EQB Climate Calculator

User Training Session – Version 1.2 Calculator Updates

2026

Agenda

1. Background
2. Calculator Updates (version 1.2)
3. Demonstration
4. Q&A

Background

Calculator History

- Initial version of the calculator was released in 2025 (version 1.1, May 2025)
- Version 1.2 of the calculator was released March 2026
- See *EQB's Climate Assessments website* to access the calculator, user manual, and prior trainings that cover:
  - Settings, structure, navigation, and formatting
  - Key features (e.g., data validations, completeness checkers, and default buttons)
  - Data inputs and outputs
  - Mitigation and adaptation modules
  - Limitations and exclusions

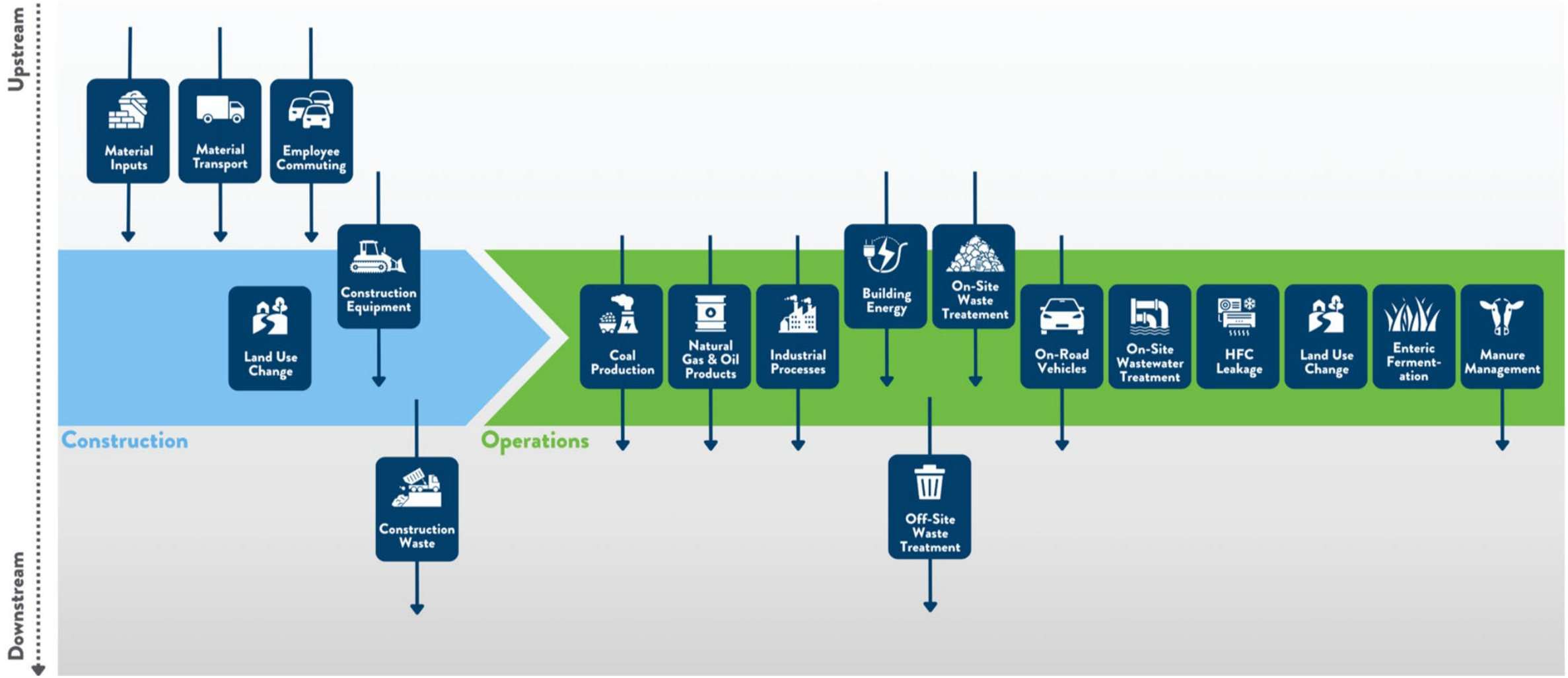
https://www.eqb.state.mn.us/environmental-review/climate-assessments

