Instructions for GHG Benefits and Electric Vehicle GHG Benefits Estimation Tools

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Introduction

The GHG Benefits Estimation Tool and Electric Vehicle GHG Benefits Estimation Tool (Tools) are Microsoft Excel workbooks that may be used by electrical distribution utilities (EDU) and natural gas suppliers (NGS) to estimate and report greenhouse gas (GHG) emissions reduction benefits from uses of allowance value allocated under the Cap-and-Trade Program. Appropriate and complete use of the Tools complies with the requirements of section 95892(e)(4)(B) and 95893(e)(4)(B) of the Cap-and-Trade Regulation (effective April 1, 2019) (Regulation). The Tools estimate lifetime GHG emissions reductions attributable to use of proceeds in the Data Year. Use of the Tools is optional. The sole purpose of the Tools is to estimate expected GHG emissions reductions from uses of allocated allowance value. The Tools are not designed for any other purpose, and they should not be applied to any other purpose.

The Tools may be used to estimate GHG emissions reductions for some of the most common uses of allocated allowance value. California Air Resources Board (CARB) staff is available to provide technical support for estimating GHG emissions reduction benefits. For each use of allocated allowance value reported in boxes 13(a)-13(h) of the EDU Use of Allowance Value Form or NGS Use of Allowance Value Form, use the corresponding tab in the Tools, if available, to estimate the GHG emissions reduction benefits associated with the expenditures. A copy of the completed Tools (as applicable) should be included with the submission of the Use of Allowance Value Form to CARB.

Consistent with the requirements of sections 95892(d)(5) and 95892(e)(4)(B) of the Regulation for EDUs and sections 95893(d)(5) and 95893(e)(4)(B) for NG suppliers, the Tools use the following framework:

- GHG benefits are estimated by comparing the anticipated emissions attributable to the use of auction proceeds in the Data Year to the anticipated emissions in the absence of the use of auction proceeds.
- The benefits are estimated for the entire expected project lifetime.
- The emissions factors in the "Emission Factors" tab of the Tools are consistent with the emission factor requirements of the Regulation.
- The GHG benefits of auction proceeds use are prorated to the percentage of total expected lifetime project costs that are covered by auction proceeds in the Data Year, including auction proceeds used in the Data Year for project administration and outreach costs.

If you choose to use a different method to estimate GHG emissions reduction benefits, the alternate method must comply with the requirements of the Regulation, including section 95892(e)(4)(B) or 95893(e)(4)(B). Please include any alternate calculations with the Use of Allowance Value report submission along with an explanation of how the alternate method complies with the requirements of the Regulation. In the future, CARB staff may provide additional tools to estimate GHG emissions reduction benefits for uses not currently included in the Tools.

General Instructions

In the Tools, **green cells** accept user input.

The GHG emissions reduction benefits for each distinct reported use should be calculated separately in the appropriate tab of the Tools. For each distinct use, the estimated lifetime GHG emissions reductions (in $MTCO_2e$) calculated in the **pink output cells** in the Tool should be reported in **box 13f** of the Use of Allocated Allowance Value Form. When selected, pink output cells display a message indicating that the output value should be reported in **box 13f**. Gray and pink cells should not be modified by users.

When calculating the percentage of project costs funded with allocated allowance auction proceeds, use the total auction proceeds spent on the project during the Data Year, including any associated administrative or outreach costs, compared to the total expected project costs, which should include costs for design, construction, operation, implementation, administration, and outreach, among other costs.

The Tools estimate lifetime GHG emissions reductions attributable to use of proceeds in the Data Year. When calculating estimated GHG benefits for a project funded with auction proceeds over multiple Data Years, start by estimating total project costs over the expected project lifetime. Then calculate the auction proceeds spent during the Data Year, including

administrative and outreach expenditures, as a percentage of the total project costs over the expected lifetime. Input this percentage into the 'percentage of project costs funded with auction proceeds' column in the GHG Benefits Estimation Tool. This approach to attributing a portion of lifetime GHG emissions reductions to use of proceeds in the Data Year is built into the EV GHG Benefits Tool, so when using the EV GHG Benefits Tool, simply input the auction proceeds used in the Data Year and the total cost of the vehicles or charging stations.

