



Alternative Fuels Insights

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Argonne National Laboratory

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Vehicle registration data

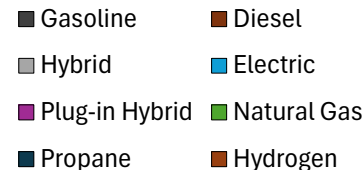
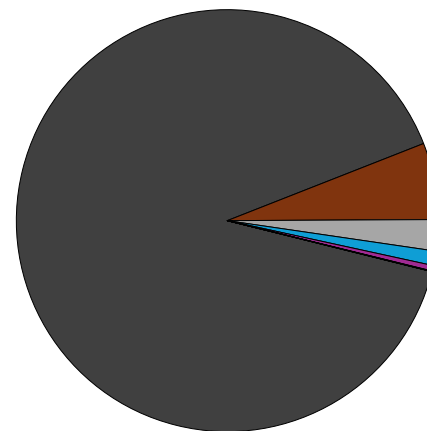
Nearly 300 million vehicles are registered in the United States, ranging from light-duty passenger vehicles to heavy-duty freight and work trucks.

The majority of these vehicles are gasoline-fueled internal combustion engine vehicles (ICEV), followed by diesel-fueled ICEV.

Sales of plug-in electric vehicles and hybrid vehicles have grown in the last few years, particularly for light-duty vehicles.

Over 10 million are registered in Illinois; these show similar registration mix.

U.S. Vehicle Registrations



Source: Argonne analysis of Experian Automotive vehicles in operation data, December 2023

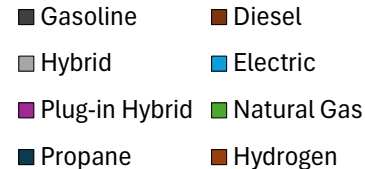
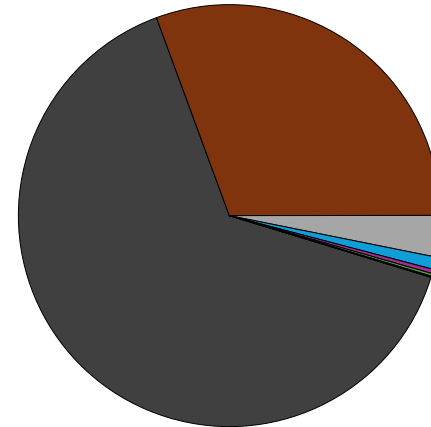
Illinois fleet vehicles

Of the 10.4 million vehicles registered in Illinois, over one million are owned by organizations (e.g., companies, governments).

Many of these are heavy-duty trucks, seen in the relative increase in diesel powertrains in the pie chart.

Hybrids, electric vehicles, and alternative fuels make up about 3.9% of all Illinois registrations, and about 4.7% of fleet-owned vehicles registrations.

Illinois Fleet-Owned Vehicles



Source: Argonne analysis of Experian Automotive vehicles in operation data, December 2023

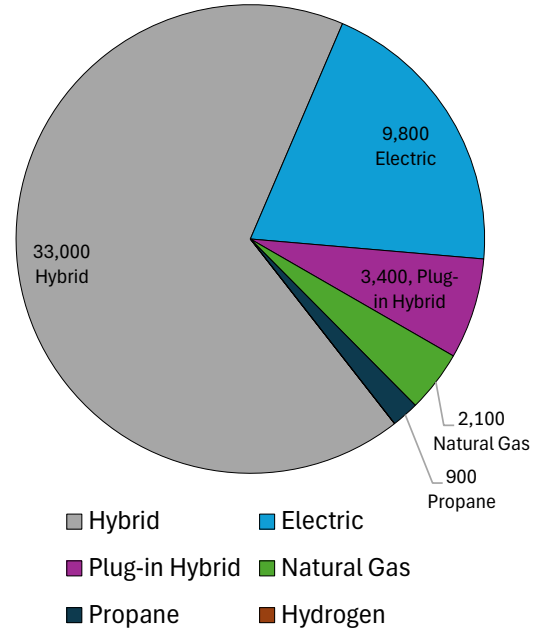
Illinois alt fuel fleet vehicles

For light-duty vehicles, hybrid vehicles and plug-in vehicles are the most common fuel-saving technology pathways in use now, with over 46,000 vehicles on the road today.

Alt fuels for trucks in use in Illinois include natural gas (over 2,000 registered today) and propane/LPG/Autogas (nearly 1,000 registered).

Almost all hydrogen fuel cell vehicles in use are registered in California.

