User Input	Calculated or from other tab

This worksheet is used to capture information on Clean Energy Manuf
should first fill out the relevant user input (green) cells in the *Project*
the yellow tab that is specific to your Technology Area. Data will be ex
This worksheet is a supplement to the application narrative. Where th

Section	Applicant Information
Project Overview	Applicant Control Number
	Company Name
	City (HQ)
	State (HQ)
	Zip Code (HQ)
	City (Facility)
	State (Facility)
	Zip Code (Facility)
	Total Qualified Investment ($)
	Expected Credit Rate
	Tax Credit ($)
	Primary Production Output
	Production or Recycling
	Primary Technology Area

Instructions are in yellow boxes next to the corresponding inputs

facturing and Recycling project proposals. Input data and assumptions should be substantiate
Overview tab. Next, applicant should fill out the user input cells in the *Workforce and Commur*
xtracted from this workbook to compare submissions. Therefore, no cells, rows, or columns sh
here does not exist clear categories in the worksheets, please use the application narrative to

Input	Units	Notes
		The control number us
		Total dollar amount of defined in 48C(b).
		Applicants should selec requirements under 48 should select 6% from Section 4 of IRS Notice
0		Calculated by multiplyi
		Brief description of the blades"). Do NOT inclu
		Indicate whether the p a recycling project, fill
		Every application must applicants have multipl *technology area here*. I project, select based te

d in and show clear correspondence to applicant's project narrative. Applicant
nity Engagement, *Commercial Viability*, and *Facility-Level Emissions* tabs, as well as
ould be added.
clarify and explain in greater detail.

ed to track the application in the DOE 48C application portal
the qualified investment that "re-equips, expands, or establishes" the facility, as
ct a 30% tax credit if they anticipate meeting the wage and apprenticeship 3C(e)(5) and (6). Applicants who do not anticipate meeting those requirements the dropdown. For more on wage and apprenticeship requirements, please see 2023-18
ng Qualified Investment by Expected Credit Rate.
facility output product in a one short sentence (e.g., "offshore wind turbine de identifying information (e.g. brand names, company names)
roject is primarily in producing or recycling eligible advanced energy property. If it is out the Recycling Tab
choose at least one technology area (and fill out the corresponding yellow tab). If le technology areas, fill out multiple yellow tabs, but still select the *primary* f Primary Technology Area is Other, fill out the Other tab. If project is a recycling echnology area of the recycled product and fill out the recycling tab.

User Input	Calculated or from other tab

This worksheet is used to capture information on commercial viability of Clean Energy Manufacturing a
the *Project Overview* tab. Data will be extracted from this workbook to compare submissions. Therefor

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

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 ($)
	Total full-time employees
	Market cap (if public)
	Moody's investment grade (if available)
	S&P investment grade (if available)
	Fitch investment grade (if available)
Project to completion	Date Complete Permitting
	Date Begin Construction
	Date Begin Operation
	Future equity need to support organization growth over next 5 years ($)
	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
	Projected payback period
	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)
	Project YOY market growth over the next 5 years (5)
	Market share over the next 5 years (%)
Product competitiveness	Unit cost ($)
	Levelized cost of energy (LCOE) or levelized cost of emissions abatement (LCEA)
	Absolute difference in unit cost of product compared to industry average
	Percent difference in unit cost of product compared to industry average
Corporate disclosures	Ongoing legal claims (Yes or No)
	Planned debt restructuring (Yes or No)
	Going concern (Yes or No)
	Near-term debt maturities ($)
	Other planned corporate actions that may affect completion of project

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
nd Recycling project proposals. Input data and assumptions should be substantiated in and show clear co
e, no cells, rows, or columns should be added.

ank quality financial model for the project. The model should quantify the projected financial parameters
parate tab. The model should be dynamic and not hardcoded. ***[Please use nominal dollars, note inflation***

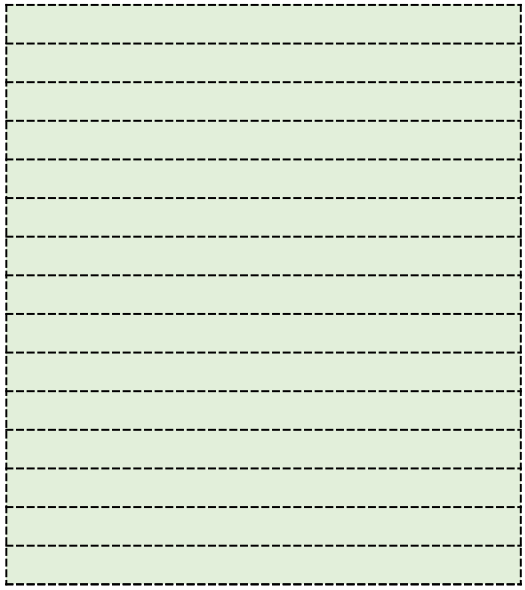
Input	Notes

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?



