User Guide: Using EPA's ESIST Tool to Provide Estimated GHG Impacts for Projects Entered into eProject eXpress

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

BERKELEY LAB

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Introduction

States that oversee savings performance contract (ESPC) projects and programs have an urgent need for tools and methods to assess and report the greenhouse gas (GHG) emissions reductions of their projects. The Berkeley Lab **eProject eXpress (ePX)** team, in collaboration with the U.S. EPA **Energy Savings and Impacts Scenario Tool (ESIST)** team now provide institutions a straightforward way to calculate and report estimated and realized electricity- and natural gas-related GHG emission reductions of their ESPC and similar energy efficiency retrofit projects.

This guide provides instructions for how to step through the ESIST Tool and enter key project information in order to produce estimated GHG impacts for a project that can be entered into the ePX project data templates. The ePX project data templates and the online system for uploading and tracking ePX projects are available on the eProject Builder (ePB) website: eprojectbuilder.lbl.gov.

If you have your project's annual estimated electricity, natural gas and other fuel savings, or your project's verified savings for a performance year handy, it should take you 30 minutes to 1 hour to walk through these steps. In the future, when you get familiar with the ESIST tool, it will take less time.

The ESIST tool and manuals are available on the ESIST website: https://www.epa.gov/statelocalenergy/energy-savings-and-impacts-scenario-tool-esist.

Important Tip: Before using this guide, please familiarize yourself with ePX by reviewing the ePX Quick Start Guide and M&V Guide and viewing the ePX introductory training webinar. These and other guidance documents and training videos are available on the ePB/ePX Help & Documentation page: https://eprojectbuilder.lbl.gov/help.

Software Requirements for eProject Builder/eProject eXpress

Browser requirements for all users

- Firefox 10.0.7 or higher
- Google Chrome 30 or higher
- Safari 9 or higher
- Internet Explorer 11 or higher
- Microsoft Edge

Software requirement for data template use and uploading

- Excel 14.0 (2010 on Windows, 2011 on Mac). ePB does not work with Excel 2007.

About ESIST

ESIST is a downloaded, customizable and transparent Excel-based planning tool primarily designed for analyzing the energy savings and costs from customer-funded energy efficiency programs and their impacts on emissions, public health, and equity. ESIST enables users to develop, explore, and share energy efficiency scenarios between 2010 and 2040.

However, the ESIST tool can also be used to produce estimated emissions impacts for individual energy efficiency projects following the steps outlined below. ePX users will enter project information such as the market segment, the utility, annual first-year estimated kWh savings, and annual verified kWh savings for the first performance year into the ESIST Excel workbook. The ESIST tool generates estimated emissions reductions which can then be entered into the ePX project data template or M&V template and uploaded to the ePB/ePX system for archiving, tracking and reporting.

Using ESIST with ePX - Overview

ESIST can be used to calculate the anticipated GHG impacts from estimated annual electricity and natural gas savings for a proposed or new project, based upon key ePX project data fields. You will enter the GHG impacts of your new or proposed project generated by the ESIST tool into one or both of the custom information data fields, cells C42 and C44 of the ePX project data template.

The ESIST Tool calculates emissions impacts for electricity and natural gas savings in these four categories:

- Avoided carbon dioxide (CO2) in thousand short tons
- Avoided fine particulate matter (PM2.5) in short tons
- Avoided sulfur dioxide (SO2) in short tons
- Avoided nitrogen oxides (NOx) in short tons

Preparation Step 1 – Download Your Tools

- **ESIST:** Download all three components of the ESIST tool from the ESIST website (https://www.epa.gov/statelocalenergy/energy-savings-and-impacts-scenario-tool-esist):
  - ESIST Version 1.1 Excel Tool (calculates emissions impacts for electricity savings)
  - ESIST Version 1.1 User Manual
  - ESIST Pilot Gas Version 1.1 (calculates emissions impacts for natural gas savings)

- **ePX:**
  - Make sure both the customer and contractor for the project have registered for accounts on eProject Builder (https://eprojectbuilder.lbl.gov/login)
  - Download the ePX project data template from the Help & Documentation Page (https://eprojectbuilder.lbl.gov/help)

Preparation Step 2 – Collect Your Project Data and Enter it into the ePX Data Template

Collect the following key project information needed to calculate the emissions impacts. It will be helpful to enter that information into the ePX project data upload template along with the other project information you will enter into the template for uploading to the ePX online system.

At minimum, collect and complete the following information in the ePX project data template:

- Annual estimated electricity savings (kWh)--**cell G39** in the ePX data template
- Annual estimated natural gas savings--**cell G40** in the ePX data template
- Natural gas units (the units your gas utility bill uses, or that you will use to report and track your natural gas savings)—**cell G18** in the ePX data template
- If applicable for the project, provide the estimated annual savings for non-electric energy sources in the following ePX template fields as applicable:
    - Fuel type for "Other 1" energy source—dropdown list in **cell G20**
    - Units for "Other 1" energy source—dropdown list in **cell G21**
    - Fuel type for "Other 2" energy source—dropdown list in **cell G23**
    - Units for "Other 2" energy source—dropdown list in **cell G24**
    - Annual estimated "Other 1" savings--**cell G41**
    - Annual estimated "Other 2" savings—**cell G42**

Summary Steps: Using ESIST to Generate GHG Impacts for a New or Proposed Project in ePX

This section provides a summary of the steps for calculating the GHG impacts of your project's estimated annual electricity savings in the ESIST tool. More detailed instructions, supplemented by screenshots of the tool, are provided in Appendix A.

A. Summary of the steps to calculate GHG impacts of your project's estimated electricity savings

1. Open the downloaded ESIST file called "esist-2023-update.xlsm."
2. ***IMPORTANT**: Use the "save as" function to save your working version with a different filename.* This critical step preserves the original ESIST file, so you can try multiple scenarios, and avoid "breaking" any of the formulas or formatting in the original ESIST file. Each time you create a new scenario with the tool, start with the master file again and use the "save as" function to create another working version.
3. On your newly-saved version of the ESIST tool, click the "Get Started" button.
    - *Note that throughout the various pages of the ESIST tool, blue boxes indicate the fields where you may either choose from a dropdown list or enter information. Some pages and boxes will not apply to using this tool with ePX.*

