



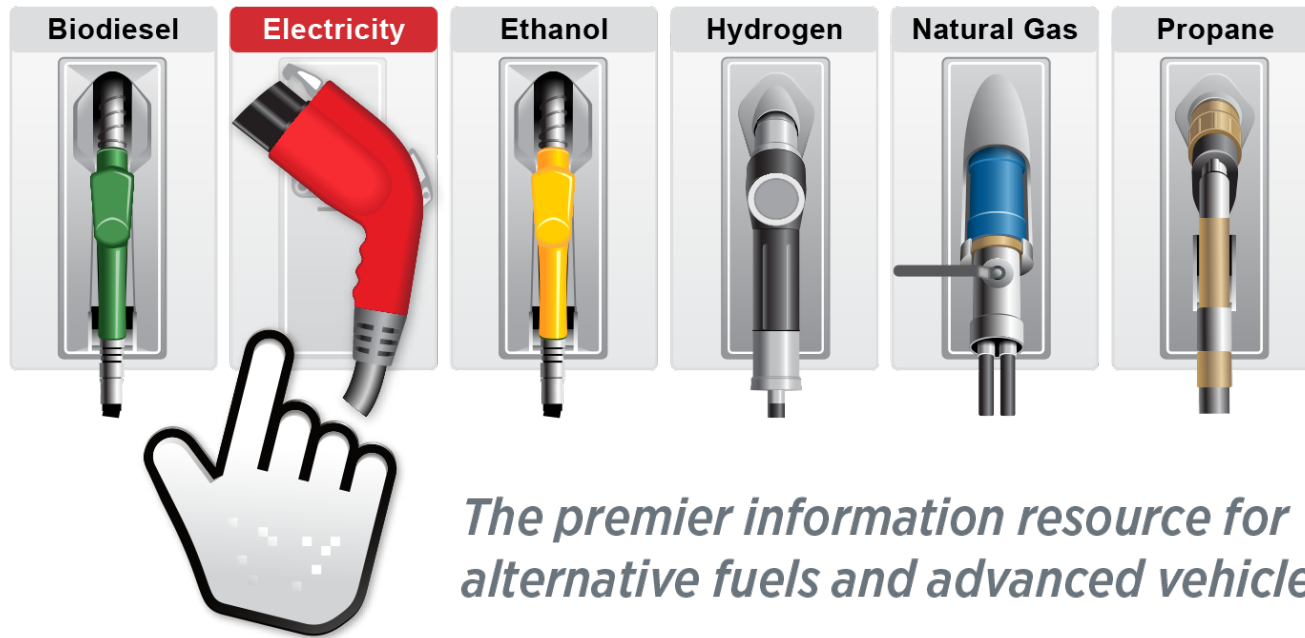
Introduction to the Alternative Fuels Data Center

October 11, 2018

Alexis Schayowitz, ICF
Rebecca Otte, Southeast Louisiana Clean Fuels
Partnership

Agenda

- Alternative Fuels Data Center (AFDC) Overview
- AFDC Tour
- AFDC in Action
- Questions



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Alternative Fuels Data Center

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Fuels & Vehicles ▾



Role: The U.S. Department of Energy's information source for alternative fuels, advanced vehicles, and other fuel-saving measures.

Key Audience: Fleets and other transportation decision makers.

Reach: 1.5 million users annually.

Maintenance: The National Renewable Energy Laboratory reviews and updates content and data on an *ad hoc* basis and at least once annually.

Information by



Information by



Delivery
Service



Public

Maps & Data

- U.S. Alternative Fuel Stations by Fuel
- U.S. Hybrid Electric Sales by Model

Tools ▾



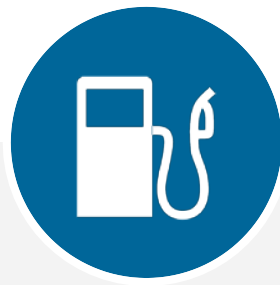
Who Uses the AFDC?



Fleet
managers



Transportation
planners



Fuel
providers

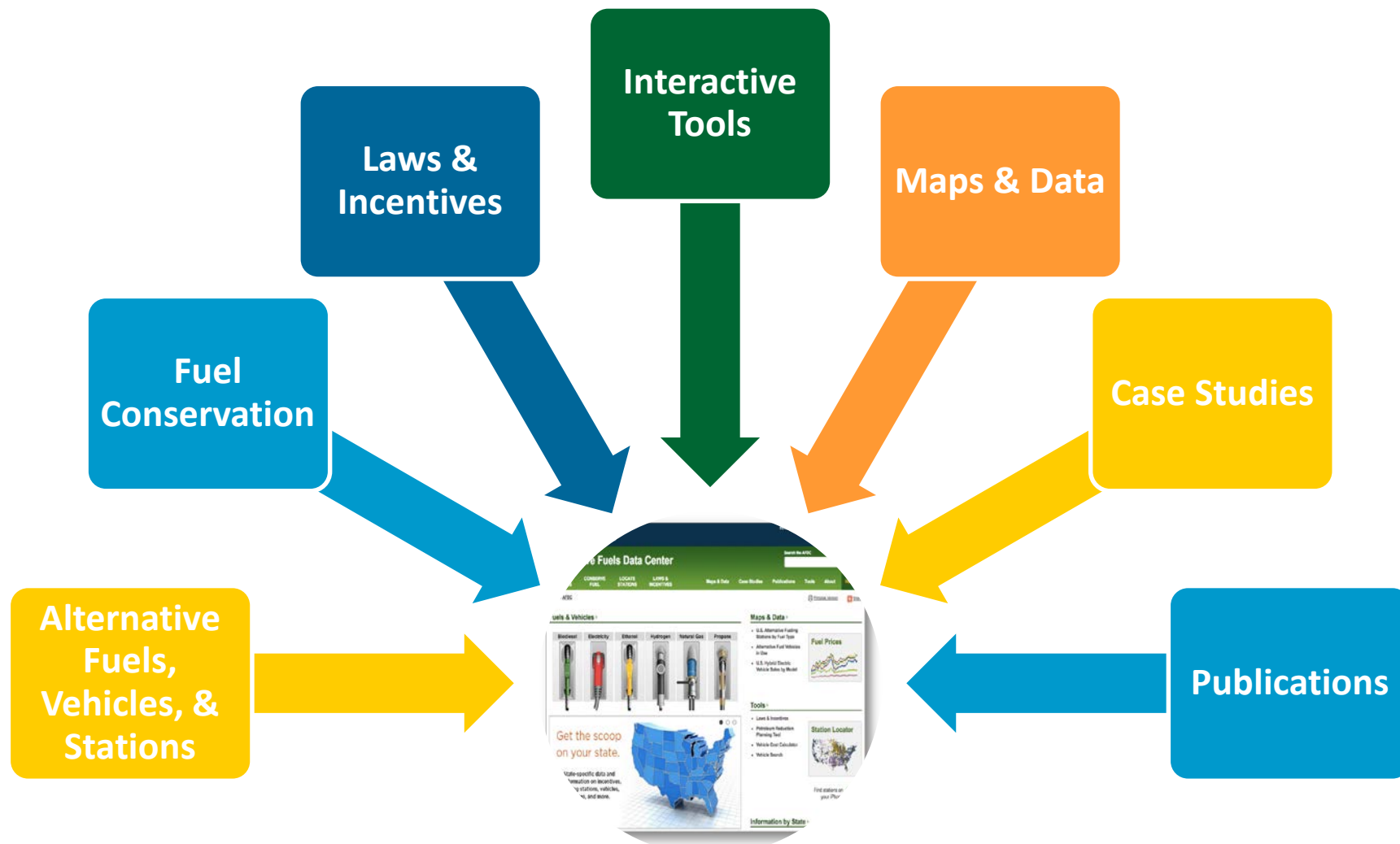


Utilities



Clean Cities
coalitions

What Does the AFDC Provide?