rrespondence to applicant's project narrative. Applicant should first fill out the relevant user input (green) cells in

including operating costs, operating revenues, financing cash flows, EBITDA, tax credits/liabilities, and ROI over
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.
Provide the revenue of the applicant company for the most recently completed fiscal year
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
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.
Also describe non-financial incentives (e.g., land leases, apprenticeship programs, infrastructure support etc.).
Indicate amount of federal incentives received for the project and briefly describe whether it is a fixed-dollar amount or cost-share.
Site third party vetting/ inputs
Site third party vetting/ inputs
Site third party vetting/ inputs
Site third party vetting/ inputs
Site third party vetting/ inputs
The levelized cost of energy (LCOE) and levelized cost of emissions abatement (LCEA) are measures of the average net present cost of advanced energy property over its deployed lifetime. The LCOE/LCEA calculation should assume that the facility's products are part of a final clean energy installation and, where appropriate, be based on the financial and resource assumptions provided in the 48C Application Data Sheet or the suggested tools in IRS Notice 2023-44 Appendix B.
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
Indicate any planned debt restructuring. If selecting Yes, please explain in the application narrative.
Please briefly describe the company's growth plans for the next five years.
Indicate any planned corporate or management actions that can impact the timely completion of the project or

expected debt funding

nsion), indicate here as well.

User Input	Calculated or from other tab	Instructions are in yellow boxes next to

In addition to details about the Specified Advanced Energy Property, which are captured in the technology
estimate the emissions footprint of the facility itself, inclusive of Scope 1 emissions and electricity- and fue

Facility-Level Greenhouse Gas Emissions			
EPA GHGRP ID (if applicable)			Applicants GHGRP rep
Estimated Facility Greenhouse Gas Emissions Scope 1		*metric tons CO2e/year*	Estimate th emissions completed should incl site statior use of gase may wish t GHG Calcu Calculator. Applicants Recyling Pr methodolc estimates i B for more
Estimated Facility Greenhouse Gas Emissions Scope 2		*metric tons CO2e/year*	Estimate th related) CO the project 2 emission emissions electricity, facility. For consider th Calculator Calculator. Applicants Recyling Pr methodolc estimates i B for more

the corresponding inputs

-specific tabs to the right, applicants are asked to
l-related Scope 2 emissions.

with existing facilities subject to EPA orting should provide their GHGRP ID.
ne annual Scope 1 CO2-equivalent at the facility after the project is and fully operational. Scope 1 emissions ude at least emissions associated with on- ary combustion, process emissions, and es such as HFCs. For assistance, applicants o consider the use of the EPA's Simplified lator or Greenhouse Gas Equivalencies for Clean Energy Manufacturing and rojects are not required to submit a full gy, but should justify their emissions in the narrative. See Section V of Appendix information.
ne annual Scope 2 (electricity- and fuel- 02-equivalent emissions at the facility after t is completed and fully operational. Scope s should include at least the upstream associated with the production of any hydrogen, or steam purchased by the r assistance, applicants may wish to ne use of the EPA's Simplified GHG or Greenhouse Gas Equivalencies for Clean Energy Manufacturing and rojects are not required to submit a full gy, but should justify their emissions in the narrative. See Section V of Appendix information.

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. For retrofit 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 project.
Do not list Indirect Jobs, defined as employees included in the supply chain who are not directly billed to the pr
- 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 steelworke

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 Economic
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 located in?
Does the project meet the Prevailing Wage and Apprenticeship (PWA) requirements? (Yes/No) *For more on wage and apprenticeship requirements, please see Section 4 of IRS Notice 2023-18.*
Have you provided a Prevailing Wage and Apprenticeship (PWA) certification? (Yes/No)
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 under develo named co-signers or other partners in last column. Please list the specific named co-signers or other partners in 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 apprenticeshi 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 Protecti Justice Screening and Mapping (EJSCREEN) tool (https://www.epa.gov/ejscreen).

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

s next to the corresponding inputs

s/reequipped facilities, please list the number of current jobs for the purposes of calculating increment

oject. Examples include:

rs not working on the GHG reduction)

	Input
Justice Screening Tool (CEJST)? (Yes/No)	

pment, signed, or active. Please list the specific
last column. Please distinguish between co-

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

o 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*

on Agency's Environmental

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

tal

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*

TE only if this is an

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

Instructions for Manufacturers of Eligible Renewable Energy Products or Microturbines

User Input	Calculated or from other tab	Instructions are in yellow boxes next to the

Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.

