User Input	Calculated or from other tab	Instructions are in yellow boxe

This worksheet is used to capture information on Industrial Greenhouse Gas Reduction project proposa
relevant user input (green) cells in the *Project Overview* tab. Data will be extracted from this workbook

Section	Applicant Information	Input
Project Overview	Applicant Control Number	
	Company Name	
	City (HQ)	
	State (HQ)	
	Zip Code (HQ)	
	City (Facility)	
	State (Facility)	
	Zip Code (Facility)	
	Qualified Investment ($)	
	Expected Credit Rate	
	Tax Credit ($)	0
	Sector/Industry	
	If other Sector	
	Facility Output Product	
	Current production	
	Future production	
	GHG Emissions Reduction Approach	
	If other (or multiple) Decarbonization Approach	
	Technology Readiness Level of decarbonization approach	
	EPA GHGRP ID (if applicable)	
	Which emissions reduction eligibility requirement do you meet?	

es next to the corresponding inputs

als. Input data and assumptions should be substantiated in and show clear correspondence to
to compare submissions. **Therefore, no cells, rows, or columns should be added.**

Units	Notes
	The control number used to track the application in the DOE 48C a
	Dollar amount of the qualified investment that "re-equips" the faci
	Applicants should select a 30% tax credit if they anticipate meeting and (6). Applicants who do not anticipate meeting those requireme and apprenticeship requirements, please see Section 4 of IRS Notic
	Calculated by multiplying Qualified Investment by Expected Credit
	Select the sector or industry that most closely matches the facility.
	If selected Other above, type a freeform answer.
	Brief description of the facility output product in 5 words or less (e
tons/year	Current annual production **in the facility covered by the greenhou** output product per year.
tons/year	Future annual production **in the facility covered by the greenhous** product per year after the retrofit project. If the project will alter a should be reflected here and described in the narrative.
	Select the process change that most closely describes the greenho
	If selected Other above, type a freeform answer. If secondary or m describe
	Submit the Technology Readiness Level (1-9) of the technology, eq assess their technology, applicants may use DOE's CARAT tool here https://www.energy.gov/media/290831
	Applicants subject to EPA GHGRP reporting should provide their GH
	Applicants should select whether they achieve at least a 20% reduc Scopes 1 and 2, or a facility sub-unit. Regardless of eligibility, appli emissions before and after the retrofit below; combined Scope 1 a impact of the project.

applicant's project narrative. Applicant should first fill out the

pplication portal.
ility, as defined in 48C(b).
; the wage and apprenticeship requirements under 48C(e)(5) ents should select 6% from the dropdown. For more on wage ce 2023-18
Rate.
.g., "rebar").
se gas reduction project, expressed in tons of the facility
e gas reduction project, expressed in tons of the facility output nnual production (e.g., increase or decrease output), that
use gas reduction technique
ultiple equipment types are used, use freeform answer to
uipment, or process used in the GHG reduction project. To , based on the related Adoption Readiness Level:
HGRP ID.
ction in GHG emissions for Scope 1, Scope 2, a combination of cants must fill out at least facility-wide Scope 1 and Scope 2 nd Scope 2 emissions will be used to evaluate the holistic

User Input	Calculated or from other tab

This worksheet is used to capture information on commercial viability of Industrial Greenhouse Gas Re
(green) cells in the *Project Overview* tab. Data will be extracted from this workbook to compare submis

Cash flow statement instructions: In the appendix materials, applicants should provide an investment b
and ROI over the project lifespan. The model should also include a list of key economic/financial assum

Section	Applicant Information
Organization	Organization type
	Public or private (if small, medium, or large business)
	Investment stage (if private)
	Capital raised to date ($)
	Annual revenue ($)
	Net income ($)
	Debt to capital ratio
	Cash flow available for debt service ($)
	5-year revenue projection ($)
	Total full-time employees
	Market cap (if public)
	Moody's investment grade (if available)
	S&P investment grade (if available)
	Fitch's investment grade (if available)
Project to completion	Date Complete Permitting
	Date Begin Construction
	Date Begin Operation
	Future equity need to support organization growth over next 5 years ($)
	Future debt need to support organization growth over next 5 years ($)
Site selection	Company Name
	City (Facility)
	State (Facility)
	Zip Code (Facility)
Project finance metrics	Projected return on investment
	Weighted average cost of capital
	Net present value (with incentives)
	Net present value (without incentives)
	Unlevered Project IRR (%) (with incentives)

	Unlevered Project IRR (%) (without incentives)
	Break-even point (with incentives)
	Break-even point (without incentives)
Project finance sources (please list sources in the table below)	Equity (%)
	Debt (%)
	State or local incentives ($)
	State or local incentives (non-financial)
	Other federal incentives ($)
Market overview	Target addressable market ($ revenue)
	Target addressable market (# of units)
	Projected YOY market growth over the next 5 years (5)
	Key customers
	Market share over the next 5 years (%)
Product competitiveness	Unit cost ($)
	Absolute difference in unit cost of product compared to industry average
	Percent difference in unit cost of product compared to industry average
Corporate disclosures	Ongoing legal claims (Yes or No)
	Planned debt restructuring (Yes or No)
	Going concern (Yes or No)
	Near-term debt maturities ($)
	Other planned corporate actions that may affect completion of project (Yes or No)

List the top four financing sources for the project and the sum of all other financing sources. Please des

Financing Source	Type of Financing (e.g., equity, debt, etc.)
Financing Source 1	
Financing Source 2	
Financing Source 3	
Financing Source 4	
Financing Source 5	
Sum of other financing sources	

Indicate the main categories of expenditures associated with the qualified investment. If project contai

Cost ($)	Description of expenditure (e.g., Purchasing 2 new units of XX machinery, retooling XX production line)

Instructions are in yellow boxes next to the corresponding inputs
duction project proposals. Input data and assumptions should be substantiated in and show clear corresp
sions. Therefore, no cells, rows, or columns should be added.

ank quality financial model for the project. The model should quantify the projected financial parameters
ptions as a separate tab. The model should be dynamic and not hardcoded. ***[Please use nominal dollars,***

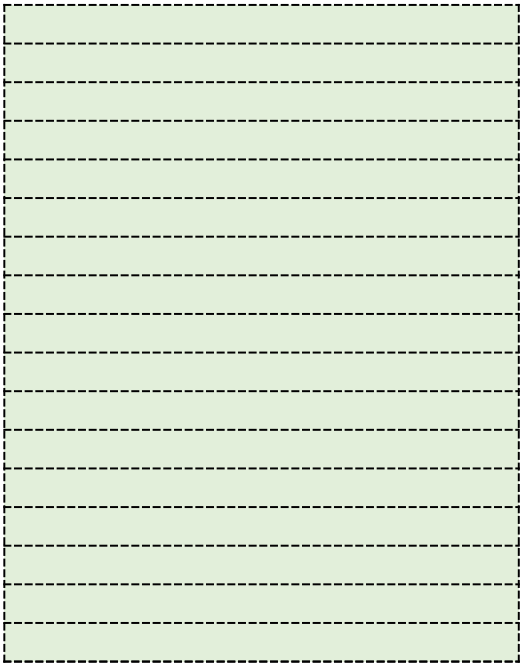
Input	**Notes**

cribe the timing of expected equity contributions and debt funding as well as the timing of repayment of

Amount ($)	Timing of financing

ns additional categories of expenditures that are not eligible as a qualified investment (e.g., building expa

Is this investment qualified per IRS Notices 2023-18 and 2023-44?



ɔondence to applicant's project narrative. Applicant should first fill out the relevant user input

; including operating costs, operating revenues, financing cash flows, EBITDA, tax credits/liabilities,
note inflation estimator used and the start year]

Instructions
Small business, medium business, large business, academic, federal government, state or local government, non-profit. Small and medium enterprises are classified in the North American Industry Classification System (NAICS) as any of sectors 31 through 33; and have a total number of employees within 165% of the size standard limits established by the Small Business Administration (SBA), based on the firm's associated NAICS sector as set forth in 13 CFR Part 121.201.
Specify investment stage (e.g., series A, B, or C)
Specify capital raised to date and describe who led the last round of funding in the notes section
Provide the revenue of the applicant company for the most recently completed fiscal year
Please briefly describe the company's growth plans for the next five years.
See instructions above on the cash flow statement to be submitted
See instructions above on the cash flow statement to be submitted
See instructions above on the cash flow statement to be submitted
See instructions above on the cash flow statement to be submitted

See instructions above on the cash flow statement to be submitted
Indicate the percentage of anticipated equity from outside sources
Indicate the percentage of debt anticipated in the capital stack. Enter 0 if not applicable.
Indicate amount of state or local incentives received for the project and briefly describe whether it is a fixed-dollar amount or cost-share. Indicate which incentives are already secured.
Describe non-financial incentives (e.g., land leases, apprenticeship programs, infrastructure support etc.). Indicate which incentives are already secured.
Indicate amount of federal incentives received for the project and briefly describe whether it is a fixed-dollar amount or cost-share. Indicate which incentives are already secured.
Site third party vetting/ inputs
Site third party vetting/ inputs
Site third party vetting/ inputs
Please list your key customers and indicate customer concentration in the notes.
Site third party vetting/ inputs
Site third party vetting/ inputs
Describe how much more expensive than average your unit cost is. If less expensive, indicate this with a negative value. Site third party vetting/ inputs.
Site third party vetting/ inputs
Indicate if there are any ongoing or expected legal claims related to the project . If selecting Yes, please describe in application narrative
Indicate any planned debt restructuring. If selecting Yes, please explain in the application narrative.
Indicate any planned corporate or management actions that can impact the timely completion of the project or can cause the project to be stalled for an extended period of time. If selecting Yes, explain in brief.

expected debt funding

nsion), indicate here as well.

Baseline Emissions Summary

Guidance

This Summary Tab estimates baseline and future annual GHG emissions at the retrofitted facility. Columns F and I below automatically emissions from the required Scope 1 and Scope 2 tabs. In Column I through Column M, applicants are asked to explain and justify imp that particular emissions source category. Applicants have the option to include information on offsets and RECs, though these **will n** total reductions and are merely an opportunity for the applicant to showcase additional efforts underway.

The methodology for estimating baseline and future emissions in this data sheet is based on EPA's Simplified Greenhouse Gas Calcula calculate all possible emissions at a facility, it is designed to capture the major industrial Scope 1 and Scope 2 sources. Applicants who specific emissions assessments (e.g., LCAs, FEED studies) are encouraged to do so in their supplementary materials.

Applicants should complete each tab with in the most recent year-long reporting period. Applicants with up-to-date GHGRP reporting GHGRP record in lieu of baseline emissions accounting and submit their GHGRP ID below.

Organizational Information:

Control ID:

GHGRP ID (if applicable):

Note: Applicants that provide a GHGRP ID are encouraged, but not required, to fill in the Scope 1 tabs. All applicants are required to fil

Inventory Reporting Period: Start: *MM/DD/YY* End: *MM/DD/YY*

Scope 1 Emissions	**Baseline (pulls from tabs)** Cells pull from the detailed baseline emissions tabs.	
Stationary Combustion	0	CO_2-e (metric tons)
Process Emissions	0	CO_2-e (metric tons)
Refrigeration / AC Equipment Use	0	CO_2-e (metric tons)
Fire Suppression	0	CO_2-e (metric tons)
Purchased Gases	0	CO_2-e (metric tons)

Scope 2 Emissions		
Purchased and Consumed Electricity	0	CO_2-e (metric tons)
Purchased and Consumed Steam	0	CO_2-e (metric tons)
Purchased and Consumed Hydrogen	0	CO_2-e (metric tons)

Total Facility Emissions		
Total Scope 1 & Scope 2	0	CO_2-e (metric tons)

(OPTIONAL) Offsets and RECs - DO NOT count to emissions reductions achieved from retrofits

Offsets	0	CO_2-e (metric tons)
Renewable Electricity Credits	0	CO_2-e (metric tons)

y sum the baseline and post-retrofit
roved annual emissions at the facility for
ot count in the calculation of the applicants'

tor. While this simplified calculator may not
wish to submit more detailed project-

may indicate that they have submitted a

l in the Scope 2 tabs.