For example, if the total cost of a project over its lifetime is expected to be $10,000 and $5,000 of auction proceeds were spent on the project during the first Data Year, then 50 percent would be input into the 'percentage of project costs funded with auction proceeds' column in the first Data Year. If in the second Data Year $2,000 dollars of auction proceeds are spent on the project, and the total cost is still expected to be $10,000, then 20 percent would be input into the 'percentage of project costs funded with auction proceeds' column in the second Data Year.

Projected lifetime costs or lifetime estimated benefits may change from one year to the next; report using the best available information at the time of reporting. GHG estimates from prior years may be updated. See the 'Revising Prior Submissions" section of the *Instructions for Use of Allocated Allowance Value Forms*.

Email questions to *edu-allocation@arb.ca.gov* or *ngs-allocation@arb.ca.gov*.

Overview of Available GHG Benefits Estimation Tools

1. **Energy Efficiency and Fuel-Switching Projects.** This tab within the GHG Benefits Estimation Tool may be used to estimate GHG emissions reduction benefits for a wide variety of energy efficiency programs, including programs to improve residential and commercial energy efficiency, investments in efficiency upgrades for utility infrastructure, and demand response programs.
2. **Renewable Energy Purchases.** This tab within the GHG Benefits Estimation Tool may be used to estimate GHG emissions reduction benefits from purchases of renewable electricity.
3. **Renewable Energy Projects.** This tab within the GHG Benefits Estimation Tool may be used to estimate GHG emissions reduction benefits from renewable energy projects that either the utility develops and owns or for which the utility provides rebates. This includes community solar projects and rebates for rooftop solar installation. For rebate incentives, use an estimate of average costs and annual production based on capacity installed (or approved) under the program in the Data Year.
4. **Energy Storage Projects**. This tab within the GHG Benefits Estimation Tool may be used to estimate GHG emission reduction benefits from uses of auction proceeds for energy storage projects which support the integration of renewable energy that either the utility owns or for which the utility provides rebates.
5. **Energy Storage Purchases**. This tab within the GHG Benefits Estimation Tool may be used to estimate GHG emissions reduction benefits from uses of auction proceeds for

annual purchases of electricity from storage projects that support the integration of renewable energy.

6. **Active Transportation.** This tab within the GHG Benefits Estimation Tool may be used to estimate GHG emissions reduction benefits for various active transportation programs, including pedestrian and bicycle infrastructure projects and bike-sharing programs. The active transportation tab in California Climate Investments *Strategic Growth Council Affordable Housing and Sustainable Communities Calculator Tool* may be used to estimate the GHG emissions reduction benefits of these activities.
7. **Electric Vehicle Infrastructure.** This tab within the EV GHG Benefits Estimation Tool may be used to estimate GHG emissions reductions associated with expenditures on or subsidies for purchasing and installing electric vehicle charging stations. The charging stations may be owned by the utility or by others. Allowed uses include subsidies that may be associated with charging stations, such as charging rebates for users.
8. **Electric Vehicles.** This tab within the EV GHG Benefits Estimation Tool may be used to estimate GHG emissions reductions associated with expenditures on or subsidies for purchasing electric vehicles. The electric vehicles may be purchased by the utility or by others.
9. **Wildfire Risk Reduction.** *Forthcoming.* CARB will advise utilities once a calculation methodology is available.

GHG Benefits Estimation Tool

Instructions

1. Under "Project ID," enter the Project ID from box 13a of the EDU or NGS Use of Allocated Allowance Value form.
2. Under "Project Description," enter the brief description from box 13e in the EDU or NGS Use of Allocated Allowance Value Form.
3. Under "Date Operational," enter the actual or anticipated date (in MM/DD/YY format) that the project went into or will go into service. For uses that have multiple sub-projects, like the retrofit of multiple households with energy efficient cooling, enter year the projects were installed.
4. Under "Percentage of Project Costs Funded with Auction Proceeds," enter the percentage of total project costs funded with auction proceeds during the Data Year.
    a. Total costs include costs for design, implementation, operation, administration, and outreach, among other costs. For multi-year projects, estimate the total project costs over the expected project lifetime. Then calculate the auction proceeds spent during the Data Year, including administrative and outreach expenditures, as a percentage of the total project costs over the expected lifetime.
5. Under "Expected Project Lifetime," input the number of years GHG benefits are expected to accrue for this project.