Annual Attributable Production Capacity (AAPC)

Descriptor	Data	Units	Notes/Instructions
Annual Production Capacity		*MW/year*	Expected annual production. Us electrical technologies such as s components without watt rating the amount of watts of the end component, and state your assu
Conversion Factor and Explanation			For non-watt rated technologies factor (e.g., square meters to wa
Manufacturing Contribution		*$/W*	Value added contribution to syst feedstock materials, upstream c
Total System Hardware Price		*$/W*	Price to end user of total system system but excluding installatior be greater than what is entered
Typical Annual Capacity Factor		*%*	See *Assumptions* tab for commo assumptions of typical use. Defi output)/(peak power rating * 87 capacity factor, please justify in
Share of facility output		*%*	Fraction of production from proj that will be allocated for renewa

corresponding inputs

e equivalent watts for non-
olar water heating. For
s, make an assumption about
product per unit of your
mptions below.

ONLY, explain your conversion
atts) in 50 words or less.

tem (excludes price paid for
omponents, etc.).

hardware including balance of
labor costs. This value should
in cell B9

n capacity factors, based on
ned as (annual energy
60 hours). If you use a different
the narrative.

ject (i.e., manufacturing facility)
able resource production.

EXAMPLE

Descriptor	Data
Annual Production Capacity	50
Conversion Factor and Explanation	N/A
Manufacturing Contribution	0.06
Total System Hardware Price	0.64
Typical Annual Capacity Factor	25%
Share of facility output	100%

Units	Notes/Instructions
MW/year	Facility produces 50 MW of c-Si solar PV cells per year for small-scale residential developers.
	Not applicable; technology is already rated in watts.
$/W	Cost to produce a c-Si solar PV cell is $0.18/W, including margin, but cost of inputs is about $0.12/W. So value add is $0.06/W.
$/W	Total hardware cost of solar module and BOS (NREL, 2022).
%	Average U.S. capacity factor of solar PV is 25%, per the *Assumptions* tab.
%	All of the facility's production goes to solar cell manufacturing.

Instructions for Manufacturers of Eligible Renewable Energy Products or Microturbines

User Input	Calculated or from other tab	Instructions are in yellow boxes next to the

Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.

Annual Attributable Production Capacity (AAPC)

Descriptor	Data	Units	Notes/Instructions
Annual Production Capacity		*MW/year*	Expected annual production. Us electrical technologies such as s components without watt rating the amount of watts of the end component, and state your assu
Conversion Factor and Explanation			For non-watt rated technologies factor (e.g., square meters to wa
Manufacturing Contribution		*$/W*	Value added contribution to syst feedstock materials, upstream c
Total System Hardware Price		*$/W*	Price to end user of total system system but excluding installatior be greater than the value in cell
Typical Annual Capacity Factor		*%*	See *Assumptions* tab for commo assumptions of typical use. Defi output)/(peak power rating * 87 capacity factor, please justify in
Share of facility output		*%*	Fraction of production from proj that will be allocated for renewa

corresponding inputs

e equivalent watts for non-
olar water heating. For
s, make an assumption about
product per unit of your
mptions below.

ONLY, explain your conversion
atts) in 50 words or less.

tem (excludes price paid for
omponents, etc.).

hardware including balance of
labor costs. This value should
B9.

n capacity factors, based on
ned as (annual energy
60 hours). If you use a different
the narrative.

ject (i.e., manufacturing facility)
able resource production.

EXAMPLE	
Descriptor	**Data**
Annual Production Capacity	50
Conversion Factor and Explanation	N/A
Manufacturing Contribution	0.06
Total System Hardware Price	0.64
Typical Annual Capacity Factor	25%
Share of facility output	100%

Units	Notes/Instructions
MW/year	Facility produces 50 MW of c-Si solar PV cells per year for small-scale residential developers.
	Not applicable; technology is already rated in watts.
$/W	Cost to produce a c-Si solar PV cell is $0.18/W, including margin, but cost of inputs is about $0.12/W. So value add is $0.06/W.
$/W	Total hardware cost of solar module and BOS (NREL, 2022).
%	Average U.S. capacity factor of solar PV is 25%, per the *Assumptions* tab.
%	All of the facility's production goes to solar cell manufacturing.

Instructions for Manufacturers of Eligible Refining, Blending, or Electrolyzing Equipment or Fuel Cel

User Input	Calculated or from other tab

Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.

Fuel Type/Process	

Annual Attributable Production Capacity (AAPC)

Descriptor	**Data**
Annual Production Capacity	
Manufacturing Contribution	
Total Installed System Price	
Capacity per unit per year	
Deployed Property Lifetime	
Share of Facility Output	

ls	
Instructions are in yellow boxes next to the corresponding inputs	

	Select the most representative fuel refining, blending, or electrolyzing process.

