AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool

Information:

The AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool estimates well-to-wheel operation air pollutant emissions for proposals to the Federal Highway Administration's (FHW Discretionary Grant Program (CFI Program). The CFI Program covers electric vehicle charging, fueling infrastructure.

This tool was developed with the support of the Joint Office of Energy and Transportation, us https://greet.es.anl.gov/afleet. The AFLEET Tool uses emissions data from both the EPA's MO

Instructions: To estimate emissions reductions, complete steps 1 to 4 de

Yellow cells are required inputs
Orange cells are optional inputs
Clear cells are calculations or results

Step 1. Select the state where the project is proposed from the drop-down menu in cell C4.

Step 2a. Input the number of chargers/stations by type and by utilization category (i.e. low, C9 – E14.

Note: In accordance with FHWA's National Electric Vehicle Infrastructure Standards and Requ in this tool, a charger is defined as a device with one or more charging ports and connectors Vehicle Supply Equipment (EVSE)."

-- Default moderate utilization is based on current real-world average usage of each station ty low and high utilization of L2 and DCFC chargers. While the low and high utilization for other s moderate value, respectively.

-- For reference, based on the default utilization for each charger/station type:
    L2 EVSE: light-duty EV ~ 60 kWh/vehicle; serves full fill of ~
    DCFC EVSE: light-duty EV ~ 60 kWh/vehicle; serves full fill of ~
    Hydrogen: light-duty FCV ~ 5 kg/vehicle; serves full fill of ~
    Propane: heavy-duty LPGV ~ 70 gal/vehicle; serves full fill of ~
    CNG: heavy-duty CNGV ~ 100 GGE/vehicle; serves full fill of ~
    LNG: heavy-duty LNGV ~ 100 gal/vehicle; serves full fill of ~

Step 2b. Default annual fuel consumption estimates are populated by utilization category ty based on local information, you can change these cells.

Step 2c. Default percentage of vehicle types using each station type are populated in cells J change the cells in J9 – J14, as column K will sum to 100%.

Step 3. You can change the fuel production assumptions for natural gas, EVSE, and hydroge

User-Defined Electric Generation Mix

Residual oil
Natural gas
Coal
Nuclear power
Biomass
Others (Wind, Solar, Hydro, etc)

**Step 4. Based on the inputs and drop-down selections made in Steps 1-3, the table in cells B
results. Copy this table and paste into your grant application where appropriate.**

Note: positive values mean utilization of the charger/AFV station has lower emissions than ut
values mean utilization of the charger/AFV station has higher emissions than utilization of ga

Copyright:

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Versions:

v1.0 released 3/13/2023

v1.1 released 4/3/2023: Updated calculations so LDVs only compare to gasoline and HDVs only compare to diesel vehicles. Updated AFV air pollutant multipliers for LPG to compare to diesel HDVs (instead of gasoline)

greenhouse gas emissions and vehicle

/A) Charging and Fueling Infrastructure

 as well as hydrogen, propane, and natural gas

ing the AFLEET Tool available at:

VES and Argonne's GREET models.

escribed below on the "CFI Tool" sheet

	REQUIRED

, moderate, and high) for this project in cells	**REQUIRED**

irements [FHWA Docket No. FHWA-2022-008]
for charging EVs. Also referred to as Electric

/pe; real-world data was also used for default
stations are assumed to be half and double of

Low Utilization	Moderate Utilization	High Utilization	
50	100	167	EV/year
217	467	867	EV/year
2,800	5,600	11,200	FCV/year
79	157	314	LPGV/year
1,225	2,450	4,900	CNGV/year
815	1,630	3,260	LNGV/year

/pe in cells F9 – H14. To use a different values	**OPTIONAL**

9 – K14. To change the percentage, you can	**OPTIONAL**

n stations in cells D17, D19, D21, or D25.	**OPTIONAL**

r a user-defined mix by selecting 12 in the drop-

User-Defined Mix
0.3%
36.5%
23.8%
19.6%
0.3%
19.5%

29 – K38 will calculate the emission reduction   REQUIRED

ilization of gasoline/diesel baseline; negative
soline/diesel baseline

al and supporting documentation are

ghts are reserved to the AFLEET Tool.

AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool

1. Charging and Fueling Infrastructure Location *(REQUIRED)*

State	MAINE

2. Charging and Fueling Infrastructure Inputs

	2a. Number of Chargers/Stations *(REQ*	
Charger/Station Type	**Low Utilization**	**Moderate Utilization**
Level 2 EVSE	0	0
DCFC EVSE	8	36
Hydrogen	0	0
Propane	0	0
CNG	0	0
LNG	0	0

3. Fuel Production Assumptions *(OPTIONAL)*

CNG Feedstock Source	1 - North American Fossil NG	1
	2 - Renewable Natural Gas	
LNG Feedstock Source	1 - North American NG	1
	2 - Renewable Natural Gas	
Source of Electricity for EVSEs and Hydrogen (Electrolysis)		6
	1 - Average U.S. Mix	
	2 to 11 - EIA Region Mix (see map)	
	12 - User Defined (go to 'Intro' sheet)	
Hydrogen Production Process	1 - NG SMR	1
	2 - Electrolysis	

4. Annual CFI Tool - Emissions Reductions *(PASTE TABLE INTO PROPOSAL)*

	GHGs	CO
AFV Fueling Infrastructure	**(short tons)**	**(lb)**
Level 2 EVSE		
DCFC EVSE	2,994.9	23,305.7
Hydrogen		
Propane		
CNG		
LNG		
Fueling Infrastructure Total	2,994.9	23,305.7

	2b. Annual Fuel Consumption Per Fuel Unit (OPTIONAL)				2c. Vehicle Ty Charger/S (OPTIO

UIRED) High Utilization	Low Utilization	Moderate Utilization	High Utilization	Fuel Unit	Light-Duty
0	3,000	6,000	10,000	kWh	100%
36	13,000	28,000	52,000	kWh	90%
0	14,000	28,000	56,000	hydrogen kg	100%
0	5,500	11,000	22,000	LPG gallon	0%
0	122,500	245,000	490,000	CNG GGE	0%
0	81,500	163,000	326,000	LNG gallon	0%

1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
6	Default based on S
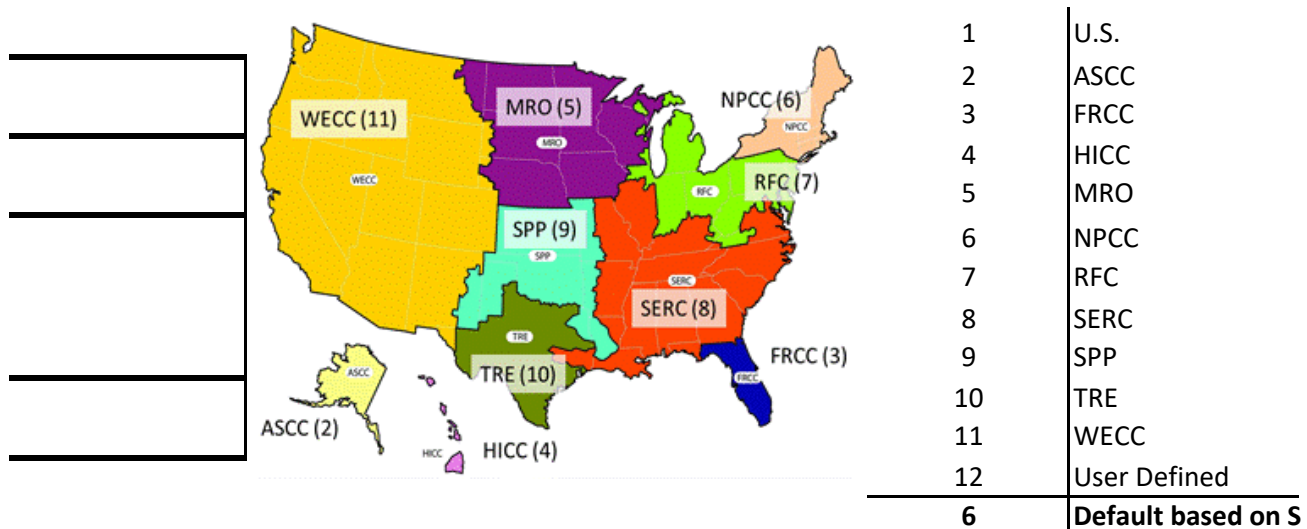
NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)	Fuel Dispensed (fuel unit)
4,160.5	106.4	75.9	2,128.6	10.4	2,984,000
4,160.5	106.4	75.9	2,128.6	10.4	

ype Utilizing tation % NAL)	User Total Annual Fuel Consumption (fuel unit/station)
Heavy-Duty	
0%	*0*
10%	*2,984,000*
0%	*0*
100%	*0*
100%	*0*
100%	*0*

tate

Fuel Unit
kWh
kWh
kg
gal
GGE
gal