Estimated post-retrofit (pulls from tabs)

Estimated emissions in each source category after the retrofit. Unaffected source categories should remain unchanged from Column F.
0
0
0
0
0

0
0
0

0

0
0

	Percentage change	Decarb approach	Justification
		Select the decarbonization approach that specifically corresponds to this source category	Reference any technical documentation (studies, etc.) that justifies these emissions estimates
CO_2-e (metric tons)	#DIV/0!		
CO_2-e (metric tons)	#DIV/0!		
CO_2-e (metric tons)	#DIV/0!		
CO_2-e (metric tons)	#DIV/0!		
CO_2-e (metric tons)	#DIV/0!		

CO_2-e (metric tons)	#DIV/0!		
CO_2-e (metric tons)	#DIV/0!		
CO_2-e (metric tons)	#DIV/0!		

CO_2-e (metric tons)

CO_2-e (metric tons)
CO_2-e (metric tons)

User Input	Calculated or from other tab	Instructions are in yellow boxe

Please list the direct jobs that will be created during both construction and operations of the facility. Fo
operating jobs created by the project. Please be as specific as possible.
Direct jobs are those jobs represented by the number of people whose work is directly billed to the pro
Do not list Indirect Jobs, defined as employees included in the supply chain who are not directly billed
- Producers of equipment or services that are used on the project
- Accounting or administrative services
- End-use installers
- Operating jobs unrelated to the project (for a GHG reduction project in a steel facility, do not count st
The review team will calculate indirect jobs using a consistent methodology.

Workforce and community engagement questions
Question
Does the location or community qualify as a disadvantaged community according to the Climate and E
Does the location qualify as a 48C energy community? (Yes/No)
If yes to above, which census track as identified in Appendix C or IRS Notice 2023-44 is your poject loca
Does the project meet the Prevailing Wage and Apprenticeship (PWA) requirements? (Yes/No)
Have you provided a Prevailing Wage and Apprenticeship (PWA) certification? (Yes/No) *For more on w* *Notice 2023-18*.
How many apprenticeships do you anticipate supporting through this project?
How many scholarships do you anticipate supporting through this project?
What is the anticipated value of scholarships you will provide?
How frequently will you award scholarships?

Workforce and community agreements

Applicant should fill out this section with all community and workforce agreements and programs unde
the specific named co-signers or other partners in last column. Please list the specific named co-signers
distinguish between co-signers and anticipated co-signers where appropriate.

Agreement Type	No. of agreements under development	No. of agreements signed or active
Good Neighbor Agreement / Community Benefits Agreement		
Collective Bargaining Agreement (Non-Construction)		
Project Labor Agreement or Community Workforce Agreement (Construction)		
Other workforce development agreements or community engagement agreements		

Workforce and jobs impacts

Applicant should fill out this section for any construction jobs they anticipate will meet wage and appre
corresponding Treasury guidance.

Construction Jobs - Meeting Wage and Apprenticeship Requirements

Job Category *Applicant can determine category*	Annualized FTE *FY2023*	Annualized FTE *FY2024*

Environmental impacts

Quantify the extent to which the proposed project accounts for its environmental impact to the surrounding community. Applicants may find it helpful to consult the U.S. Environmental Environmental Justice Screening and Mapping (EJSCREEN) tool (https://www.epa.gov/ejscreen).

Pollutant Type	**Source**	**Annual Emissions (current)**

s next to the corresponding inputs

or retrofits/reequipped facilities, please list the number of current jobs for the purposes of calculating incre

oject.
to the project. Examples include:

eelworkers not working on the GHG reduction)

	Input
conomic Justice Screening Tool (CEJST)? (Yes/No)	
ited in?	
age and apprenticeship requirements, please see Section 4 of IRS	

er development, signed, or active. Please list
s or other partners in last column. Please

List key co-signatory parties (e.g., X community nonprofit, X union local)

enticeship requirements under 48C(e) and

Applicant should fill out this section only i
prevailing wage and apprenticeship requi
expect to receive a 6% credit or pay penal

Construction Jobs - NOT Meeting Wag

Annualized FTE *FY2025*	Annualized FTE *FY2026*	Annualized FTE *FY2027*

Job Category *Applicant can determine category*

l Protection Agency's

Annual Emissions (future expected, due to this project)	**Units**

mental

f they anticipate that certain construction jobs will not meet
rements. If so, they are not guaranteed the 30% credit and should
lties.

ge and Apprenticeship Requirements

Annualized FTE *FY2023*	Annualized FTE *FY2024*	Annualized FTE *FY2025*	Annualized FTE *FY2026*	Annualized FTE *FY2027*

Current and anticipated operating jobs at the facility. Applicant should fill out the first column for Current F
existing facility.

Operating Jobs	

Job Category *Applicant can determine category*	Current FTE (if applicable) *FY2022*	Annualized New FTE *FY2023*	Annualized New FTE *FY2024*	Annualized New FTE *FY2025*

FTE only if this is an

Annualized New FTE *FY2026*	Annualized New FTE *FY2027*

Scope 1 Emissions from Stationary Combustion Sources

Guidance

(A) Enter annual data for each combustion unit, facility, or site (by fuel type) in GREEN cells on **Table 1** (thi
particular source ID of your choosing. Example entry is shown in first row (*GREEN Italics*).

- Select "Fuel Combusted" from drop down box.

- Enter " Current Quantity Combusted" and choose the appropriate units from the drop down b
it's necessary to convert units, common heat contents can be found on the "Heat Content" she
the "Unit Conversion" sheet.

- Enter "Future Quantity Combusted" and choose the appropriate units from the drop down bo
necessary to convert units, common heat contents can be found on the "Heat Content" sheet a
"Unit Conversion" sheet.

- If switching fuels during the 48C project, there should be rows for both the current and the fu
reduction in the current fuel and an increase in the future fuel.

- If the 48C project involves a retrofit that impacts fuel demand (e.g., installation of CCS equipm
combustion associated with that retrofit should be incorporated here.

(B) If fuel is consumed in a facility but stationary fuel consumption data are not available, an estimate shou
for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approac

(C) Biomass CO_2 emissions are not reported in the total emissions, but are reported separately at the bot

For categories that are not explicitly listed, please select the closest biomass category.

Table 1. Stationary Source Fuel Combustion

Source Name/ID	Source Description	Fuel Combusted	Fuel State (solid, liquid, gas)
Example: Boiler 1	*Natural gas boiler*	*Natural Gas*	*Gas*

Current Organization-Wide Stationary Source Combustion by Fuel Type

Fuel Type	Quantity Combusted	Units
Coal and Coke - Solid		
Anthracite Coal	0	short ton
Bituminous Coal	0	short ton
Sub-bituminous Coal	0	short ton
Lignite Coal	0	short ton
Mixed (Commercial Sector)	0	short ton
Mixed (Electric Power Sector)	0	short ton
Mixed (Industrial Coking)	0	short ton
Mixed (Industrial Sector)	0	short ton
Coal Coke	0	short ton
Other Fuels - Solid		
Municipal Solid Waste	0	short ton
Petroleum Coke (Solid)	0	short ton
Plastics	0	short ton
Tires	0	short ton
Biomass Fuels - Solid		
Agricultural Byproducts	0	short ton
Peat	0	short ton
Solid Byproducts	0	short ton
Wood and Wood Residuals	0	short ton
Gaseous Fuels		
Natural Gas	0	scf
Propane Gas	0	scf
Landfill Gas	0	scf

Petroleum Products			
Distillate Fuel Oil No. 2		0	gallons
Residual Fuel Oil No. 6		0	gallons
Kerosene		0	gallons
Liquefied Petroleum Gases (LPG)		0	gallons
Biomass Fuels - Liquid			
Biodiesel (100%)		0	gallons
Ethanol (100%)		0	gallons
Vegetable Oil		0	gallons

Current Organization-Wide CO_2, CH_4 and N_2O Emissions from Stationary Source Fuel Combustion

Fuel Type		CO_2 (kg)	CH_4 (g)
Coal and Coke - Solid			
Anthracite Coal		#NAME?	#NAME?
Bituminous Coal		#NAME?	#NAME?
Sub-bituminous Coal		#NAME?	#NAME?
Lignite Coal		#NAME?	#NAME?
Mixed (Commercial Sector)		#NAME?	#NAME?
Mixed (Electric Power Sector)		#NAME?	#NAME?
Mixed (Industrial Coking)		#NAME?	#NAME?
Mixed (Industrial Sector)		0.0	#NAME?
Coal Coke		#NAME?	#NAME?
Other Fuels - Solid			
Municipal Solid Waste		0.0	0.0
Petroleum Coke (Solid)		0.0	0.0
Plastics		0.0	0.0
Tires		0.0	0.0
Gaseous Fuels			
Natural Gas		0.0	0.0
Propane Gas		0.0	0.0
Landfill Gas		0.0	0.0
Petroleum Products			
Distillate Fuel Oil No. 2		0.0	0.0
Residual Fuel Oil No. 6		0.0	0.0
Kerosene		0.0	0.0
Liquefied Petroleum Gases (LPG)		0.0	0.0
Total Fossil Fuel Emissions		**0.0**	**#NAME?**
Biomass Fuels - Solid			
Agricultural Byproducts		0.0	0.0
Peat		0.0	0.0
Solid Byproducts		0.0	0.0
Wood and Wood Residuals		0.0	0.0
Biomass Fuels - Liquid			
Biodiesel (100%)		0.0	0.0
Ethanol (100%)		0.0	0.0
Vegetable Oil		0.0	0.0
Total Non-Fossil Fuel Emissions		**0.0**	**0.0**
Total Emissions for all Fuels		**0.0**	**0.0**

Total Non-Biomass CO_2 Equivalent Emissions (metric tons) - Stationary Combustion
Total Biomass CO_2 Equivalent Emissions (metric tons) - Stationary Combustion

is should include sources that are and are not affected by the retrofit). Assign a

ox in the unit column. If
et and unit conversions on

x in the unit column. If it's
and unit conversions on the

iture fuel, showing a

ent), the stationary

ld be made
hes.

tom of the sheet.

Current Annual Quantity Combusted	Units	Future Annual Quantity Combusted	Units
10,000	*MMBtu*	*5,000*	*MMBtu*

Future Organization-Wide Stationary Source Combustion by Fuel Type

Fuel Type	Quantity Combusted
Coal and Coke - Solid	
Anthracite Coal	0
Bituminous Coal	0
Sub-bituminous Coal	0
Lignite Coal	0
Mixed (Commercial Sector)	0
Mixed (Electric Power Sector)	0
Mixed (Industrial Coking)	0
Mixed (Industrial Sector)	0
Coal Coke	0
Other Fuels - Solid	
Municipal Solid Waste	0
Petroleum Coke (Solid)	0
Plastics	0
Tires	0
Biomass Fuels - Solid	
Agricultural Byproducts	0
Peat	0
Solid Byproducts	0
Wood and Wood Residuals	0
Gaseous Fuels	
Natural Gas	0
Propane Gas	0
Landfill Gas	0

Petroleum Products		
Distillate Fuel Oil No. 2		0
Residual Fuel Oil No. 6		0
Kerosene		0
Liquefied Petroleum Gases (LPG)		0
Biomass Fuels - Liquid		
Biodiesel (100%)		0
Ethanol (100%)		0
Vegetable Oil		0

Future Organization-Wide CO_2, CH_4 and N_2O Emissions from Stationary

N_2O (g)	Fuel Type		CO_2 (kg)
	Coal and Coke - Solid		
#NAME?	Anthracite Coal		#NAME?
#NAME?	Bituminous Coal		#NAME?
#NAME?	Sub-bituminous Coal		#NAME?
#NAME?	Lignite Coal		#NAME?
#NAME?	Mixed (Commercial Sector)		#NAME?
#NAME?	Mixed (Electric Power Sector)		#NAME?
#NAME?	Mixed (Industrial Coking)		#NAME?
#NAME?	Mixed (Industrial Sector)		#NAME?
#NAME?	Coal Coke		#NAME?
	Other Fuels - Solid		
0.0	Municipal Solid Waste		0.0
0.0	Petroleum Coke (Solid)		0.0
0.0	Plastics		0.0
0.0	Tires		0.0
	Gaseous Fuels		
0.0	Natural Gas		0.0
0.0	Propane Gas		0.0
0.0	Landfill Gas		0.0
	Petroleum Products		
0.0	Distillate Fuel Oil No. 2		0.0
0.0	Residual Fuel Oil No. 6		0.0
0.0	Kerosene		0.0
0.0	Liquefied Petroleum Gases (LPG)		0.0
#NAME?	**Total Fossil Fuel Emissions**		**0.0**
	Biomass Fuels - Solid		
0.0	Agricultural Byproducts		0.0
0.0	Peat		0.0
0.0	Solid Byproducts		0.0
0.0	Wood and Wood Residuals		0.0
	Biomass Fuels - Liquid		
0.0	Biodiesel (100%)		0.0
0.0	Ethanol (100%)		0.0
0.0	Vegetable Oil		0.0
0.0	**Total Non-Fossil Fuel Emissions**		**0.0**
0.0	**Total Emissions for all Fuels**		**0.0**

Current Emissions
0.0
0.0

Total Non-Biomass CO_2 Equivalent Emissions (metric tons) - Stationary
Total Biomass CO_2 Equivalent Emissions (metric tons) - Stationary Con

Units
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
short ton
scf
scf
scf

gallons
gallons
gallons
gallons
gallons
gallons
gallons

Source Fuel Combustion

CH_4 (g)	N_2O (g)
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
#NAME?	#NAME?
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
#NAME?	**#NAME?**
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	**0.0**
0.0	**0.0**

	Future Emissions
Combustion	0.0
nbustion	0.0

Scope 1 Process Emissions

Guidance

(A) Any release of CO_2, CH_4, or N_2O due to the production process (not associated with combustion) is required to be included in the GHG inventory. For instance, cement manufacturers should report on annual greenhouse gases from clinker production. Assign a particular source ID of your choosing (this can be referenced in the 'Project' tab).

