

AFLEET Assesses Vehicle, Fuel, and Infrastructure Impacts

The free AFLEET suite of tools simplifies the task of estimating petroleum use, greenhouse gas emissions, air pollutant emissions, and cost of ownership for many types of vehicles.

The Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Suite of Tools, developed by researchers at Argonne National Laboratory for the U.S. Department of Energy (DOE) Clean Cities Coalition Network, estimates the environmental and economic costs and benefits of alternative fuels and advanced vehicles and infrastructure.

Using simple inputs, AFLEET estimates petroleum use, greenhouse gas emissions (GHGs), air pollutant emissions, and cost of ownership for conventionally fueled on-road and off-road vehicles and alternative fuel vehicles (AFVs), and idle-reduction fuel savings and emissions reductions. AFLEET also examines the costs of alternative fuel infrastructure and emissions of utilization.

The AFLEET Spreadsheet and AFLEET Online Tool analyze 18 fuel/vehicle technology combinations using highly regarded data sources.¹

Key Features of AFLEET

The AFLEET suite incorporates four tools, each of which may be used independently of the others.



AFLEET evaluates the environmental impacts of light-, medium-, and heavy-duty vehicles and alternative fuel infrastructure.

AFLEET Spreadsheet

This downloadable spreadsheet version provides detailed data on AFVs' environmental and economic impacts.

AFLEET Online

This simplified, web-based version of AFLEET calculates AFVs' environmental and economic impacts, including total cost of ownership (TCO) and off-road/on-road payback.

AFLEET HDVEC

The Heavy-Duty Vehicle Emissions Calculator (HDVEC) is a web-based tool for comparing the cost-effectiveness and environmental benefits of environmental mitigation projects for medium- and heavy-duty vehicles.

AFLEET Covers:

Conventional fuels: gasoline and diesel

Alternative fuels: biodiesel (B20 and B100), renewable diesel (RD20 and RD100), ethanol (E85), hydrogen (H2), liquefied petroleum gas (LPG), compressed natural gas (CNG), liquefied natural gas (LNG), and LNG/diesel pilot ignition

Hybrid: gasoline hybrid electric vehicle (HEV), diesel HEV, and diesel hydraulic hybrid vehicle (HHV)

Plug-in electric: electric vehicle (EV), plug-in HEV (PHEV), and extended-range EV (EREV)

AFLEET CFI Emissions Tool

The Charging and Fueling Infrastructure (CFI) downloadable spreadsheet analyzes fueling infrastructure emissions benefits, factoring in utilization, vehicle mix, and upstream fuel production.

Transportation and Energy Use

The U.S. transportation sector uses more than 65% of the petroleum consumed in the United States.² In 2021, transportation accounted for 35% of the carbon dioxide emissions from U.S. fossil fuel combustion.³ Clearly, reducing vehicle petroleum consumption—and increasing the use of alternative fuels—can substantially contribute to the United States' trend toward energy security, energy resilience, and environmental sustainability.

Having the right information to understand the costs and benefits of reducing petroleum use and emissions for different AFVs can help fleet managers make informed vehicle acquisition decisions, enabling them to meet a variety of organizational goals and legal requirements.

¹ Argonne's GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) model, the U.S. Environmental Protection Agency's MOVES (Motor Vehicle Emission Simulator), and the Clean Cities Alternative Fuel Price Report

² <https://www.eia.gov/energyexplained/oil-and-petroleum-products/use-of-oil.php>

³ <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide>

Results Tailored to Your Fleet

The AFLEET suite of tools simplifies the challenging task of estimating the environmental and economic impacts of numerous conventional vehicles and AFVs.

To examine an existing fleet's environmental footprint, enter the vehicle location and fuel production assumptions on the Inputs sheet. Then, enter the vehicle type, model year, miles traveled, and fuel use for each fleet vehicle on the Footprint sheet. The AFLEET Spreadsheet's Footprint Outputs sheet displays the fleet's total petroleum use, GHG emissions, and air pollutant emissions in tables and graphs. AFLEET can also compare potential new vehicle options to see what AFVs best suit a fleet's operational and sustainability needs.