Units	**Notes/Instructions**
Unit/year	Projected (not peak or potential) number of units manufactured annually.
$/Unit	Value added contribution to system (excludes price paid for feedstock materials, upstream components, etc.).
$/Unit	Price to end user of total system hardware including balance of system but excluding installation labor costs. This value should be greater than the value in cell B10.
GGE	Amount of fuel, chemical, or product enabled the given unit of refining, electrolyzing, or blending equipment annually, best expressed in gallons of gasoline equivalent (GGE). Kilograms, MW, or other units should be converted to GGE using BTUs or MJs.
years	Number of years the deployed equipment will operate.
%	Fraction of project (i.e., manufacturing facility) that will be allocated to eligible equipment. **Please type in a percentage (no greater than 100) -- we will not convert to a percentage.**

EXAMPLE

Fuel Type/Process	Alcohol to jet from isobutanol - fermentation - corn grain/starch	The electrolyzers will applicant selects the equivalent to a 100%

Annual Attributable Production Capacity (AAPC)			
Descriptor	**Data**	**Units**	**Notes/Instructions**
Annual Production Capacity		50 *Unit/year*	Applicant produces 1
Manufacturing Contribution		50,000 *$/Unit*	Electrolyzers are sold of platinum group me by the manufacturer
Total Installed System Price		1,000,000 *$/Unit*	The full hydrogen ele for a 1-MW capacity e
Capacity per unit per year		150,000 *GGE*	A 1-MW electrolyzer 150,000 kg of hydrog conditions.
Deployed Property Lifetime		10 *years*	Electrolyzers are expe replacement.
Share of Facility Output		100 *%*	100% of the facility w

run on renewable electricity, so the
LCA for "renewable electrolysis." This is
reduction in emissions per GGE.

000 1-MW electrolyzers at its new facility.

for $100,000 each, but use $50,000 worth
etals and other inputs, so the value added
is $50,000.

ctrolysis system is estimated at $1 million
electrolyzer.

could be expected to produce about
en per year under typical operating

ected to last about 10 years before

ill be used to produce clean hydrogen.

Instructions for Manufacturers of Energy Storage Systems		
User Input	Calculated or from other tab	Instructions are in yellow boxes next
Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.		

Annual Attributable Production Capacity (AAPC)			
Descriptor	**Data**	**Units**	**Notes/Instructions**
Annual Production Capacity		*MW/year*	Expected annual produ production capacity in output of the batteries watt ratings, make an a end product per unit o assumptions below.
Conversion Factor and Explanation			For non-watt rated tec factor (e.g., square me
Manufacturing Contribution		*$/kWh*	Value added contributi feedstock materials, u
Total System Hardware Price		*$/kWh*	Price to end user of tot system but excluding i greater than the value
Typical Annual Capacity Factor		*%*	See *Assumptions* tab fo assumptions of typical output)/(peak power r capacity factor, please
Share of facility output		*%*	Fraction of production that will be allocated f

to the corresponding inputs	
	EXAMPLE
	Descriptor
uction. Facilities that typically express their Megawatt-Hours should instead state power in Megawatts. For components without assumption about the amount of watts of the f your component, and state your	Annual Production Capacity
hnologies ONLY, explain your conversion ters to megawatt-hours) in 50 words or less.	Conversion Factor and Explanation
ion to system (excludes price paid for ostream components, etc.).	Manufacturing Contribution
tal system hardware including balance of nstallation labor costs. This value should be in cell B9.	Total System Hardware Price
or common capacity factors, based on use. Defined as (annual energy ating * 8760 hours). If you use a different justify in the narrative.	Typical Annual Capacity Factor
from project (i.e., manufacturing facility) or renewable resource production.	Share of facility output

Data	Units	Notes/Instructions
100	*MW/year*	Lithium-ion battery factory assembles 200 MWh of 2-hour duration batteries for stationary storage applications. Those batteries represent 100 MW of power.
N/A		N/A
$50	*$/kWh*	Manufacturer adds $50/kWh of value in assembling the battery cell and pack.
$400	*$/kWh*	Total price of the installed system is $400/kWh.
10%	*%*	Capacity factor of stationary storage, according to the *Assumptions* tab.
100%	*%*	100% of the factory is being used for battery production.

Instructions for Manufacturers of Eligible Electric, Fuel Cell, and Hybrid Vehicles and Components (

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

Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.

Annual Attributable Production Capacity (AAPC)

Descriptor	Data	Units	Notes/Inst
Annual Production Capacity		*Unit/year*	Projected (manufactu
Manufacturing Contribution		*$/Unit*	Value adde feedstock
Total Price of Vehicle Equipment		*$/Unit*	Price to en system but be greater
Deployed Property Lifetime		*years*	Number of
Share of facility output		*%*	Fraction of that will be **Please typ**

The following formulas calculate the greenhouse gas emissions reductions associated with the project.

