

CLEAN COMMUNITIES OF WNY



Buffalo Auto Show

June 23, 2016

Craig Jackson

Coordinator

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Alternative Fuels and Advanced Vehicle Technologies

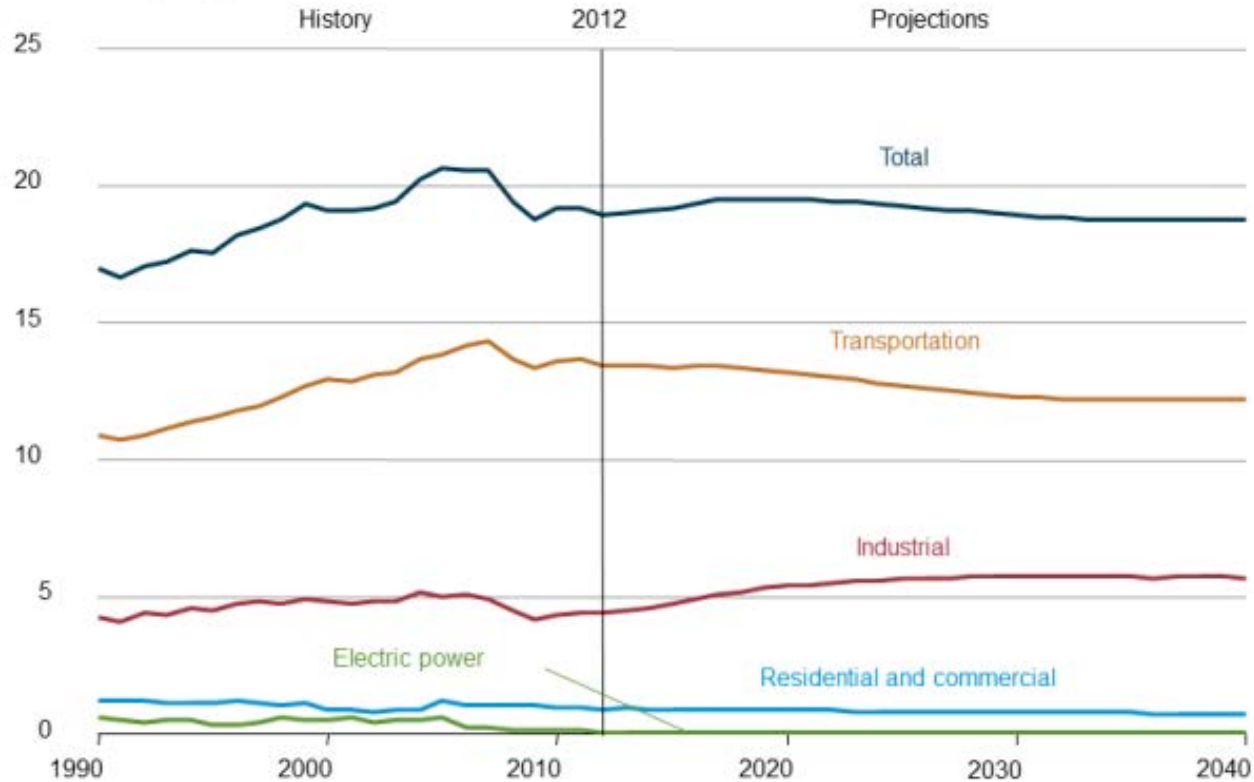
- Energy Trends
- Alternative and Renewable Fuels
- Idle Reduction
- Alternative Fuels Data Center

Clean Cities Mission

To advance the energy, economic, and environmental security of the U.S. by supporting local decisions to reduce petroleum use in transportation.