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Fuels & Vehicles ▶

Biodiesel



Electricity



Ethanol



Hydrogen



Natural Gas



Propane



Information by State ▶



select a state

Information by Fleet Application ▶

Delivery
ServicesRefuse
Collection

More Later!

Air
Transportation

Maps & Data ▶

- U.S. Alternative Fueling Stations by Fuel Type
- U.S. Hybrid Electric Vehicle Sales by Model

Fuel Prices



Tools ▶

- Laws & Incentives
- Electricity Sources & Costs

Station Locator

Traveling between the United States
and Canada just got easier

with updates to the Alternative Fueling Station Locator.

<https://www.afdc.energy.gov/>

Fuels and Advanced Vehicles

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Alternative Fuels and Advanced Vehicles

More than a dozen [alternative fuels](#) are in production or under development for use in [alternative fuel vehicles](#) and [advanced technology vehicles](#). Government and private-sector vehicle fleets are the primary users for most of these fuels and vehicles. Individual consumers are increasingly interested in them. Using alternative fuels and advanced vehicles instead of conventional fuels and vehicles helps the United States conserve fuel and lower vehicle emissions.



Biodiesel ▶

Biodiesel is a renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled cooking grease for use in diesel vehicles.

[Diesel Vehicles ▶](#)

Electricity ▶

Electricity can be used to power plug-in electric vehicles, which are increasingly available. Hybrids use electricity to boost efficiency.

[Hybrid & Plug-In Vehicles ▶](#)

Ethanol ▶

Ethanol is a widely used renewable fuel made from corn and other plant materials. It is blended with gasoline for use in vehicles.

[Flexible Fuel Vehicles ▶](#)

Hydrogen ▶

Hydrogen is a potentially emissions-free alternative fuel that can be produced from domestic resources for use in fuel cell vehicles.

[Fuel Cell Vehicles ▶](#)

Natural Gas ▶

Natural gas is a domestically abundant gaseous fuel that can have significant fuel cost advantages over gasoline and diesel fuel.

[Natural Gas Vehicles ▶](#)

Propane ▶

Propane is a readily available gaseous fuel that has been widely used in vehicles throughout the world for decades.

[Propane Vehicles ▶](#)

Emerging Fuels ▶

Several emerging fuels are considered alternative fuels under the [Energy Policy Act](#) and may be under development or already developed and available in the United States.

Tools ▶



[Vehicle Cost Calculator](#) — Compare costs and greenhouse gas emissions



[Alternative Fuel and Advanced Vehicle Search](#) — Find a hybrid or alternative fuel vehicle

Vehicle Conversions ▶

Conventional vehicles and engines can be modified to operate using a different fuel or power source.



Fuel Prices ▶

Alternative fuel prices can fluctuate based on location, time of year, or political climate.



<https://www.afdc.energy.gov/fuels/>

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Electricity Basics

Benefits &
Considerations

Stations

Vehicles

Laws & Incentives

Electricity

Electricity can be used to power plug-in electric vehicles (PEVs), including [all-electric vehicles](#) and [plug-in hybrid electric vehicles](#). These vehicles can draw electricity directly from the grid and other off-board electrical power sources and store it in batteries. In contrast, [hybrid electric vehicles](#) are fueled with liquid fuels, like gasoline, but use batteries to recapture energy otherwise lost during braking (ultimately boosting fuel economy). Using electricity to power vehicles can have significant energy security and emissions benefits.



Basics ▶

Find information about using electricity to power vehicles, including production and distribution, research and development, and related links.



Benefits and Considerations ▶

Explore the benefits and considerations of using electricity to power vehicles.



Stations ▶

Locate electric charging stations in your area and learn about charging infrastructure for PEVs.



Vehicles ▶

Learn about hybrid and plug-in electric vehicles and how they work, and find information about vehicle availability, conversions, emissions, batteries, deployment, maintenance, and safety.



Laws and Incentives ▶

Find laws and incentives in your area related to hybrid and plug-in electric vehicle

Fuel Prices ▶

Find electricity prices and trends.



<https://www.afdc.energy.gov/fuels/ethanol.html>

More Later!

Electricity → Vehicles

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Fuel Prices

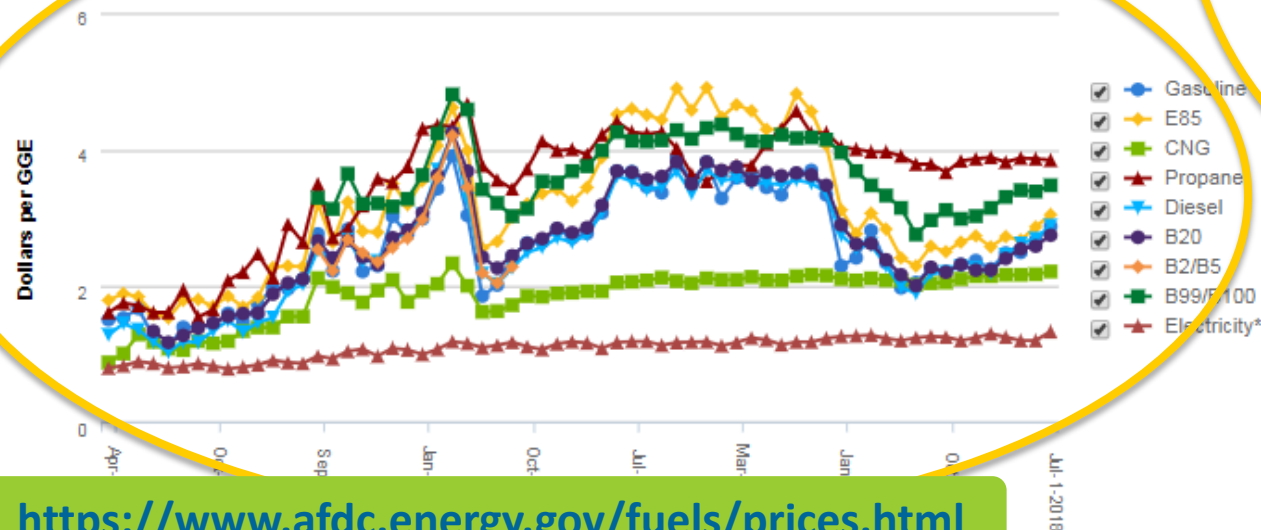
As gasoline prices increase, alternative fuels appeal more to vehicle fleet managers and consumers. Like gasoline, alternative fuel prices can fluctuate based on location, time of year, and political climate.

Alternative Fuel Price Report

The Clean Cities Alternative Fuel Price Report provides regional alternative and conventional fuel prices for biodiesel, compressed natural gas, ethanol, hydrogen, propane, gasoline, and diesel. The Alternative Fuel Price Report is a snapshot in time of retail fuel prices. Alternative fuel fleets can obtain significantly lower fuel prices than those reported by entering into contracts directly with local fuel suppliers. See [all price reports](#).

- [July 2018](#)
- [April 2018](#)

Average Retail Fuel Prices in the U.S.



National Average Price Between July 1 and July 30, 2018

Fuel	Price
Biodiesel (B20)	\$3.06/gallon
Biodiesel (B99-B100)	\$3.55/gallon
Electricity	\$0.13/kWh
Ethanol (E85)	\$2.35/gallon
Natural Gas (CNG)	\$2.22/GGE
Liquefied Natural Gas	\$2.60/DGE
Propane	\$2.81/gallon
Gasoline	\$2.88/gallon
Diesel	\$3.24/gallon

Source: [Alternative Fuel Price Report, July 2018](#) and [U.S. Energy Information Administration](#)

<https://www.afdc.energy.gov/fuels/prices.html>

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Electricity Basics**Benefits &
Considerations****Station****Vehicle**

Comparisons

Emissions

Batteries

Maintenance & Safety

Laws & Incentives

Hybrid and Plug-In Electric Vehicles

Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs)—also called electric-drive vehicles collectively—use electricity either as their primary fuel or to improve the efficiency of conventional vehicle designs.

