eProjecteXpress

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

U.S. DEPARTMENT OF



Energy Efficiency & Renewable Energy

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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 <u>Quick Start Guide</u> and <u>M&V Guide</u> and viewing the <u>ePX introductory training</u> <u>webinar</u>. These and other guidance documents and training videos are available on the ePB/ePX Help & Documentation page: <u>https://eprojectbuilder.lbl.gov/help</u>.

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 (<u>https://eprojectbuilder.lbl.gov/login</u>)
 - Download the ePX project data template from the Help & Documentation Page (<u>https://eprojectbuilder.lbl.gov/help</u>)



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&D¹ 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



- 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

<u>https://www.eia.gov/tools/faqs/faq.php?id=45&t=8</u>. 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.



- *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)"
- \circ $\:$ 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-2023update.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.
 - o 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" 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.

| Energy Savings and Impacts | Scenario Tool – AZ, Commercial Sector | r, Arizona Public Service Co | | | | | | | | | |
|-------------------------------|---|--|--|--|--|--|--|--|--|--|--|
| Step I. Set Stud | y Area | | | | | | | | | | |
| For this step, select the reg | gion to be analyzed. Users can select the L | Inited States as a whole, a state, a utility type, a utility, or a utility's sector. | | | | | | | | | |
| Select state/U.S. Total: | AZ | Choose total (the United States as a whole); any of the 50 states; Washington, D.C.; or Puerto Rico. | | | | | | | | | |
| Select sector: | Commercial | cial Choose total (all sectors), or choose between the residential, commericial, and industrial sectors. | | | | | | | | | |
| Select utility type: | Investor Owned | Choose total (all utility types), or choose between investor-owned, cooperative, municipal, or another utility type. | | | | | | | | | |
| Select utility: | Arizona Public Service Co | Choose total (all of the utilities under the above selection), or choose a specific utility. | | | | | | | | | |
| Note: You have selected | d a sector other than residential. ESI | ST does not contain data to assess energy burden impacts for this sector. | | | | | | | | | |
| | | | | | | | | | | | |
| NEXT → Welcome | m | Step 3. Target Target Program Costs Step 5. Program Budget Step 6. Other Setings Outputs | | | | | | | | | |

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.

| Step 2. Set Baseline Electricity Sales Use this step to set trajectories for electricity sales. Theported sales' include the effects of energy efficiency. "Baseline sales' have these effects removed—they show what sales would have been if not for energy efficiency. This step determines the expected demand for energy in future years in the absence of any energy efficiency. You can select a pre-populated growth rate specific to your selected region, enter your own growth rate, or enter MWh sales manually. | | | | | | | | | | | | | | | | |
|--|--|-------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|-------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Select annual growth rate: CAGR Select annual growth rate (CAGR) for the region your selected state is in. This is best for capturing long-term trends in electricity seles. | | | | | | | | | | | | | | | | |
| | Click here to jump to future years | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| Annual sales growth rate | % | | 0.61% | -0.07% | 0.22% | 0.64% | 3.37% | -0.36% | -0.51% | 1.19% | 0.97% | -4.00% | 1.73% | 1.03% | 1.03% | 1.03% |
| Reported sales | MWh | 72,748,895 | 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 | | | |
| Baseline sales | MWh | 72,748,895 | 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 |
| NEXT → Welcome GACK Welcome Data sources: Energy Information Administration (EIA U.S. Energy Information Administration | Step 1. Study Area Sales State Sta | tep 3. arget Type | Step 4. rogram Costs | Step 5. rogram Budget | Step 6. Other Settings | Step 7. Display Outputs | Reset defau | its 11a/eia861/ | | | | | | | | |

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.