4. On the "Step 1 Set Study Area" page, enter the U.S. state, building sector, utility type and utility name, choosing from the dropdown lists provided. Click "Next."
5. On the "Step 2 Set Baseline Consumption" page, click "Next." This page is not applicable for ePX.
6. On the "Step 3 Set Target Type" page, choose "Annual Incremental Savings" in the blue box. (It may already be selected by default). Click "Next."
7. One the "Step 4 Set Savings Trajectory" page, choose "User Input (MWH savings)" from the dropdown list in the blue box. You will then enter your project's first-year estimated electricity savings, from which the electricity-related GHG reductions will be derived by doing the following:
    - You can leave the information in the grey boxes as-is. They won't impact the calculations for the purposes of ePX.
    - In the row called "First year savings" scroll to the right and find the blue boxes.
    - Under the **year that represents the first performance year of your project**, enter your project's estimated annual savings in therms.
        - To get the number for this cell of the ESIST tool, take your project's annual estimated electricity savings (number of kWh) from cell G39 of the ePX template.
    - Type the number 0 in all the other blue boxes, including years prior to the first performance year of your project, to zero out those values.
    - ***IMPORTANT:*** *You also need to zero out some information that is not in the blue boxes. Select the cells under the year 2011 through the year just prior to the first performance year of your project for the row labeled "Annual incremental savings" and enter 0 in all of those cells.* These prior years' savings garnered by the utility in your region do not apply to a single project.
    - Click "Next."
8. On the "Step 5" page "Set Program Cost Assumptions," click "Next." This page is not applicable for ePX.
9. On the "Step 6" page "Set Multiple Benefits and Other Settings," you can either leave as-is and use the default emissions factors (**recommended**), or, if you want to enter customized emissions factors, click the "Emissions Factors" box.
    - The "Avoided Emissions and T&D[1] Losses" table opens. In that table, you may enter custom emissions factors – only in the year that represents the first performance year of your project. When done, click "Back to Step 6."
    - When done with Step 6, click "Next."
10. On the "Step 7" page "Review Outputs," view the emissions impacts results and copy the emissions rows into a separate Excel document.
    - Create a new Excel document into which you will paste your GHG results in preparation for entering into the ePX template.

[1] T&D stands for transmission and distribution

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- In your ESIST tool working document, select and highlight the cells in the emissions rows for only the years that your project will be in the performance period.
  - The ESIST tool provides results for the following four emissions types:
    - Avoided carbon dioxide (CO2) in thousand short tons
    - Avoided fine particulate matter (PM2.5) in short tons
    - Avoided sulfur dioxide (SO2) in short tons
    - Avoided nitrogen oxides (NOx) in short tons
- Copy and paste that information using **"paste values"** into your new Excel document. ***IMPORTANT:*** *You **must** use the "paste values" function.*
- Add a new column in your new Excel document to the right of those fields and enter formulas that SUM the annual emissions impacts of each row.
- Add another column to the right of that column in which you divide the emissions impacts by your project's number of performance years.
- This new column displays the *average* GHG emissions for the performance period of the project for each of the various emissions types. These are the values that will go into your ePX project data template.
- Note that if you also have natural gas savings, you will follow a similar process and ultimately will need to sum your electricity GHG savings and natural gas GHG savings before entering them into the ePX template.

11. Enter the average GHG impacts for the emissions types you wish to capture into the ePX project data template – in the user-customized cells, C41 through 44
    - In cell C41, indicate the type of GHG you are capturing and the units (e.g., "Annual avoided CO2 (thousand short tons)"
    - In cell C42, enter the estimated annual avoided GHG emissions value generated by the ESIST tool
    - In cell C43, you may indicate another type of GHG that you want to document (e.g., "Annual avoided NOx (short tons)"
    - In cell C44, enter the estimated annual avoided GHG emissions value generated by the ESIST tool

The next section summarizes steps for calculating the GHG impacts of your projects estimated annual natural gas savings

B. Summary of the steps to calculate GHG impacts of your project's estimated annual natural gas savings

This section provides a summary of the steps for calculating the GHG impacts of your project's estimated annual natural gas savings using the ESIST tool.

1. Open the downloaded ESIST file called "esist-pilot-gas-version-2023-update.xlsm."
2. ***IMPORTANT**: Use the "save as" function to save your working version with a different filename.* This critical step preserves the original ESIST file, so you can try multiple scenarios and avoid "breaking" any of the formulas or formatting in the original ESIST file. Each time you create a new scenario with the tool, start with the master file again and use the "save as" function to create another working version.
3. On your newly-saved version of the gas version of the ESIST tool, click the "Get Started" button.
4. On the "Step 1 Set Study Area" page, enter the U.S. state, and utility name, choosing from the dropdown list
    - (Note that in the GHG calculation for electricity to choose the sector, as the ESIST tool applies the same information to residential and commercial)
5. On the "Step 2 Set Baseline Consumption" page, click "Next." This page is not applicable for ePX.
6. On the "Step 3 Set Target Type" page" choose "Annual Incremental Savings" in the blue box (it may already be selected by default). Click "Next."
7. One the "Step 4 Set Savings Trajectory" page, choose "User Input (therm savings)" from the dropdown list in the blue box. Then do the following:
    - You can leave the information in the grey boxes as-is. They won't impact the calculations for the purposes of ePX.
    - In the row called "Annual incremental savings" scroll to the right and find the blue boxes.
    - Under the **year that represents the first performance year of your project**, enter your project's estimated annual savings in therms.
        - To get the number for this cell of the ESIST tool, take your project's annual estimated natural gas savings from cell G40 of the ePX template.
        - **Important:** If your natural gas savings are in units other than therms (see ePX template cell G18 for the units you chose) you will need to first convert your savings figure to therms before entering it into the ESIST tool. For conversion information, see https://www.eia.gov/tools/faqs/faq.php?id=45&t=8. For example, if your natural gas savings are in MMBtu, multiply that figure by 10 to convert to therms before entering into the ESIST tool.
    - For all of the blue boxes underneath the rest of the years, replace the value in them with the number 0, including any years prior to the first performance year of your project.

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- ***IMPORTANT:*** *You will also need to zero out some information that is outside the blue boxes. In the "Incremental Savings" row, replace the values in the cells under years 2011 through 2021 with the number 0.* These prior years' savings garnered by the utility do not apply to a single project.
- When you do that, the boxes that were grey now appear blue. You can still ignore those boxes.
- Click "Next."