Hybrid Electric Vehicles ▶



HEVs are powered by an internal combustion engine and by an electric motor that uses energy stored in a battery. The battery is charged through regenerative braking and by the internal combustion engine and does not plug in to charge.

Plug-In Hybrid Electric Vehicles ▶



PHEVs are powered by an internal combustion engine and an electric motor that uses energy stored in a battery. The vehicle can be plugged in to an electric power source to charge the battery. Some can travel nearly 100 miles on electricity alone, and all can operate solely on gasoline (similar to a conventional hybrid).

All-Electric Vehicles ▶



EVs use a battery to store the electric energy that powers the motor. EV batteries are charged by plugging the vehicle in to an electric power source.

Tax Credits and Incentives

Plug-in hybrids and all-electric vehicles qualify for a [\\$2,500 to \\$7,500 federal tax credit](#).

[Find tax credits and incentives](#) in your state.

Electric Vehicle Community Readiness

The U.S. Department of Energy funded 16 [electric vehicle projects](#) in 24 states and the District of Columbia to help communities prepare for plug-in electric vehicles and charging infrastructure.

Email Updates

Subscribe to receive email updates about electric vehicle community readiness.

+ Maps & Data**– Case Studies**

North Carolina Commits to Clean Energy with EV Charging



Going Beyond Gas: Nissan Brings Car Charging to Indianapolis Convenience Store Chain



Cleveland Car Dealership Working Toward a More Sustainable Future

[More Electricity Case Studies](#) | [All Case Studies](#)

+ Publications**+ Tools**

Electric Drive Cost Calculator

Choose a vehicle to compare fuel cost and emissions with a conventional vehicle.

Select Fuel/Technology ▼

Next ▶



<https://www.afdc.energy.gov/vehicles/electric.html>

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Emissions from Hybrid and Plug-In Electric Vehicles

Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs) typically produce lower tailpipe emissions than conventional vehicles do. When measuring [well-to-wheel](#) emissions, the electricity source is important: for PHEVs and EVs, part or all of the power provided by the battery comes from off-board sources of electricity. There are emissions associated with the majority of electricity production in the United States.

Electricity Sources and Emissions

EVs and PHEVs running only on electricity have zero tailpipe emissions, but emissions may be produced by the source of electrical power, such as a power plant. In geographic areas that use relatively low-polluting energy sources for electricity generation, PHEVs and EVs typically have a well-to-wheel emissions advantage over similar conventional vehicles running on gasoline or diesel. In regions that depend heavily on conventional fossil fuels for electricity generation, PEVs may not demonstrate a well-to-wheel emissions benefit.

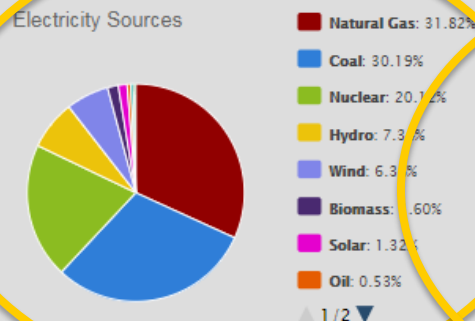
Compare Electricity Sources and Annual Vehicle Emissions

Select a state to see a breakdown of the electricity sources used to charge EVs and PHEVs on a local grid and compare the annual emissions generated from vehicles using electricity from the grid, gasoline, or a combination of the two.

Select a State

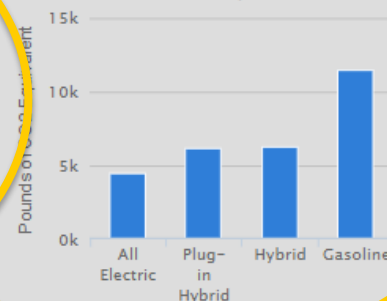
Find Data

Electricity Sources



National Averages

Annual Emissions per Vehicle



ASSUMPTIONS

https://www.afdc.energy.gov/vehicles/electric_emissions.php

Vehicle emissions can be divided into two general categories: air pollutants, which contribute to smog, haze, and health problems; and greenhouse gases (GHGs), such as carbon dioxide and methane. Both categories of emissions can be evaluated on a direct basis and a well-

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Strategies to Conserve Fuel

More than 250 million vehicles consume millions of barrels of petroleum every day in the United States. On-road passenger travel alone accounts for more than 2.5 trillion vehicle miles traveled each year. Vehicle fleet managers, drivers, corporate decision makers, sustainability managers, and public transportation planners can use the following strategies to conserve fuel.



Idle Reduction ▶

Find ways to save fuel and money by idling less.



Parts and Equipment ▶

Learn about outfitting your fleet's vehicles with devices that save fuel.



Vehicle Maintenance ▶

Discover ways to improve your fleet's fuel economy through vehicle maintenance.



Driving Behavior ▶

Learn strategies and techniques to improve driving behavior, conserve fuel, and save money.



Fleet Rightsizing ▶

Evaluate your vehicle needs to build and maintain a more sustainable, fuel-efficient fleet.



Transportation System Efficiency ▶

Find ways to conserve fuel by reducing vehicle miles traveled and improving transportation system efficiency.

Fuels & Vehicles

Biodiesel
Electricity
Ethanol
Hydrogen
Natural Gas
Propane

Conserve Fuel

Idle Reduction
Parts & Equipment
Maintenance
Driving Behavior
Fleet Rightsizing
System Efficiency

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Alternative Fueling Station Locator

Find alternative fueling stations in the United States and Canada. For U.S. stations, see [data by state](#). For Canadian stations in French, see [Natural Resources Canada](#).

Public Stations

Advanced Filters

28,120 results in U.S. and Canada

Enter location



All Fuels

Map a Route

5.5 million station searches per year!

New Corridor Tool:

www.afdc.energy.gov/corridors



iPhone App
for U.S. stations



Android App
for U.S. stations



Developer APIs



Embed Tool



Submit New Station



About the Data

<https://www.afdc.energy.gov/stations/#/find/nearest>

More Later!

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- State
- Local Examples
- Summary Tables

Federal and State Laws and Incentives

Find federal and state laws and incentives for alternative fuels and vehicles, air quality, fuel efficiency, and other transportation-related topics.

Federal
laws and incentives

State
laws and incentives

Select a State

GO



Search All Laws and Incentives

Use an advanced or keyword search to find a specific federal or state law or incentive.



View Tables of Laws and Incentives

View laws and incentives sorted by [technology/fuel](#), [incentive](#), [regulation](#), or [user](#).



Read Key Legislation

Read selected legislation summaries about alternative transportation technologies.



Find Local Laws and Incentives

incentives from local governments.

What's New

[Recent State Updates](#)

[Recent Federal Actions](#)

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<https://www.afdc.energy.gov/laws>

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Maps and Data

Find maps and charts showing transportation data and trends related to alternative fuels and vehicles.