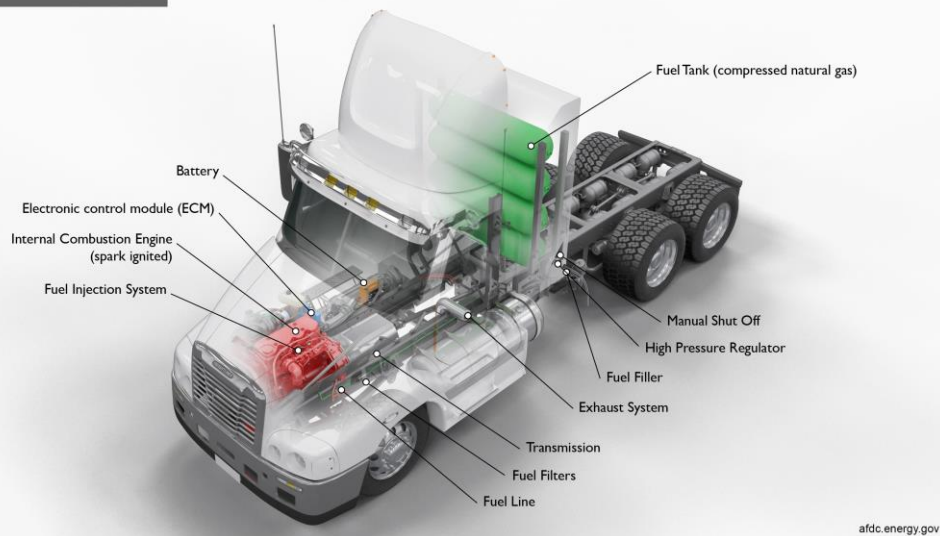
Illinois Fleet Alt-Fuel Vehicles



Source: Argonne analysis of Experian Automotive vehicles in operation data, December 2023

Operation of alt fuel vehicles

Natural Gas Vehicle



Natural gas and propane operate similar to gasoline- and diesel-fueled ICEV.

Propane is stored in liquid low-pressure tanks; natural gas can be either pressurized (compressed natural gas, CNG), or cryogenically stored (liquefied natural gas, LNG).

Bi-fuel vehicles can switch between use of alternative fuel and conventional fuel.

Source: DOE Alternative Fuel Data Center,
<https://afdc.energy.gov/vehicles/how-do-natural-gas-class-8-trucks-work>
<https://afdc.energy.gov/vehicles/how-do-bifuel-propane-cars-work>

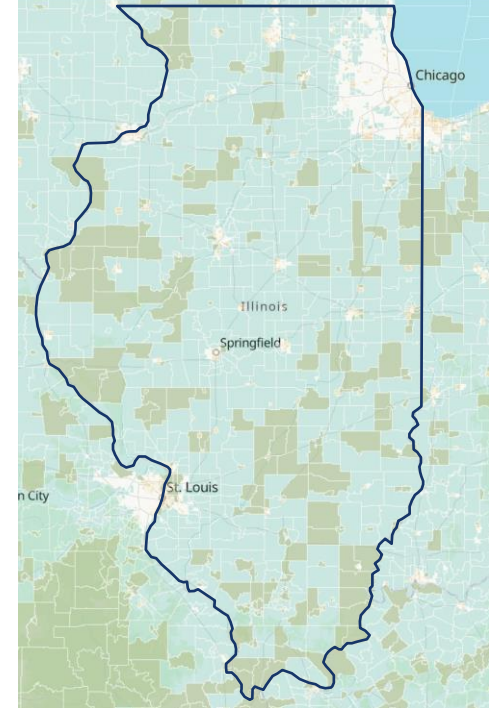
Fueling infrastructure credits

Tax credits exist for installation of “clean-burning fuels”

Alternative fuels that qualify as clean-burning fuels for the purposes of the 30C tax credit:

- (i) Any fuel at least 85 percent of the volume of which consists of one or more of the following: ethanol, natural gas, compressed natural gas, liquified natural gas, liquified petroleum gas, or hydrogen.
- (ii) Any mixture-
 - (I) which consists of two or more of the following: biodiesel (as defined in section 40A(d)(1)), diesel fuel (as defined in section 4083(a)(3)), or kerosene, and
 - (II) at least 20 percent of the volume of which consists of biodiesel (as so defined) determined without regard to any kerosene in such mixture.
- (iii) Electricity

30C Tax Credit Eligibility Locator



<https://www.anl.gov/esia/refueling-infrastructure-tax-credit>

AFLEET model

EXAMINES ON-ROAD AND OFF-ROAD FLEET

- ✓ Environmental footprint
- ✓ Cost of ownership
- ✓ Refueling infrastructure
- ✓ Idle reduction

CURRENT FLEET



AFLEET

Helps identify vehicle replacement

10,000+ USERS



18 ALTERNATIVE FUEL/TECHNOLOGY COMBINATIONS



OPTIMIZED FLEET



BENEFITS OF NEW TECHNOLOGIES

- ✓ Save on cost of ownership
- ✓ Reduce carbon footprint
- ✓ Contribute to cleaner air
- ✓ Reduce petroleum use

To learn more, visit afleet.es.anl.gov.