8. On the "Step 5" page "Set Program Cost Assumptions," click "Next." This page is not applicable for ePX.
9. On the "Step 6" page "Set Multiple Benefits and Other Settings," leave as-is and use the default Emissions Impacts factors, which are not editable.
    - You may view the factors by clicking the "Emissions Impacts" box. When done viewing, click "Back to Step 6."
    - Click "Next."
10. On the "Step 7" page "Review Outputs," you will view the emissions impacts results and copy the emissions rows into a separate Excel document.
    - You will be dealing with the rows that display results for the following four emissions types:
        - Avoided carbon dioxide (CO2) in thousand short tons
        - Avoided fine particulate matter (PM2.5) in short tons
        - Avoided sulfur dioxide (SO2) in short tons
        - Avoided nitrogen oxides (NOx) in short tons
    - Create a new Excel document into which you will paste your GHG results in preparation for entering into the ePX template.
    - In your ESIST tool working document, select and highlight the emissions rows for only the years that your project will be in the performance period.
    - Copy and paste that information using **"paste values"** into your new Excel document. ***IMPORTANT:*** *You **must** use the "paste values" function.*
        - Note that when you paste these values into your new Excel document, the values will carry out to the full number of decimals available
    - Add a new column in your new Excel document to the right of those fields and enter formulas that SUM the annual emissions impacts of each row.
    - Add another column to the right of that column in which you divide the emissions impacts by your project's number of performance years.
    - This new column displays the *average* GHG emissions for the performance period of the project for each of the various emissions types. These are the values that will go into your ePX project data template.
    - Note that if you also have electricity savings, you will follow a similar process and ultimately will need to sum your natural gas and electricity GHG savings for each emissions type before entering them into the ePX template.
11. Enter the average GHG impacts for the emissions types you wish to capture into the ePX project data template – in the user-customized cells, C41 through 44
    - In cell C41, enter the type of GHG you are capturing and the units (e.g., "Annual avoided CO2 (thousand short tons)"

- In cell C42, enter a single number for the estimated annual avoided GHG emissions value generated by the ESIST tool
- In cell C43, you may indicate another type of GHG that you want to document (e.g., "Annual avoided NOx (short tons)"
- In cell C44, enter the estimated annual avoided GHG emissions value generated by the ESIST tool

APPENDIX A: Detailed Instructions for Using ESIST to Generate GHG Impacts for a New or Proposed Project in ePX

This section provides detailed step by step instructions for calculating the GHG impacts of your project's estimated annual electricity, natural gas and other fuel savings. More detailed instructions, supplemented by screenshots of the tool, are provided farther down in this document.

A. Details: calculating estimated annual GHG impacts of the project's estimated annual electricity savings

1. Open the downloaded ESIST file for electricity savings called "esist-2023-update.xlsm"
2. ***IMPORTANT**: Use the "save as" function to save your working version with a different filename, in case you make some edits that break the ESIST tool calculations.* This step ensures that you retain a 'master' version of the tool that can go back to, for trying different scenarios, etc. Each time you create a new scenario with the tool, make sure start with the master file again and use the "save as" function to create a new working version.
3. Read the instructions on the page.
    - *Note that throughout the various pages of the tool, blue boxes indicate the fields where you may either choose from a dropdown list or enter information. Some pages and boxes will not apply to using this tool with ePX.*
    - Click the "Get Started" box-shaped button at the bottom left of the page.
4. You are now on the "**Step I. Set Study Area**" page (see **Figure 1**, below). On this page, complete the four blue boxes in the upper left as they apply to the project by choosing from the dropdown lists in each box:
    - U.S. state where the project is located
    - Building sector (you will choose commercial in most cases, unless this is an industrial or residential project).
        - *Note that when you choose "commercial," the ESIST tool displays a message that it does not contain data to assess energy burden impacts for this sector. Disregard this message, as energy burden impacts are not applicable for use with ePX and will not affect the GHG calculations.*
    - Utility type (investor-owned, municipal, cooperative, etc.)
    - Name of the utility
        - *Note that the tool may be a little 'sticky' and may not immediately display the dropdown list of utilities. After you choose the state,*

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building sector and utility type and click on the "Name of the utility" field, if you do not see a dropdown list of all the utilities, try clicking the "Back" button to return to the previous page, then click the "Next button" to return to this page. That action should make the list of utilities appear. We have sent a request to EPA about this issue.

- Once you have completed the four boxes, click the red "Next" button near the lower left-hand corner of the page to move to the next page.

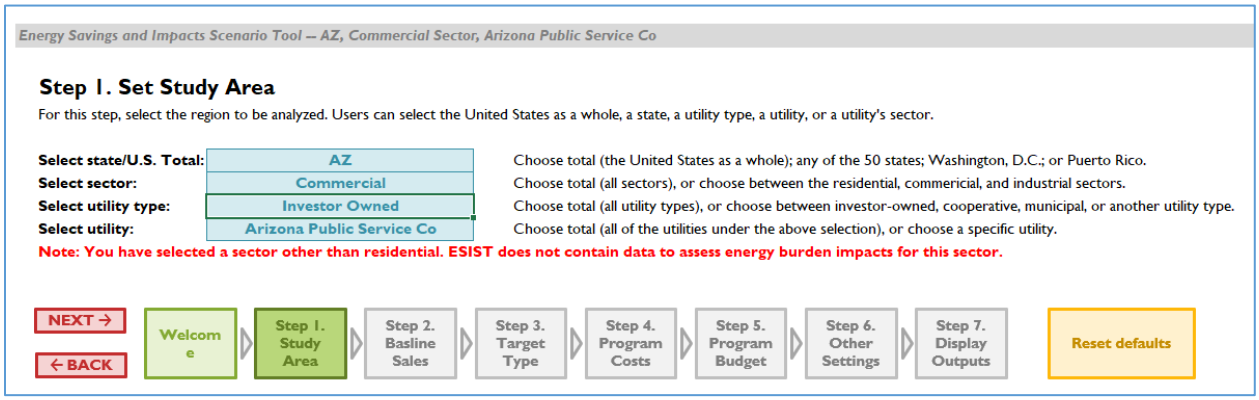

Figure 1. "Set Study Area" page in the ESIST tool

5. You are now on the **"Step 2. Set Baseline Electricity Sales"** page. This page is not applicable for use with ePX, so please leave it in the default setting (see **Figure 2**, below) and click the "Next" button to move to the next page.