(B) Describe the process emissions source and input the associated annual GHG emissions in lbs. These are converted to CO2-equivalent emissions at the bottom of the sheet.

Table 1. Total Emissions from Production Processes		Current Annual Emissions			Future Annual Emissions	
Source Name/ID	Source Description	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb)	CH_4 Emissions (lb)
Kiln 1	*Cement kiln*	*50,000.0*	*0.0*	*0.0*	*10,000.0*	*0.0*
Total Emissions for All Sources		0	0	0	0	0

Total GHG Emissions (metric tons CO2-e)	0.0	0.0

N_2O Emissions (lb)
0.0
0

Scope 1 Emissions from Refrigeration and Air Conditioning Equipment

Guidance

(A) HFC, PFC, CO_2, and SF_6 refrigerants from facilities and vehicles are required to be included in the GHG inventor substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inve as a memo item.

(B) Enter annual data in GREEN cells as appropriate.

- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period. (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventory within purchased equipment, and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.

Table 1. Refrigeration Gas CO_2 Equivalent Emissions - Material Balance

		Current Annual Inventory			
Gas	Gas GWP	Inventory Change (lb)	Transferred Amount (lb)	CO_2 Equivalent Emissions (lb)	Inventory Change (lb)

Total CO_2 Equivalent Emissions (metric tons) - Refrigeration and AC Equipment	Current
	0.0

Notes:

1. CO_2 emissions estimated using emission factors provided in Table 3 of the Center for Corporate Climate Leadership *Greenhouse Gas Inventory Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression and Industrial Gases. (Dec 2020).*
2. GWPs are from *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007).*

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ntory or reported

y),

Future Annual Inventory	
Transferred Amount (lb)	**CO_2 Equivalent Emissions (lb)**

	Future
	0.0

y Guidance

Scope 1 Emissions from Fire Suppression Equipment

Guidance

(A) HFC, PFC, and CO_2 fire suppressants are required to be included in the GHG inventory. Other fire suppressant Halon compounds, HCFCs, aqueous solutions, or inert gases are typically excluded from a GHG inventory.

(B) Enter annual data in GREEN cells as appropriate.

- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period. (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventor within purchased equipment, and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.
- Capacity Change = capacity of all units at beginning minus capacity of all units at end of reporting perio (can be assumed to be capacity of retired units minus capacity of new units).

Table 1. Fire Suppression Gas CO_2 Equivalent Emissions - Material Balance

		Current Annual Inventory			
Gas	**Gas GWP**	**Inventory Change (lb)**	**Transferred Amount (lb)**	**Capacity Change (lb)**	**CO_2 Equivalent Emissions (lb)**
CO_2	1				
HFC-23	14,800				
HFC-125	3,500				
HFC-134a	1,430				
HFC-227ea	3,220				
HFC-236fa	9,810				
CF_4	7,390				
C_4F_{10}	8,860				

	Current
Total CO_2 Equivalent Emissions (metric tons) - Fire Suppression Equipment	0.0

Notes:

1. Leak rates of fire extinguishers from Page A-28, *US EPA (2021) - Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2018.*
2. GWPs are from *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007).*

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Future Annual Inventory			
Inventory Change (lb)	Transferred Amount (lb)	Capacity Change (lb)	CO_2 Equivalent Emissions (lb)

	Future
	0.0

Scope 1 Emissions from Purchased Gases

Guidance

(A) Any use and release of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6, and NF_3) is required to GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typica GHG inventory or reported as a memo item.

(B) Select the gas you purchase from the drop down menu and the amount purchased for the annual inventory repor GREEN cells.

(C) It is assumed that all gas purchased in the reporting period will be used and released during the reporting period. bulk purchases and plans on using the gas for several years, divide the bulk amount by the years of usage and rep

Table 1. Purchased Gases

Gas	Gas GWP	Current Annual Purchases: Purchased/Used Amount (lb)	Current Annual Purchases: CO_2 Equivalent Emissions (lb)	Future Annu: Purchased/Used Amount (lb)

	Current
Total CO_2 Equivalent Emissions (metric tons) - Purchased Gas	0.0

Notes:

1. GWPs are from *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007).*

be included in the
lly excluded from a

rting period in the

If your business makes
ort that amount.

al Purchases
CO_2 Equivalent Emissions (lb)

Future
0.0

Scope 2 Emissions from Purchase of Electricity

Guidance

The Indirect Emissions from Purchased Electricity Guidance document provides guidance for quantifying two scope 2 emissions totals, using a **location-based method** and a **procurement-based method**. The organization should quantify and report both totals in its GHG inventory. The location-based method considers average emission factors for the electricity grids that provide electricity. The procurement-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as renewable energy.

Applicants who wish to demonstrate emissions savings on the basis of marginal grid emissions factors are welcome to submit an alternative accounting in their supplementary materials.

(A) Enter total annual electricity purchased in kWh and each eGRID subregion for each facility or site in GREEN cells of **Table 1**. Enter a source ID (this can be referenced in the 'Project' tab).

(B) If electricity consumption data are not available for a facility, an estimate should be made for completeness.
See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Select "eGRID subregion" from drop down menu and enter "Electricity Purchased."

- Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion. If subregion cannot be determined from the map, find the correct subregion by entering the location's zip code into EPA's Power Profiler:
  https://www.epa.gov/egrid/power-profiler#/

(D) If the facility procures electricity directly, provide the emissions factors in the GREEN cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for procuremnet-based emissions.

Tips: Enter electricity usage by location and then look up the eGRID subregion for each location.
If you purchase renewable energy that is less than 100% of your site's electricity, see the example in the market-based method Help sheet.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

Source ID	Source Description	Source Area (sq ft)	eGRID Subregion *where electricity is consumed*
Bldg-012	*East Power Plant*	*12,517*	*HIMS (HICC Miscellaneous)*

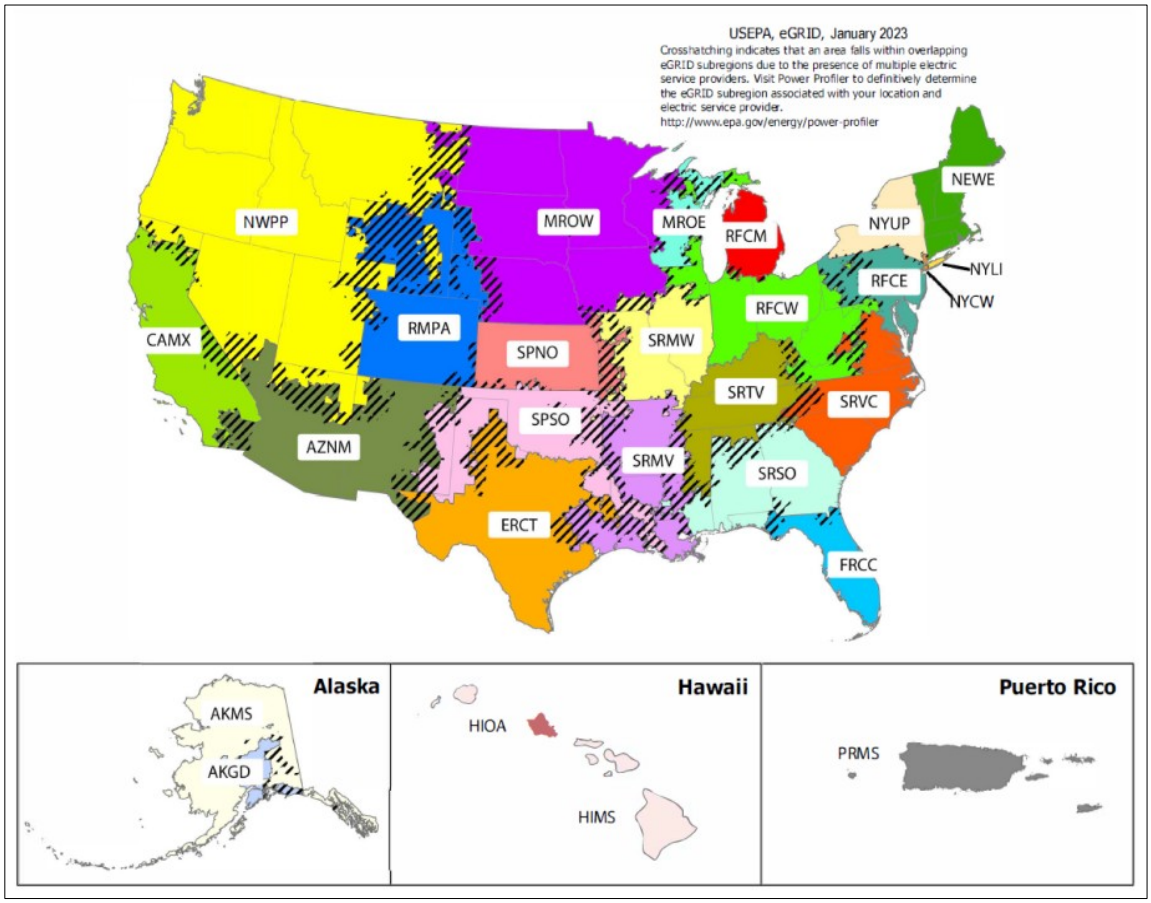
Total Emissions for All Sources			

CO_2 Equivalent Emissions (metric tons)
Location-Based Electricity Emissions
Procurement-Based Electricity Emissions (final value)

Notes:

1. CO_2, CH_4 and N_2O emissions are estimated using methodology provided in EPA's Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance - Indirect Emissions from Purchased Electricity (January 2016).

Figure 1. EPA eGRID2021, January 2023.



CURRENT	CURRENT Location-Based			
	Emissions			E
Current Electricity Purchased (kWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb/MWh)
200,000	226,880.0	27.0	4.2	200000

0.0	**0.0**	**0.0**	**0.0**	

Current		Future
0.0		0.0
0.0		0.0

CURRENT Procurement-Based *Use these cells to enter procurement-based emission factors*					**FUTURE**	**FUTURE Location-Based**			*Use these cells t*	
mission Factors		**Emissions**				**Emissions**			**Emission Factors**	
CH_4 Emissions (lb/MWh)	**N_2O Emissions (lb/MWh)**	**CO_2 Emissions (lb)**	**CH_4 Emissions (lb)**	**N_2O Emissions (lb)**	**Future Purchased (kWh)**	**CO_2 Emissions (lb)**	**CH_4 Emissions (lb)**	**N_2O Emissions (lb)**	**CO_2 Emissions (lb/MWh)**	**CH_4 Emissions (lb/MWh)**
27	*4.2*	*40,000,000.0*	*5,400.0*	*840.0*	*200,000*	*226,880.0*	*27.0*	*4.2*	*200000*	*27*

		0.0	0.0	0.0	0.0	0.0	0.0	0.0		

FUTURE Procurement-Based

:o enter procurement-based emission factors

s	Emissions		
N_2O Emissions (lb/MWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)
4.2	*40,000,000.0*	*5,400.0*	*840.0*

	0.0	0.0	0.0

Scope 2 Emissions from Purchase of Steam

Guidance

(A) Enter annual data for each facility or site in GREEN cells in **Table 1**.
- Enter amount of steam purchased in mmBtu. Heat Content conversions can be found on the "Heat Content" sheet.
- Select "Fuel Type" from drop down menu to indicate the fuel used to generate the steam.
  -- If "Fuel Type" is not known, select "Natural Gas" from drop down menu as default value.
  -- If more than one fuel type is used, enter multiple rows, apportioning the steam using the same percentages as the fuel mix.