- Energy Policy Act of 1992 (EPAAct)
 - WNY coalition established 1993
- Connecting fleets with fuel providers and industry partners
 - Training and information
 - Technical assistance
 - Funding
 - Education and outreach to decision makers, fleets, and the public

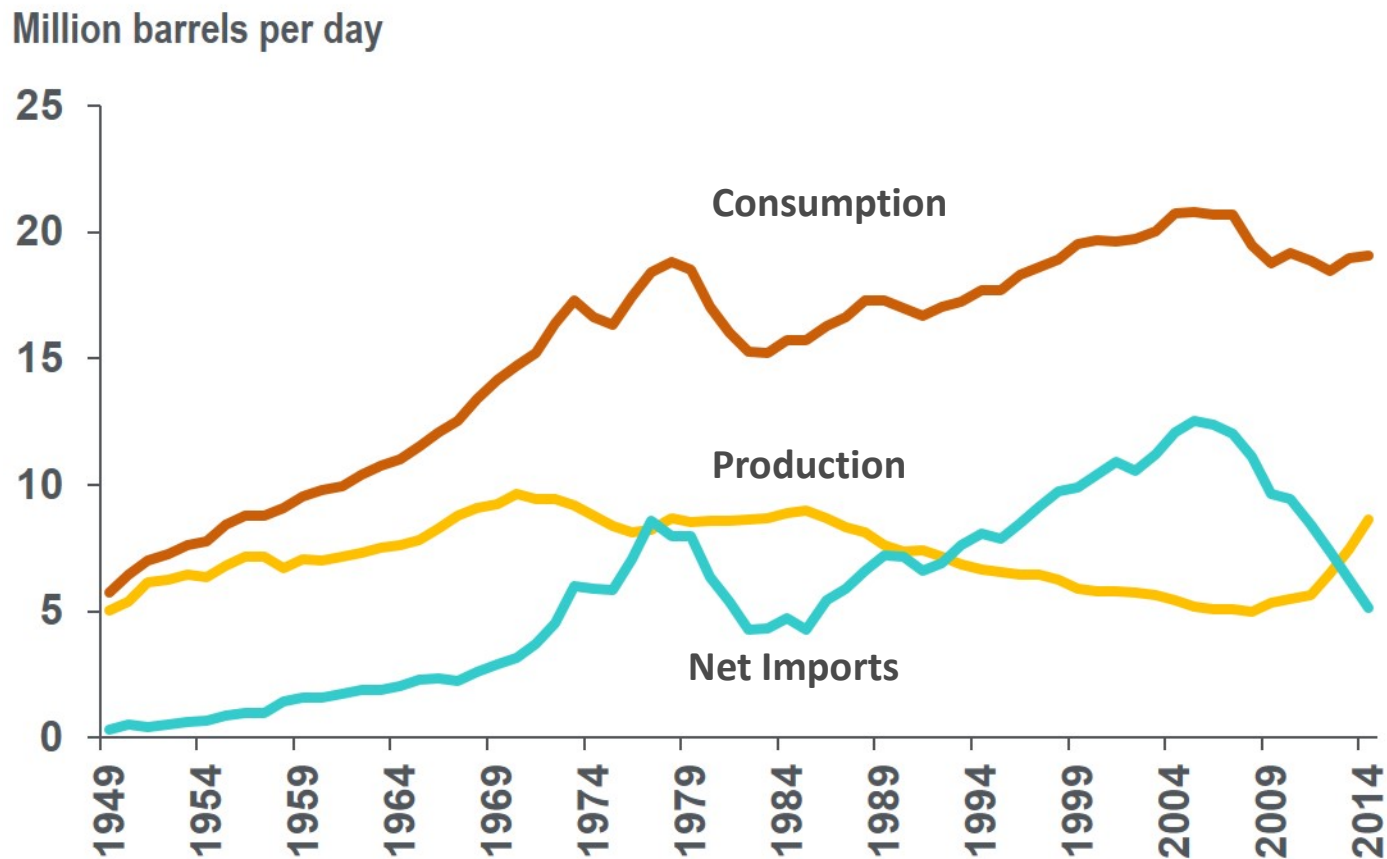
U.S. Energy Consumption



Liquid fuels consumption by sector, 1990-2040 (million barrels per day)

Source: [Annual Energy Outlook 2014](#). Energy Information Administration (EIA).