Climate Calculator Overview

- Purpose
  - Help project developers and RGUs assess the **full GHG emissions impact potential** of a project in Minnesota
  - Identify and implement **mitigation and adaptation** strategies
  - Answer **EAW items #7 and #18** **Not Required**
- Scope
  - Quantifies impact from project **construction and operation**, including **upstream and downstream** emissions
  - Assesses GHG impact from **18 potential emission sources**
  - Quantifies **potential mitigation measures** to reduce GHG emissions

Use of the Climate Calculator is not required to complete the EAW

Scope


Upstream
Material Inputs
Material Transport
Employee Commuting
Land Use Change
Construction Equipment
Construction Waste
Construction
Coal Production
Natural Gas & Oil Products
Industrial Processes
Building Energy
On-Site Waste Treatement
Off-Site Waste Treatment
On-Road Vehicles
On-Site Wastewater Treatment
HFC Leakage
Land Use Change
Enteric Ferment-ation
Manure Management
Operations
Downstream

Calculator Updates (version 1.2)

Version 1.2 Updates

Emissions Source/Module	Update
Land Use Change	Updated land use types for wetlands
Wastewater Treatment	Tailored calculation by treatment system type Added direct N_2O emissions
HFC Leakage	Updated equipment type list and default HFC assumptions Added option for users to select HFC
Construction equipment	Added alternate option to input total fuel consumption
Building energy consumption	Added alternate option to input total fuel consumption
Mitigation	Added quantification of select mitigation measures

Land Use Types

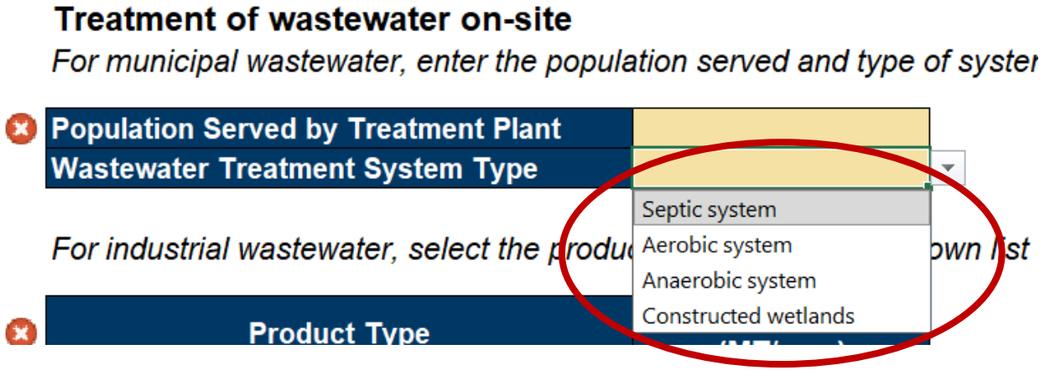
- Split land use type for wetlands into:
  - Peatland, forested
  - Peatland, non-forested
  - Mineral soil, forested
  - Mineral soil, non-forested
- Previously, broken out by forested and non-forested

Land Use Carbon Stock

Land Use Type	Carbon Stock (MT C/acre)
Wetlands: peatland, non forested	367.87
Wetlands: peatland, forested	436.18
Wetlands: mineral soil, non forested	55.56
Wetlands: mineral soil, forested	77.15
Forest	99.00
Rivers and streams	-
Brush and grassland	40.80
Cropland	32.49
Livestock rangeland/pastureland	40.80
Lawn/landscaping	19.06
Green Infrastructure: Constructed wetlands, paved	-
Green Infrastructure: Constructed wetlands, vegetated	43.40
Green Infrastructure: Constructed green roofs	19.06
Green Infrastructure: Constructed permeable pavements	-
Impervious surface	-
Stormwater pond (wet sedimentation basin)	-

Wastewater Treatment

- Added user input for waste treatment system type
  - Tailored emission factors based on system type
- Added equation for direct N_2O emissions from wastewater



New

Treatment of Wastewater On-Site

Annual Methane Emissions from Municipal Wastewater Treatment

Population Served		BOD (kg/person/day)		Unit Conversion (days/year)		Emission Factor (kg CH_4/kg BOD)		Methane Correction Factor		CH4 Emissions (kg CH_4/year)
100	x	0.09	x	365	x	0.6	x	0.030	=	59.13