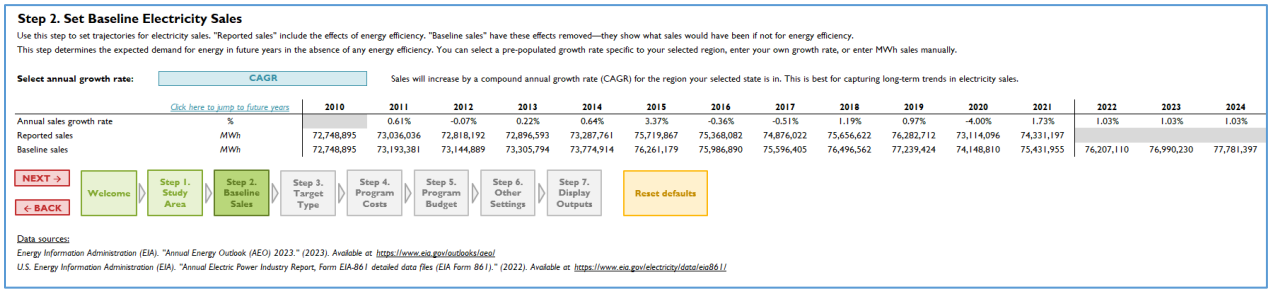

Figure 2. "Set Baseline Electricity Sales" page in default setting

6. You are now on the **"Step 3. Set Target Type"** page.
   - In the "Select target type" blue box near the upper left of the page choose "Annual Incremental Savings" from the dropdown list.
     - *Annual incremental savings represents new annual savings achieved each year (in the way an energy efficiency program would expect to implement more projects and garner additional incremental savings each year). However, for an individual project, no new incremental savings will be added each year. For the purposes of this tool, we assume that the annual energy*

and GHG savings during each year of the project performance period will be equal to the first-year savings. The ESIST tool automatically degrades the GHG impacts over time, accounting for a decarbonizing grid to some extent, according to EPA's formula.

- Click the red "Next" button to move to the next page.

7. You are now on the "**Step 4. Set Savings Trajectory"** page. This is the page on which you will enter your project's first-year estimated electricity savings, from which the electricity-related GHG reductions will be derived.
   - 1) In the blue box labeled "Select savings trend" choose "User Input (MWH savings) from the dropdown list (see **Figure 3**, below).
   - 2) In the row farther down the page, called "Annual incremental savings" scroll to the right and find the blue boxes—in particular, find the blue box directly under the first performance year of the project.
   - 3) In the blue box under that year, enter the number of **MWh** of annual estimated **electricity savings**. See the example in **Figure 3**, below, in which we entered 800 (for 800 MWh) in the box under the year 2023.
   - 4) Overwrite the values the rest of the blue boxes on that row by typing the number 0 in those boxes – *including any years prior to your project's first performance year* (see **Figure 3**, where information for 2022 was deleted). Only the one box under the first year of your project's performance period should have your annual estimated electricity savings figure.
   - *IMPORTANT: You also need to zero out some information that is not in the blue boxes. Select the cells under the year 2011 through the year just prior to the first performance year of your project for the row labeled "Annual incremental savings" and enter 0 in all of those cells.* These prior years' savings garnered by the utility in your region do not apply to a single project.
   - Click the red "Next" button to move to the next page.

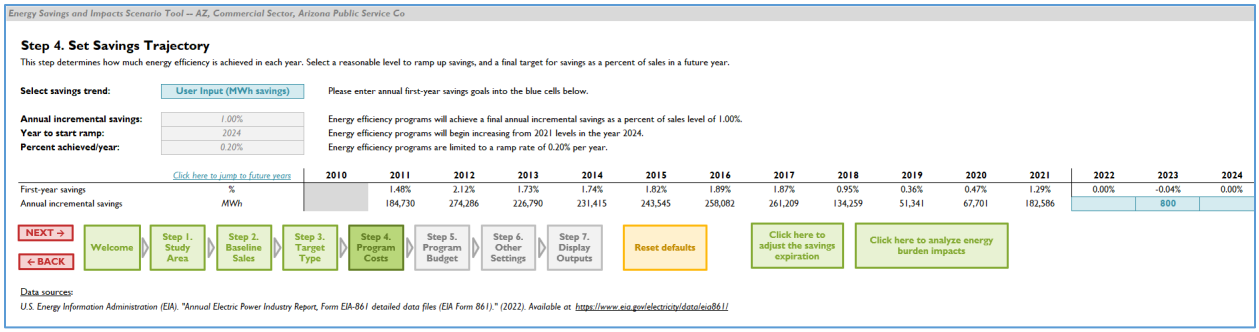

Figure 3. "Set Savings Trajectory" page in the ESIST tool, with 800 MWh of savings entered for year 2023

8. You are now on the **"Step 5. Set Program Cost Assumptions"** page.
   - This page is not relevant to ePX and is to be ignored for these purposes. It will not affect the GHG calculations.

- Click the red "Next" button to move to the next page.

9. You are now on the **"Step 6. Set Multiple Benefits and Other Settings"** page (see **Figure 4**, below).
   - We recommend leaving the settings for this section as-is which will apply the default emissions factors to your savings.
   - However, if you want to enter customized emissions factors, click the "Emissions Impacts" box and follow the steps below.
     - If you click the "Emissions Impacts" box, the "Avoided Emissions and T&D[2] Losses" table will display (see **Figure 5**, below).
     - The top blue box, "Select source of emissions rates" is the only one relevant to ePX. (The "Select source of T&D losses" box is not applicable).
     - Click the "Select source of emissions rates" blue box and choose "User Input" from the drop-down list (see **Figure 6**, below).
     - Editable blue boxes will now appear under the years 2022 and onward for the top 5 rows of emissions types. You may enter the emissions factors for each of the emissions type – *but only enter emissions factors under the first year of your projects' performance period*. Those emissions factors will be applied to the estimated first year MWh savings you entered on the "Step 4. Set Savings Trajectory" page. You may ignore or delete the emissions information in all of the other years in the table.
     - When your data entry is complete, click the red box labeled "Back to Step 6. Other Settings"
   - You won't need any of the other settings for the ePX GHG fields, so click the red "Next" button to move to the next page.

