

Making It Happen In WV – Electric Vehicles and Electric Vehicle Supply Equipment

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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)
- Provides a framework for businesses and government agencies to work together
- Clean Cities activities are implemented by a national network of nearly 100 Clean Cities coalitions.
- Major milestone: In 2013, coalitions and stakeholders reduced U.S. petroleum consumption by 1 billion gallons in a single year
- Ahead of schedule on goal: Reduce U.S. petroleum use by 2.5 billion gallons per year

www.energywv.org/cleanstateprogram

Description of Area: State of West Virginia

When was coalition formed? Oct. 19, 1994;
re-designated in 1999, 2005, 2012 and 2016

Coalition Structure

- Host agency is W.Va. Division of Energy, the state energy office
- Activities set by WVDOE director
- 60 stakeholders
- Coalition funded through U.S. Department of Energy
- In 2015, stakeholders reduced 536,827 gasoline gallon equivalents through electric vehicle use, reducing idling, and the use of alternative fuels (biodiesel, CNG and propane)



21,105 public alternative fuel stations in U.S.



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 station count.

Find Stations | Plan a Route

Q address, ZIP, or state... **Go**

All Fuels

[more search options](#)

21,105
alternative fuel stations
in the United States

Excluding private stations

Location details are subject to change. We recommend calling the stations to verify location, hours of operation, and access.

ABOUT THE DATA

↔ Embed | + Submit New Station

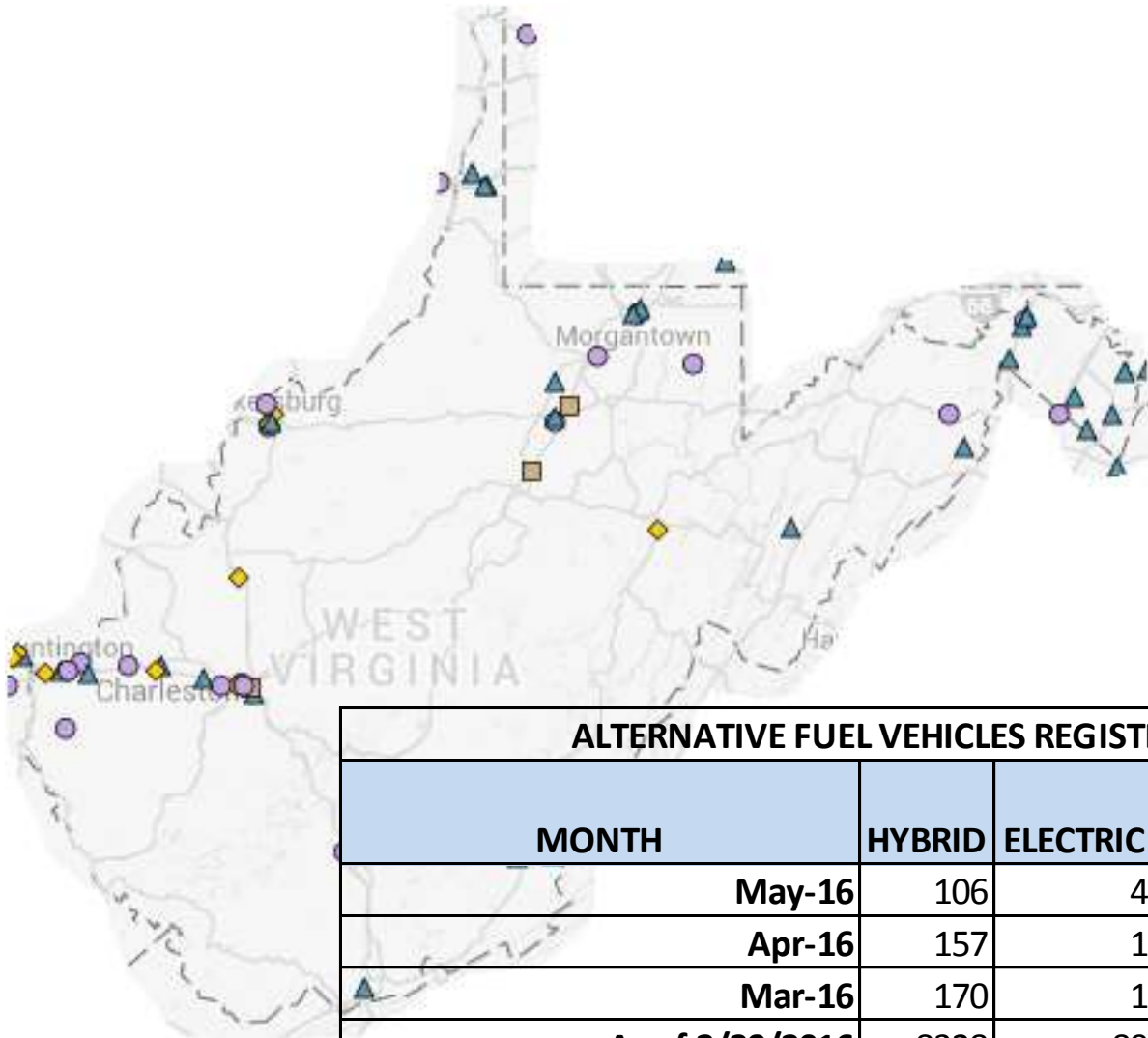
Legend

- Biodiesel
- CNG
- Electric
- Ethanol
- Hydrogen
- LNG
- Propane

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Alternative fuel vehicles and stations in WV



- 3 CNG
- ◆ 7 E85
- ▲ 26 Electric
- 16 Propane

ALTERNATIVE FUEL VEHICLES REGISTERED IN WEST VIRGINIA								
MONTH	HYBRID	ELECTRIC	PHEV	FLEX FUEL	CNG	ETHANOL ONLY	LPG	
May-16	106	4	7	1810	2	2	0	
Apr-16	157	1	3	3139	3	2	0	
Mar-16	170	1	7	3001	1	3	0	
As of 2/29/2016	8328	89	243	138678	81	215	8	



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

www.energywv.org/cleanstateprogram



Clean Cities 2016 Vehicle Buyer's Guide

Download the 2016 Clean Cities
Vehicle Buyer's Guide [here](#).