Annual Direct Nitrous Oxide Emissions from Municipal Wastewater Treatment

Population Served		Protein Consumption (kg/person/year)		Nitrogen Content (kg N/kg protein)		Factor for Non-Consumed Protein		Emission Factor (kg N_2O-N/kg N)		Conversion Factor (N_2O-N to N_2O)		Direct N2O Emissions (kg N_2O/year)
100	x	35.7	x	16%	x	1.75	x	0.015	x	1.57	=	23.56

HFC Leakage

- Added option for users to select HFC
- Updated default refrigerant assumptions
- Removed equipment types that are assumed to no longer use HFCs

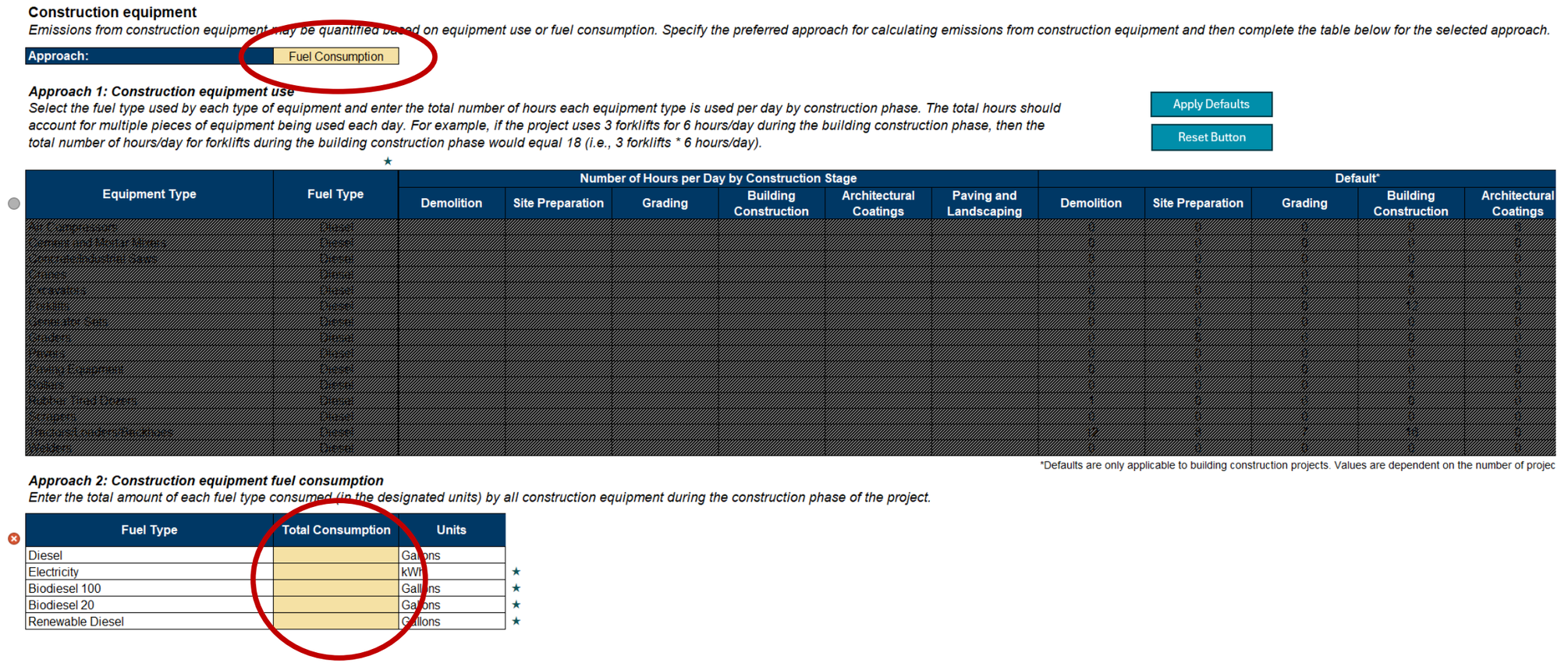
Building Type	Equipment Type	HFC	Default
Residential	Room A/C & Other residential A/C and heat pumps		R-454B ★
Commercial	Other commercial A/C and heat pumps		R-454B ★
Institutional	Walk-in refrigerators and freezers		R-404A ★
Institutional	Other commercial A/C and heat pumps		R-454B ★
Industrial	Other commercial A/C and heat pumps		R-454B ★

Apply Defaults

Reset Button

Construction Equipment

- Users can now select one of two approaches: by (1) equipment use or (2) fuel consumption
- Previously, only able to quantify emissions by equipment use



Construction equipment

Emissions from construction equipment may be quantified based on equipment use or fuel consumption. Specify the preferred approach for calculating emissions from construction equipment and then complete the table below for the selected approach.