(B) If steam is purchased at a facility but steam consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Preferred Method (steam emission factors ARE available from your supplier). Example entry is shown in first data row (*GREEN Italics*).
- Enter supplier emission factors for CO_2, CH_4 and N_2O in the purple cells marked as "<enter factor>" if available, otherwise leave factor cells blank.
- These should be expressed in lb / mmBtu of Steam. Heat Content conversions can be found on the "Heat Content" sheet.
- Boiler Efficiency is not necessary if emission factors are available.
- Typically supplier emission factors for steam will apply to both location-based and market-based emissions, and no market-based emission factors need to be entered. However, if there are different applicable market-based emission factors, enter the factors in the cells marked as "<enter factor>". If needed, see the market-based method Help Sheet for guidance.

(D) Alternative Method (supplier-specific emission factors are NOT available). Example entry is shown in second data row (*BLUE Italics*).
- Enter boiler efficiency. If boiler efficiency is not known, use 80% as default value. Do not enter market-based emission factors.

Table 1. Fuel, Boiler, Steam and Emission Factor Data for Steam Purchased

					Emission Factors			Current Annual Emissions		
Source ID	Source Description	Source Area (sq ft)	Fuel Type	Boiler Efficiency (%)	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	Steam Purchased (mmBtu)	CO_2 Emissions (kg)	CH_4 Emissions (g)
Bldg-011	*Office*	*5,000*	*Natural Gas*	*80*	*72.00*	*1.50*	*0.60*	*5,000*	*450,000*	*9,375*
Bldg-012	*Steam-Blr Room*	*2,000*	*Sub-bituminous Coal*	*80*	<enter factor>	<enter factor>	<enter factor>	*1,000*	121,463	13,750

Current Annual Emissions by Source and Fuel Type for Steam Purchased

Fuel Type	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Natural Gas	0.0	0.0	0.0
Distillate Fuel Oil No. 2	0.0	0.0	0.0
Residual Fuel Oil No. 6	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0.0	0.0	0.0
Anthracite Coal	0.0	0.0	0.0
Bituminous Coal	0.0	0.0	0.0
Sub-bituminous Coal	0.0	0.0	0.0
Lignite Coal	0.0	0.0	0.0
Mixed (Electric Power Sector)	0.0	0.0	0.0
Coal Coke	0.0	0.0	0.0
Wood and Wood Residuals	0.0	0.0	0.0
Landfill Gas	0.0	0.0	0.0
Total Emissions for All Sources	0.0	0.0	0.0

Future Annual Emissions by Source and Fuel Type for Steam Purchased

Fuel Type	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Natural Gas	0.0	0.0	0.0
Distillate Fuel Oil No. 2	0.0	0.0	0.0
Residual Fuel Oil No. 6	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0.0	0.0	0.0
Anthracite Coal	0.0	0.0	0.0
Bituminous Coal	0.0	0.0	0.0
Sub-bituminous Coal	0.0	0.0	0.0
Lignite Coal	0.0	0.0	0.0
Mixed (Electric Power Sector)	0.0	0.0	0.0
Coal Coke	0.0	0.0	0.0
Wood and Wood Residuals	0.0	0.0	0.0
Landfill Gas	0.0	0.0	0.0
Total Emissions for All Sources	0.0	0.0	0.0

CO_2 Equivalent Emissions (metric tons)	Current	Future
	0.0	0.0

	Future Annual Emissions			
N_2O Emissions (g)	Steam Purchased (mmBtu)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
3,750	*5,000*	*450,000*	*9,375*	*3,750*
2,000	*1,000*	121,463	121,463	121,463

Scope 2 Emissions from Purchase of Hydrogen

Guidance

(A) Enter annual data for each facility or site in GREEN cells in **Table 1**.

- Enter amount of hydrogen purchased in kg.
- Select "Production Process" from drop down menu to indicate the process used to
  - -- If "Production Process" is not known, select "Steam Methane Reformin
  - -- If more than one production process type is used, enter multiple rows,

(B) Download and complete the GREET Hydrogen module in Excel (https://greet.anl.gov/g

- Enable macros in Excel
- Enter requested inputs and outputs
  - - "Calculate" for each hydrogen source

(C) Enter the CO2e factor generated by the GREET model in Column E

Table 1. Emission Factor Data for Hydrogen Purchased

Source Name/ID	Source Description	Production Process
H2 1.1	*Hydrogen source*	*Steam methane reforming*

Current Annual Emissions by Production Process

Production Process	CO_2e Emissions (kg)
Steam methane reforming	0.0
Nuclear (LWR) high-termperature ele	0.0
Low-temperature electrolysis (PEM)	0.0
Coal gasification	0.0
Biomass gasification	0.0
Auto-thermal reforming	0.0
Other	0.0
	0.0
	0.0
	0.0
	0.0
	0.0
	0.0
Total Emissions for All Sources	0.0

CO_2 Equivalent Emissions (metric tons)	Current
	0.0

ɔ produce the hydrogen.
ıg" from drop down menu as default value.
 apportioning the hydrogen.
ɡreet_hydrogen)

Current Annual Purchases			Future Annual Purcha	
Hydrogen Purchased (kg)	CO_2e factor from GREET (kg CO2 / kgH2)	CO_2e Emissions (kg)	Hydrogen Purchased (kg)	CO_2e factor from GREET (kg CO2 / kgH2)
5,000	8.00	40,000	5,000	8.00
		-		
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Future Annual Emissions by Production Process

Production Process	CO_2e Emissions (kg)
Steam methane reforming	0.0
Nuclear (LWR) high-termperature elect	0.0
Low-temperature electrolysis (PEM)	0.0
Coal gasification	0.0
Biomass gasification	0.0
Auto-thermal reforming	0.0
Other	0.0
	0.0
	0.0
	0.0
	0.0
	0.0
	0.0
Total Emissions for All Sources	0.0

	Future
	0.0

ases
CO_2e Emissions (kg)
40,000
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Purchased Offsets

Guidance

(A) Enter quantity of offsets purchased for each offset project in terms of CO_2 equivalent in GREEN cells of **Table 1.** Enter offsets purchased for the inventory reporting period. Example entry is shown in first row (GREEN Italics).

Table 1. Total Amount of Purchased Offsets

ID	Project Description	Current Year Offsets Purchased (Metric Tons CO_2e)	Future Year Offsets Purchased (Metric Tons CO_2e)
Trees	*Forestry Project*	*5,000*	*5,000*

Total CO_2 Equivalent Emission Reductions (metric tons) - Offsets	**0.0**	**0.0**

Purchased Renewable/Clean Energy Credits

Guidance

(A) Enter quantity of RECs purchased annually in GREEN cells of Table 1.
(B) Select "eGRID subregion" from drop down menu, selecting the location of the facility (not t

- Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion. If subregi
https://www.epa.gov/egrid/power-profiler#/

Table 1. Total Amount of Purchased RECs

ID	Project Description	RECs Purchased (kWh)
Project 1	Renewable Energy Credits	200,000
Total Emissions for All Sources		

Total CO_2 Equivalent Emission Reductions (metric tons)	Current
- RECs	0.0

he location of the purchased RECs). This is used to calculate displaced emissions.

on cannot be determined from the map, find the correct subregion by entering the location's zip code into EPA's Power

Current Year RECs			
eGRID subregion (where electricity is consumed, should be same as Electricity tab)	**Displaced CO2 Emissions (lb)**	**Displaced CH4 Emissions (lb)**	**Displaced N2O Emissions (lb)**
NEWE (NPCC New England)	107,880.0	14.4	1.8
	0.0	0.0	0.0

	Future
	0.0

Profiler:

Future Year RECs			
RECs Purchased (kWh)	**eGRID subregion** (where electricity is consumed, should be same as Electricity tab)	**Displaced CO2 Emissions (lb)**	**Displaced CH4 Emissions (lb)**
200,000	NEWE (NPCC New England)	107,880.0	14.4
		0.0	0.0

Displaced N2O Emissions (lb)
1.8
0.0

Tool Sheet: Unit Conversions

Mass		
Convert From	**Convert To**	**Multiply By**
pounds (lb)	gram (g)	453.6
pounds (lb)	kilogram (kg)	0.4536
pounds (lb)	metric ton	0.0004536
kilogram (kg)	pounds (lb)	2.205
gram (g)	short ton	0.000001102
kilogram (kg)	short ton	0.001102000
metric ton	short ton	1.102
pounds (lb)	short ton	0.0005
short ton	short ton	1.00
metric ton	pounds (lb)	2,205
metric ton	kilogram (kg)	1,000

Volume		
Convert From	**Convert To**	**Multiply By**
standard cubic foot (scf)	US gallon (gal)	7.4805
standard cubic foot (scf)	barrel (bbl)	0.1781
standard cubic foot (scf)	liters (L)	28.32
standard cubic foot (scf)	cubic meters (m3)	0.02832
US gallon (gal)	barrel (bbl)	0.0238
US gallon (gal)	liters (L)	3.785
US gallon (gal)	cubic meters (m3)	0.003785
barrel (bbl)	US gallons (gal)	42
barrel (bbl)	liters (L)	158.99
barrel (bbl)	cubic meters (m3)	0.1589
liters (L)	cubic meters (m3)	0.001
liters (L)	US gallon (gal)	0.2642
cubic meters (m3)	barrel (bbl)	6.2897
cubic meters (m3)	US gallon (gal)	264.2
cubic meters (m3)	liters (L)	1,000

Energy		
Convert From	**Convert To**	**Multiply By**
kilowatt hour (kWh)	Btu	3,412
kilowatt hour (kWh)	kilojoules (KJ)	3,600
megajoule (MJ)	gigajoules (GJ)	0.001
gigajoule (GJ)	million Btu (mmBtu)	0.9478
gigajoule (GJ)	kilowatt hours (kWh)	277.8
Btu	joules (J)	1,055
million Btu (mmBtu)	gigajoules (GJ)	1.055
million Btu (mmBtu)	kilowatt hours (kWh)	293
therm	Btu	100,000
therm	gigajoules (GJ)	0.1055
therm	kilowatt hours (kWh)	29.3

Distance		
Convert From	**Convert To**	**Multiply By**
mile	kilometers (km)	1.609
nautical mile	miles	1.15
kilometer (km)	miles	0.622

Other	
Kilo	1,000
Mega	1,000,000
Giga	1,000,000,000
Tera	1,000,000,000,000
Molecular Weigh of C	12
Molecular Weight of CO_2	44

Units
g / lb
kg / lb
metric ton / lb
lb / kg
short ton / g
short ton / kg
short ton / metric ton
short ton / lb
short ton / short ton
lb / metric ton
kg / metric ton

Units
gal / scf
bbl / scf
L / scf
m3 / scf
bbl / gal
L / gal
m3 / gal
gal / bbl
L / bbl
m3 / bbl
m3 / L
gal / L
bbl / m3
gal / m3
L / m3

Units
Btu / kWh
KJ / kWh
GJ / MJ
mmBtu / GJ
kWh / GJ
J / Btu
GJ / mmBtu
kWh / mmBtu
Btu / therm
GJ / therm
kWh / therm

Units
km / mile
mile / nautical mile
mile / km

Tool Sheet: Heat Content for Specific Fuels

Additional heat contents can be found in the EF Hub.