Indirect Greenhouse Gas Reductions and Simplified Cost of Abatement

Descriptor	Data	Units	Notes/Inst
Average Annual Mileage		*Miles/year*	List the ave for both th *Assumptio*
Annual Baseline System Fuel Consumption		*MPGGE*	Projected l equivalent (e.g., avera
Annual Improved System Fuel Consumption		*MPGGE*	Projected l typical ope duty vehicl **below. If p**

Miles per kWh		*Miles per kWh*	If electric c typical ope

excl. charging equipment)	
es next to the corresponding inputs	

ructions	EXAMPLE Descriptor
(not peak or potential) number of units ured annually.	Annual Production Capacity
ed contribution to system (excludes price paid for materials, upstream components, etc.).	Manufacturing Contribution
d user of total system hardware including balance of t excluding installation labor costs. This value should than the value in cell B8.	Total Price of Vehicle Equipment
years the deployed equipment will operate.	Deployed Property Lifetime
production from project (i.e., manufacturing facility) e allocated to produce vehicle technology. **e in a percentage (no greater than 1) -- we will not**	Share of facility output

ructions	EXAMPLE Descriptor
erage annual operations of the class of vehicle, used ne baseline and the improved system. Use the *ns* tab as needed.	Annual Mile
iquid fuel consumption in gallons of gasoline (GGE) of baseline system under typical operation age fuel economy of a heavy-duty vehicle).	Annual Baseline System Fuel Consumption
iquid fuel consumption of improved system under eration (e.g., average fuel economy of a hybrid heavy-le). **If fully electric, enter "0" and fill out the row lugin hybrid, fill out both rows.**	Annual Improved System Fuel Consumption

or plug-in hybrid, state the required electricity under eration (e.g., average MPGe of an electric vehicle).	Miles per kWh

Data	Units	Notes/Instructions
	100,000 *Unit/year*	Applicant produces 100,000 EV batteries per year at its 10 GWh factory.
	$6,000 *$/Unit*	Finished battery is sold for $12,000, but inputs and subcomponents cost $6,000, so the "manufacturing contribution" of this facility is $6,000.
	$25,000 *$/Unit*	Total price of electric vehicle is $25,000.
	20 *years*	Assumed EV lifetime is 20 years.
	90% *%*	90% of the facility's output goes to EVs, 10% to consumer electronics.

Data	Units	Notes/Instructions
	10,850 *Miles*	Per *Assumptions* tab, presumes the vehicle class has a annual mileage of 10,850 miles.
	23 *MPGGE*	Per *Assumptions* tab, presumes the baseline system gets 23.4 miles per gallon.
	0 *MPGGE*	Presumes the improved system uses no liquid fuel.

3	The improved system uses electricity and gets roughly 3 miles per kWh.

Instructions for Manufacturers of Eligible Grid Modernization Equipment and Electric Vehicle Charg

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

Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.

Annual Attributable Production Capacity (AAPC)

Descriptor	Data	Units	Notes/Instr
Annual Production Capacity		*Units, kVA, etc. per year*	Projected (r manufactur terms of pc raw numbe
Manufacturing Contribution		*$/Unit*	Value adde feedstock r
Total Price of Equipment		*$/Unit*	Price to enc system but greater tha
Typical Annual Capacity Factor		*%*	See *Assump* assumption output)/(pe capacity fac
Share of facility output		*%*	Fraction of that will be **Please type**

ing Equipment
s next to the corresponding inputs

	EXAMPLE
ructions	**Descriptor**
not peak or potential) number or capacity of units red annually. If possible, express the total capacity in ower capacity (e.g., kVA for transformers) rather than r of units.	Annual Production Capacity
d contribution to system (excludes price paid for naterials, upstream components, etc.).	Manufacturing Contribution
d user of total system hardware including balance of excluding installation labor costs. This value should be n the value in cell B8.	Total Price of Equipment
otions tab for common capacity factors, based on s of typical use. Defined as (annual energy eak power rating * 8760 hours). If you use a different ctor, please justify in the narrative.	Typical Annual Capacity Factor
production from project (i.e., manufacturing facility) allocated to produce vehicle technology. **e in a percentage (no greater than 1) -- we will not**	Share of facility output

Data	Units	Notes/Instructions
	2,000 *MVA/year*	Projected (not peak or potential) number or capacity of u manufactured annually. If possible, express the total capa electrical terms (e.g., kVA for transformers) rather than r number of units.
	1,000,000 *$/Unit*	The manufacturer purchases $500,000 of raw materials f LPT, but sells each one for $1.5 million, so generates $1 n value in the process.
	1,500,000 *$/Unit*	The total value of the completed LPT is $1.5 million
	65% *%*	Average U.S. capacity factor of transmission equipment i the *Assumptions* tab.
	100% *%*	We assume all of the facility output is for LPTs.