U.S. Petroleum Trends

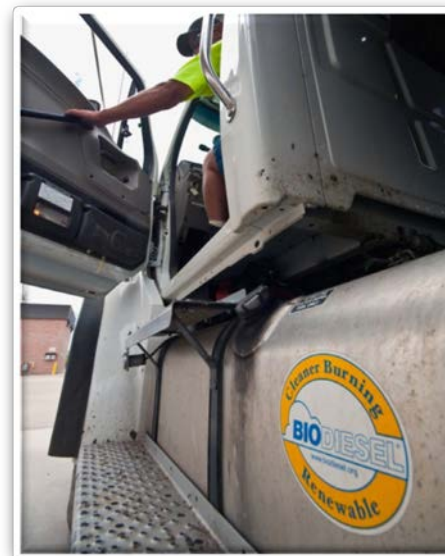


Petroleum Consumption, Production, and Import Trends

Source: [Monthly Energy Review February 2015](#). EIA.

Biodiesel

- Domestically produced, renewable fuel
- Manufactured from vegetable oils, animal fats, restaurant grease
- Reduces greenhouse gas (GHG) emissions
- Cleaner-burning replacement for diesel fuel
- B20 is the most common blend in the United States.
- Similar payload capacity, range, horsepower, and torque as diesel.
- B20 suitable for nearly all unmodified diesel engines.



Basics: Hybrid and Electric Drive Vehicles



Hybrid Electric Vehicle (HEV)

- Powered by an engine and electric motor
- Does not use electric vehicle supply equipment (EVSE) to charge the battery



Plug-In Hybrid Electric Vehicle (PHEV)




- Powered by an electric motor and engine
- Uses EVSE to charge the battery



All-Electric Vehicle (EV)

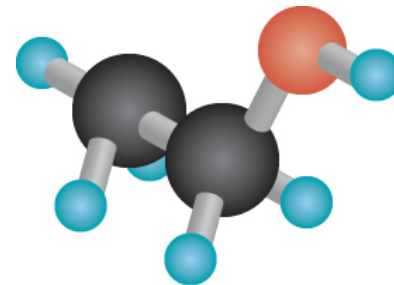
- Powered by an electric motor
- Uses EVSE to charge the battery

Charging EVs and PHEVs

	Current Type	Voltage (V)	Charging Time	Primary Use	Connector
Level 1	Alternating Current (AC)	120V	2-5 miles of range per hour of charging	Residential	
Level 2	AC	240V	10-20 miles of range per hour of charging	Residential Commercial	
Level 3 (Pending Industry Consensus)	<i>Undefined</i>	<i>Undefined</i>	<i>Undefined</i>	<i>Undefined</i>	
DC Fast	Direct Current (DC)	480V	60-80 miles of range per 20 minutes of charging	Commercial	
Wireless	AC	240V	10-20 miles of range per hour of charging	Residential Commercial	

Ethanol

- Renewable fuel produced from plant materials (biomass)
- Same chemical compound in alcoholic beverages
- Comes from starchy feedstocks (corn, sugar cane, sugar beets) and cellulosic feedstocks (yard waste, grasses, poplars)
- Blended at low levels into more than 95% of gasoline sold in the United States
- Increasingly available as E85, for use in flex fuel vehicles
- High-octane fuel
- Reduces GHG emissions



Hydrogen Use

- The energy in 2.2 lb of hydrogen gas is about the same as the energy in 1 gallon of gasoline.
- Fuel cell vehicles powered by hydrogen can be 2-3 times more efficient than conventional vehicles.
- Currently used in modified internal combustion engines and in Fuel Cell Electric Vehicles (FCEVs)
- Several OEMs have light-duty vehicles available in select regions
- Heavy-duty tractors and buses have hydrogen options available on a demonstration basis.