Fuel Type	Convert From	Convert To	Multiply By	Units
Natural Gas	mmBtu	scf	974.7	scf / mmBtu
Natural Gas	Dth (Decatherm)	scf	974.7	scf / Dth
Natural Gas	therm	scf	97.5	scf / therm
Natural Gas	ccf	scf	100	scf / ccf
Natural Gas	Mcf	scf	1000	scf / Mcf
Natural Gas	cubic meter	scf	35.31	scf / cubic meter
Natural Gas	kWh	scf	3.326	scf / kWh
Anthracite Coal	mmBtu	Short ton	0.03986	short ton / mmBtu
Bituminous Coal	mmBtu	Short ton	0.04011	short ton / mmBtu
Sub-bituminous Coal	mmBtu	Short ton	0.05797	short ton / mmBtu
Lignite Coal	mmBtu	Short ton	0.07037	short ton / mmBtu
Mixed (Commercial Sector)	mmBtu	Short ton	0.04675	short ton / mmBtu
Mixed (Electric Power Sector)	mmBtu	Short ton	0.05068	short ton / mmBtu
Mixed (Industrial Coking)	mmBtu	Short ton	0.03805	short ton / mmBtu
Mixed (Industrial Sector)	mmBtu	Short ton	0.04474	short ton / mmBtu
Coal Coke	mmBtu	Short ton	0.04032	short ton / mmBtu
Agricultural Byproducts	mmBtu	Short ton	0.12121	short ton / mmBtu
Peat	mmBtu	Short ton	0.12500	short ton / mmBtu
Solid Byproducts	mmBtu	Short ton	0.09625	short ton / mmBtu
Wood and Wood Residuals	mmBtu	Short ton	0.05721	short ton / mmBtu
Municipal Solid Waste	mmBtu	Short ton	0.10050	short ton / mmBtu
Petroleum Coke (Solid)	mmBtu	Short ton	0.03333	short ton / mmBtu
Plastics	mmBtu	Short ton	0.02632	short ton / mmBtu
Tires	mmBtu	Short ton	0.03571	short ton / mmBtu
Distillate Fuel Oil No. 2	mmBtu	gallon	7.2464	gallon / mmBtu
Residual Fuel Oil No. 6	mmBtu	gallon	6.667	gallon / mmBtu
Kerosene	mmBtu	gallon	7.407	gallon / mmBtu
Liquefied Petroleum Gases (LPG)	mmBtu	gallon	10.870	gallon / mmBtu
Biodiesel (100%)	mmBtu	gallon	7.813	gallon / mmBtu
Ethanol (100%)	mmBtu	gallon	11.905	gallon / mmBtu
Vegetable Oil	mmBtu	gallon	8.333	gallon / mmBtu
Propane Gas	mmBtu	scf	397	scf / mmBtu
Propane Gas	therm	scf	39.7	scf / therm
Landfill Gas	mmBtu	scf	2062	scf / mmBtu
Landfill Gas	therm	scf	206.2	scf / therm
Steam	Mlb (1,000 pounds)	mmBtu	1.194	mmBtu / Mlb
Steam	lb	mmBtu	0.001194	mmBtu / lb
Steam	short ton	mmBtu	2.388	mmBtu / short ton

Source
EPA, Emission Factors Hub March 2023, Based on Federal Register EPA; 40 CFR Part 98; e-CFR, (see link below). Table C-1, Table C-2 (as amended at 81 FR 89252, Dec. 9, 2016), Table AA-1 (78 FR 71965, Nov. 29, 2013). https://www.ecfr.gov/cgi-bin/text-idx?SID=ae265d7d6f98ec86fcd8640b9793a3f6&mc=true&node=pt40.23.98&rgn=div5#ap40.23.98_19.1
EPA, ENERGY STAR, https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-thermal-conversion-factors

Tool Sheet: Emission Factors

All emission factors are sourced from EPA's Emission Factors Hub, March 2023 unless otherwise noted. Fuel emission factors presented represent the combustion-only (tank-to-wheel) emissions.

Reference the below link to the EPA's Emission Factors Hub for source data information and links to the methodology and technical documents associated with each table.

https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub

Stationary Combustion Emission Factors (Used for Steam and Stationary Combustion)

Fuel Type	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	CO_2 Factor (kg / Unit)	CH_4 Factor (g / unit)
Natural Gas	53.06	1.0	0.10	0.05444	0.00103
Distillate Fuel Oil No. 2	73.96	3.0	0.60	10.21	0.41
Residual Fuel Oil No. 6	75.10	3.0	0.60	11.27	0.45
Kerosene	75.20	3.0	0.60	10.15	0.41
Liquefied Petroleum Gases (LPG)	61.71	3.0	0.60	5.68	0.28
Anthracite Coal	103.69	11	1.6	2,602	276
Bituminous Coal	93.28	11	1.6	2,325	274
Sub-bituminous Coal	97.17	11	1.6	1,676	190
Lignite Coal	97.72	11	1.6	1,389	156
Mixed (Commercial Sector)	94.27	11	1.6	2,016	235
Mixed (Electric Power Sector)	95.52	11	1.6	1885	217
Mixed (Industrial Coking)	93.9	11	1.6	2468	289
Mixed (Industrial Sector)	94.67	11	1.6	2116	246
Coal Coke	113.67	11	1.6	2819	273
Municipal Solid Waste	90.7	32	4.2	902	318
Petroleum Coke (Solid)	102.41	32	4.2	3072	960
Plastics	75	32	4.2	2850	1216
Tires	85.97	32	4.2	2407	896
Agricultural Byproducts	118.17	32	4.2	975	264
Peat	111.84	32	4.2	895	256
Solid Byproducts	105.51	32	4.2	1096	332
Wood and Wood Residuals	0	7.2	3.6	1,640	126
Propane Gas	61.46	3	0.60	0.15	0.01
Landfill Gas	0	3.2	0.63	0.03	0.00
Biodiesel (100%)	73.84	1.1	0.11	9.45	0.14
Ethanol (100%)	68.44	1.1	0.11	5.75	0.09
Rendered Animal Fat	71.06	1.1	0.11	8.88	0.14
Vegetable Oil	81.55	1.1	0.11	9.79	0.13

Hydrogen Production Emission Factors (Used for Estimating LCA of Hydrogen Consumption)

Fuel Type	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	CO_2 Factor (kg / Unit)	CH_4 Factor (g / unit)
Natural gas reforming					
Electrolysis					
Biomass gasification					
Biomass-derived liquid refomring					
Solar thermochemical hydrogen					
Direct solar water splitting					
Microbial biomass conversion					
Photobiological					

Mobile Combustion Emission Factors

CO_2 Emissions for Road Vehicles

Fuel Type	CO_2 Emission Factor (kg CO_2 / unit)	Unit
Motor Gasoline	8.78	gallon
Diesel Fuel	10.21	gallon
Residual Fuel Oil	11.27	gallon
Aviation Gasoline	8.31	gallon
Kerosene-Type Jet Fuel	9.75	gallon
Liquefied Petroleum Gases (LPG)	5.68	gallon
Ethanol (100%)	5.75	gallon
Biodiesel (100%)	9.45	gallon
Liquefied Natural Gas (LNG)	4.50	gallon
Compressed Natural Gas (CNG)	0.05444	scf

CH_4 and N_2O Emissions for Highway Vehicles

Note: As of the v9 Simplified GHG Calculation tool update, the latest mobile combustion factors reflect year 2020 data. Therefore, for all vehicle model years 2021 onv

Vehicle Type	Year	CH_4 Factor (g / mile)	N_2O Factor (g / mile)	
Gasoline Passenger Cars	1984-93	0.0704	0.0647	
	1994	0.0617	0.0603	
	1995	0.0531	0.0560	
	1996	0.0434	0.0503	
	1997	0.0337	0.0446	
	1998	0.0240	0.0389	
	1999	0.0215	0.0355	
	2000	0.0175	0.0304	
	2001	0.0105	0.0212	

	2002	0.0102	0.0207	
	2003	0.0095	0.0181	
	2004	0.0078	0.0085	
	2005	0.0075	0.0067	
	2006	0.0076	0.0075	
	2007	0.0072	0.0052	
	2008	0.0072	0.0049	
	2009	0.0071	0.0046	
	2010	0.0071	0.0046	
	2011	0.0071	0.0046	
	2012	0.0071	0.0046	
	2013	0.0071	0.0046	
	2014	0.0071	0.0046	
	2015	0.0068	0.0042	
	2016	0.0065	0.0038	
	2017	0.0054	0.0018	
	2018	0.0052	0.0016	
	2019	0.0051	0.0015	
	2020	0.0050	0.0014	
	2021	0.0050	0.0014	Held constant from most updated data (year 2
	2022	0.0050	0.0014	Held constant from most updated data (year 2
	2023	0.0050	0.0014	Held constant from most updated data (year 2
Gasoline Light-Duty Trucks	1987-93	0.0813	0.1035	
(Vans, Pickup Trucks, SUVs)	1994	0.0646	0.0982	
	1995	0.0517	0.0908	
	1996	0.0452	0.0871	
	1997	0.0452	0.0871	
	1998	0.0412	0.0787	
	1999	0.0333	0.0618	
	2000	0.0340	0.0631	
	2001	0.0221	0.0379	
	2002	0.0242	0.0424	
	2003	0.0221	0.0373	
	2004	0.0115	0.0088	
	2005	0.0105	0.0064	
	2006	0.0108	0.0080	
	2007	0.0103	0.0061	
	2008	0.0095	0.0036	
	2009	0.0095	0.0036	
	2010	0.0095	0.0035	
	2011	0.0096	0.0034	
	2012	0.0096	0.0033	
	2013	0.0095	0.0035	
	2014	0.0095	0.0033	
	2015	0.0094	0.0031	
	2016	0.0091	0.0029	
	2017	0.0084	0.0018	
	2018	0.0081	0.0015	
	2019	0.0080	0.0013	
	2020	0.0079	0.0012	Assume these CH4 and N2O factors for ethan
	2021	0.0079	0.0012	Held constant from most updated data (year 2
	2022	0.0079	0.0012	Held constant from most updated data (year 2
	2023	0.0079	0.0012	Held constant from most updated data (year 2
Gasoline Heavy-Duty Vehicles	1985-86	0.4090	0.0515	
	1987	0.3675	0.0849	
	1988-1989	0.3492	0.0933	
	1990-1995	0.3246	0.1142	
	1996	0.1278	0.1680	
	1997	0.0924	0.1726	
	1998	0.0655	0.1750	
	1999	0.0648	0.1724	
	2000	0.0630	0.1660	
	2001	0.0577	0.1468	
	2002	0.0634	0.1673	
	2003	0.0602	0.1553	
	2004	0.0298	0.0164	
	2005	0.0297	0.0083	
	2006	0.0299	0.0241	
	2007	0.0322	0.0015	
	2008	0.0340	0.0015	
	2009	0.0339	0.0015	
	2010	0.0320	0.0015	
	2011	0.0304	0.0015	
	2012	0.0313	0.0015	
	2013	0.0313	0.0015	
	2014	0.0315	0.0015	
	2015	0.0332	0.0021	

	2016	0.0321	0.0061	
	2017	0.0329	0.0084	
	2018	0.0326	0.0082	
	2019	0.0330	0.0091	
	2020	0.0328	0.0098	Assumed these CH4 and N2O factors for etha
	2021	0.0328	0.0098	Held constant from most updated data (year 2
	2022	0.0328	0.0098	Held constant from most updated data (year 2
	2023	0.0328	0.0098	Held constant from most updated data (year 2
Gasoline Motorcycles	1960-1995	0.0070	0.0083	
	1996-2005	0	0	
	2006-2023	0.0070	0.0083	Held constant for 2021 onwards from most rec

Vehicle Type	Fuel Type	Vehicle Year	CH_4 Factor (g / mile)	N_2O Factor (g / mile)	Notes
Passenger Cars	Diesel	1960-1982	0.0006	0.0012	
		1983-2006	0.0005	0.0010	
		2007-2023	0.0302	0.0192	Held constant for 2021 onwards from most recent data year (year 2020 data).
Light-Duty Trucks	Diesel	1960-1982	0.0011	0.0017	
		1983-2006	0.0009	0.0014	
		2007-2023	0.0290	0.0214	Held constant for 2021 onwards from most recent data year (year 2020 data).
Medium- and Heavy-Duty Vehicles	Diesel	1960-2006	0.0051	0.0048	
		2007-2023	0.0095	0.0431	Held constant for 2021 onwards from most recent data year (year 2020 data).
Light-Duty Cars	Methanol		0.0150	0.0040	
	Ethanol		0.0150	0.0040	
	CNG		0.1460	0.0040	
	LPG		0.0150	0.0040	
	Biodiesel		0.0300	0.0190	
Light-Duty Trucks	Ethanol		0.0160	0.0050	
	CNG		0.1580	0.0050	
	LPG		0.0160	0.0050	
	LNG		0.1580	0.0050	
	Biodiesel		0.0290	0.0210	
Medium-Duty Trucks	CNG		1.8290	0.0010	
	LPG		0.0090	0.0180	
	LNG		1.8290	0.0010	
	Biodiesel		0.0090	0.0430	
Heavy-Duty Trucks	Methanol		0.0750	0.0280	
	Ethanol		0.0750	0.0280	
	CNG		0.9210	0	
	LPG		0.0030	0.0070	
	LNG		0.9210	0	
	Biodiesel		0.0090	0.0430	
Buses	Methanol		0.1020	0.0470	
	Ethanol		0.1020	0.0470	
	CNG		2.7870	0.0010	
	LPG		0.0100	0.0110	
	LNG		2.7870	0.0010	
	Biodiesel		0.0090	0.0430	