Approach: Fuel Consumption

Approach 1: Construction equipment use

*Select the fuel type used by each type of equipment and enter the total number of hours each equipment type is used per day by construction phase. The total hours should account for multiple pieces of equipment being used each day. For example, if the project uses 3 forklifts for 6 hours/day during the building construction phase, then the total number of hours/day for forklifts during the building construction phase would equal 18 (i.e., 3 forklifts * 6 hours/day).*

Apply Defaults

Reset Button

Equipment Type	Fuel Type	Number of Hours per Day by Construction Stage						Default*				
		Demolition	Site Preparation	Grading	Building Construction	Architectural Coatings	Paving and Landscaping	Demolition	Site Preparation	Grading	Building Construction	Architectural Coatings
Air Compressors	Diesel							0	0	0	0	0
Cement and Mortar Mixers	Diesel							0	0	0	0	0
Concrete/Industrial Saws	Diesel							0	0	0	0	0
Cranes	Diesel							0	0	0	4	0
Excavators	Diesel							0	0	0	0	0
Forklifts	Diesel							0	0	0	12	0
Generator Sets	Diesel							0	0	0	0	0
Graders	Diesel							0	0	0	0	0
Pavers	Diesel							0	0	0	0	0
Paving Equipment	Diesel							0	0	0	0	0
Rollers	Diesel							0	0	0	0	0
Rubber Tired Dozers	Diesel							1	0	0	0	0
Scrapers	Diesel							1	0	0	0	0
Tractors/Loaders/Backhoes	Diesel							12	3	7	16	0
Welders	Diesel							0	0	0	0	0

*Defaults are only applicable to building construction projects. Values are dependent on the number of projec

Approach 2: Construction equipment fuel consumption

Enter the total amount of each fuel type consumed (in the designated units) by all construction equipment during the construction phase of the project.

Fuel Type	Total Consumption	Units
Diesel		Gallons
Electricity		kWh
Biodiesel 100		Gallons
Biodiesel 20		Gallons
Renewable Diesel		Gallons

Building Energy Consumption

- Users can now select one of two approaches: by (1) energy intensity or (2) fuel consumption
- Previously, only able to quantify emissions by energy intensity

Building energy consumption

Emissions from buildings may be quantified based on building energy intensities or fuel consumption. Specify the preferred approach for calculating emissions from buildings and then complete the table below for t

Approach:	Fuel Consumption

Approach 1: Building energy intensities

Enter the energy intensity of each building type that is applicable to your project in Btu per square foot per year. Applicability is determined based on the building square footage data entered in the Project Background tab. Select the "Apply Defaults" button to the right of the table to populate the table with default values. For "Other" building types, no default is available and must be provided, if applicable.

Building Type	Energy Intensity (Btu/sq ft/year)				Default*			
	Electricity	Natural Gas	Propane	Kerosene or Fuel Oil	Electricity	Natural Gas	Propane	Kerosene or Fuel Oil
Residential					18,091.91	24,190.91	3,619.36	233.61
Commercial					30,756.13	15,334.66	0.00	1,661.36
Industrial					229,952.20	650,392.90	0.00	8,191.69
Institutional					40,880.06	46,210.03	0.00	3,659.82
Other					NA	NA	NA	NA

Apply Defaults

Reset Button

*Refer to the *Buildings tab* for industry-specific default values for industrial buildings. These values may be manually entered in place of the default provided.

Approach 2: Building fuel consumption

Enter the total amount of energy consumed annually by fuel type.

Fuel Type	Fuel Consumption (units/year)	Unit
Electricity		kWh
Natural Gas		Cubic feet
Propane		Gallons
Kerosene or Fuel Oil		Gallons

Mitigation Measure Quantification

- Added new Quantified Reductions tab to quantify reductions from select mitigation measures

- Reductions quantified based on data and methods already embedded into the calculator

	One-Way Distance (miles)	Default
Average One-Way Commute Length	13.2	13.2

Apply Defaults

Reset Button

Transportation Mode	Percent of Employees	Default	
Single Occupancy Vehicle	81.7%	81.7%	
Carpool	10.6%	10.6%	★
Motorcycle	0.2%	0.2%	
Bus	1.9%	1.9%	★
Transit Rail	2.2%	2.2%	★
Bike/Walk	3.4%	3.4%	★
Total:	**100%**		

Star icons indicate that user input is used in mitigation calculations. In this example, inputs are used to quantify reductions from developing a ride share program for construction contractors.