Propane

- Also known as liquefied petroleum gas (LPG)
- Colorless, odorless liquid (when stored under pressure)
- High octane rating
- By-product of natural gas processing and crude oil refining
- Less than 2% of propane used in U.S. used in transportation
- Lower GHG emissions



Idle Reduction

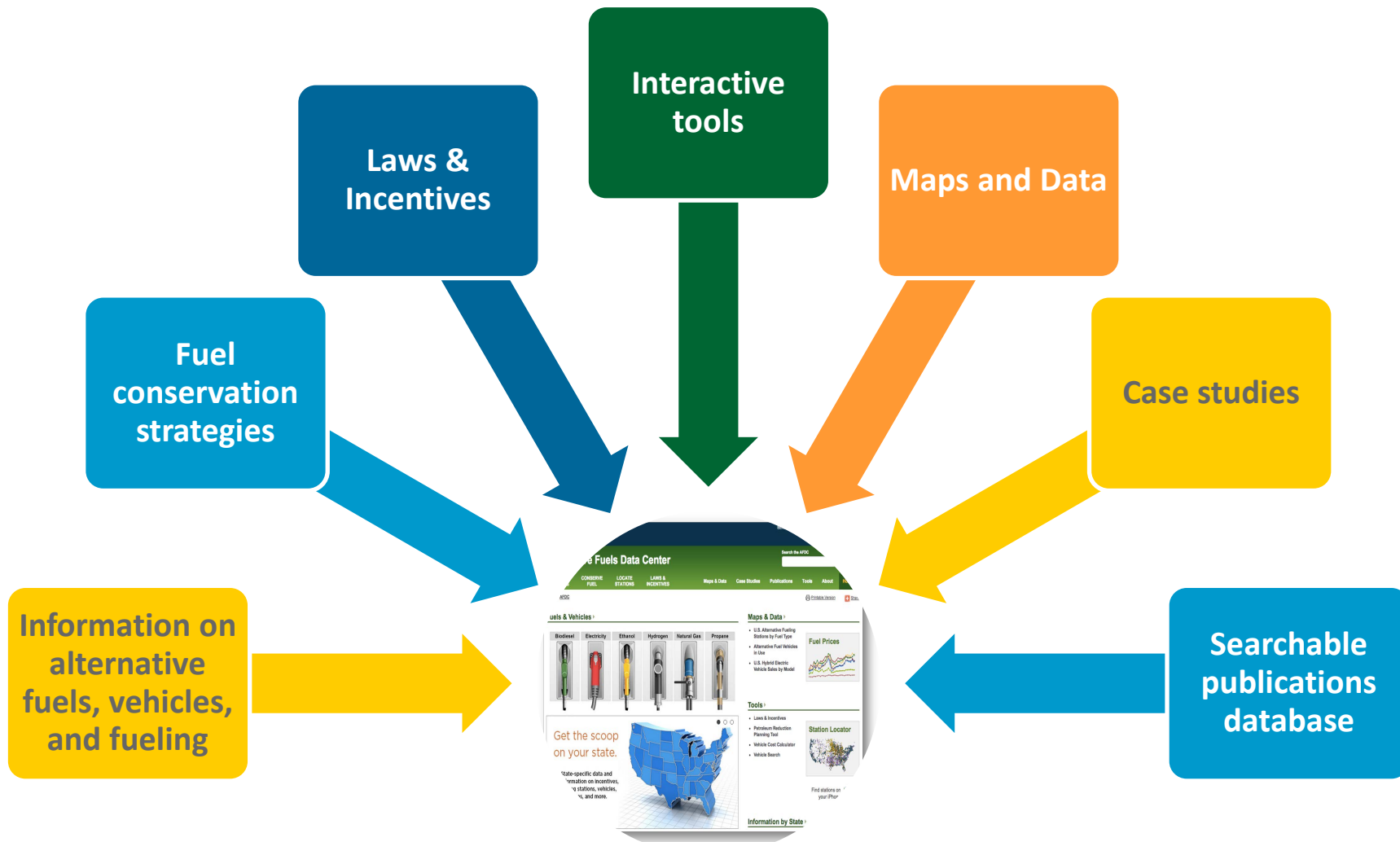
What's wrong with idling?