CH_4 and N_2O Emissions for Non-Road Vehicles

Vehicle Type (superscript from EF Hub removed)	Fuel Type	CH_4 Factor (g / gallon)	N_2O Factor (g / gallon)
Ships and Boats	Residual Fuel Oil	1.11	0.32
	Gasoline (2 stroke)	4.61	0.08
	Gasoline (4 stroke)	2.25	0.01
	Diesel	6.41	0.17
Locomotives	Diesel	0.80	0.26
Aircraft	Jet Fuel	0	0.30
	Aviation Gasoline	7.06	0.11
Agricultural Equipment	Gasoline (2 stroke)	6.92	0.47
	Gasoline (4 stroke)	1.93	1.20
	Gasoline Off-Road Trucks	1.93	1.20
	Diesel Equipment	1.27	1.07
	Diesel Off-Road Trucks	0.91	0.56
	LPG	0.33	0.94
Construction/Mining Equipment	Gasoline (2 stroke)	7.98	0.12
	Gasoline (4 stroke)	2.85	1.47
	Gasoline Off-Road Trucks	2.85	1.48
	Diesel Equipment	1.01	0.94
	Diesel Off-Road Trucks	0.91	0.56
	LPG	0.59	0.50
Lawn and Garden Equipment	Gasoline (2 stroke)	7.28	0.31
	Gasoline (4 stroke)	2.99	1.49
	Diesel	0.67	0.49
	LPG	0.41	0.63
Airport Equipment	Gasoline	1.03	1.07
	Diesel	1.88	1.16
	LPG	0.35	0.89

Industrial/Commercial Equipment	Gasoline (2 stroke)	7.12	0.50
	Gasoline (4 stroke)	2.74	1.54
	Diesel	0.41	0.60
	LPG	0.45	0.64
Logging Equipment	Gasoline (2 stroke)	9.68	0
	Gasoline (4 stroke)	3.24	2.05
	Diesel	0.48	1.27
Railroad Equipment	Gasoline	3.24	1.81
	Diesel	0.38	0.95
	LPG	1.99	0.01
Recreational Equipment	Gasoline (2 stroke)	17.61	0.11
	Gasoline (4 stroke)	2.87	1.50
	Diesel	0.73	0.66
	LPG	0.43	0.60

Refrigerants and Global Warming Potentials (GWPs)

Gas	GWP
CO_2	1
CH_4	25
N_2O	298
HFC-23	14,800
HFC-32	675
HFC-41	92
HFC-125	3,500
HFC-134	1,100
HFC-134a	1,430
HFC-143	353
HFC-143a	4,470
HFC-152	53
HFC-152a	124
HFC-161	12
HFC-227ea	3,220
HFC-236cb	1,340
HFC-236ea	1,370
HFC-236fa	9,810
HFC-245ca	693
HFC-245fa	1,030
HFC-365mfc	794
HFC-43-10mee	1,640
SF_6	22,800
NF_3	17,200
CF_4	7,390
C_2F_6	12,200
C_3F_8	8,830
c-C_4F_8	10,300
C_4F_{10}	8,860
C_5F_{12}	9,160
C_6F_{14}	9,300
$C_{10}F_{18}$	>7,500

Note: Global Warming Potential (GWP) factors in the 2023 Emission Factors update associated with the Simplified GHG Calculator Tool v9 release are based on AR4 GWPs, but EPA recognizes that Fifth

Blended Refrigerants (ASHRAE #)

ASHRAE #	Blend GWP HFC/PFC	Blend Make-up
R-401A	16	53% HCFC-22 , 34% HCFC-124 , 13% HFC-152a
R-401B	14	61% HCFC-22 , 28% HCFC-124 , 11% HFC-152a
R-401C	19	33% HCFC-22 , 52% HCFC-124 , 15% HFC-152a
R-402A	2,100	38% HCFC-22 , 6% HFC-125 , 2% propane
R-402B	1,330	6% HCFC-22 , 38% HFC-125 , 2% propane
R-403B	3,444	56% HCFC-22 , 39% PFC-218 , 5% propane
R-404A	3,922	44% HFC-125 , 4% HFC-134a , 52% HFC 143a
R-406A	0	55% HCFC-22 , 41% HCFC-142b , 4% isobutane
R-407A	2,107	20% HFC-32 , 40% HFC-125 , 40% HFC-134a
R-407B	2,804	10% HFC-32 , 70% HFC-125 , 20% HFC-134a
R-407C	1,774	23% HFC-32 , 25% HFC-125 , 52% HFC-134a
R-407D	1,627	15% HFC-32 , 15% HFC-125 , 70% HFC-134a
R-407E	1,552	25% HFC-32 , 15% HFC-125 , 60% HFC-134a
R-408A	2,301	47% HCFC-22 , 7% HFC-125 , 46% HFC 143a

R-409A	0	60% HCFC-22 , 25% HCFC-124 , 15% HCFC-142b
R-410A	2,088	50% HFC-32 , 50% HFC-125
R-410B	2,229	45% HFC-32 , 55% HFC-125
R-411A	14	87.5% HCFC-22 , 11 HFC-152a , 1.5% propylene
R-411B	4	94% HCFC-22 , 3% HFC-152a , 3% propylene
R-413A	2,053	88% HFC-134a , 9% PFC-218 , 3% isobutane
R-414A	0	51% HCFC-22 , 28.5% HCFC-124 , 16.5% HCFC-142b
R-414B	0	5% HCFC-22 , 39% HCFC-124 , 9.5% HCFC-142b
R-417A	2,346	46.6% HFC-125 , 5% HFC-134a , 3.4% butane
R-422A	3,143	85.1% HFC-125 , 11.5% HFC-134a , 3.4% isobutane
R-422D	2,729	65.1% HFC-125 , 31.5% HFC-134a , 3.4% isobutane
R-423A	2,280	47.5% HFC-227ea , 52.5% HFC-134a ,
R-424A	2,440	50.5% HFC-125, 47% HFC-134a, 2.5% butane/pentane
R-426A	1,508	5.1% HFC-125, 93% HFC-134a, 1.9% butane/pentane
R-428A	3,607	77.5% HFC-125 , 2% HFC-143a , 1.9% isobutane
R-434A	3,245	63.2% HFC-125, 16% HFC-134a, 18% HFC-143a, 2.8% isobutane
R-500	32	73.8% CFC-12 , 26.2% HFC-152a , 48.8% HCFC-22
R-502	0	48.8% HCFC-22 , 51.2% CFC-115
R-504	325	48.2% HFC-32 , 51.8% CFC-115
R-507	3,985	5% HFC-125 , 5% HFC143a
R-508A	13,214	39% HFC-23 , 61% PFC-116
R-508B	13,396	46% HFC-23 , 54% PFC-116

Molecular Weights

Element	Atomic Weight
Carbon	12.011

Electricity Emission Factors (System Average)

CO_2, CH_4 and N_2O Total Output Emission Factors by Subregion eGRID2021, January 2023.

Subregion	CO_2 Factor (lb CO_2/MWh)	CH_4 Factor (lb CH_4/MWh)	N_2O (lb N_2
AKGD (ASCC Alaska Grid)	1,067.7	0.091	
AKMS (ASCC Miscellaneous)	485.2	0.025	
AZNM (WECC Southwest)	819.7	0.052	
CAMX (WECC California)	531.7	0.031	
ERCT (ERCOT All)	813.6	0.054	
FRCC (FRCC All)	832.9	0.053	
HIMS (HICC Miscellaneous)	1,134.4	0.135	
HIOA (HICC Oahu)	1,633.1	0.176	
MROE (MRO East)	1,582.1	0.148	
MROW (MRO West)	995.8	0.107	
NEWE (NPCC New England)	539.4	0.072	
NWPP (WECC Northwest)	634.6	0.058	
NYCW (NPCC NYC/Westchester)	816.8	0.019	
NYLI (NPCC Long Island)	1,210.9	0.126	
NYUP (NPCC Upstate NY)	233.1	0.015	
PRMS (Puerto Rico Miscellaneous)	1,558.0	0.081	
RFCE (RFC East)	672.8	0.049	
RFCM (RFC Michigan)	1,214.1	0.115	
RFCW (RFC West)	1,046.1	0.095	
RMPA (WECC Rockies)	1,158.9	0.109	
SPNO (SPP North)	991.7	0.108	
SPSO (SPP South)	1,031.6	0.080	
SRMV (SERC Mississippi Valley)	772.7	0.040	
SRMW (SERC Midwest)	1,543.0	0.171	
SRSO (SERC South)	891.9	0.067	
SRTV (SERC Tennessee Valley)	931.6	0.087	
SRVC (SERC Virginia/Carolina)	639.7	0.052	

Note: These factors do not include upstream transmission and distribution emissions associated with delivered electricity.

Business Travel and Employee Commuting Emission Factors

Vehicle Type	CO_2 Factor (kg / unit)	CH_4 Factor (g / unit)	N_2O Factor (g / unit)	Units
Passenger Car	0.313	0.008	0.007	vehicle-mile
Light-Duty Truck	0.467	0.013	0.012	vehicle-mile
Motorcycle	0.178	0.111	0.019	vehicle-mile
Intercity Rail - Northeast Corridor	0.058	0.0055	0.0007	passenger-mile
Intercity Rail - Other Routes	0.150	0.0117	0.0038	passenger-mile
Intercity Rail - National Average	0.113	0.0092	0.0026	passenger-mile
Commuter Rail	0.135	0.0109	0.0027	passenger-mile
Transit Rail (i.e. Subway, Tram)	0.096	0.0080	0.0011	passenger-mile
Bus	0.055	0.0063	0.0011	passenger-mile
Air Short Haul (< 300 miles)	0.207	0.0064	0.0066	passenger-mile
Air Medium Haul (>= 300 miles, < 2300 miles)	0.129	0.0006	0.0041	passenger-mile
Air Long Haul (>= 2300 miles)	0.163	0.0006	0.0052	passenger-mile

Upstream Transportation and Distribution Emission Factors

Vehicle Type	CO_2 Factor (kg / unit)	CH_4 Factor (g / unit)	N_2O Factor (g / unit)	Units
Medium- and Heavy-Duty Truck	1.387	0.013	0.038	vehicle-mile
Passenger Car	0.313	0.008	0.007	vehicle-mile
Light-Duty Truck	0.467	0.013	0.012	vehicle-mile
Medium- and Heavy-Duty Truck	0.170	0.0016	0.0047	ton-mile
Rail	0.021	0.0016	0.0005	ton-mile
Waterborne Craft	0.044	0.0254	0.0011	ton-mile
Aircraft	0.698	0.0000	0.0215	ton-mile

Fire Suppressant Leak Rates

Type of Equipment	Leak Rate
Fixed	3.5%
Portable	2.5%

Source:
EPA (2021) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. Page A-275.