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All Categories

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Clean Cities

[Petroleum Use Reduction](#)[Vehicles](#)[Program](#)


Vehicles

[AFVs and HEVs](#)[Fuel Consumption and Efficiency](#)[Vehicle Market](#)[Driving Patterns](#)

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123 results


by Regulated Fleets (by Fleet Type)

[View Graph](#) V acquisitions by fleet type from 1992-2014
2016[Download Data](#) 


by Regulated Fleets (by Fuel Type)

[View Graph](#) V acquisitions by fuel type from 1992-2015
2016[Download Data](#) 

Model Offerings, by Manufacturer

[View Graph](#) Models produced by OEMs from 1991-2016
2016[Download Data](#) 

Credits Earned and Used by Regulated Fleets

[View Graph](#) Act credits traded and transactions from 1997-2014
2016[Download Data](#) [View Image](#) 

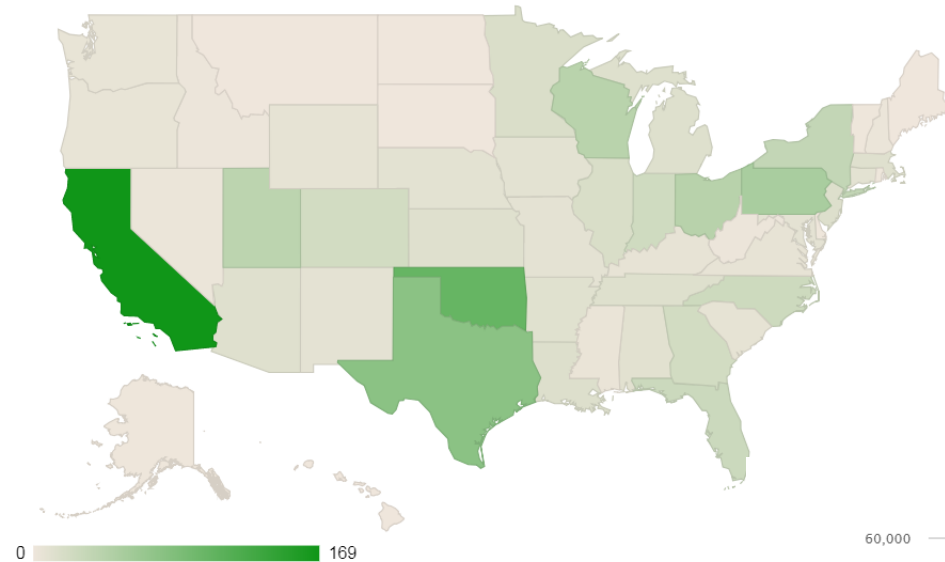
An interactive map for comparing biomass feedstocks and biofuels by location. This tool helps users as well as query and download biofuels and feedstock data. The infrastructure for traditional and bioenergy power, fuels, and also calculates the biorefinery potential for a given area. BioFuels Atlas was developed by the National Laboratory with funding from the DOE Biomass Program.

<https://www.afdc.energy.gov/data/>

Natural Gas Fueling Stations by State

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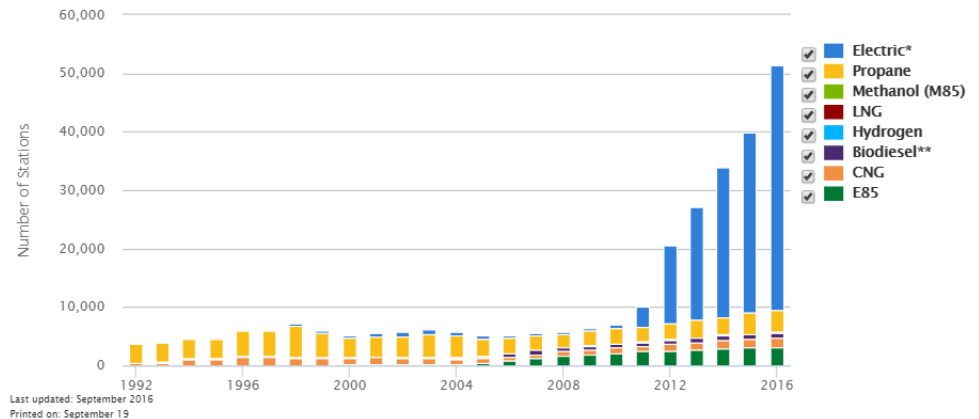
☒ Public Stations ☐ Private Stations

Source: [AFDC Alternative Fueling Station Locator Data](#)

Several regions in the United States have fueling stations that provide compressed natural gas (CNG). Roll public CNG stations. To map CNG stations near a specific address or city, use the [Alternative Fueling Station](#) alternative fuels are updated using an established data collection schedule on an ongoing basis.

U.S. Alternative Fueling Stations by Fuel Type

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Source: Alternative Fuels Data Center (AFDC), either directly (www.afdc.energy.gov/fuels/stations_counts.html) or from historical Transportation Energy Data Books (www.osti.gov/bndge/basicsearch.jsp)

Notes: Data snapshots for each year are based on the federal fiscal year and taken as close to September 30th of the indicated year as possible. All attempts were made to space data samples out one year. However, this was not always possible due to when the TEDB samples were taken. This caused the largest disturbance in 2004, when the sample was taken only five months after the 2003 sample. Therefore, data trends are understated between 2003 and 2004. See Refuel Stations by State for exact sampling dates.

Station counts include both public and private stations.

* Starting in 2011, electric charge equipment was counted by the plug rather than by the geographical location. This is different than other fuels, which only count the geographical location regardless of how many dispensers or nozzles are on site.

** Stations selling low-level biodiesel blends (less than B20) are included in the station listing only for the years 2005-2007

*** Total is the total number of fuel types sold at stations. Stations are counted once for each type of fuel sold.

This chart shows the trend of U.S. alternative fueling stations by fuel type from 1992 to 2016. Propane stations were the most numerous until 2011, when they were surpassed by electric vehicle supply equipment (EVSE), or charging units. The growth in EVSE units accelerated starting in 2011, following the 2010 increase of plug-in electric vehicles offered by major automakers. 2016 experienced the largest growth for EVSE in order to support the growing electric vehicle population. As the population of electric vehicles continues to increase, the demand to support with EVSE growth should do the same. The number of E85 stations has been increasing steadily since 2004, as the number of flex-fuel vehicles available from major manufacturers has increased. The number of CNG stations decreased between 1996 and 2007 (despite the increase in CNG sales during this time) largely because the average station size was increasing. The number of CNG stations then increased 2.4X between 2007 and 2016.

Case Studies

Find case studies and success stories about alternative transportation technologies and alternative fuels.



Natural Gas Stations Abound on Oklahoma's Interstate Highway System

Drivers of compressed natural gas (CNG) vehicles along Oklahoma's interstate highways don't need to worry about finding a place to fill up—the state now has public CNG stations located every 100 miles.

[Learn More](#)

Category

Keyword

Choose one or more items from the following categories.

Fuel/Technology

- ☐ All Fuels
- ☐ Biodiesel
- ☐ Ethanol
- ☐ Hydrogen
- ☐ Propane
- ☐ Natural Gas
- ☐ All-Electric
- ☐ Hybrid Electric
- ☐ Plug-In Hybrid Electric
- ☐ Fuel Economy Improvements
- ☐ Idle Reduction

Applications

- ☐ All Applications
- ☐ Long-Haul Trucking
- ☐ Refuse Collection
- ☐ Taxi Services
- ☐ Airport
- ☐ Delivery Services
- ☐ Law Enforcement
- ☐ Park Services
- ☐ Public Transit
- ☐ School Transportation
- ☐ Shuttle Services

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Date	Title	Type
Aug. 13, 2018	Republic Services Reduces Waste with CNG Vehicles	Web Story
July 23, 2018	Smithtown Selects CNG to Cut Refuse Collection Costs	Web Story
July 23, 2018	Rolling Down the Arizona EV Highway	Web Story
July 23, 2018	Propane Mowers Help National Park Cut Emissions	Web Story
July 12, 2018	Santa Fe Metro Fleet Runs on Natural Gas	Web Story
July 11, 2018	Ryder Opens Natural Gas Vehicle Maintenance Facility	Web Story
July 11, 2018	Liquefied Natural Gas Allows for Cleaner Refuse Collection in Sacramento	Web Story
June 27, 2018	Home Improvement Retailer Offers Propane Fueling	Web Story
May 29, 2018	Electric Refrigeration Translates Fuel Burn into Savings for Nonprofit	Web Story
May 18, 2018	Easter Seals: Supporting the Mission and Saving Money with Natural Gas	Web Story

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Publications

Find publications about alternative transportation, including alternative fuels, advanced vehicles, and regulated fleets.