- The cost of fuel
- Increased petroleum consumption
- Engine wear
- Air pollution
- Noise
- Against the law



Idle reduction is the “low-hanging fruit” of fuel economy

Alternative Fuels Data Center



AFDC: Fuels & Vehicles

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EERE » AFDC » Fuels & Vehicles » Natural Gas

Natural Gas Basics
Benefits & Considerations
Stations
Vehicles
Laws & Incentives

Natural Gas

Natural gas, a domestically produced gaseous fuel, is a clean-burning alternative fuel. Whether produced via [infrastructure](#), or [conventional](#) alternative fuel must be compressed or liquefied for use in vehicles.

- Basics** ▶ Find information about natural gas, including its properties and uses.
- Benefits and Considerations** ▶ Explore the benefits and considerations of natural gas as a fuel source.
- Stations** ▶ Locate natural gas fueling stations in your area.
- Vehicles** ▶ Learn about natural gas vehicles and their safety.
- Laws and Incentives** ▶ Find natural gas laws and incentives in your area.

Natural Gas Vehicles

Natural gas powers about 150,000 vehicles in the United States and roughly 15.2 million vehicles worldwide. Natural gas vehicles (NGVs), which can run on compressed natural gas (CNG), are good choices for high-mileage, centrally fueled fleets that operate within a limited area. For vehicles needing to travel long distances, liquefied natural gas (LNG) is a good choice. The advantages of natural gas as a transportation fuel include its domestic availability, widespread distribution infrastructure, low cost, and inherently clean-burning qualities.

CNG and LNG are considered alternative fuels under the [Energy Policy Act of 1992](#). The horsepower, acceleration, and cruise speed of NGVs are comparable with those of equivalent conventional vehicles. Also, compared with conventional diesel and gasoline vehicles, NGVs can produce some [emissions](#) benefits.

There are many heavy-duty natural gas vehicles—as well as a growing number of light-duty NGVs—available from original equipment manufacturers. Qualified system retrofitters can also economically, safely, and reliably [convert](#) many vehicles for natural gas operation.

Types of Natural Gas Vehicles

There are three types of NGVs:

Related Information

- ▶ [Availability](#)
- ▶ [Conversions](#)
- ▶ [Emissions](#)
- ▶ [Incentives & Laws](#)

Maps & Data
Case Studies
Publications
Tools
Vehicle Cost Calculator
Vehicle Search

Natural Gas Calculator

Enter mileage to convert emissions

Natural Gas Vehicle

27 City 38

AFDC: Alternative Fueling Station Locator

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EERE » AFDC » Locate Stations

Alternative Fueling Station Locator

Find alternative fueling stations near an address or ZIP code or along a route in the United States. Enter a state to see a

Find Stations | **Plan a Route**

Search: Chicago, IL [Go]

All Fuels [more search options]

Alternative fuel stations near Chicago, IL
Excluding private stations

- A INTERPARK**
318 S Federal St
Chicago, IL 60604
Phone: 888-758-4389
Fuel: Electric
Electric charging types: Level 1, Level 2
Distance: 0.05 mi
- B INTERPARK**
17 E Adams St
Chicago, IL 60603
Phone: 888-758-4389
Fuel: Electric

[Go to mobile version](#)
[Download iPhone app](#)

[Download Data](#) | [Developer APIs](#)
Data last updated: 08/06/2015

INTERPARK

318 S Federal St
Chicago, IL 60604
888-758-4389

[Directions](#) | [Find Nearby Stations](#)

Access: Public
Hours: 24 hours daily
Notes: SOUTH LOOP 2; South Loop Self-Park Garage
SOUTH LOOP 1; South Loop Self-Park Garage
[www.InterParkGreen.com](#)