| Energy Savings and Impacts Scenario | o Tool AZ, Commercial Sector, A | rizona Public S | Service Co | | | | | | | | | | | | | |
|---|--|----------------------|----------------------------|------------------------------|------------------------------|-------------------------------|----------------------------|-------------|--|------------------|-------------------------------|-------------------------|---------|-------|--------|-------|
| Step 4. Set Savings Tr | ajectory | | | | | | | | | | | | | | | |
| This step determines how much ene | rgy efficiency is achieved in each year. | Select a reasor | able level to rai | mp up savings, ar | nd a final target fo | or savings as a pe | rcent of sales in a futu | re year. | | | | | | | | |
| Select savings trend: | User Input (MWh savings) | Please en | ter annual first- | year savings goa | ls into the blue co | ells below. | | | | | | | | | | |
| Annual incremental savings: | 1.00% | Energy et | ficiency program | ns will achieve a | final annual incre | mental savings as | a percent of sales lev | l of 1.00%. | | | | | | | | |
| Year to start ramp: | 2024 | Energy et | ficiency program | ns will begin incr | reasing from 202 | l levels in the yea | ar 2024. | | | | | | | | | |
| Percent achieved/year: | 0.20% | Energy et | ficiency program | ns are limited to | a ramp rate of (| 0.20% per year. | | | | | | | | | | |
| | Click here to jump to future years | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| First-year savings | % | | 1.48% | 2.12% | 1.73% | 1.74% | 1.82% | 1.89% | 1.87% | 0.95% | 0.36% | 0.47% | 1.29% | 0.00% | -0.04% | 0.00% |
| Annual incremental savings | MWh | | 184,730 | 274,286 | 226,790 | 231,415 | 243,545 | 258,082 | 261,209 | 134,259 | 51,341 | 67,701 | 182,586 | | 800 | |
| NEXT → Welcome | Step I. Study Area | ep 3. rget ypc | Step 4. rogram Costs | Step 5. Program Budget | Step 6. Other Settings | Step 7. Display Outputs | Reset defaults |] | Click here adjust the sav expiration | to iings 1 | Click here to ar burden ir | nalyze energy npacts | | | | |
| Data sources: U.S. Energy Information Administration | (EIA). "Annual Electric Power Industry Rep | ort, Form EIA-86 | l detailed data (| files (EIA Form 86 | l)." (2022). Availa | ible at <u>https://www</u> | v.eia.gov/electricity/data | eia8611 | | | | | | | | |

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.
 - $\circ~$ 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&D² 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



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 (SO₂), carbon dioxide (CO₂), 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 | | ntiguous US, em | iissions rates are | based on (a) AV | ERT for 2010-20 | 020, (b) IPM run | results in 2040, an |
|-----------------------------------|------------------------------------|---------------|------------------|--------------------|-------------------|--------------------|--------------------|---------------------|
| | Click here to jump to future years | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| CO ₂ | lb þer MWh | 1,283 | 1,264 | 1,254 | 1,157 | 1,156 | 1,235 | 1,401 |
| PM _{2.5} | lb þer MWh | 0.09 | 0.08 | 0.08 | 0.07 | 0.06 | 0.05 | 0.07 |
| SO ₂ | lb þer MWh | 0.5 | 0.5 | 0.5 | 0.2 | 0.3 | 0.6 | 0.4 |
| NO _x (annual) | lb þer MWh | 1.1 | 1.1 | 1.2 | 0.8 | 0.7 | 0.9 | 1.2 |
| NO _x (ozone season) | lb þer 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 fa | ctor is based th | e national averag | e of T&D losses o | over the past five | e years using data | from the Annual |
| | 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 default | ts | | | | | |