Keyword

Category

Choose one or more categories to search.

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|--------------------------------------|---|--|
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| <input type="checkbox"/> Electricity | <input type="checkbox"/> Plug-in Hybrid Electric Vehicles | <input type="checkbox"/> Idle Reduction |
| <input type="checkbox"/> Ethanol | <input type="checkbox"/> Hybrid Electric Vehicles | <input type="checkbox"/> Vehicle Conversions |
| <input type="checkbox"/> Hydrogen | <input type="checkbox"/> Flex Fuel Vehicles | |
| <input type="checkbox"/> Natural Gas | <input type="checkbox"/> Fuel Cell Vehicles | |
| <input type="checkbox"/> Propane | <input type="checkbox"/> Natural Gas Vehicles | |
| <input type="checkbox"/> Methanol | <input type="checkbox"/> Propane Vehicles | |
| | <input type="checkbox"/> Diesel Vehicles | |

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– Latest Additions



Clean Cities Alternative Fuel Price
Report, April 2018



Using Recent Land Use Changes to
Validate Land Use Change Models

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Tools

The Alternative Fuels Center offers a large collection of helpful tools. These calculators, interactive maps, and data searches can assist fleets, fuel providers, and other transportation decision makers in their efforts to advance alternative fuels and energy-efficient vehicle technologies.



Calculators



Vehicle Cost Calculator

Compare cost of ownership and emissions for most vehicle models. [mobile](#)



Petroleum Reduction Planning Tool

Create a plan for your fleet to save fuel and reduce emissions.



CNG VICE Model 2.0

Evaluate ROI and payback period for natural gas vehicles and infrastructure.



AFLEET Tool

Calculate a fleet's petroleum use, cost of ownership, and emissions.



JOBS Model

Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.



GREET Fleet Footprint Calculator

Calculate your fleet's petroleum use and emissions footprint.



Heavy-duty Vehicle Emissions

Calculate the emissions of alternative fuel heavy-duty vehicles.



EVI-Pro Lite

Estimate how much electric vehicle charging a city or state might need.



PEV Readiness Scorecard

Assess your community's readiness for the arrival of plug-in electric vehicles.



Interactive Maps



Alternative Fueling Station Locator

Locate alternative fueling stations and get maps and driving directions. [mobile](#)



TransAtlas

Analyze vehicle densities and locations of fueling stations and production facilities.



BioFuels Atlas

Compare feedstocks and analyze biofuel production by location.



Truck Stop Electrification Sites

Locate truck stops with electrification sites to reduce the need for idling.



Coalition Locations

Find Clean Cities coalitions and contact information for coordinators.



Data Searches



Vehicle Search

Compare all classes of alternative vehicles, electric vehicles, and



Local Incentives Search

Search for laws and incentives related to alternative fuels and advanced vehicles.



Fuel Properties Comparison

Compare alternative fuel properties and characteristics.



Fuel Efficiency

Compare fuel efficiency, costs, carbon footprint, and emissions. [mobile](#)



State Information

Find state information about alternative fuels and advanced vehicles.

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Vehicle Cost Calculator

This tool uses basic information about your driving habits to calculate total cost of ownership and emissions for makes and models of most vehicles, including alternative fuel and advanced technology vehicles. Also see the cost [calculator widgets](#).

ASSUMPTIONS

Choose vehicles to compare

Select up to eight vehicles to compare from the makes and models below or [create your own custom vehicle](#).

2018 ▼ Make ▼ Model ▼ [ADD >>](#)

[Create Custom Vehicle](#)

Tell us how you use your car

Because vehicle efficiencies vary depending on how you use your car, this information allows the tool to more accurately calculate fuel usage.

Normal Daily Use

Average daily driving distance milesDays per week Weeks per year ▼Percent highway







Other Trips

Annual mileage milesPercent highway

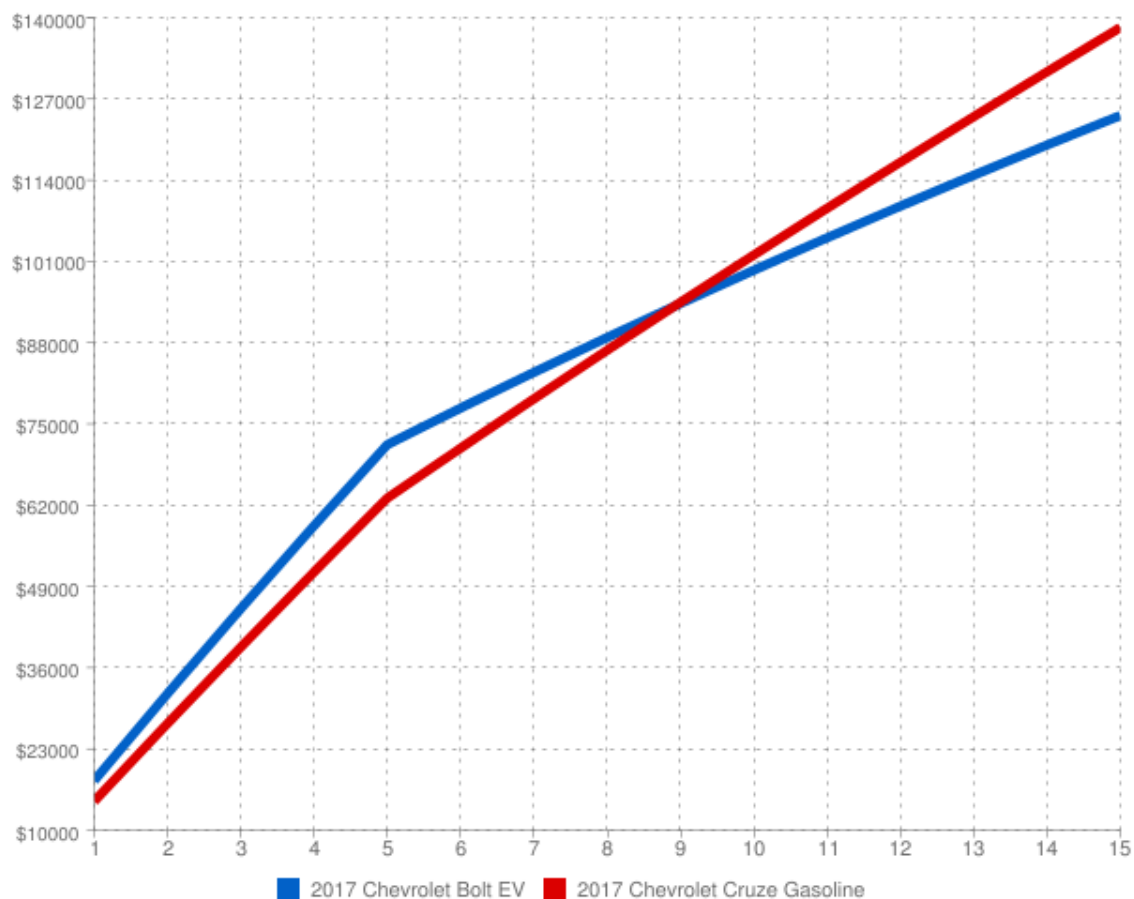
Annual Driving Distance **11926 miles**
City Distance **5301 miles**