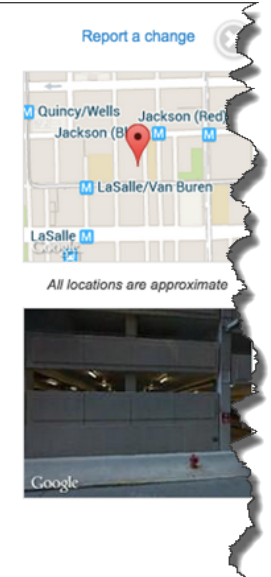
Fuel Available

Electric Vehicle Charging

Electric charging network: ChargePoint Network
Level 1 outlets: 2
Level 2 outlets: 2
Connector types: NEMA 5-20, J1772

Last confirmed: July 2015

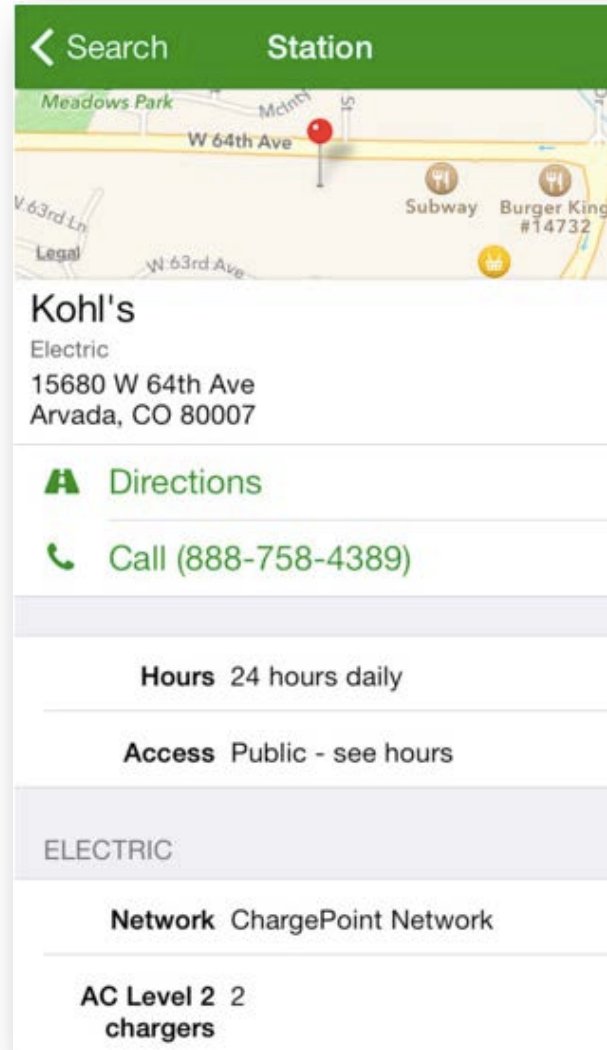
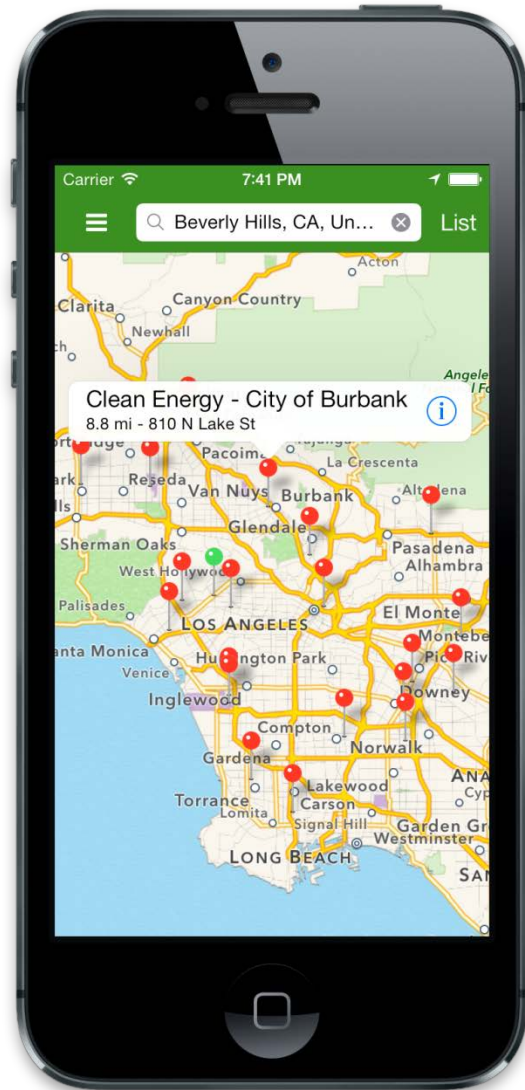
Location details are subject to change. We cannot guarantee access.