Mitigation tab (UPDATED)

Select the buttons to select "Yes" for all visible measures or remove all selections from the first column.

Select the "Generate PDF" button to print a PDF of all visible measures shown on this page.

Select the button to select "Yes" for measures that are deemed applicable based on entered user input.

Select "Yes" or "No" from drop-downs to choose measures to implement as part of the project.

Mitigation Measures (Step 5a)

Use the filters in the table below to identify potential mitigation measures to reduce GHG emissions from the proposed project. Use the column on the far left to select measures you plan to implement. Measures marked as 'Yes' in column F are available for quantification in the Quantified Reductions tab. Click the 'Select Applicable Quantifiable Measures' button to select quantifiable mitigation measures that are deemed applicable based on entered user inputs. Select the 'Generate PDF' button once you've made your desired selections to export the list.

Select Applicable Quantifiable Measures | Select All Unhidden Measures | Reset all Selected Measures | Generate PDF | Go to Quantified Reductions | Go to Charts

Select	Emissions Source	Phase	ID	Quantifiable?	Measure Title	Measure Description
	Employee commuting	Construction	M-1C-01	No	Use Local Construction Contractors	Maximize use of local construction contractors. Contracting construction work with a local company reduces vehicle miles traveled associated with construction employee commute distances and, therefore, reduces emissions from vehicle fuel combustion. Local hire provisions may cover the entire workforce, or a percentage of the workforce based on the project size or employment type.
Yes	Employee commuting	Construction	M-1C-02	Yes	Develop a Ride Share Program for Construction Contractors	Develop a project specific ride share program to encourage carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. Ride share programs reduce employee commute vehicle miles traveled, which in turn reduces emissions from fuel combustion.
	Construction equipment	Construction	M-1D-01	Yes	Use Renewable Diesel	Use renewable diesel in construction equipment and vehicles in lieu of similar vehicles powered by gasoline or diesel fuel. Tailpipe GHG emissions from renewable diesel are identical to tailpipe GHG emissions from conventional diesel; thus, the GHG benefits of renewable diesel come from the fact that it is produced from biomass.
	Construction equipment	Construction	M-1D-02	Yes	Use Electric or Hybrid Powered Equipment	Use electric- or hybrid-powered construction equipment over conventional diesel-fueled counterparts. Replacing diesel-powered equipment with electric or hybrid-electric equipment reduces fossil fuel combustion and thus GHG emissions. However, all-electric equipment results in GHG emissions from the electricity used to charge the equipment. The indirect GHG emissions increase from electricity must be calculated in addition to the GHG emissions reduction from displaced fossil fuel combustion to estimate the total net GHG emissions reduction achieved by this measure if using all electric equipment.
	Construction equipment	Construction	M-1D-03	No	Limit Heavy-Duty Diesel Vehicle Idling	Minimize idling time by requiring that equipment be shut down after five minutes when not in use. Provide clear signage that posts this requirement for workers at the entrances to the site and provide a plan for the enforcement of this requirement. Reducing idling time will reduce emissions from fuel combustion.
	Construction equipment	Construction	M-1D-04	No	Maintain All Equipment in Proper Condition	Maintain all construction equipment in proper working condition and perform all preventative maintenance. Required maintenance includes compliance with all manufacturer's recommendations, proper upkeep and replacement of filters and mufflers, and maintenance of all engine and emissions systems in proper operating condition. Maintenance schedules should be detailed in an Air Quality Control Plan prior to commencement of construction.
	Construction equipment	Construction	M-1D-05	No	Implement a Tire Inflation Program	Implement a tire inflation program on jobsites to confirm that equipment tires are correctly inflated. Check tire inflation when equipment arrives on site and every two weeks for equipment that remains on site. Check vehicles used for hauling materials off site weekly for correct tire inflation. Procedures for the tire inflation program should be documented in an Air Quality Management Plan prior to commencement of construction.

Quantified Reductions tab (NEW)

Select the "Generate PDF" button to print a PDF of all visible measures shown on this page.