AFLEET model

The AFLEET model developed at Argonne examines light-duty, heavy-duty, and off-road vehicles to estimate:

- Fuel consumption
- Greenhouse gas emissions
- Air pollutants
- Cost of ownership

AFLEET contains 18 fuel/vehicle technologies, including conventional, hybrids, plug-in vehicles, and alt fuels

AFLEET ONLINE

The Department of Energy has enlisted the expertise at Argonne to develop the Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool for Clean Cities Coalition stakeholders. This online version of AFLEET compares new alternative fuel vehicles to gasoline (light-duty) and diesel (heavy-duty) vehicles.

Below are the calculators implemented by the online version from the [AFLEET Tool 2023 spreadsheet](#). Select one of the options below to get started:

SELECT A TOOL TO GET STARTED

PAYBACK ON-ROAD CALCULATOR

Enter vehicle type, powertrain types, mileage, fuel economy, purchase price, maintenance, fuel price, and other options to calculate:

- Annual petroleum use
- Annual greenhouse gas emissions
- Annual air pollutant emissions
- Simple payback

PAYBACK OFF-ROAD CALCULATOR

Enter equipment type, powertrain types, usage, fuel consumption, purchase price, maintenance, fuel price, and other options to calculate:

- Annual petroleum use
- Annual greenhouse gas emissions
- Annual air pollutant emissions
- Simple payback

TCO CALCULATOR

Enter vehicle type, powertrain types, mileage, planned ownership, fuel economy, purchase price, maintenance, insurance, fuel price, and other options to calculate:

- Lifetime petroleum use
- Lifetime greenhouse gas emissions
- Lifetime air pollutant emissions
- Total cost of ownership

For any questions please contact: afleet@anl.gov

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<https://afleet.es.anl.gov/afleet/>

AFLEET model

Using AFLEET, a user can input fleet-specific assumptions to compare operational costs and environmental impacts of different vehicle technologies.

AFLEET Online

Home Feedback Contact Feedback Offroad TDS

Vehicle Info Fuel Prices Other Costs Fuel Options

Vehicle Type: School Bus

State: Illinois

Quantity: 1 (VEHICLE)

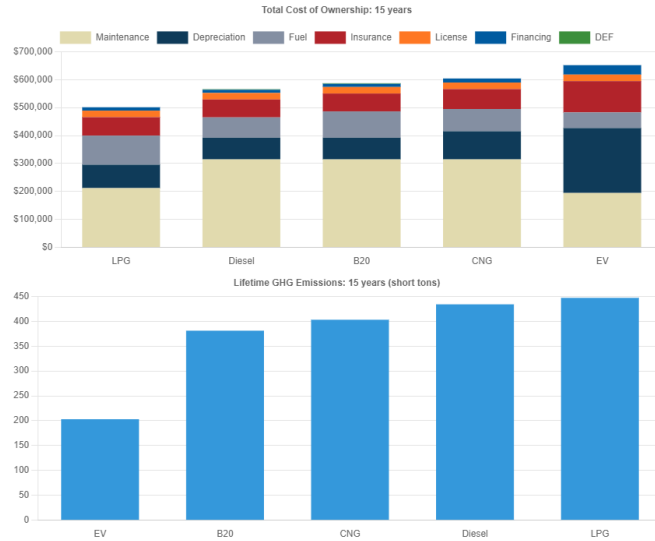
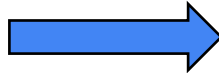
Vehicle Mileage: 15,000 mi/year

Planned Ownership: 15 years

Powertrains to Compare

Powertrain	Fuel Economy (MPG)	Purchase Price (\$/vehicle)	Maintenance (\$/mi)
<input type="checkbox"/> Gasoline	6.81	\$0	\$0.61
<input checked="" type="checkbox"/> Diesel	8.17	\$100,000	\$0.93
<input checked="" type="checkbox"/> EV	23.96	\$100,000	\$0.56
<input type="checkbox"/> FCV	11.28	\$0	\$0.94
<input type="checkbox"/> Diesel HEV	13.03	\$100,000	\$0.81
<input type="checkbox"/> Diesel HRFV	10.54	\$0	\$0.81
<input checked="" type="checkbox"/> B20	8.17	\$100,000	\$0.93
<input type="checkbox"/> B100	8.17	\$100,000	\$0.93
<input type="checkbox"/> RD20	8.17	\$100,000	\$0.93
<input type="checkbox"/> RD100	8.17	\$100,000	\$0.93
<input type="checkbox"/> E85	6.81	\$0	\$0.61
<input checked="" type="checkbox"/> LPG	6.81	\$100,000	\$0.61
<input checked="" type="checkbox"/> CNG	6.94	\$130,000	\$0.93
<input type="checkbox"/> LNG	6.94	\$120,000	\$0.93
<input type="checkbox"/> LHGD	7.76	\$0	\$0.87

Save Load



<https://afleet.es.anl.gov/afleet/>