<https://www.afdc.energy.gov/calc/>

GET RESULTS

Vehicle	Annual Fuel Use 	Annual Electricity Use 	Annual Fuel/Elec Cost 	Annual Operating Cost 	Cost Per Mile 	Annual Emissions (lbs CO2) 
2017 Chevrolet Bolt EV	0 gal	14,937 kWh	\$2,826	\$6,599	\$0.13	13,827
2017 Chevrolet Cruze Gasoline	1,545 gal	0 kWh	\$4,126	\$8,572	\$0.16	37,091
	Graph	Graph	Graph	Graph	Graph	Graph

Cumulative Cost of Ownership by Year (Dollars)



Alternative Fuels Data Center

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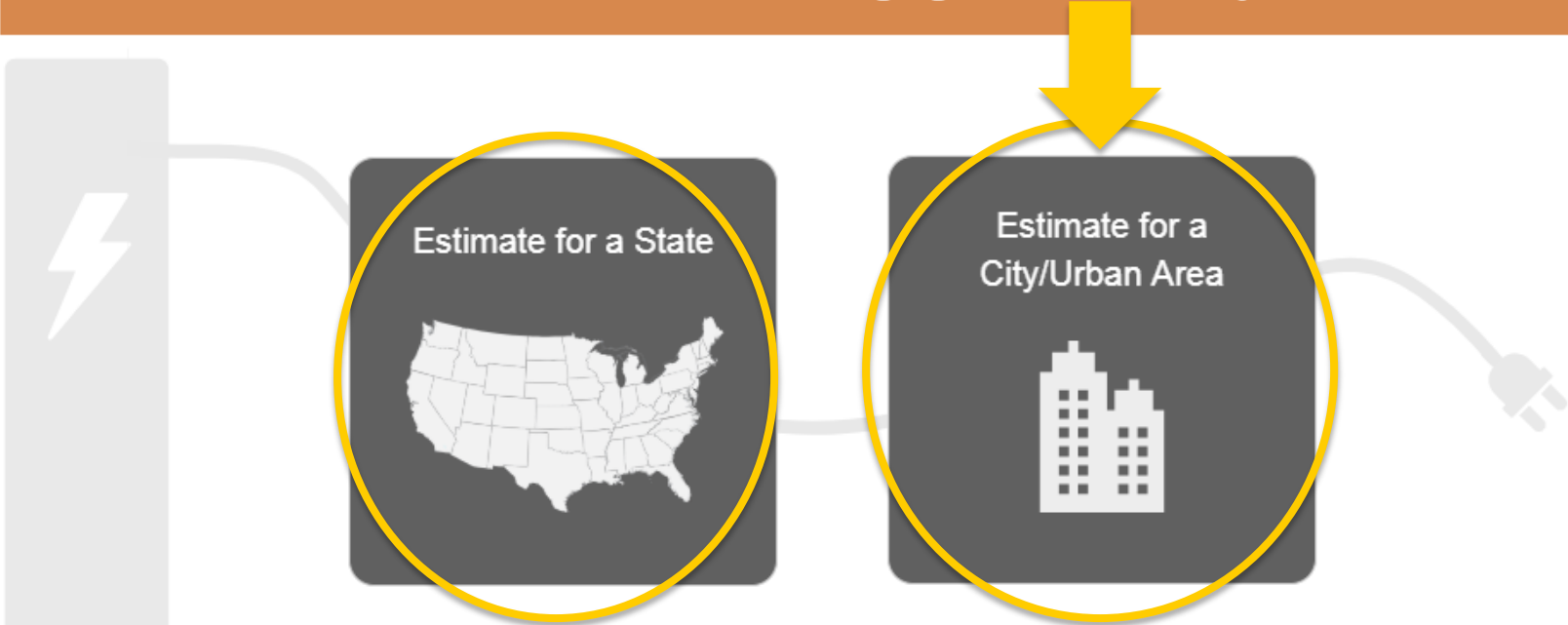
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Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite

This tool provides a simple way to estimate how much electric vehicle charging you might need at a city- and state-level.

How Much Electric Vehicle Charging Do I Need in My Area?





Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite

This tool provides a simple way to estimate how much electric vehicle charging you might need at a city- and state-level.

How Much Electric Vehicle Charging Do I Need in My Area?



State



City/Area



Vehicles



Results

Start Over

Your Results

In the Denver-Aurora area, to support 10,000 plug-in electric vehicles you would need:

228 Workplace Level 2 Charging Plugs

176 Public Level 2 Charging Plugs

There are currently 588 plugs with an average of 2.6 plugs per charging station per the Department of Energy's [Alternative Fuels Data Center Station Locator](#).

33 Public DC Fast Charging Plugs

There are currently 51 plugs with an average of 2.5 plugs per charging station per the Department of Energy's [Alternative Fuels Data Center Station Locator](#).

Where Do I Start?

Planners may want to prioritize installation of fast charging infrastructure above Level 2 charging.

Build DC Fast First: Establishing fast charging networks that enable long-distance travel, serve as charging safety nets, and provide charging for drivers without home charging is critical to support all-electric vehicles that have no other alternative for quickly extending their driving range.

Build Level 2 Second: EVI-Pro typically simulates the majority of Level 2 charging demand coming from plug-in hybrid electric vehicles, which have the ability to use gasoline as necessary for quickly extending driving range.

Change Assumptions

Plug-in Electric Vehicles (as of 2016): 4,800

Light Duty Vehicles (as of 2016): 2,387,400

Number of vehicles to support

Vehicle Mix

Plug-in Hybrids
20-mile electric range %

Plug-in Hybrids
50-mile electric range %

All-Electric Vehicles
100-mile electric range %

All-Electric Vehicles
250-mile electric range %

Total 100%

How much support do you want to provide for plug-in hybrid electric vehicles (PHEVs)?

- ☐ **Full Support**
Most PHEV drivers wouldn't need to use gasoline on a typical day.
- ☒ **Partial Support**
Calculate using half of full support assumption.
- ☐ **Do not count PHEVs in charging demand estimates.**

Percent of drivers with
access to home charging %

Calculate



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Fuel Properties Comparison

Create a custom chart comparing fuel properties and characteristics for multiple fuels. Select the fuel and properties of interest.

Select Fuels

[Clear all](#)

- ☐ All Fuels
- ☐ Gasoline/E10
- ☐ Low Sulfur Diesel
- ☐ Biodiesel
- ☐ Compressed Natural Gas (CNG)
- ☐ Electricity
- ☐ Ethanol/E100
- ☐ Hydrogen
- ☐ Liquefied Natural Gas (LNG)
- ☐ Propane (LPG)
- ☐ Methanol

Select Properties

[Clear all](#)

- ☐ All Properties
- ☐ Chemical Structure
- ☐ Fuel Material (feedstocks)
- ☐ Gasoline Gallon Equivalent
- ☐ Energy Content (lower heating value)
- ☐ Energy Content (higher heating value)
- ☐ Physical State
- ☐ Cetane Number
- ☐ Pump Octane Number
- ☐ Flash Point
- ☐ Autoignition Temperature
- ☐ Maintenance
- ☐ Energy Security Impacts

[CREATE MY CUSTOM CHART](#)

More fuel information:



https://www.afdc.energy.gov/fuels/fuel_properties.php

- [Hydrogen](#)
- [Natural Gas](#)

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Fuel Properties Comparison Results

View the results of your custom comparison or [create a new comparison](#).[ABOUT THE DATA](#)