nits acity in aw
or each nillion of
s 65%, per

Instructions for Manufacturers of Eligible Energy Conservation Equipment

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

Manufacturing facilities for eligible energy conservation equipment should complete each green cell on this ta

Fuel Information

Baseline Fuel Type/Process		**If selected 'Other', explain here**	Select the or electrol
Improved Fuel Type/Process		**If selected 'Other', explain here**	Select the blending, c projects, s fuel switch

Annual Attributable Production Capacity (AAPC)

Descriptor	**Data**	**Units**	**Notes/Inst**
Annual Production Capacity		*Unit/year*	Projected (manufactu
Manufacturing Contribution		*$/Unit*	Value adde feedstock
Total Price of Efficiency Equipment		*$/Unit*	Price to en system but be greater
Annual Baseline System Consumption		*MMBTU/year*	Likely annu (WITHOUT operation natural gas the assum paper appl
Annual Improved System Consumption		*MMBTU/year*	Likely annu fuel switch (e.g., energ pump).
Deployed Property Lifetime		*years*	See *Assum* assumptio equipment
Share of Facility Output		*%*	Fraction of that will be

es next to the corresponding inputs ab to indicate annual production. These metrics	
most representative baseline fuel refining, blending, yzing process.	**EXAMPLE** Baseline Fuel Type/Process
most representative improved/ new fuel refining, or electrolyzing process. For efficiency improvement elect the same fuel type/ process as the baseline if ing not applicable and explain efficiency	Improved Fuel Type/Process
ructions	**EXAMPLE** **Descriptor**
(not peak or potential) number of units ured annually.	Annual Production Capacity
ed contribution to system (excludes price paid for materials, upstream components, etc.).	Manufacturing Contribution
d user of total system hardware including balance of t excluding installation labor costs. This value should than the value in cell B12.	Total Price of Efficiency Equipment
ual energy consumption of baseline system fuel switching or efficiency technology) under typical (e.g., energy consumption of average home using s heating). Baseline system assumptions must match ptions used in commercial viability section of concept ication	Annual Baseline System Consumption
ual energy consumption of improved system (AFTER ing or efficiency technology) under typical operation gy consumption of average home with air source heat	Annual Improved System Consumption
ptions tab for common capacity factors, based on ns of typical use. Number of years the deployed t will operate.	Deployed Property Lifetime
production from project (i.e., manufacturing facility) e allocated to produce energy efficiency technology.	Share of Facility Output

Natural Gas	The project manufactures heat pumps which are assumed to replace natural gas furnaces.
Grid electricity	Heat pumps are assumed to be powered by grid electricity.

Data	Units	Notes/Instructions
10,000	*Unit/year*	Manufacturer produces 10,000 units of cold-climate air-source heat pumps
$3,500	*$/Unit*	Heat Pumps are sold for $5000 but incorporate $1500 of input materials and components, so the manufacturer's contribution is $3500 per unit.
$5,000	*$/Unit*	Price to end user of total HVAC system hardware including balance of system but excluding installation labor costs.
80	*MMBTU/year*	Annual energy consumption of the average building using natural gas furnance of comparable size to heat pump
16	*MMBTU/year*	Cold climate heat pump is projected to reduce energy usage by 64 MMBTU
10	*years*	Heat pumps average lifetime are 10 years
100%	*%*	All of the factory's output goes to producing heat pump

Instructions for Manufacturers of Carbon Capture, Removal, Use, and Storage or Other Greenhouse

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

Applicants should complete **ONLY ONE TAB per application** on the basis of their technology area.

Annual Attributable Production Capacity (AAPC)

Descriptor	Data	Units	Notes/Instr
Annual Production Capacity		*Unit/year*	Projected (r annually.
Manufacturing Contribution		*$/Unit*	Value adde feedstock n
Total Cost of Emissions Reduction Component		*$/Unit*	Price to enc including ba This value s
CO2e Reduction Per Unit		*Metric tons CO2e*	Annual CO2 equipment "CO2 Equiv
Deployed Property Lifetime		*years*	Number of
Share of Facility Output		*%*	Fraction of that will be

e Gas Reduction Equipment
s next to the corresponding inputs

	Annual Attributable Production Capacity
ructions	**Descriptor**
not peak or potential) number of units manufactured	Annual Production Capacity
d contribution to system (excludes price paid for materials, upstream components, etc.).	Manufacturing Contribution
d user of total system hardware (e.g., full CCS system) alance of system but excluding installation labor costs. should be greater than the value in cell B8.	Total Cost of Emissions Reduction Component
2-equivalent emissions reductions per unit deployed. For that reduces non-CO2 emissions, applicants can use the alency Assumptions" on the *Assumptions* tab.	CO2e Reduction Per Unit
years the deployed equipment will operate.	Deployed Property Lifetime
production from project (i.e., manufacturing facility) allocated to produce energy efficiency technology.	Share of Facility Output