Waste Emission Factors

		Metric Tons CO_2e / Short Ton Material			
WARM Material	Material for SGEC Lookup (red text indicates different name from WARM)	Recycled	Landfilled	Combusted	Composted
Aluminum Cans	Aluminum Cans	0.06	0.02	0.01	NA
Aluminum Ingot	Aluminum Ingot	0.04	0.02	0.01	NA
Steel Cans	Steel Cans	0.32	0.02	0.01	NA
Copper Wire	Copper Wire	0.18	0.02	0.01	NA
Glass	Glass	0.05	0.02	0.01	NA
HDPE	HDPE	0.21	0.02	2.80	NA
LDPE	LDPE	NA	0.02	2.80	NA
PET	PET	0.23	0.02	2.05	NA
LLDPE	LLDPE	NA	0.02	2.80	NA
PP	PP	NA	0.02	2.80	NA
PS	PS	NA	0.02	3.02	NA
PVC	PVC	NA	0.02	1.26	NA
PLA	PLA	NA	0.02	0.01	0.17
Corrugated Containers	Corrugated Containers	0.11	0.90	0.05	NA
Magazines/Third-class mail	Magazines and Third class ma	0.02	0.42	0.05	NA
Newspaper	Newspaper	0.02	0.35	0.05	NA
Office Paper	Office Paper	0.02	1.25	0.05	NA
Phonebooks	Phonebooks	0.04	0.35	0.05	NA
Textbooks	Textbooks	0.04	1.25	0.05	NA
Dimensional Lumber	Dimensional Lumber	0.09	0.17	0.05	NA
Medium-density Fiberboard	Medium density Fiberboard	0.15	0.07	0.05	NA
Food Waste (non-meat)	Food Waste non meat	NA	0.58	0.05	0.15
Food Waste (meat only)	Food Waste meat only	NA	0.58	0.05	NA
Beef	Beef	NA	0.58	0.05	0.15
Poultry	Poultry	NA	0.58	0.05	0.15
Grains	Grains	NA	0.58	0.05	0.15
Bread	Bread	NA	0.58	0.05	0.15
Fruits and Vegetables	Fruits and Vegetables	NA	0.58	0.05	0.15
Dairy Products	Dairy Products	NA	0.58	0.05	0.15
Yard Trimmings	Yard Trimmings	NA	0.33	0.05	0.19
Grass	Grass	NA	0.26	0.05	0.19
Leaves	Leaves	NA	0.26	0.05	0.19
Branches	Branches	NA	0.53	0.05	0.19
Mixed Paper (general)	Mixed Paper general	0.07	0.80	0.05	NA
Mixed Paper (primarily residential)	Mixed Paper primarily residen	0.07	0.77	0.05	NA
Mixed Paper (primarily from offices)	Mixed Paper primarily from off	0.03	0.75	0.05	NA
Mixed Metals	Mixed Metals	0.23	0.02	0.01	NA
Mixed Plastics	Mixed Plastics	0.22	0.02	2.34	NA
Mixed Recyclables	Mixed Recyclables	0.09	0.68	0.11	NA
Food Waste	Food Waste	NA	0.58	0.05	0.15
Mixed Organics	Mixed Organics	NA	0.48	0.05	0.17
Mixed MSW	Mixed MSW municipal solid w	NA	0.52	0.43	NA
Carpet	Carpet	NA	0.02	1.68	NA
Desktop CPUs	Desktop CPUs	NA	0.02	0.40	NA
Portable Electronic Devices	Portable Electronic Devices	NA	0.02	0.89	NA
Flat-panel Displays	Flat panel Displays	NA	0.02	0.74	NA
CRT Displays	CRT Displays	NA	0.02	0.64	NA
Electronic Peripherals	Electronic Peripherals	NA	0.02	2.23	NA
Hard-copy Devices	Hard copy Devices	NA	0.02	1.92	NA
Mixed Electronics	Mixed Electronics	NA	0.02	0.87	NA
Clay Bricks	Clay Bricks	NA	0.02	NA	NA
Concrete	Concrete	0.01	0.02	NA	NA
Fly Ash	Fly Ash	0.01	0.02	NA	NA
Tires	Tires	0.10	0.02	2.21	NA
Asphalt Concrete	Asphalt Concrete	-	0.02	NA	NA
Asphalt Shingles	Asphalt Shingles	0.03	0.02	0.70	NA
Drywall	Drywall	NA	0.02	NA	NA
Fiberglass Insulation	Fiberglass Insulation	0.05	0.02	NA	NA
Vinyl Flooring	Vinyl Flooring	NA	0.02	0.29	NA

Wood Flooring	Wood Flooring	NA	0.18	0.08	NA

Notes: These factors do not include any avoided emissions impact from any of the disposal methods. All the factors presented here include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility. AR4 GWPs are used to convert all waste emission factors into CO_2e.

Recycling emissions include transport to recycling facility and sorting of recycled materials at material recovery facility.
Landfilling emissions include transport to landfill, equipment use at landfill and fugitive landfill CH4 emissions. Landfill CH4 is based on typical landfill gas collection practices and average landfill moisture conditions.
Combustion emissions include transport to combustion facility and combustion-related non-biogenic CO2 and N2O
Composting emissions include transport to composting facility, equipment use at composting facility and CH4 and N2O emissions during composting.

-wheel) emissions and do not represent upstream

N_2O Factor (g / unit)	Unit
0.00010	scf
0.08	gallons
0.09	gallons
0.08	gallons
0.06	gallons
40	short tons
40	short tons
28	short tons
23	short tons
34	short tons
32	short tons
42	short tons
36	short tons
40	short tons
42	short tons
126	short tons
160	short tons
118	short tons
35	short tons
34	short tons
44	short tons
63	short tons
0.00	scf
0.00	scf
0.01	gallons
0.01	gallons
0.01	gallons
0.01	gallons

N_2O Factor (g / unit)	Unit
	kg
	kg
	kg
	kg
	kg
	kg
	kg
	kg

ward, the 2020 year factor is used.

Notes

020 factor).
020 factor).
020 factor).

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020 factor).
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020 factor).

nol heavy-duty vehicles and buses	
2020 factor).	
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2020 factor).	
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Factor O/MWh)
0.012
0.004
0.007
0.004
0.008
0.007
0.021
0.027
0.022
0.015
0.009
0.008
0.002
0.016
0.002
0.013
0.007
0.016
0.014
0.016
0.016
0.012
0.006
0.025
0.010
0.013
0.007

No update

Anaerobically Digested (Dry Digestate with Curing)	Anaerobically Digested (Wet Digestate with Curing)
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
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NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
0.14	0.11
0.14	0.11
0.14	0.11
0.14	0.11
0.14	0.11
0.14	0.11
0.14	0.11
0.14	0.11
0.11	NA
0.09	NA
0.13	NA
0.16	NA
NA	NA
NA	NA
NA	NA
NA	NA
NA	NA
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NA	NA

needed for v9 -- WARM not yet updated.

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U.S. Environmental Protection Agency

Scope 1 Emissions from Stationary Combustion Sources - HELP SHEET

DEFINITION

Combustion emission sources are stationary sources that combust fuel, like a natural gas hot water heater for an office building or an oil burning boiler. Emissions result from the actual combustion of the fuels to produce useful products, like heat and hot water.

COLLECT

To account for these sources, collect information about the type of fuel used and the quantity of fuel combusted at each facility. Sources of data can vary, but the data are often provided by the utility organization that supplies the fuel to the organization. A monthly natural gas bill, for example, can be used to provide information regarding how much natural gas was purchased for the previous billing cycle.

Data Collection Checklist (for all facilities)

- Type of fuel consumed
- Amount of fuel consumed

QUANTIFY

After the data has been collected, it should be entered into the appropriate orange colored boxes of the Calculator section titled "Stationary Combustion." The fuel type can be selected from the form. After the data are entered into the Calculator, the CO_2 equivalent emissions are displayed in the blue colored box.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.
- If you are one of many tenants in a facility and you do not have the actual amount of fuel used in your space, you may estimate your fuel usage by multiplying the fuel usage of the entire facility by the percentage of the floor area that your organization occupies.
- Companies with home offices can optionally include these spaces in their inventory if the energy use associated with business activities can be reasonably estimated.
- The Energy Information Administration conducts a Commercial Building Energy Consumption Survey and provides average energy consumption by building type per square foot. Use the numbers below to compare against your data or to estimate for natural gas if no data are available. For example, if you have a 1,000 sq ft office suite in the Northeast multiply by 20.6 to get an estimation of 20,600 scf natural gas for a year.

Natural Gas Intensity	standard cubic feet (scf) natural gas / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	41.5	38.7	21.2	21.9
Food sales	Insufficient Data	75.4	Insufficient Data	Insufficient Data
Food service	Insufficient Data	212.0	152.2	106.4
Health care	58.2	59.4	63.5	54.2
Inpatient	89.5	71.1	76.0	84.0
Outpatient	30.9	34.0	22.8	22.4
Lodging	45.7	44.1	27.1	38.6
Mercantile	41.9	41.4	28.9	37.1
Retail (other than mall)	25.0	26.4	20.0	22.5
Enclosed and strip malls	49.2	58.9	34.2	43.9
Office	20.6	26.3	18.7	18.6
Public assembly	52.6	48.5	28.7	33.5
Public order and safety	Insufficient Data	Insufficient Data	40.2	34.8
Religious worship	33.8	28.6	16.7	17.4
Service	38.2	38.3	51.3	39.1
Warehouse and storage	19.3	27.7	13.5	10.4
Other	38.7	Insufficient Data	21.2	Insufficient Data
Vacant	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Source: EIA's Commercial Buildings Energy Consumption Survey (CBECS) 2018, Released September 2022. Table C25: Natural gas consumption and conditional energy intensity by Census region, 2018

https://www.eia.gov/consumption/commercial/data/2018/index.php?view=characteristics

Scope 1 Emissions from Refrigeration and Air Conditioning Equipment - HELP SHEET

DEFINITION

Refrigeration and Air Conditioning (AC) equipment sources can vary in size based on the type of organizatic refrigeration and AC devices, in facilities or vehicles, are caused by the leakage of chemicals with global wa during use, maintenance and/or disposal of the device. They are often small sources for office-based organ example, a small office building may have one rooftop AC unit while a grocery store chain may have severa rooftop AC units per store as well as a multitude of other refrigeration equipment.

COLLECT

Choose one of three different calculation methods available in the "Refrigeration and AC" section of the Calc of refrigerants along with the data needs for each method are listed in the Calculator. Data for these source from maintenance and inspection records, work orders, or invoices from contractors that service this equipm not included on the list may be chemicals that do not need to be included in the inventory. For example, ozc substances, such as chlorofluorocarbons (CFCs) or "freon" and hydrochlorofluorocarbons (HCFCs), are reg internationally and are typically excluded from a GHG inventory or reported as a memo item. A reason to tra is to provide explanation for the increase of HFCs and PFCs when they replace the phased out CFCs and H

Data Collection Checklist (by equipment)

- Refrigerant purchase, inventory, and disposal data
- Inventory of equipment by facility
- Refrigerant capacity of equipment
- Amount of refrigerant (HFC and PFC) emitted over the inventory reporting period
- Optional: Track HCFC and CFCs, such as R-22

QUANTIFY

Determine which of the three options is suitable for your business and enter the data into the appropriate ora boxes of the Calculator section titled "Refrigeration and AC." Once the data are entered into the Calculator, equivalent emissions are calculated and summarized in the blue colored box.

Option 1: The Detailed Material Balance Method is recommended for companies who maintain the This method requires data from inventories, purchase and service records, and the full and proper equipment. It includes emissions from equipment operation, servicing, and disposal.

Option 2: The Simplified Material Balance Method is recommended for companies who have contr their HFC/PFC containing equipment. This method tracks emissions from equipment operation, se disposal. The method requires data on the quantity of refrigerant: (a) used to fill new equipment du used to service equipment, and (c) recovered from retiring equipment, as well as the full and prope and retiring equipment. If notified in advance of the need for this information, the contractor should it.

Option 3: It is recommended that the Screening Method be used only as a screening tool because factors used in the approach are highly uncertain. Emission factors vary between individual pieces over time. Even if the amount of refrigerant added to a piece of equipment has been tracked carefu previous leak rate of that equipment to be established, that leak rate can change after a leak is rep equipment ages.

Items to Note

- If you are one of many tenants in a facility and you cannot quantify the refrigerant emissions specif you may estimate them based on the percentage of the floor area that your organization occupies.
- Emissions from refrigerants in an office-based organization are typically less than 2 percent of emi this as you decide which Option is most appropriate.

- If your organization uses a refrigerant that is not listed, the user may need to determine the constit website lists common refrigerant compositions:

  http://www.epa.gov/ozone/snap/refrigerants/refblend.html

- R-134a is the predominantly used refrigerant in vehicle AC systems. If you are uncertain of which your vehicles use, you can assume R-134a.

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Scope 1 Emissions from Fire Suppression Equipment - HELP SHEET

DEFINITION

Fire suppression emission sources can range in scale from a small portable fire extinguisher to a large scale system for an office building or warehouse. The emissions are caused by chemicals (e.g., HFCs or CO_2) en suppression devices during use, maintenance, and disposal.

COLLECT

Choose one of three different calculation methods available in the "Fire Suppression" section of the Calculat method, choose the types of fire suppression gases used and then gather the corresponding emissions data sources is often collected from maintenance and inspection records, work orders, or invoices from contracto equipment.