Property	Fuels									
	Gasoline/E10	Low Sulfur Diesel	Biodiesel	Compressed Natural Gas (CNG)	Electricity	Ethanol/E100	Hydrogen	Liquefied Natural Gas (LNG)	Propane (LPG)	Methanol
Gasoline Gallon Equivalent [4]	97% - 100%	1 gallon of diesel has 113% of the energy of one gallon of gasoline.	B100 has 103% of the energy in one gallon of gasoline or 93% of the energy of one gallon of diesel. B20 has 109% of the energy of one gallon of gasoline or 99% of the energy of one gallon of diesel.	5.66 pounds or 123.57 cu ft. of CNG has 100% of the energy of one gallon of gasoline. [2] [5](g)	33.70 kWh has 100% of the energy of one gallon of gasoline.	1 gallon of E85 has 73% to 83% of the energy of one gallon gasoline (variation due to ethanol content in E85). 1 gallon of E10 has 96.7% of the energy of one gallon of gasoline. [3]	1 kg or 2.198 lbs. of H ₂ has 100% of the energy of one gallon of gasoline.	5.38 pounds of LNG has 100% of one gallon of gasoline and 6.06 pounds of LNG has 100% of the energy of one gallon of diesel (r)	1 gallon of propane has 73% of the energy of one gallon of gasoline.	1 gallon of methanol has 49% of the energy of one gallon of gasoline.
Energy Content (lower heating value)	12,114 - 116,090 Btu/gal (g)	128,488 Btu/gal (g)	119,550 Btu/gal for B100 (g)	20,160 Btu/lb [2](g)	3,414 Btu/kWh	76,330 Btu/gal for E100 (g)	51,585 Btu/lb (g)	21,240 Btu/lb (r)	84,250 Btu/gal (g)	57,250 Btu/gal (g)

Fuels & Vehicles

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North Carolina Transportation Data for Alternative Fuels and Vehicles

Find transportation data and information about alternative fuels and advanced vehicles in North Carolina, including laws and incentives, fueling stations, fuel prices, and more.

North Carolina

Laws and Incentives

25 laws and incentives in North Carolina related to alternative fuels and advanced vehicles

Recent Additions and Updates

[Propane Dealer License](#) updated 9/10/2018

[Volkswagen Settlement Allocation](#) updated 9/10/2018

[EVSE Rebate and Charging Rate Reduction - Randolph Electric Membership Corporation \(EMC\)](#) added 8/9/2018

[Natural Gas Vehicle \(NGV\) Weight Exemption](#)

Data Download

Fueling Stations

983 stations in North Carolina with alternative fuels

Fuel	Public	Private
Biodiesel (B20 and above)	3	108
Compressed Natural Gas (CNG)	26	15
Electric	532	123
Ethanol (E85)	74	12
Hydrogen	0	0
Liquefied Natural Gas (LNG)	1	0
Propane (LPG)	79	10

Data Download

Clean Cities Coalitions

[Clean Cities](#) builds partnerships to advance alternative fuels and energy-efficient vehicle technologies through a national network of nearly 100 coalitions.

North Carolina has 3 coalitions:

[Centralina Clean Fuels Coalition](#)

[Land of Sky Clean Vehicles Coalition \(Western North Carolina\)](#)

[Triangle Clean Cities \(Raleigh, Durham, Chapel Hill\)](#)

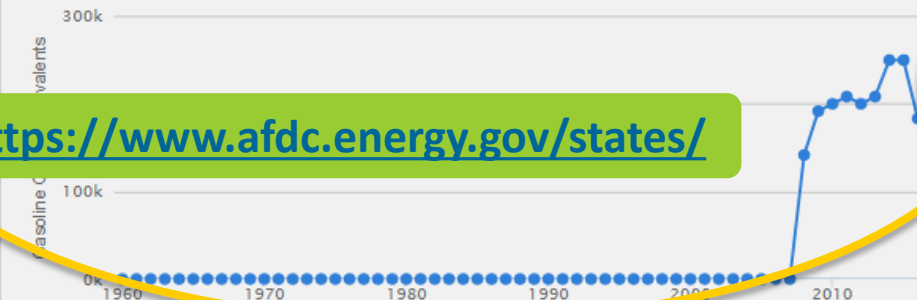
Contact a [local coordinator](#) or [regional manager](#) for project assistance or to connect with other local stakeholders.

Transportation Fuel Consumption

Electricity Fuel Consumption in North Carolina

Electricity

Download



Fuel Production

Gasoline (million gallons/year)	4,119
Diesel (million gallons/year)	992
Electricity (thousand MWh/year)	128,085
Natural Gas (million cubic feet)	358,510
Conventional Power Plants	81
Generating Capacity (nameplate, MW)	28,271
Oil Refineries	0
Oil Refinery Capacity (bbl/day)	0
Renewable Power Plants	47
Renewable Power Plant Capacity (nameplate, MW)	2,115

Source: [BioFuels](#) from the National Renewable Energy Laboratory

<https://www.afdc.energy.gov/states/>

Case Studies



Triangle Clean Cities Resource Gives CNG Installation a Boost
Aug. 19, 2015



Biodiesel Offers an Easy Alternative for Fleets
Aug. 18, 2015



Blue Skies Initiative Clears the Air in North Carolina for More Than a Decade
Aug. 17, 2015

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Videos



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[More North Carolina Videos on YouTube](#)



North Carolina Commits to Clean Energy with EV Charging
Oct. 7, 2017



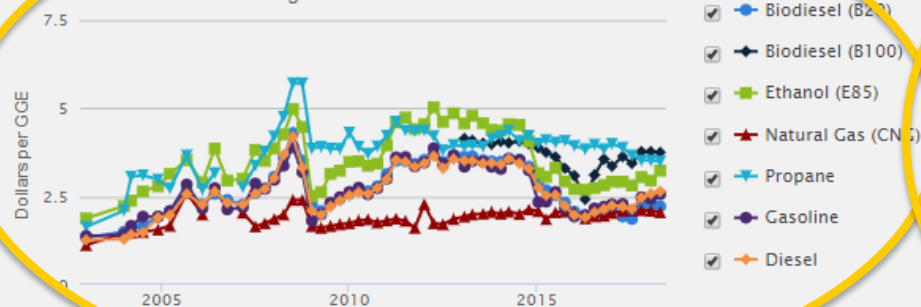
America's Largest Home Runs on Biodiesel in North Carolina
June 9, 2017



City of Hendersonville Converts Vehicles to Natural Gas in North Carolina
Aug. 6, 2016

Regional Fuel Prices

Average Fuel Prices for the Lower Atlantic PADD



Source: Average prices per gasoline gallon equivalent (GGE) for the Lower Atlantic PADD from the [Alternative Fuel Price Report](#)

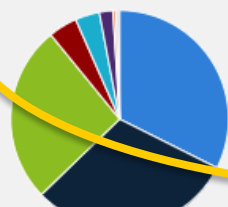
Bioenergy Production and Infrastructure

Ethanol Plants	0.0
Total Ethanol Capacity (million gallons/year)	0.0
Biodiesel Plants	5
Total Biodiesel Capacity (million gallons/year)	15.9
Biopower Plants	16
Biopower Plant Capacity (nameplate, MW)	449.9

Source: [BioFuels Atlas](#) from the National Renewable Energy Laboratory

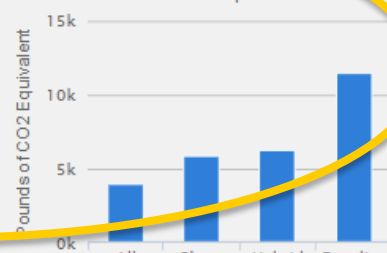
Electricity Sources and Vehicle Emissions

Electricity Sources in North Carolina



Nuclear	32.42%
Natural Gas	30.34%
Coal	26.37%
Solar	4.27%
Hydro	3.61%
Biomass	2.01%
Other Fossil	0.44%
Wind	0.25%

Annual Emissions per Vehicle



Transportation Projects

[Alternative Fuel Implementation Team \(AFIT\) for North Carolina](#)