(AAPC)		
Data	**Units**	**Notes/Instructions**
	100,000 *Unit/year*	A manufacturer projects that its new factory will produce gallons of a solvent that can be used in carbon capture sy
	450 *$/Unit*	Value added contribution to system (excludes price paid feedstock materials, upstream components, etc.).
	5,000 *$/Unit*	The full price of the functional CCS apparatus is estimate per gallon of solvent.
	100 *Metric tons CO2e*	Each gallon of solvent is expected to reduce 1,000 metric CO2e per year.
	1 *years*	The solvent is expecteed to last 20 years before replacem
	50% *%*	Half of the facility's solvent will be sold into the cleaning market, so only 50% of the facility's output is dedicated t technologies.

e 100,000 ystems.
for
d at $5,000
tons of
nent
products o eligible

Instructions for Recyclers of Qualified Energy Properties

User Input	Calculated or from other tab

Recycling facilities of qualified energy properties should complete each green cell on this tab to in
products (output) and associated production information. Applicants may reference the example

Fuel Information

Input Technology Area	
Output Technology Area	

Annual Attributable Production Capacity (AAPC)

Descriptor	Data
Recovery Rate	
Annual Production Capacity	
Manufacturing Contribution	

Instructions are in yellow boxes next to the corresponding inputs ıdicate annual production. These metrics include the recycled properties (input) and the to the right and/or the Assumptions tab for assistance.

If selected 'Other', explain here	Select the most representative technology area for the recycling input. If the input is a critical material, use the critical material data sheet and application
If selected 'Other', explain here	Select the most representative technology area for the recycling output. If the output is a critical material, fill out the critical material data sheet

Units	**Notes/Instructions**
Mass/Unit	Provide the projected (not peak or potential) recovered rate. Fill in the Unit column with the appropriate units.
Unit/year	Projected (not peak or potential) number of output units produced. Fill in the Unit column with the appropriate unit e.g. MWh, tonnes, etc
$/Unit	Value added contribution to system (excludes price paid for feedstock materials, upstream components, etc.). Fill in the Unit column with the appropriate units.

EXAMPLE			
Input Technology Area	Electric or fuel cell vehicles - 48C(c)(1)(A)(i)(VII)	**If selected 'Other', explain here**	Select the recycling ir material da
Output Technology Area	Electric or fuel cell vehicles - 48C(c)(1)(A)(i)(VII)	**If selected 'Other', explain here**	Select the recycling ir and write i

EXAMPLE			
Descriptor	**Data**	**Units**	**Notes/Inst**
Recovery Rate		0.5 *g Li/battery cell*	Projected (
Annual Production Capacity		100,000 *kg Li/year*	Manufactu batteries ir
Manufacturing Contribution		20 *$/kg Li recovered*	Manufactu the selling

most representative technology area for the nput. If the input is a critical material, use the critical ata sheet and application
most representative technology area for the nput. If the output is a critical material, select other n the critical material

ructions
(not peak or potential) recovered rate
urer produces 100,000 kg of of Lithium from recycled nputs
urer value-add to process (should be strictly less than price)

Instructions for Manufacturers of Other Greenhouse Gas Reduction Equipment

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

Manufacturing facilities for other equipment designed to reduce greenhouse gas emissions should comp
production. These include metrics to understand the performance of the product in its ultimate use. App
and/or the Assumptions tab for assistance.

Provide Brief Description of Output			In 10 word and how it

Annual Attributable Production Capacity (AAPC)

Descriptor	Data	Units	Notes/Inst
Base Unit		Unit	Describe th
Annual Production Capacity		*Unit/year*	Projected (manufactu
Manufacturing Contribution		*$/Unit*	Value adde feedstock
Total Cost of Emissions Reduction Component		*$/Unit*	Price to en system) inc labor costs B11.
CO2e Reduction Per Unit		*Metric tons CO2e/unit*	Annual CO For equipn use the "C tab.
Deployed Property Lifetime		*years*	See *Assum* assumptio equipment
Share of Facility Output		*%*	Fraction of that will be

xes next to the corresponding inputs lete each green cell on this tab to indicate annual licants may reference the example to the right

s or less, describe what product the facility produces reduces greenhouse gas emissions