[2] T&D stands for transmission and distribution

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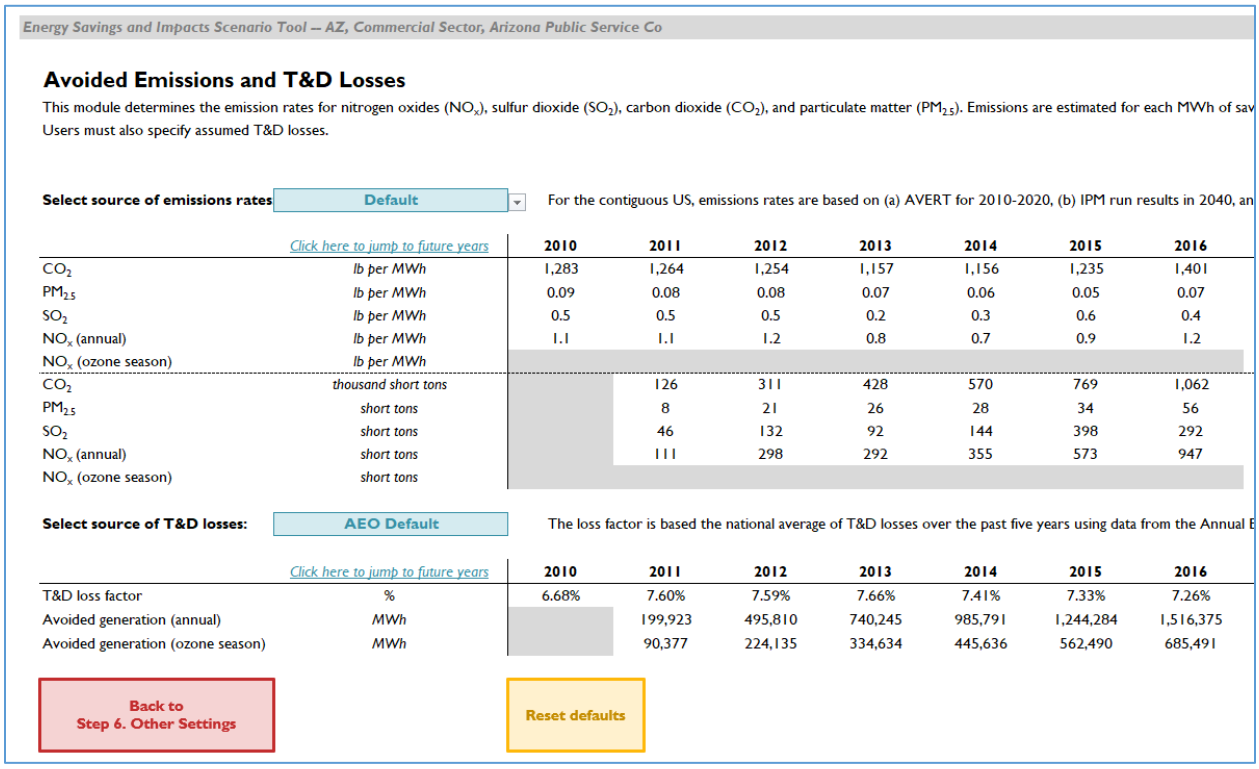


Energy Savings and Impacts Scenario Tool -- AZ, Commercial Sector, Arizona Public Service Co

Avoided Emissions and T&D Losses

This module determines the emission rates for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon dioxide (CO_2), and particulate matter ($PM_{2.5}$). Emissions are estimated for each MWh of sav
Users must also specify assumed T&D losses.

Select source of emissions rates Default — For the contiguous US, emissions rates are based on (a) AVERT for 2010-2020, (b) IPM run results in 2040, an

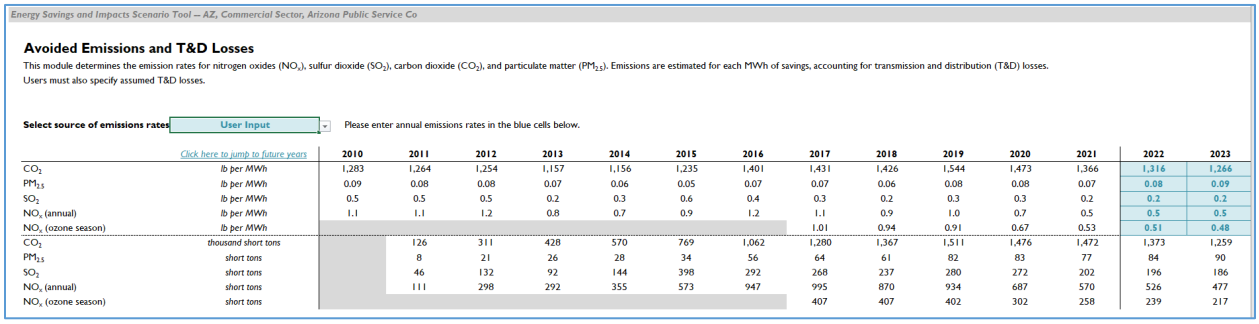
	Click here to jump to future years	2010	2011	2012	2013	2014	2015	2016
CO_2	*lb per MWh*	1,283	1,264	1,254	1,157	1,156	1,235	1,401
$PM_{2.5}$	*lb per MWh*	0.09	0.08	0.08	0.07	0.06	0.05	0.07
SO_2	*lb per MWh*	0.5	0.5	0.5	0.2	0.3	0.6	0.4
NO_x (annual)	*lb per MWh*	1.1	1.1	1.2	0.8	0.7	0.9	1.2
NO_x (ozone season)	*lb per MWh*							
CO_2	*thousand short tons*		126	311	428	570	769	1,062
$PM_{2.5}$	*short tons*		8	21	26	28	34	56
SO_2	*short tons*		46	132	92	144	398	292
NO_x (annual)	*short tons*		111	298	292	355	573	947
NO_x (ozone season)	*short tons*							

Select source of T&D losses: AEO Default — The loss factor is based the national average of T&D losses over the past five years using data from the Annual E

	Click here to jump to future years	2010	2011	2012	2013	2014	2015	2016
T&D loss factor	%	6.68%	7.60%	7.59%	7.66%	7.41%	7.33%	7.26%
Avoided generation (annual)	*MWh*		199,923	495,810	740,245	985,791	1,244,284	1,516,375
Avoided generation (ozone season)	*MWh*		90,377	224,135	334,634	445,636	562,490	685,491

Back to Step 6. Other Settings — Reset defaults

Figure 5. "Avoided Emissions and T&D Losses" table in the ESIST tool



Energy Savings and Impacts Scenario Tool -- AZ, Commercial Sector, Arizona Public Service Co

Avoided Emissions and T&D Losses

This module determines the emission rates for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon dioxide (CO_2), and particulate matter ($PM_{2.5}$). Emissions are estimated for each MWh of savings, accounting for transmission and distribution (T&D) losses.
Users must also specify assumed T&D losses.

Select source of emissions rates User Input — Please enter annual emissions rates in the blue cells below.