Check out the AFDC Truck Stop Electrification Locator to locate electrification sites that reduce the need for heavy-duty trucks to idle.



AFDC: Alternative Fueling Station Locator Mobile App



AFDC: Laws & Incentives

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EERE » AFDC » Laws & Incentives

Search
Federal
State
Local Examples
Summary Tables

Federal and State Laws and Incentives

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

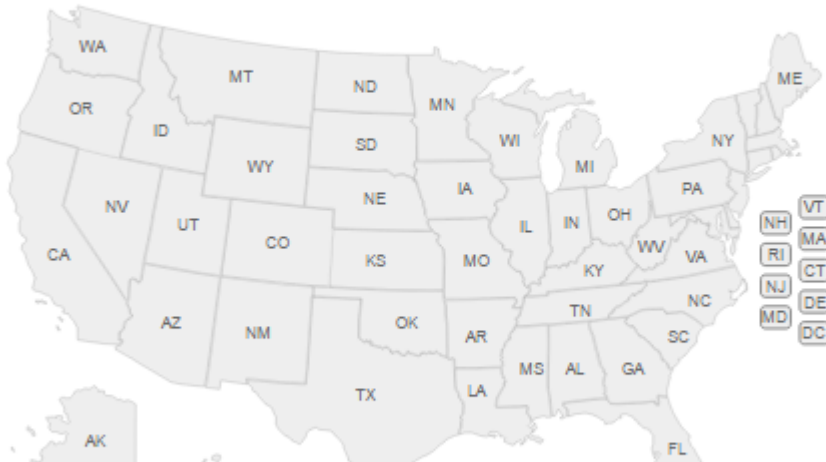
Federal laws and incentives
State laws and incentives

Select a State

- 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**
Find examples of laws and incentives from local governments.

State Laws and Incentives

To view a state's laws and incentives related to alternative fuels and advanced vehicles, select a state from the map or list below. See a list of the [most recent updates to state laws and incentives](#).



Download laws and incentives using the "Download Data" link

AFDC: Case Studies

Alternative Fuels Data Center

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Case Studies

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




Propane Fuel

Many organizations face the challenges of converting their fleets to propane, including a school district. They are finding that propane offers both goals.

[Learn More](#)

May 30, 2015
Publications

Los Angeles Public Works Fleet Converts to Natural Gas



Learn how Los Angeles, California, has converted its fleet of diesel-powered, solid waste collection vehicles to alternative fuels.

For information about this project, contact [Los Angeles Clean Cities Coalition](#).

[QuickTime \(.mov\)](#)
[Windows Media \(.wmv\)](#)
[Video Download Help](#)

Text version
MotorWeek
 Television's Original Automotive Magazine
 Provided by Maryland Public

Category
Keyword

Choose one or more items from the following categories.

Fuel/Technology

- All Fuels
- Biodiesel
- Ethanol
- Hydrogen
- Propane
- Natural Gas

Applications

- All Applications
- Long-Haul Trucking
- Refuse Collection
- Taxi Services
- Airport
- Delivery Services

Search Results | 198 case studies

Date	Title	Type
June 6, 2015	Delaware Transit Corporation Adds Propane Buses to Its Fleet	Video
May 30, 2015	Los Angeles Public Works Fleet Converts to Natural Gas	Video
May 30, 2015	Yellowstone Park Recycles Vehicle Batteries for Solar Power	Video
May 16, 2015	Lancaster Co., Pennsylvania, Converts Trash to Energy	Video



AFDC Tools

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Tools

The Alternative Fuels Data 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 reduce petroleum use.