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

| Energy Savings and Impacts Sco | enario Tool – AZ, Commercial Sector, An | zona Public Ser | vice Co | | | | | | | | | | | | |
|--|---|--------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---|---|---|---|---|---|--|---|
| | | | | | | | | | | | | | | | |
| Avoided Emissions | and T&D Losses | | | | | | | | | | | | | | |
| This module determines the e | mission rates for nitrogen oxides (NO _x), su | fur dioxide (SO; |), carbon dioxide | (CO2), and part | iculate matter (P | M25). Emissions | are estimated for | each MWh of s | avings, accountin | g for transmissio | n and distributio | n (T&D) losses. | | | |
| Users must also specify assum | ed T&D losses. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Select source of emissions | rates User Input | Please ent | er annual emissio | ns rates in the bl | ue cells below. | | | | | | | | | | |
| | | - | | | | | | | | | | | | | |
| | Click here to jump to future years | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| CO2 | 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 |
| PM2.5 | 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 |
| 5O ₂ | | | | | | | | | | | | | 0.07 | | |
| - | lb þer 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 þer MWh Ib þer MWh | 0.5 | 0.5 | 0.5 1.2 | 0.2 0.8 | 0.3 0.7 | 0.6 0.9 | 0.4 | 0.3 | 0.2 0.9 | 0.3 1.0 | 0.3 | 0.2 | 0.2 | 0.2 |
| NO _x (annual) NO _x (ozone season) | lb þer MWh Ib þer MWh Ib þer MWh | 0.5 | 0.5 1.1 | 0.5 1.2 | 0.2 0.8 | 0.3 0.7 | 0.6 0.9 | 0.4 | 0.3 1.1 1.01 | 0.2 0.9 0.94 | 0.3 1.0 0.91 | 0.3 0.7 0.67 | 0.2 0.5 0.53 | 0.2 0.5 0.51 | 0.2 0.5 0.48 |
| NO _x (annual) NO _x (ozone season) CO ₂ | lb per MWh lb per MWh lb per MWh thousand short tons | 0.5 | 0.5 | 0.5 1.2 311 | 0.2 0.8 428 | 0.3 0.7 570 | 0.6 0.9 769 | 0.4 1.2 | 0.3 1.1 1.01 1,280 | 0.2 0.9 0.94 1,367 | 0.3 1.0 0.91 1,511 | 0.3 0.7 0.67 1,476 | 0.2 0.5 0.53 1,472 | 0.2 0.5 0.51 1,373 | 0.2 0.5 0.48 1,259 |
| NO _x (annual) NO _x (ozone season) CO ₂ PM _{2.5} | lb þer MWh lb þer MWh lb þer MWh thousand short tons short tons | 0.5 | 0.5 1.1 126 8 | 0.5 1.2 311 21 | 0.2 0.8 428 26 | 0.3 0.7 570 28 | 0.6 0.9 769 34 | 0.4 1.2 1,062 56 | 0.3 1.1 1.01 1,280 64 | 0.2 0.9 0.94 1,367 61 | 0.3 1.0 0.91 1,511 82 | 0.3 0.7 0.67 1,476 83 | 0.2 0.5 0.53 1,472 77 | 0.2 0.5 0.51 1,373 84 | 0.2 0.5 0.48 1,259 90 |
| NO _x (annual) NO _x (ozone season) CO ₂ PM _{2.5} SO ₂ | Ib per MWh Ib per MWh Ib per MWh thousand short tons short tons short tons | 0.5 | 0.5 1.1 126 8 46 | 0.5 1.2 311 21 132 | 0.2 0.8 428 26 92 | 0.3 0.7 570 28 144 | 0.6 0.9 769 34 398 | 0.4 1.2 1,062 56 292 | 0.3 1.1 1.01 1,280 64 268 | 0.2 0.9 0.94 1,367 61 237 | 0.3 1.0 0.91 1,511 82 280 | 0.3 0.7 0.67 1,476 83 272 | 0.2 0.5 0.53 1,472 77 202 | 0.2 0.5 0.51 1,373 84 196 | 0.2 0.5 0.48 1,259 90 186 |
| NO _x (annual) NO _x (ozone season) CO ₂ PM ₁₅ SO ₂ NO _x (annual) | Ib per MWh Ib per MWh Ib per MWh thousand short tons short tons short tons short tons | 0.5 | 0.5 1.1 126 8 46 111 | 0.5 1.2 311 21 132 298 | 0.2 0.8 428 26 92 292 | 0.3 0.7 570 28 144 355 | 0.6 0.9 769 34 398 573 | 0.4 1.2 1,062 56 292 947 | 0.3 1.1 1.01 1.280 64 268 995 | 0.2 0.9 0.94 1,367 61 237 870 | 0.3 1.0 0.91 1,511 82 280 934 | 0.3 0.7 0.67 1,476 83 272 687 | 0.2 0.5 0.53 1,472 77 202 570 | 0.2 0.5 1,373 84 196 526 | 0.2 0.5 0.48 1,259 90 186 477 |

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.

| Review outputs from all steps, including | information on annual incremental s | gy efficiency (EE) | , cumulative savi | ngs, costs, emiss | ion impacts, pub | lic health impacts | s, energy burden | impacts, and pea | k demand impact | s. | | | | | | |
|--|-------------------------------------|--------------------|-------------------|-------------------|------------------|--------------------|------------------|------------------|-----------------|------------|------------|------------|------------|------------|------------|------------|
| | | | | | | | | | | | | | | | | |
| 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 (CO2) | thousand short tons | 136 | 269 | 317 | 386 | 442 | 497 | 474 | 539 | 561 | 618 | 652 | 621 | 1.042 | 986 | 930 |
| Avoided fine particulate matter (PM2.5) | short tons | 14 | 24 | 26 | 28 | 31 | 34 | 34 | 30 | 37 | 42 | 43 | 55 | 116 | 133 | 149 |
| Avoided sulfur dioxide (SO2) | 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 |
| | | | | | | | | | | | | | | | | |

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

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"



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.

| A1 • : × • | f _x | ragninent s equer cent |
|--|---|--|
| ESIST: Pilot Gas Version_CA | A. Residential and Commercial Sectors. | PACIFIC GAS |
| Step 1. Set Study For this step, select the reg | y Area ion to be analyzed. Users can select the U | Inited States as a whole, a state, a utility type, or a utility. Data is only shown for the residential and commercial sectors in aggregate. |
| Select state/U.S. Total: | CA | Choose total (the United States as a whole), any of the 50 states, or Washington, D.C. |
| Select sector: | Residential and Commercial | Users may only model the residential and commercial sectors in aggregate. |
| Select utility: | PACIFIC GAS | Choose total (all of the utilities under the above selection), or choose a specific utility. Note: Utilities may be shown with a diffe |
| NEXT→ ←BACK | m Step I. Study Area Sales | Step 3. Step 4. Target Annual Savings Costs Step 5. Step 6. Other Display Outputs |

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.