Click here to jump to future years		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CO_2	*lb per MWh*	1,283	1,264	1,254	1,157	1,156	1,235	1,401	1,431	1,426	1,544	1,473	1,366	1,316	1,266
$PM_{2.5}$	*lb per MWh*	0.09	0.08	0.08	0.07	0.06	0.05	0.07	0.07	0.06	0.08	0.08	0.07	0.08	0.09
SO_2	*lb per MWh*	0.5	0.5	0.5	0.2	0.3	0.6	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.2
NO_x (annual)	*lb per MWh*	1.1	1.1	1.2	0.8	0.7	0.9	1.2	1.1	0.9	1.0	0.7	0.5	0.5	0.5
NO_x (ozone season)	*lb per MWh*								1.01	0.94	0.91	0.67	0.53	0.51	0.48
CO_2	*thousand short tons*		126	311	428	570	769	1,062	1,280	1,367	1,511	1,476	1,472	1,373	1,259
$PM_{2.5}$	*short tons*		8	21	26	28	34	56	64	61	82	83	77	84	90
SO_2	*short tons*		46	132	92	144	398	292	268	237	280	272	202	196	186
NO_x (annual)	*short tons*		111	298	292	355	573	947	995	870	934	687	570	526	477
NO_x (ozone season)	*short tons*								407	407	402	302	258	239	217

Figure 6. "Avoided Emissions and T&D Losses" table: customizing the emissions rates by choosing "User Input"

10. You are now on the **"Step 7. Review Outputs"** page (see **Figure 7**, below). This page displays the emissions impacts of the electricity savings, along with other information that you won't need for use with ePX. You will need to copy the emissions results from this page and paste it into a separate Excel document in order to calculate the average annual GHG impacts of your estimated annual savings—and generate the values you will enter into the GHG fields in the ePX project data template.
    - Note the rows where the ESIST tool provides results for the following four emissions types:

        - Avoided carbon dioxide (CO2) in thousand short tons
        - Avoided fine particulate matter (PM2.5) in short tons
        - Avoided sulfur dioxide (SO2) in short tons
        - Avoided nitrogen oxides (NOx) in short tons
    - Open a new Excel document.
    - In your ESIST working document, select and highlight the emissions rows for only the years that your project will be in the performance period.
    - Copy and paste that information using the **"paste values" function** into the new Excel document. *IMPORTANT: You **must** use the "paste values" function.*
        - Note that these values appear in the ESIST tool rounded to a whole number, but when you paste these values into your new Excel document, the values will carry out to the full number of decimals available.
    - In your new Excel document, add a column to the right of those pasted cells. In that column, add a formula that totals the annual emissions impacts for each row.
    - Add another column to the right of that one in which you divide the emissions impacts by the number of performance years
    - This new column displays in the *average* annual GHG avoided emissions from natural gas for the performance period of the project for each of the various emissions types. These are the values that will go into your ePX project data template.
    - If you also have electricity savings, sum your natural gas and electricity GHG savings before entering them into the ePX template.

Step 7. Review Outputs Click here to jump to future years

Review outputs from all steps, including information on annual incremental sgy efficiency (EE), cumulative savings, costs, emission impacts, public health impacts, energy burden impacts, and peak demand impacts.

Sales and Savings	View charts	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Baseline sales	MWh	73,193,381	73,144,889	73,305,794	73,774,914	76,261,179	75,986,890	75,596,405	76,496,562	77,239,424	74,148,810	75,431,955	76,207,110	76,990,230	77,781,397	78,580,695
Annual incremental savings	MWh	157,345	170,064	83,425	79,327	55,891	80,124	104,696	125,564	131,110	91,009	89,906	0	800,000	0	0
Annual incremental savings	%	0.22%	0.23%	0.11%	0.11%	0.08%	0.11%	0.14%	0.17%	0.17%	0.12%	0.12%	0.00%	1.06%	0.00%	0.00%
Expiring savings	MWh	0	712	921	1,375	1,732	2,627	3,122	6,007	14,337	13,007	23,862	35,490	50,911	70,317	72,166
Net cumulative savings	MWh	157,345	326,697	409,201	487,153	541,312	618,808	720,383	839,940	956,712	1,034,714	1,100,758	1,065,268	1,814,357	1,744,040	1,671,874
Net cumulative savings	%	0.2%	0.4%	0.6%	0.7%	0.7%	0.8%	1.0%	1.1%	1.2%	1.4%	1.5%	1.4%	2.4%	2.2%	2.1%
Sales after EE	MWh	73,036,036	72,818,192	72,896,593	73,287,761	75,719,867	75,368,082	74,876,022	75,656,622	76,282,712	73,114,096	74,331,197	75,141,842	75,175,873	76,037,358	76,908,821

Costs	View charts	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total annual costs	*2021 $ M*	$70	$84	$31	$30	$25	$50	$44	$50	$58	$51	$47	$0	$716	$0	$0
Annual utility costs	*2021 $ M*	$38	$46	$17	$16	$14	$27	$24	$27	$31	$27	$26	$0	$387	$0	$0
Annual participant costs	*2021 $ M*	$32	$39	$14	$14	$12	$23	$20	$23	$27	$23	$22	$0	$329	$0	$0
First-year utility cost of saved energy	*2021 ¢/kWh*	24	27	20	20	24	34	23	21	24	30	28	48	48	48	48
Levelized utility cost of saved energy	*2021 $/MWh*	$23	$25	$19	$19	$23	$32	$22	$20	$23	$29	$27	$0	$46	$0	$0

Emissions Impacts	View charts	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Avoided carbon dioxide (CO_2)	*thousand short tons*	136	269	317	386	442	497	474	539	561	618	652	621	1,042	986	930
Avoided fine particulate matter ($PM_{2.5}$)	*short tons*	14	24	26	28	31	34	34	30	37	42	43	55	116	133	149
Avoided sulfur dioxide (SO_2)	*short tons*	294	416	472	578	530	456	202	230	119	151	189	174	279	253	228
Avoided nitrogen oxides (NO_x)	*short tons*	120	200	226	285	292	326	235	214	183	204	202	188	307	282	258

Figure 7. "Review Outputs" page

11. Enter the total (from both electricity and natural gas) of your annual average GHG impacts for the emissions types you wish to capture into the ePX project data template – in the user-customized cells, C41 through 44
    - In cell C41, indicate the type of GHG you are capturing and the units (e.g., "Annual avoided CO2 (thousand short tons)"

- In cell C42, enter the estimated annual avoided GHG emissions value generated by the ESIST tool
- In cell C43, you may indicate another type of GHG that you want to document (e.g., "Annual avoided NOx (short tons)"
- In cell C44, enter the estimated annual avoided GHG emissions value generated by the ESIST tool document.