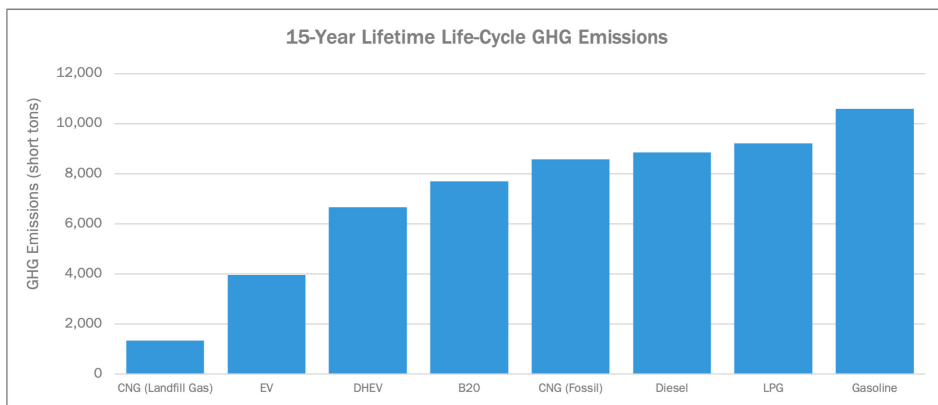
Compare Costs of Potential New Vehicle Purchases

AFLEET Spreadsheet and Online can perform either a simple payback analysis or a TCO analysis once a user enters information about vehicle location, vehicle type, number of vehicles, miles traveled, fuel economy, purchase price, and fuel price data.

AFLEET's TCO calculation considers user-entered details such as years of planned ownership, loan terms, and discount factor, generating a comparison of lifetime costs, energy use, and emissions. In addition, fuel-production assumptions can be adjusted, which impact emissions results.

Calculating Ongoing EV Costs

The cost of charging an EV fleet varies based on location, time of year, time of charging, vehicle needs, and charging-specific variables. AFLEET offers the following two tools to help organizations calculate their costs to charge an EV fleet.



AFLEET Online graph shows the 15-year lifetime life-cycle greenhouse gas (GHG) emissions for a fleet of 20 school buses in Illinois based on their powertrains and user-entered cost data. Location is required to identify the electric grid mix, which factors into the GHG calculation for EVs. CNG = compressed natural gas (source, landfill gas); EV = electric vehicle; DHEV = diesel hybrid electric vehicle; B20 = biodiesel 20% vehicle; CNG = compressed natural gas (source, fossil gas); and LPG = liquefied petroleum gas vehicle.

EV Utility Rate Calculator

AFLEET's EV Utility Rate Calculator applies utility-specific electricity rates for EV residential, public, and fleet charging, considering rate type, charger rating, charging period/strategy, and vehicle requirements. It addresses energy, demand, and fixed charges for summer and winter, and off-peak, mid-peak, and on-peak variability.

EV Charger TCO Calculator

AFLEET's EV Charger TCO Calculator assesses the levelized and net present value costs of charging a fleet's electric vehicles, along with utilization, capital costs (charger and make-ready), annual operating costs (communications, warranty, maintenance), and electricity costs, to present a full, organization-specific cost of charging an EV fleet.

Accessing AFLEET

The free AFLEET suite of tools is available at <https://afleet.es.anl.gov>. To learn more, watch the AFLEET Tool 2023 Updates [webinar](#) on YouTube.

DOE's Clean Cities Coalition Network

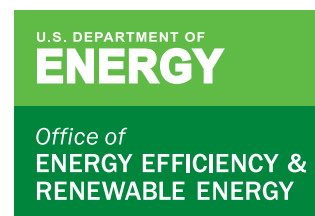
The Clean Cities Coalition Network is a resource of DOE's Vehicle Technologies Office (VTO) Technology Integration Program. Clean Cities Coalitions

strengthen the nation's environment, energy security, and economic prosperity by working locally to advance affordable, efficient, and clean transportation fuels, energy efficient mobility systems, and other fuel-saving technologies and practices. To find your nearest Clean Cities Coalition, go to <https://cleancities.energy.gov> and enter your zip code.

The AFLEET suite of tools and more than 20 other tools for the U.S. Department of Energy's Clean Cities Coalition Network are available at <https://www.afdc.energy.gov/tools>. ■

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