6. Under "Annual Energy Savings/Total Annual Generation Purchased/Annual Production/Lifetime GHG Reductions from CCI Active Transportation Tool" (as applicable), enter the data applicable to the specific use. For renewable energy projects and energy storage projects, the annual production should be the amount of electricity (MWh) expected to be generated/dispatched from the project during the initial full year (i.e., the first full 365 days) of operation. See the Data Inputs section below for links to tools that may be useful in developing these estimates.
7. In the Renewable Energy Projects and Energy Storage Projects tabs under "Annual Degradation Factor," input the applicable expected annual degradation factor for the project in percent per year. The default annual degradation factor for solar photovoltaic (PV) projects is 0.5 percent per year. The tool will reduce the lifetime GHG reductions to reflect the annual degradation factor entered.
8. In the Energy Efficiency and Fuel-Switching Projects tab, under "Energy Pricing" choose the pricing class applicable to the project (residential or commercial). The default residential and commercial prices for electricity and natural gas can be found in the "Emissions Factors" tab.
9. In the Energy Storage Projects and Energy Storage Purchases tabs:
    a. Under "Type of Energy Storage Project," select from the drop-down menu the type of storage that best matches the project.
    b. Under the "Use of Energy Storage," select from the drop-down menu the use that best matches how the storage device is being used.
    c. Enter the applicable emission factors in the "Emission Factor of Electricity Used to Charge Storage Project" and" Emission Factor of Electricity Displaced by Using Stored Electricity" columns. If the stored electricity is dispatched during off-peak or mid-peak usage periods, then use an appropriate average emissions factor for that period. If dispatched during a peak usage period, then use the default emissions factor for unspecified electricity (0.428 $MTCO_2e/MWh$) or describe in the "Source(s) of Emission Factors" column why a different emissions factor is appropriate.
    d. Under "Source(s) of Emission Factors," list the source of the emission factors applicable to the project.
10. The **pink output cell**, "Estimated Lifetime GHG Emission Reductions Attributable to Proceeds Use in Data Year ($MTCO_2e$)" is automatically calculated when all green input cells in a given row are completed. Each **pink output cell** in the Tools should be reported for the corresponding project in **box 13f** of the EDU or NGS Use of Allocated Allowance Value Form.

Data Inputs and Tool Development

The GHG Benefits Estimation Tool requires several types of inputs, such as estimated energy savings from efficiency projects and expected energy production from renewable energy

projects. The following third-party tools may be useful in developing estimates for these needed inputs:

1. *Database for Energy Efficient Resources (Energy Efficiency)*
2. *Snugg Pro (Energy Efficiency)*
3. *EnergyPro (Energy Efficiency)*
4. *NREL PVWatts Calculator (Solar PV Generation)*
5. *California Climate Investments, Strategic Growth Council Affordable Housing and Sustainable Communities Calculator Tool (Active Transportation)*

The "EE and Fuel-Switching Projects," "Renewable Energy Purchases," and "Renewable Energy Projects" calculations within the Tool were adapted from the California Department of Community Services and Development (CSD) Community Calculator Tool. More information on these calculations, including quantification methodologies, can be found on the *California Climate Investments webpage.*

EV GHG Benefits Estimation Tool

Instructions for "Electric Vehicles" Tab

This tab may be used to estimate GHG emissions reductions associated with expenditures on or subsidies for purchasing electric vehicles, whether the vehicles are purchased by the utility or by others. The GHG emissions reduction benefits for each relevant reported use should be calculated separately in a distinct row in the appropriate tab of the EV Tool.