ructions	**Annual Attributable Production Ca**
	Descriptor
ne unit of production	Base Unit
(not peak or potential) number of units ured annually.	Annual Production Capacity
ed contribution to system (excludes price paid for materials, upstream components, etc.).	Manufacturing Contribution
d user of total system hardware (e.g., full CCS cluding balance of system but excluding installation . This value should be greater than the value in cell	Total Cost of Emissions Reduction Component
2-equivalent emissions reductions per unit deployed. ment that reduces non-CO2 emissions, applicants can O2 Equivalency Assumptions" on the *Assumptions*	CO2e Reduction Per Unit
ptions tab for common capacity factors, based on ns of typical use. Number of years the deployed t will operate.	Deployed Property Lifetime
production from project (i.e., manufacturing facility) e allocated to produce energy efficiency technology.	Share of Facility Output

apacity (AAPC)		
Data	**Units**	**Notes/Instructions**
gallon	Unit	Describe the unit of production
100,000	*Unit/year*	A manufacturer projects that its new factory will produce 100,000 gallons of a solvent that can be used in carbon capture systems.
450	*$/Unit*	Value added contribution to system (excludes price paid for feedstock materials, upstream components, etc.).
5,000	*$/Unit*	The full price of the functional CCS apparatus is estimated at $5,000 per gallon of solvent.
100	*Metric tons CO2e*	Each gallon of solvent is expected to reduce 1,000 metric tons of CO2e per year.
20	*years*	The solvent is expecteed to last 20 years before replacement
50%	*%*	Half of the facility's solvent will be sold into the cleaning products market, so only 50% of the facility's output is dedicated to eligible technologies.

Baseline Metrics and Conversion Factors
Metric
MJ per gallon of gasoline
BTUs per gallon of gasoline
Annual Miles Traveled (average new light-duty vehicle)
Baseline Vehicle Fuel Economy
Vehicle Cost (2021 average new light-duty vehicle)

CO2 Equivalency Assumptions
Original Metric
Metric ton of CO2
Metric ton of Methane
Metric ton of Nitrous Oxide
Metric ton of HFCs/PFCs
Metric ton of SF6
Gallon of gasoline avoided
Megawatt-hour of electricity avoided

Source: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Common Service Life Assumptions
Technology
General suggestion (for technologies excluded below)
Distributed Solar Photovoltaics - Modules
Distributed Solar Photovoltaics - Inverters
Distributed Wind
Battery Storage - Cells
Battery Storage - String Inverters
Fuel Cell
Micro Turbine
Air-Source Heat Pump
Electric Rooftop Heat Pump
Ground-Source Heat Pump
Grid Modernization Equipment
Light-duty Vehicle
Utility-scale PV
Utility-scale Wind
Utility-scale Fuel Cells
Utility-scale Combustion Turbines

Common Capacity Factor Assumptions
End Use Energy Product (Technology)
Biomass (general)
Geothermal
Grid - Transmission/Transportation
Grid Equipment - Interconnection
Landfill gas utilization (general)
Solar Thermal
Solar Photovoltaic (general)
Storage
Storage – Pumped Hydro

Storage – Adv. Batteries
Storage – Flywheel
Wind
Wind – Offshore

CO2 Equivalency Assumptions
Original Metric
Metric ton of CO2
Metric ton of Methane
Metric ton of Nitrous Oxide
Metric ton of HFCs/PFCs
Metric ton of SF6
Gallon of gasoline avoided
Megawatt-hour of electricity avoided

Source: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Value
120
114,000
10,850
24
42,000

CO2e Emissions (metric tons)
1
22.7
270
Various (use EPA calculator below)
20,684
0.009
0.709

Service Life Years
20
26
21
20
10
15
10
10
9 to 22
21
8 to 21
25
16
30
30
30
30

Capacity Factor (%)
52%
73%
65%
80%
80%
28%
20%
10%
N/A

10%
N/A
44%
42%

CO2e Emissions (metric tons)
1
22.7
270
Various (use EPA calculator below)
20,684
0.009
0.709

Units
MJ/GGE
BTU/GGE
miles
mpg
$

Notes
https://www.eia.gov/analysis/studies/buildings/dg_storage_chp/
https://www.eia.gov/analysis/studies/buildings/dg_storage_chp/
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https://www.eia.gov/analysis/studies/buildings/equipcosts/
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Note: Utility-scale technologies are evaluated using a 30-year investment recovery period. However, these technologies will remain in service as long as going-forward revenues (system value) exceed going-forward costs (variable and fixed operating costs). Thus actual service life may be shorter-than or substantially longer than 30-years.

Notes
Fleet capacity factor in 2021
Fleet capacity factor in 2021
Fleet capacity factor in 2021
Based on NEMS EMM Region 20 WECC Southwest
Based on ac kWh delivered and dc watts rated power (Use 25% if ac-to-ac)

Based on NEMS EMM Region 18 and 19: Southwest Power Pool Central and North
Based on NEMS EMM Region 7 NPCC New England