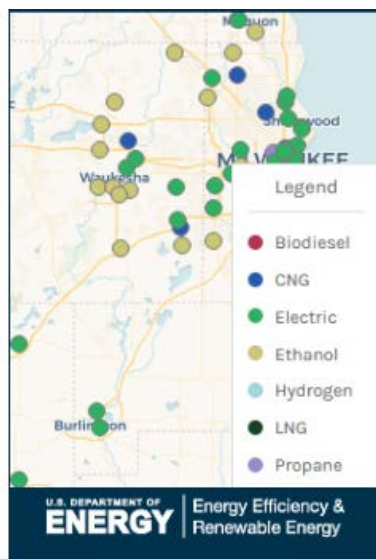
[Carl Sandburg Home National Historic Site](#)

[Carolina Blue Skies and Green Jobs Initiative](#)

[Great Smoky Mountains National Park](#)

[Maryland Hybrid Truck Goods Movement Initiative](#)

Widgets: Bring the AFDC To Your Website



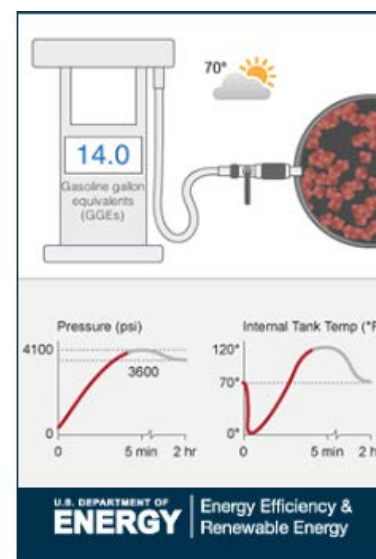
Vehicle Cost Calculator

Choose a vehicle to compare fuel cost and emissions with a conventional vehicle.

Select Fuel/Technology ▼

Next ►

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Also:
Biodiesel,
Flex Fuel,
Propane,
and Electric
Drive

Natural Gas Cost Calculator

Enter mileage to compare cost and emissions.

Natural Gas Vehicle
27 City 38 Hwy (mi/GGE)

Gasoline Vehicle
28 City 39 Hwy (mi/gal)

Defaults based on 2013 Honda Civic Natural Gas and Civic

Next ►

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Clean Cities News and Events

News Events

News
Department of Energy Announces \$80 Million Investment in Advanced Vehicle Technologies Research
Sept. 5, 2018
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Secretary of Energy Rick Perry Announces \$68.5 Million for Advanced Vehicle Technologies Research
May 1, 2018

This widget is provided by the U.S. Department of Energy's Vehicle Technologies Office.

<https://www.afdc.energy.gov/widgets/>

Data Downloads & APIs: Use & Manipulate AFDC Data

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Alternative Fuels Data Center

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Data Downloads

To download data related to alternative fuels and advanced vehicles, follow the steps below.

Step 1. Choose data to download

Choose the dataset and file format you want to download.

Dataset:
Alternative fuel stations
Laws and incentives
Vehicles

File Format:

Step 2. Share your information

Provide the following contact and use information to download the data.

* First Name

* Last Name

* E-mail Address

How will you use the data? (optional)

* Required fields

☐ I have read and agree to the [terms and conditions](#).

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Transportation

Use this Web service documentation to access data about alternative transportation technologies.

[Alternative Fuel Stations](#)
Query our database of alternative fuel stations.

[Transportation Laws and Incentives](#)
Query our database of State and Federal Laws and Incentives for Alternative Fuels

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https://www.afdc.energy.gov/data_download/
<https://developer.nrel.gov/docs/transportation/>

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Travel Carbon Calculator

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Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool

AFLEET Tool

Download tool and documentation

- AFLEET Tool 2017 (5552 kB xls)
- User Guide for AFLEET Tool 2017 (1186 kB pdf)

Heavy-Duty Vehicle Emissions Calculator (HDVEC)

We are pleased to announce a new online calculator based on the AFLEET Tool. HDVEC was developed to aid fleets and decision makers compare vehicle technologies for NOx, PM and GHG emission reductions and consider allocation of funding for environmental mitigation projects. HDVEC can be found at <https://afleet-web.es.anl.gov/hdv-emissions-calculator>.

AFLEET Tool 2017

We are pleased to announce a new release of the AFLEET Tool. This release includes the following updates:

- Added low-NOx engine option for CNG and LNG heavy-duty vehicles
- Added diesel in-use emissions multiplier sensitivity case
- Added well-to-pump air pollutants and vehicle cycle petroleum use, GHGs, and air pollutants
- Added renewable diesel vehicles

AFLEET
greet.es.anl.gov/afleet

HEAVY-DUTY VEHICLE EMISSIONS CALCULATOR

About Vehicle Options Results

HEAVY-DUTY VEHICLE EMISSIONS CALCULATOR

The Heavy-Duty Vehicle Emissions Calculator (HDVEC) was developed to estimate the vehicle operation nitrogen oxide (NOx) and particulate matter (PM_{2.5}), as well as the well-to-wheel greenhouse gas emissions (GHGs) of commercially available alternative fuel medium- and heavy-duty vehicles. This tool is ideally suited to aid fleets and decision makers compare vehicle technologies for emission reductions and consider allocation of funding.

The tool can calculate results for 3 project types:

- Environmental Mitigation w/ Scrappage**
 - New alternative fuel versus new diesel, plus additional benefit from early retirement of scrapped vehicle.
- Environmental Mitigation w/ Repower**
 - Vehicle after repower versus diesel vehicle before repower.
- Clean Vehicle Replacement**
 - New alternative fuel versus new diesel.

The first two are specifically for environmental mitigation projects such as those funded under the Clean Diesel Settlement or the Diesel Emission Reduction Program, while the third provides results without the scrappage benefit. The HDVEC tool was developed by Argonne National Laboratory's AFLEET Tool 2017, available at: <https://greet.es.anl.gov/afleet>

Heavy-Duty Emissions Calculator
afleet-web.es.anl.gov/hdv-emissions-calculator/

U.S. DEPARTMENT OF ENERGY

www.fueleconomy.gov

the official U.S. government source for fuel economy information

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Find out how much with our Fuel Savings and Cost Calculator!

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Gas Mileage Tips Fuel Cost Calculator

Hybrids Hybrids

FuelEconomy.gov
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IdleBox Toolkit for Idling Reduction Projects

IdleBox is an electronic education and outreach toolkit on vehicle idling reduction. The low-hanging fruit of fuel economy: idling reduction is a simple way to use less fuel and to reduce pollution and greenhouse gases.

What is Idling?

Idling is running a vehicle's propulsion engine when the vehicle isn't moving. Idling wastes fuel and creates harmful emissions.

Like IdleBox to:

- Learn more about the benefits of idling reduction for your organization, fleet, or community.
- Engage and educate others—including drivers, fleet managers, policymakers, sustainability managers, and others—on the value of idling reduction.
- Launch an idling reduction campaign for your organization, fleet, or community.

STOP Idling. START Saving.

Core F

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IdleBox
cleancities.energy.gov/technical-assistance/idlebox/

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Map Satellite

Transportation summary for Boston, Massachusetts

Find details about the on-road transportation market in your area including fuel use, vehicle miles traveled, vehicle fuel breakdown, fuel costs, and refueling infrastructure.

Vehicle Data for Boston, Massachusetts in 2013

ON-ROAD VEHICLE FUEL USE (LIGHT, MEDIUM, AND HEAVY DUTY) (GALLONS)

VEHICLE MILES TRAVELED BY ROAD CLASS (TOTAL VMT)

gasoline diesel local collector

State & Local Energy Data
apps1.eere.energy.gov/sled/#/

Technical Response Service

TechnicalResponse@icf.com

800-254-6735

Alexis Schayowitz, ICF
alexis.schayowitz@icf.com

617-250-4281

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If you don't have a question, tell us how will you use the AFDC in your day-to-day work.