Mitigation Measure Emission Reductions (Step 5b)

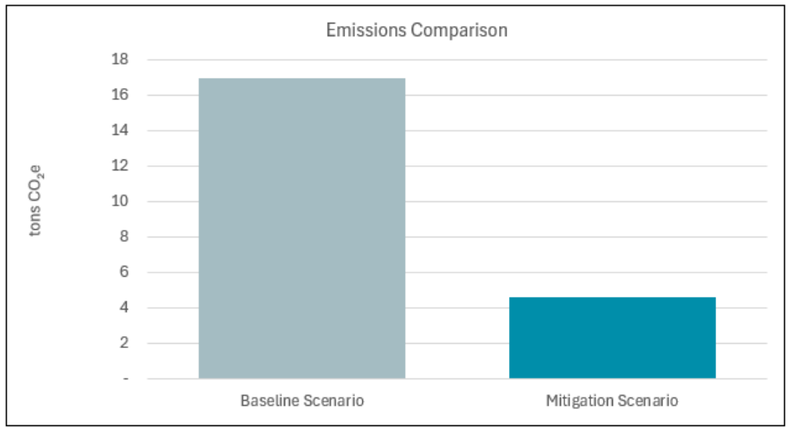
This tab quantifies GHG emission reductions from select mitigation measures. Measures that are available for quantification are identified in the Mitigation tab. Only results for measures that are selected with a 'Yes' in the Mitigation tab are quantified below. Reductions are quantified based on data entered in the Project Background and User Inputs tabs as well as methods and assumptions used throughout the calculator. In some cases, additional data inputs are required to quantify reductions. Enter data into the yellow cells, as needed, to quantify reductions from these measures.

Go to Adaptation

Generate PDF

Unit:	tons

Measure	Baseline Scenario CO_2e Emissions	Mitigation Scenario CO_2e Emissions	Total Mitigated CO_2e Emissions
M-1C-02: Develop a Ride Share Program for Construction Contractors	16.92	4.77	12.14
M-1D-01: Use Renewable Diesel in Construction Equipment	Measure not selected	Measure not selected	Measure not selected
M-1D-02: Use Electric or Hybrid Powered Construction Equipment	Measure not selected	Measure not selected	Measure not selected
M-1E-01: Create New Open Space with Native Vegetation and Habitat	Measure not selected	Measure not selected	Measure not selected
M-1E-02: Expand Urban Tree Planting	-	(0.20)	0.20
M-1E-06: Afforestation	Measure not selected	Measure not selected	Measure not selected
M-2A-22: Establish Onsite Renewable Energy Systems	-	-	-
M-2A-23: Use Renewable Natural Gas or Green Hydrogen Fuel	Measure not selected	Measure not selected	Measure not selected
M-2C-01/M-2C-02/M-2C-03/M-2C-04/M-2C-05: Reduce Natural Gas Leakage and Venting	Measure not selected	Measure not selected	Measure not selected
M-2E-01: Use Alternative Refrigerants Instead of High-GWP Refrigerants	Measure not selected	Measure not selected	Measure not selected
M-2J-01: Institute or Extend Recycling Services	Measure not selected	Measure not selected	Measure not selected
M-2J-03: Implement Organics Diversion Program	Measure not selected	Measure not selected	Measure not selected
M-2L-01: Require Best Management Practices for Manure Management	Measure not selected	Measure not selected	Measure not selected
Total	**16.92**	**4.57**	**12.34**



M-1C-02: Develop a Ride Share Program for Construction Contractors

Reductions from this measure are achieved by encouraging employees to commute using alternative modes of transportation instead of driving alone. To quantify reductions from this measure, enter the anticipated percent of employees that will participate in the ride share program.

Percent of Employees Participating in Rideshare Program	8%

User input needed to quantify this measure.

	Mitigation Scenario		Baseline Scenario	
Transportation Mode	Mode Breakout	$kgCO_2e$	Mode Breakout	$kgCO_2e$
Single Occupancy Vehicle	0.0%	-	8.0%	15,345
Carpool	4.7%	3,638	0.0%	-
Motorcycle	0.0%	-	0.0%	-
Bus	0.8%	305	0.0%	-
Transit Rail	1.0%	386	0.0%	-
Bike/Walk	1.5%	-	0.0%	-

Emissions under Baseline Scenario ($kgCO_2e$)	15,345
Emissions under Mitigation Scenario ($kgCO_2e$)	4,329
Emissions Mitigated ($kgCO_2e$)	11,016

Demonstration

Thank you!

Questions? Please reach out!

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