Data Collection Checklist (by equipment and/or facility)

- Fire suppressant purchase, inventory, and disposal data
- Inventory of equipment by facility
- Fire suppressant capacity of equipment
- Amount of fire suppressant (HFC and PFC) emitted over the inventory reporting period

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled "Fire Suppression." entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colore

Items to Note

- Contact the manufacturer if you cannot find the list of propellants or chemicals used in the fire extir

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Scope 1 Emissions from Purchased Gases - HELP SHEET

DEFINITION

Industrial gases are sometimes used in processes such as manufacturing, testing, or laboratory uses. For e is often used in welding operations. These gases are typically released to the atmosphere after use. Any re seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6, and NF_3) must be included in the GHG i depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded fr inventory or reported as a memo item.

COLLECT

Determine if CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 or NF_3 are used in processes such as those mentioned abov mass of gas purchased. If data are not available in mass units, the user may need to convert from volume t density of the specific gas.

Data Collection Checklist (for all applicable facilities)

- Type of gas purchased
- Amount of gas purchased
- Purpose for the gas

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled “Gas.” Once the da the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Items to Note

- If your business makes bulk purchases and plans on using the gas for several years, you should d amount by the years of usage and report that amount.

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Scope 2 Emissions from Purchase of Electricity - HELP SHEET

DEFINITION

GHGs are emitted when fossil fuels are combusted to generate electricity. Companies account for their respo emissions by reporting them as scope 2 indirect emissions. This Calculator quantifies emissions from both the method and the market-based method, and both totals should be reported. The location-based method consi emission factors for the electricity grids that provide electricity. The market-based method considers contractu under which the organization procures power from specific sources, such as renewable energy. Market-base reflect these arrangements. Examples of market-based emission factors are: renewable energy certificates (R purchase agreements (PPAs), and supplier-specific factors. For detailed information on the location-based m market-based method review EPA's Indirect Emissions from Purchased Electricity Guidance (link at the bottor

COLLECT

Collect electricity purchase information in units of kWh for each facility. The best data source is typically its el invoice. In the Calculator, there is a map at the bottom of the "Electricity" section which divides the United Sta subregions based on the electric grid. Select the subregion(s) in which the organization's facilities are located correct CO_2, CH_4, and N_2O emission factors to use, since different parts of the country use different fuels to ge Multiple facility locations can be entered as separate line items in the Calculator. If a facility is on the border o enter the zip code into EPA's Power Profiler (https://oaspub.epa.gov/powpro/ept_pack.charts) to find the corre

Data Collection Checklist (for all facilities)

- Amount of electricity purchased
- Amount of electricity purchased using contractual arrangements
- Emission factors (CO_2, CH_4 and N_2O) for contractual arrangements

QUANTIFY

There are two methods to quantify emissions from electricity: location-based and market-based. Both must be in accordance with the Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance.

Location-based: Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized i box for the location based method.

Market-based: Enter applicable market-based emission factors (lb/MWh) for the purchased electricity in the y 1) of the Calculator section titled "Electricity." See the market-based method Help sheet for additional guidanc are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colo market-based method.

HELP - Market-Based Method

Items to Note

- If you are one of many tenants in a facility and you do not have the actual amount of electricity used may estimate your usage by multiplying the electricity usage of the entire facility by the percentage o that your organization occupies.
- The number off the utility bill to use is the total usage amount (i.e., the difference between the meter beginning of the month and the end of the month).
- Companies with home offices can optionally include these spaces in their inventory if the energy use business activities can be reasonably estimated.

- The Energy Information Administration conducts a Commercial Building Energy Consumption Survey average energy consumption by building type per square foot. Use the numbers below to compare a or to estimate if no data are available. For example, if you have a 1,000 sq ft office suite in the North 17.1 to get an estimation of 17,100 kWh electricity for a year.

Electricity Intensity	**kWh electricity / sq ft / year**		
Principal Building Activity	**Northeast**	**Midwest**	**South**
Education	7.9	8.1	11.4
Food sales	Insufficient Data	67.3	53.7
Food service	29.7	43.0	52.7
Health care	19.0	25.0	27.3
Inpatient	22.4	28.3	32.2
Outpatient	15.9	18.6	19.6
Lodging	13.7	14.8	15.2
Mercantile	15.1	15.4	17.8
Retail (other than mall)	11.3	12.7	15.3
Enclosed and strip malls	17.9	18.9	20.2
Office	13.8	12.0	15.4
Public assembly	9.6	11.6	15.1
Public order and safety	Insufficient Data	Insufficient Data	16.7
Religious worship	5.1	4.2	5.4
Service	7.3	5.7	9.0
Warehouse and storage	6.0	5.2	6.5
Other	31.4	24.0	25.3
Vacant	Insufficient Data	4.2	4.9

Source: Commercial Buildings Energy Consumption Survey (CBECS) 2012, Released September 2022. Table consumption and conditional energy intensity by Census region, 2018

https://www.eia.gov/consumption/commercial/data/2018/index.php?view=characteristics

Refer to the Greenhouse Gas Inventory Guidance: Indirect Emissions from Purchased Electricity Guidanc

https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance

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Market-Based Method - HELP SHEET

Market-Based Electricity Emission Factors

The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as fossil, renewable, or other generation facilities. Market-based emission factors reflect these arrangements. The following are the types of market-based emission factors available, listed in order of preference based on the precision of the factors. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions.

(1) Energy Attribute Certificates — If an energy attribute certificate carries with it an emission factor, that factor can be used to quantify emissions in the market-based method. Examples are renewable energy certificates (RECs) or Guarantees of Origin (GOs). The emission factor is based on the specific source that the certificate represents, regardless of the energy resource used. Typically these certificates represent renewable energy and may have an emission factor of zero, but they may in some cases have a non-zero emission factor (e.g., if there is a fossil-fuel or biomass generation component).

(2) Contracts — An organization may have a contract, such as a power purchase agreement (PPA), to purchase electricity from a specified generating facility, which may be located at the organization's facility, at a nearby location with a direct line connection to the organization, or located remotely. If there are no certificates available, the contract itself carries the emission factor associated with the generation facility, regardless of the energy resource used. If certificates are used, see Energy Attribute Certificates above.

(3) Supplier-Specific Emission Factor — An electricity supplier, such as a regulated utility or a deregulated supplier, may provide information to its customers on the emission factor associated with its electricity product. To be used in the market-based method, the emission factor must include all the electricity delivered by the supplier, including electricity it generates as well as electricity it purchases from others.

(4) Residual Mix Factor — A residual mix emission factor represents the emissions and generation that remain after certificates, contracts, and supplier-specific factors have been claimed and removed from the calculation. Residual mix emission factors are currently not widely available. Organizations are encouraged to check for available residual mix factors each year when their GHG inventory is completed, if the options above are not available or relevant.

(5) Regional Emission Factor — If residual mix factors are not available, organizations can use a regional grid average emission factor as the default. This calculator will use eGRID subregion emission factors in this case.

(6) National Emission Factor — This should not be applicable for any companies reporting US based emissions, due to the availability of regional emission factors.

Quality Criteria for Contractual Instruments

All contractual instruments used in the market-based method must meet the following criteria:

(1) Convey the direct GHG emission rate attribute associated with the unit of electricity produced.

(2) Be the only instruments that carry the GHG emission rate attribute claim associated with that quantity of electricity generation. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(3) Be tracked and redeemed, retired, or canceled by or on behalf of the reporting entity. This can be done through a tracking system, an audit of contracts, third-party certification, or other means.

(4) Have a vintage that matches as closely as possible to the date of the reporting period to which the instruments are applied. The vintage of the instrument is based on the date of the energy generation that the instrument represents.

(5) Be sourced from the same market in which the reporting entity's electricity-consuming operations are located and to which the instrument is applied. A market is defined as a geographical area which has a common system for trading and retiring contractual instruments. For this purpose the U.S. constitutes a single market, despite regional grid boundaries.

The Indirect Emissions from Purchased Electricity Guidance defines EPA best-practice quality recommendations that go beyond these minimum requirements.

Items to Note

- EPA encourages organizations to use renewable energy as a way to reduce the environmental impacts associated with the electricity they purchase. Organizations can reduce their market-based scope 2 emissions by purchasing renewable energy, or "green power." They can do this by choosing a differentiated electricity product from their utility or electricity supplier, by contracting directly with a renewable energy generator (if the regulatory rules allow), or by purchasing unbundled renewable energy certificates (RECs). In any case, the RECs must be acquired and retired.

An Example

In a situation where an organization has procured electricity from a specific source that is relevant to report for the market-based method, but the source supplies less than 100% of the kWh consumed by the facility, it is important to enter the data correctly. Consider the following scenario:

- 100,000 kWh total facility consumption
- 25,000 kWh purchased with energy attribute certificates such as renewable energy certificates (RECs).
- Emission factors for RECs from many RE sources are zero.
- No other market-based emission factors are available.

The table below shows how to enter the data for this example site. There are two rows entered for the facility in order to allocate the market-based emissions to the appropriate kWh.
The total Electricity Purchased (kWh) of the two rows adds up to facility's total consumption. Be careful not to double count kWh.
The REC emission factors are entered in the first row. In the second row, there is no need to enter market-based emission factors, because none are available.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

					Use these cells to enter contractual or supplier specific emission factors		
					Emission Factors		
Source ID	**Source Description**	**Source Area (sq ft)**	**eGRID Subregion** *where electricity is consumed*	**Electricity Purchased (kWh)**	**CO_2 Emissions (lb/MWh)**	**CH_4 Emissions (lb/MWh)**	**N_2O Emissions (lb/MWh)**
Building A	Wind Farm RECs	6,000	RFCW (RFC West)	25,000	0	0	0
Building A	Local Utility	6,000	RFCW (RFC West)	75,000	<enter factor>	<enter factor>	<enter factor>

Refer to the Greenhouse Gas Inventory Guidance: Indirect Emissions from Purchased Electricity Guidance for more information.

https://www.epa.gov/climateleadership/center-corporate-climate-leadership-greenhouse-gas-inventory-guidance

Scope 2 Emissions from Purchase of Steam - HELP SHEET

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U.S. Environmental Protection Agency

DEFINITION

Similar to electricity production, GHGs are emitted when fossil fuels are combusted to generate heat or steam. If the organization purchases heat or steam, the emissions are accounted for as scope 2 indirect emissions. Also similar to electricity, both the location-based method and the market-based method should be calculated and reported as done in this Calculator. Typically supplier-specific emission factors for steam will apply to both location-based and market-based emissions, and no market-based emission factors need to be entered. If needed, see the market-based method Help Sheet for more information.

COLLECT

Determine the amount of steam purchased, the types of fuel that the steam supplier uses to generate the steam, and either the emission factors provided by the steam supplier or the boiler efficiency. If values for boiler efficiency are unavailable, a default of 80% is provided in the Calculator.

Data Collection Checklist (for all facilities)

- Amount of steam purchased
- Fuel type used to generate steam
- Boiler efficiency or supplier-specific emission factors

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled “Steam.” Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box. Enter the market-based emission factors in the yellow cells if applicable.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.
- If you are one of many tenants in a facility and you do not have the actual amount of steam used in your space, you may estimate your usage by multiplying the steam usage of the entire facility by the percentage of the floor area that your organization occupies.

Scope 2 Emissions from Purchase of Hydrogen - HELP SHEET

DEFINITION

Similar to electricity production, GHGs may be emitted when hydrogen is produced. If the organization purchases hydrogen, the emissions are accounted for as scope 2 indirect emissions. Typically, a supplier of hydrogen will understand the greenhouse gas emissions associated with their production process (as is necessary to claim certain incentives).

COLLECT

Determine the amount of hydrogen purchased, the process and types of fuel that the hydrogen supplier uses to produce the hydrogen, and the emission factors provided by the hydrogen producer. If values are unavailable, use the assumptions provided below.

Data Collection Checklist (for all facilities)

- Amount of steam purchased
- Fuel type used to generate steam
- Boiler efficiency or supplier-specific emission factors

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled “Hydrogen.” Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.

EPA CENTER FOR CORPORATE CLIMATE LEADERSHIP
U.S. Environmental Protection Agency

Purchased Offsets - HELP SHEET

DEFINITION

Offsets are project-based emission reductions and/or removals that occur outside the organizational bounda
organization. Offsets can be purchased by an organization to offset emissions from scope 1, scope 2, and s

COLLECT

Quantity of offsets purchased in metric tons CO_2 equivalent for each offset project.

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Offsets." entered into the Calculator, the CO_2 equivalent emissions are summarized in the green colored box.

ary of the reporting
scope 3 sources.

Once the data are