| ESIST: Pilot Gas version—CA, Resid | ential and Commercial Sectors, PA | CIFIC GAS | | | | | | | | | | | | |
|--|---|---|---|---|----------------------------------|------------------------------|---------------------|--------------------|-------------------|-------------------|----------------------|--------------------|---------------------|----------------------|
| Chan 2 Cat Baseline N | | | | | | | | | | | | | | |
| Step 2. Set Baseline N | atural Gas Consumptio | on | | | | | | | | | | · · · | | |
| This step to set up trajectories | for natural gas consumptionReports | ed consumption | ncludes the efficiency officiency | ects of energy ef | ticiency. "Baseline | e consumption ⁻ n | ias these effects r | emoved—this si | nows what consu | mption would n | iave been if not fe | or energy efficien | cy. | |
| This step determines the expected | demand for energy in lucure years in | the absence of a | ity energy enicle | ncy. rou can ser | ecca pre-popula | ded growth rate s | pecific to your se | lected region, er | ider your own gri | swell rate, or en | iter sales (in cheri | ins) manually. | | |
| Select annual growth rate: | Historical CAGR | | Sales will | increase by the | compound annua | al growth rate (C) | AGR) observed fe | or this region fro | om 2011 to 2020 | This is best for | situations where | e future sales gro | wth is likely to re | esemble growth in th |
| | | | - | | | | | | | | | | | |
| | Click here to jump to future years | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Annual consumption growth rate | % | | 1.25% | -1.43% | 0.92% | -13.65% | -0.31% | 1.04% | 3.84% | 1.02% | 3.27% | -2.20% | -0.15% | -0.69% |
| Reported consumption (total) | therms | 3,354,579,105 | 3,396,373,679 | 3,347,665,063 | 3,378,492,906 | 2,917,338,860 | 2,908,235,193 | 2,938,428,921 | 3,051,149,659 | 3,082,218,055 | 3,183,071,365 | 3,112,988,935 | 3,108,239,174 | |
| Baseline consumption | therms | 3,354,579,105 | 3,396,373,675 | 3,347,665,063 | 3,378,492,906 | 2,917,338,860 | 2,908,235,193 | 2,938,428,921 | 3,051,149,659 | 3,082,218,055 | 3,183,071,365 | 3,112,988,935 | 3,108,239,174 | 3,086,762,337 3,0 |
| Baseline consumption therms 3.354,579,105 3.396,373,679 3.347,655,063 3.378,492,996 2.917,338,860 2.908,235,193 2.938,428,921 3.051,149,659 3.082,218,055 3.183,071,365 3.112,988,935 3.108,239,174 3.086,762,337 3.062 NEXT → Step 1: Step 5: Step 5: Step 5: Step 7: Step 7: | | | | | | | | | | | | | | |
| Data sources: Energy Information Administration (EI/ U.S. Energy Information Administration | A). "Annual Energy Outlook (AEO) 2023 n (EIA). "Natural Gas Annual Responden | ." (2023). Availab t Query System (E | le at <u>https://www</u> IA Form 176)." (; | <u>eia.gov/outlooks/c</u> 2022). Available a | eo/ t <u>https://www.eia.</u> | gov/naturalgas/ngq | <u>s/</u> | | | | | | | |

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. \cap
- 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 0 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 vear.
 - 2) In the row farther down the page, called "Annual incremental savings" 0 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 0 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 \cap 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 0 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. 0



Email: epb-support@lbl.gov Phone: 510-486-7442 Web: eprojectbuilder.lbl.gov 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).

| SIST, Bilot Car Verries CA Berident | ial and Commercial Sector BACIEIC CAS |
|--|--|
| and it i flot dus relation any recordent | tor and commercial sectors, river in and |
| Step 6. Set Multiple Ber | nefits and Other Settings |
| Set other inputs for the modules descr | ibed below. If these modules are not edited, default values will be used. |
| Note that some modules may contain o | detailed results, rather than inputs that are meant to be edited by the user. |
| | |
| Emissions Impacts | Estimate impacts on greenhouse gas and criteria pollutant emissions. |
| | |
| Energy Burden Impacts | Analyze energy burden and investment in energy efficiency, bill assistance, and other programs for low-income customers. |
| | Examine historical information on number of customers, average rates, and average per-customer consumption. |
| Customer Information | This sheet is informational only; there are no inputs to edit. |
| Part of Part of the | |
| Savings Expiration | Determine the schedule on which savings from energy efficiency measures expire. |
| | |
| | tep 1. Step 2. Step 3. Step 4. Step 5. Step 6. Step 7. |
| Welcome S | itudy D Baseline D Target D Annual D Program D Other Display |
| ← BACK | Sales Type Savings Costs Sectings Outputs |
| | |

• 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 (CO2) | 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 (SO2) | 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