- 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 reduce petroleum consumption and emissions.
 - CNG VICE Model 2.0**
Evaluate ROI and payback period for natural gas vehicles and infrastructure.
- 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.
- Data**
 - Laws and Incentives Search**
Search for laws and incentives related to alternative fuels and advanced vehicles.
 - Fuel Properties Comparison**
Compare alternative fuel properties and characteristics.

Bookmark it!

AFDC Tools: Petroleum Reduction Planning Tool

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Petroleum Reduction Planning Tool

This planning tool helps your vehicle fleet reduce petroleum consumption and greenhouse gas (GHG) emissions. Create a comprehensive plan for your fleet by using several savings methods. If your fleet includes multiple vehicle types, add more vehicles to each method.

ASSUMPTIONS

My Current Plan

SET GOAL CLEAR PLAN

Savings Methods		Petroleum Reduction gal/yr	GHG Reduction tons CO ₂ /yr	Fuel Cost Savings \$/yr	Impact on Plan percent
<u>Replace Vehicles</u>	ADD TO PLAN	0	0	\$0	0%
<u>Use Alternative Fuel in Existing Vehicles</u>	ADD TO PLAN	0	0	\$0	0%
<u>Reduce Idling</u>	ADD TO PLAN	0	0	\$0	0%
<u>Reduce Mileage</u>	ADD TO PLAN	0	0	\$0	0%
<u>Drive Efficiently</u>	ADD TO PLAN	0	0	\$0	0%
Total savings from plan per year		0 gallons	0 tons of CO ₂	\$0	100%

AFDC Tools: Spreadsheet Models



AFLEET Tool

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

Energy Systems



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GREET

- Publications
- GREET.net Model
- Fuel-Cycle Model
- Vehicle-Cycle Model
- Mini-tool and Results
- AFLEET Tool
- Fleet Footprint Calculator
- Travel Carbon Calculator
- Power Water Model
- Workshops
- Contact
- Copyright Statement

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

AFLEET Tool

- Download tool and documentation
- AFLEET Tool 2013 (2.9 MB xls)
- User Guide for AFLEET Tool 2013 (609 kB)

What is AFLEET Tool?

The Department of Energy's Clean Cities Program and Argonne has developed the Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool for Clean Cities stakeholders to estimate petroleum use, emissions, and cost of ownership of light-duty vehicles.

The tool uses data from Argonne's Greenhouse Gas Emissions Tool (GREET) fuel-cycle model to generate net emissions for key fuel production pathways and vehicle emissions. Various sources are used to provide vehicle purchase prices and fuel prices from the Energy Information Administration's Annual Energy Review and American Recovery and Reinvestment Act of 2009.

AFLEET_Tool_2013 (1).xlsx					
	B	C	D	E	F
1	Key Inputs				
2	Primary Vehicle Location				
3	State	MICHIGAN			
4	Light-Duty Vehicle Information				
5	Vehicle Type	Passenger Car			
6	Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price (\$/Vehicle)
7	Gasoline	8	8,500	26.7	\$20,000
8	Diesel	12	12,400	32.0	\$22,500
9	Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	37.4	\$28,000
10	Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	41.4	\$33,000
11	Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	31.5	\$35,000
12	All-Electric Vehicle (EV)	0	12,400	90.8	\$37,500
13	Biodiesel (B20)	4	9,500	32.0	\$22,500
14	Biodiesel (B100)	0	12,400	32.0	\$22,500
15	Ethanol (E85)	0	12,400	26.7	\$20,000
16	Propane (LPG)	2	5,500	26.7	\$26,000
17	Compressed Natural Gas (CNG)	0	12,400	25.4	\$27,000
18	Heavy-Duty Vehicle Information				
19	Vehicle Type	Combination Long-Haul Truck			
20	Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price (\$/Vehicle)
21	Gasoline	1	1,200	26.7	\$20,000

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