B. Details: calculating estimated annual GHG impacts of the project's estimated annual natural gas savings

1. Open the downloaded ESIST file for natural savings called "esist-pilot-gas-version-2023-update.xlsm."
2. ***IMPORTANT**: Use the "save as" function to save your working version with a different filename, in case you make some edits that break the ESIST tool calculations.* This critical step ensures that you retain the original version of the ESIST file so you can try multiple scenarios and avoid "breaking" any of the formulas or formatting in the original ESIST file. Each time you create a new scenario with the tool, make sure start with the master file again and use the "save as" function to create a new working version.
3. Read the instructions on the page.
   - *Note that throughout the various pages of the tool, blue boxes indicate the fields where you may either choose from a dropdown list or enter information. Some pages and boxes will not apply to using this tool with ePX.*
   - Click the "Get Started" box-shaped button at the bottom left of the page.
4. You are now on the "**Step I. Set Study Area**" page (see **Figure 1**, below). On this page, complete the four blue boxes in the upper left as they apply to the project by choosing from the dropdown lists in each box:
   - U.S. state where the project is located
   - Building sector (you will choose commercial in most cases, unless this is an industrial or residential project).
     - *Note that when you choose "commercial," the ESIST tool displays a message that it does not contain data to assess energy burden impacts for this sector. Disregard this message, as energy burden impacts are not applicable for use with ePX and will not affect the GHG calculations.*
   - Utility type (investor-owned, municipal, cooperative, etc.)
   - Name of the utility
     - *Note that the tool may be a little 'sticky' and may not immediately display the dropdown list of utilities. After you choose the state, building sector and utility type and click on the "Name of the utility"*

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field, if you do not see a dropdown list of all the utilities, try clicking the "Back" button to return to the previous page, then click the "Next button" to return to this page. That action should make the list of utilities appear. We have sent a request to EPA about this issue.

- Once you have completed the four boxes, click the red "Next" button near the lower left-hand corner of the page to move to the next page.

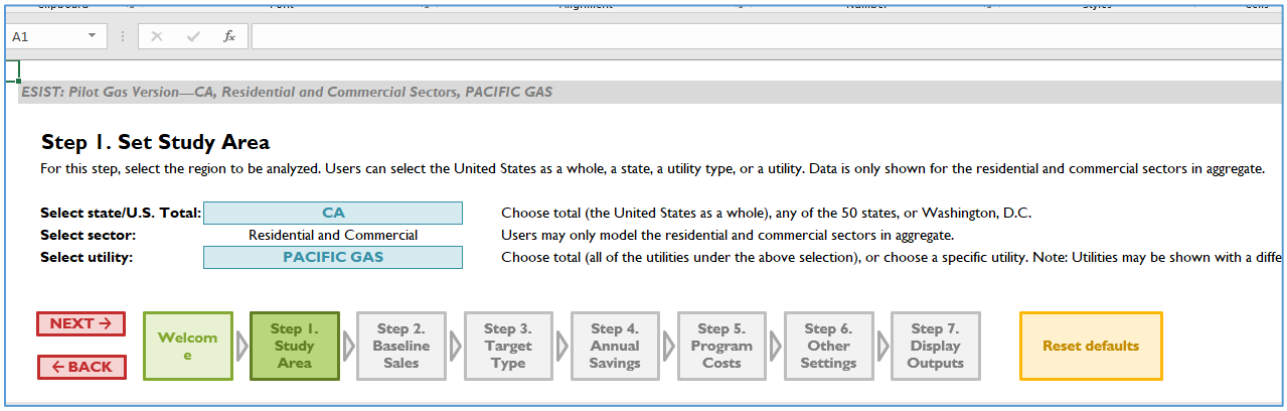

Figure 1. "Set Study Area" page in the pilot gas ESIST tool

5. You are now on the **"Step 2. Set Baseline Natural Gas Consumption"** page. This page is not applicable for use with ePX, so please leave it in the default setting (see **Figure 2**, below) and click the "Next" button to move to the next page.

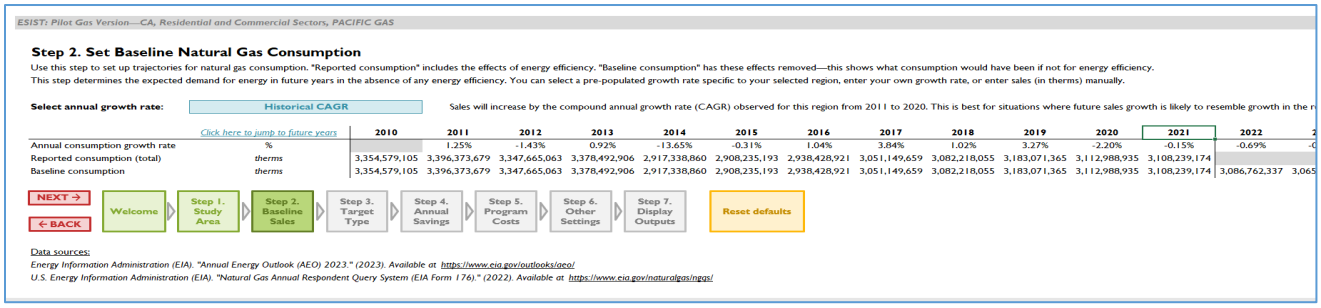

Figure 2. "Set Baseline Natural Gas Consumption" page in default setting

6. You are now on the **"Step 3. Set Target Type"** page.
   - In the "Select target type" blue box near the upper left of the page keep the default settings "Annual Incremental Savings" as-is.
     - *Annual incremental savings represents new annual savings achieved each year (in the way an energy efficiency program would expect to implement more projects and garner additional incremental savings each year). However, for an individual project, no new incremental savings will be added each year. For the purposes of this tool, we assume that the annual energy*

and GHG savings during each year of the project performance period will be equal to the first-year savings. The ESIST tool automatically degrades the GHG impacts over time, accounting for a decarbonizing grid to some extent, according to EPA's formula.

- Click the red "Next" button to move to the next page.

7. You are now on the "**Step 4. Set Savings Trajectory"** page. This is the page on which you will enter your project's first-year estimated natural gas savings, from which the natural gas-related GHG reductions will be derived.
   - 1) In the blue box labeled "Select savings trend" choose "User Input (MWH savings) from the dropdown list (see **Figure 3**, below).
     - Please do nothing with the boxes labeled "Annual incremental savings" "Year to start ramp" and "Percent achieved/year." They will not affect your GHG savings from a project implemented in a specific year.
   - 2) In the row farther down the page, called "Annual incremental savings" scroll to the right and find the blue boxes—in particular, find the blue box directly under the first performance year of the project.
   - 3) In the blue box under that year, enter the number of **MWh** of annual estimated **natural gas savings**. See the example in **Figure 3**, below, in which we entered 800 (for 800 MWh) in the box under the year 2023.
   - 4) Overwrite the values the rest of the blue boxes on that row by typing the number 0 in those boxes – *including any years prior to your project's first performance year* (see **Figure 3**, where the default values for 2011 through 2022 and numbers from 2024 through 2040 were replaced with the number 0). Only the one box under the first year of your project's performance period should have your annual estimated annual natural gas savings figure.
   - *IMPORTANT: You also need to zero out some information that is not in the blue boxes. Select the cells under the year 2011 through the year just prior to the first performance year of your project for the row labeled "Annual incremental savings" and enter 0 in all of those cells.* These prior years' savings garnered by the utility in your region do not apply to a single project.
   - Finally, click the red "Next" button to move to the next page.