1. Under "Project ID," enter the Project ID from box 13a of the EDU or NGS Use of Allocated Allowance Value form.
2. Under "Project Description," enter the brief description from box 13e in the EDU or NGS Use of Allocated Allowance Value Form.
3. Under "Region," select from the drop-down menu the county (with local air district abbreviation) in which the project is located. If the project occurs across multiple regions, select the region in which the largest share of the project is located.
4. In the next columns, enter relevant information for the project during the Data Year regarding the total auction proceeds expended on the use, the total cost of all vehicles, and the number of vehicles purchased or subsidized.
5. Under "Year Vehicles Begin Use", enter the initial year for use of the vehicles.
6. Under "Vehicle Useful Life", enter the expected average useful lifetime of the vehicles in years, with a maximum useful lifetime of 15 years.
7. Under "Retail Electricity Price ($/kWh)," enter the utility's applicable annual average retail electricity price in dollars per kilowatt-hour.
8. If the mileage rate of the electric vehicles is known, such as for vehicles purchased by the utility, select "Yes" from the drop-down menu under "Is the EV Mileage Rate Known?", and enter the known annual average mileage rate under "EV Mileage Rate (kWh/mi)" in kilowatt-hours per mile. If the EV mileage rate is unknown, select "No" from the drop-down menu and leave "EV Mileage Rate (kWh/mi)" empty; the EV Tool will automatically estimate an EV mileage rate.
9. Under "Associated Charging Stations Project," identify the Project ID for any project in the "Charging Station" tab that is associated with these vehicles. If there is no such project, leave this blank.
10. The **pink output cell (column R)**, "Estimated Lifetime GHG Emission Reductions Attributable to Proceeds Use in Data Year ($MTCO_2e$)" is automatically calculated when all green input cells in a given row are completed. The value in the **pink output cell** should be reported for the corresponding project in **box 13f** of the EDU or NGS Use of Allocated Allowance Value Form.

Instructions for "Charging Station" Tab

This tab may be used to estimate GHG emissions reductions associated with expenditures on or subsidies for purchasing and installing electric vehicle charging stations, whether the charging stations are owned by the utility or by others. This includes subsidies that may be associated with charging stations, such as rebates for users. Note that rebates paid with allocated allowance auction proceeds must be nonvolumetric credits.[1] The GHG emissions reduction benefits for each relevant reported use should be calculated separately in a distinct row in the appropriate tab of this workbook.

1. Under "Project ID," enter the Project ID from box 13a of the EDU or NGS Use of Allocated Allowance Value form.
2. Under "Project Description," enter the brief description from box 13e in the EDU or NGS Use of Allocated Allowance Value Form.
3. Under "Region," select from the drop-down menu the county (with local air district abbreviation) in which the project is located. If the project occurs across multiple regions, select the region in which the largest share of the project is located.
4. In the next columns, enter relevant information for the project during the Data Year regarding the total auction proceeds expended on the use, the lifetime installation and operation costs for all charging stations, and the number of charging stations installed or included in a rebate program.
5. Under "Year Charging Stations Begin Operation," enter the initial year for use of the charging stations.
6. Under "Charging Station Useful Life", enter the expected average useful lifetime of the charging stations in years, with a maximum useful lifetime of 15 years.
7. Under "Retail Electricity Price ($/kWh)," enter the annual average retail electricity price in dollars per kilowatt-hour paid by customers at that charging station.
8. Finally, enter the charging rate (kW) while the charging station is in use and the expected annual usage per charging station (hours).
9. The **pink output cell (column R)**, "Estimated Lifetime GHG Emission Reductions Attributable to Proceeds Use in a Data Year (MT CO_2e)" is automatically calculated when all green input cells in a given row are completed. The value in the **pink output cell** should be reported for the corresponding project in **box 13f** of the EDU or NGS Use of Allocated Allowance Value Form.

[1] "Volumetric" describes an EDU's or NGS's direct distribution of allocated allowance auction proceeds to one or more of its ratepayers based on the current or recent amount of electricity, natural gas, or other relevant utility service delivered to those ratepayers, such that higher usage results in ratepayers' receipt of more funds.

Tool Development

The EV Tool builds on the approach used in the Greenhouse Gas Quantification Methodology for California Air Resources Board Low Carbon Transportation Program Clean Vehicle Rebate Project. Gasoline vehicle GHG emission factors were adapted from the factors used in the California Climate Investments Quantification Methodology Emission Factor Database using EMFAC 2017.

More information on these quantification methodologies and factors can be found on the *California Climate Investments webpage*.