<b>Fossil Fuel Consumption</b>  <p>Obtained regional energy consumption projections from the Energy Information Administration's (EIA) Annual Energy Outlook 2021. This report is accessible online at: <a href="https://www.eia.gov/outlooks/aeo/">https://www.eia.gov/outlooks/aeo/</a>. Energy consumption by sector (e.g. residential) and source (e.g., motor gasoline) for 9 regions was projected.</p> <p>Projected regional consumption was disaggregated to state-level estimates by applying the proportion of consumption in 2021 from EIA's State Energy Data 2021 Consumption tables (EIA 2023). This data is available online at <a href="http://www.eia.gov/state/seds/">http://www.eia.gov/state/seds/</a>.</p> <p><b>Notes and assumptions about certain fuels:</b></p> <p>Transportation motor gasoline does include some ethanol.</p> <p>Regional consumption estimates of certain fuels in the AEO were disaggregated to their components using the relative consumption of each component in each region in 2021, obtained from the EIA 2023.</p> <p>Industrial petrochemical feedstocks were disaggregated to its components 1) feedstocks, naphtha less than 401 F, and 2) feedstocks, other oils greater than 401 F.</p> <p>Industrial other petroleum was disaggregated to its components 1) asphalt and road oil, 2) lubricants, 3) petroleum coke, 4) still gas, and 5) misc. petroleum products.</p> <p>Transportation other petroleum was disaggregated to its components 1) aviation gasoline, and 2) lubricants.</p> <p>The AEO did not develop consumption projections for a number of fuels in the following sectors:</p> <p>Industrial: crude oil, aviation gasoline blending components, motor gasoline blending components, unfinished oils, kerosene, special naphthas, pentanes plus, waxes.</p> <p>Transportation: naphtha-based jet fuel.</p> <p>Electric Power: petroleum coke.</p> <p>However, annual consumption (in Btu) of these fuels comprises less than 1% of total U.S. consumption.</p> <p>The EIA has redefined their sectoral definitions, and has included nonutility generators with utility generators in the sector labeled "electric power".</p>	
<b>State Population</b>  <p>State population for 1990-1999 is from the U.S. Census Bureau, "State Population Estimates: Annual Time Series, July 1, 1990 to July 1, 1999.</p> <p>State population for 2000-2021 is from the U.S. Census Bureau, "Population, Population change and estimated components of population change." Available online at: <a href="https://factfinder.census.gov">https://factfinder.census.gov</a></p> <p>State population projections for the years 2025 and 2030 were obtained from the U.S. Census Bureau, "Current Population Reports,</p>	

> ...
Flaring & LFGTE
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WasteResults
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Summary by Gas
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### 1.2.5 The Summary Worksheet

Once all data input worksheets have been completed, users can access the summary worksheets from the control worksheet. Step 6 on the control worksheet gives users the option of viewing results by gas type, by economic sector, or emissions intensity (i.e., emissions per gross state product). These worksheets contain tables summarizing the state's historical and projected emissions, as well as various charts that allow users to easily compare emissions from different gases and sectors. The sector summary worksheet for North Carolina, using all default data, is shown in Figure 8 (no emissions are estimated for sectors for which default data is unavailable).

**Figure 8: North Carolina Summary Worksheet by Sector**

## 1.3 FREQUENTLY ASKED QUESTIONS

### 1. *For which years does the Projection Tool estimate emissions?*

Users may obtain a complete time series of emissions from 1990 through 2050 from the Projection Tool.

For most sectors, the Projection Tool has the capability of estimating emissions as early as 2001. However, users may adjust the Projection Tool so that it begins estimating emissions as late as 2026.

The Projection Tool can also estimate historical emissions using linear trends of calculated emissions. However, the methodologies used to estimate historical emissions are associated with a large degree of uncertainty; therefore, these historical estimates should be used for comparison purposes only. Users are strongly encouraged to use the SIT to develop more accurate historical estimates.

### 2. *What system requirements do I need to run the Projection Tool?*

An IBM-PC compatible computer with the Windows 95 operating system or later, Microsoft® Excel 1997 or later, and a hard drive with at least 20MB free. It is recommended, but not necessary, that users have Windows 2000 or later and Excel 2000 or later.

### 3. *When I click on the buttons, nothing happens. Why?*

When opening the file, be sure to enable macros. Macros must be enabled in order for the modules to work.

### 4. *Is it possible to view the calculations used to estimate emissions?*

Unfortunately, most of these calculations are not explicitly displayed in the Projection Tool. However, the "Projection Methodology" page explains the methodologies used to determine emissions.

### 5. *I have not used the SIT to estimate my historical emissions. Is it still possible to develop a comprehensive projections inventory for my state?*

Yes. However, it will be necessary to manually input historical emission estimates for certain source categories, since some projected emissions are based on these estimates and default data are not always available. If no historical data are available, projection estimates can still be completed; however, emissions from some sources will not be calculated.

### 6. *Why is the Projection Tool unable to import my data files?*

If you have added rows or columns, moved any of the cells, or otherwise altered any export files, the Projection Tool may not be able to import the data. It is recommended that the modules' summary pages, and not the export files, be used to view results; these results may be copied into another workbook and manipulated by users as needed.

7. *I successfully imported a data file, but it looks like some of the data are missing or in the wrong cells.*

When importing the data file for each source, be sure to select the file specific to the source you are trying to import. Try importing the file again and be sure to select the appropriate data file.

Also be sure to use the latest version of the SIT modules with the latest version of the Projection Tool. Rows in a previous version of the SIT may not align with rows in the latest Projection Tool due to the addition of new source categories. Use the latest version of each SIT module with the latest version of the Projection Tool so the data can be imported correctly.

The latest SIT modules and Projection Tool are available online at:

<https://www.epa.gov/statelocalenergy/download-state-inventory-and-projection-tool>.

8. *I successfully imported data for some years, but the cells for the later years are blacked out. Why?*

The Projection Tool might be set to project emissions for years for which you'd like to import SIT estimates. Adjust the years for which the Projection Tool calculates emissions (see Section 1.2.3) and import the data again.

9. *I completed my emissions projections using data from the SIT, but have since updated the SIT. Will the Projection Tool update automatically?*

No. In order to include the updated values in the Projection Tool, you must create a new export file from the SIT. Re-open the Projection Tool and import the newly export data file. The new results will replace the old ones.

## 1.4 FOR MORE INFORMATION

For questions regarding these tools, or to request additional information, please contact:

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