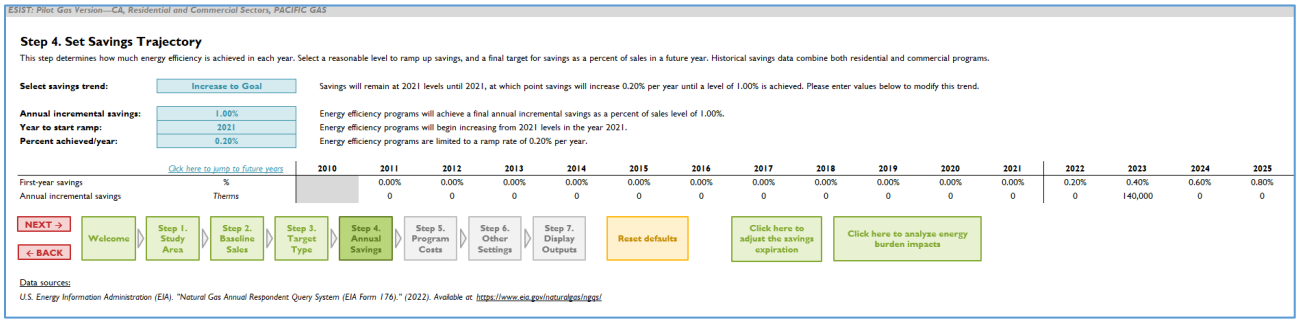

Figure 3. "Step 4. Set Savings Trajectory" page in the pilot gas ESIST tool, with 140,000 MWh of natural savings entered for year 2023, and all other years changed to the number 0

8. You are now on the **"Step 5. Set Program Cost Assumptions"** page.
    - This page is not relevant to ePX and is to be ignored for these purposes. It will not affect the GHG calculations.
    - Click the red "Next" button to move to the next page.

9. You are now on the **"Step 6. Set Multiple Benefits and Other Settings"** page (see **Figure 4**, below).
    - We recommend leaving the settings for this section as-is which will apply the default emissions factors to your savings. (See Figure 4).
    - Click the red "Next" button to move to the next page.

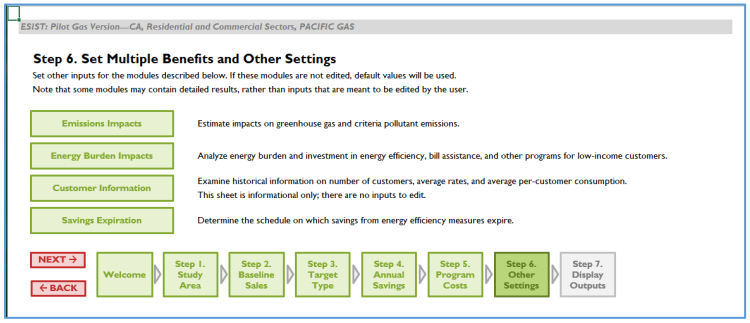

Figure 4. "Step 6. Set Multiple Benefits and Other Settings" page

10. You are now on the **"Step 7. Review Outputs"** page (see **Figure 5**, below). This page displays the emissions impacts of the natural gas savings, along with other information that you won't need for use with ePX. You will need to copy just the emissions results from this page and paste it into a separate Excel document in order to calculate the average annual GHG impacts of your estimated annual savings—and generate the values you will enter into the GHG fields in the ePX project data template.
    - Note the rows where the ESIST tool provides results for the following four emissions types:
        - Avoided carbon dioxide (CO2) in thousand short tons
        - Avoided fine particulate matter (PM2.5) in short tons
        - Avoided sulfur dioxide (SO2) in short tons
        - Avoided nitrogen oxides (NOx) in short tons
    - Open a new Excel document.
    - In your ESIST working document, select and highlight the emissions rows for only the years that your project will be in the performance period (See **Figure 5** below showing that the emissions from the 2023 example project start in 2023 and continue (degrading slightly) during the following years).

- Copy and paste that information using the **"paste values" function** into the new Excel document. ***IMPORTANT:*** *You **must** use the "paste values" function.*
  - Note that these values appear in the ESIST tool rounded to a whole number, but when you paste these values into your new Excel document, the values will carry out to the full number of decimals available.
- In your new Excel document, add a column to the right of those pasted cells. In that column, add a formula that totals the annual emissions impacts for each row.
- Add another column to the right of that one in which you divide the emissions impacts by the number of performance years
- This new column displays in the *average* annual GHG avoided emissions from natural gas for the performance period of the project for each of the various emissions types. These are the values that will go into your ePX project data template.
- If you also have electricity savings, sum your natural gas and electricity GHG savings before entering them into the ePX template.

Emissions Impacts	View charts	2020	2021	2022	2023	2024	2025	2026	2027	20
Avoided carbon dioxide (CO_2)	*thousand short tons*	0	0	0	0.81	0.81	0.81	0.81	0.81	0.
Avoided fine particulate matter ($PM_{2.5}$)	*short tons*	0	0	0	0	0	0	0	0	
Avoided sulfur dioxide (SO_2)	*short tons*	0	0	0	0	0	0	0	0	
Avoided nitrogen oxides (NO_x)	*short tons*	0	0	0	7	7	7	7	7	7

Figure 5. The "Emissions Impacts" row of the "Step 7. Review Outputs" page

11. Finally, enter the total (from both electricity and natural gas) of your annual average GHG impacts for the emissions types you wish to capture into the ePX project data template – in the user-customized cells, C41 through 44
    - In cell C41, indicate the type of GHG you are capturing and the units (e.g., "Annual avoided CO2 (thousand short tons)"
    - In cell C42, enter the estimated annual avoided GHG emissions value generated by the ESIST tool
    - In cell C43, you may indicate another type of GHG that you want to document (e.g., "Annual avoided NOx (short tons)"
    - In cell C44, enter the estimated annual avoided GHG emissions value generated by the ESIST tool