Benefits

- Increased energy security
- Improved fuel economy
- Lower fuel costs
- Low or zero tailpipe emissions

Considerations

- Higher initial vehicle cost
- Limited infrastructure availability
- Battery life
- Reduced all-electric range



Image: NREL Image Gallery #28974

Infrastructure: Electric Vehicle Supply Equipment (EVSE)



	Current Type	Voltage (V)	Charging Time	Primary Use
Level 1	Alternating Current (AC)	120V	2 to 5 miles of range per hour of charging	Residential
Level 2	AC	240V	10 to 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 to 80 miles of range per 20 minutes of charging	Commercial
Wireless	AC	240V	10 to 20 miles of range per hour of charging	Residential Commercial



Image: NREL Image Gallery #26453



Charging at Home

- Most charge vehicles overnight at home using a Level 1 outlet or installed Level 2 EVSE
- Installation requires permitting and licensed contractors



Charging in Public

- Increases vehicle range, especially for consumers who live in high-density urban areas
- Ideal public charging locations include:
 - Workplaces or office buildings
 - Shopping centers
 - City parking lots
 - Airports
 - Hotels



Shepherd University

The Institute of Environment and Physical Science Sustainability Site is equipped with three new 6.6 kW cloud connected Schneider EVLink electric vehicle (EV) charging units. These level 2 charging units were made possible in part by generous support from Schneider Electric, who donated one of the units, and a grant from the West Virginia Division of Energy.



Electric Drive – Today and Tomorrow

- More technologically refined vehicles
- Recent BEV developments
- Many light-duty HEV options
- Some medium- and heavy-duty EVs are also available
- Medium- and heavy-duty applications may utilize diesel-electric hybrid systems

The Future of Electric Drive

- Fuel Cell Electric Vehicles
 - Produces electricity while converting hydrogen and oxygen into water
 - Platinum may be required for some components
 - Hydrogen gas used to power fuel cell
 - Do not require large batteries



Figure 1: Mercedes-Benz F600 fuel cell prototype.
Source: NAFTC.



Wireless Charging

- Can shorten charging times
- Electricity is sent through charging pad under vehicle
- Automatically charge the batteries when placed within a specified range of charger
- Operates at 240 volts, Level 2

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

Alternative Fuels Data Center Search the AFDC SEARCH

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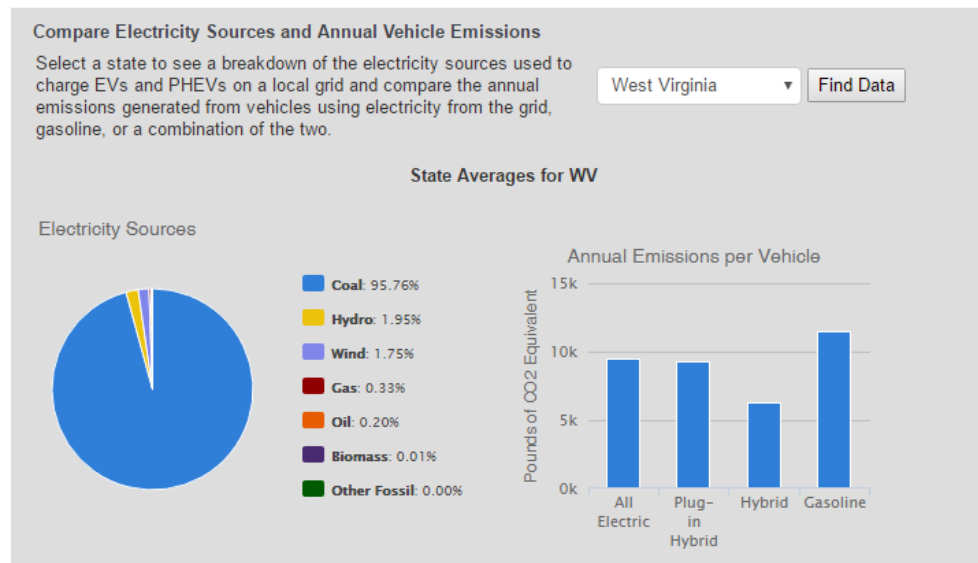
- Electricity Basics
- Benefits & Considerations
- Stations
- Vehicles
 - Availability
 - Conversions
 - Emissions**
 - Batteries
 - Deployment
 - Maintenance & Safety
- Laws & Incentives

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.



www.fueleconomy.gov/feg/Find.do?action=phev1Prompt

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My Plug-in Hybrid Calculator

Car | Driving | Prices | Results

Step 1. My car



2017 Chevrolet Volt

Next

Can a Plug-in Hybrid Save Me Money?

This calculator can help estimate personalized fuel use and costs for a plug-in hybrid based your driving habits, fuel prices, and charging schedule.

Contacts | Download EPA's MPG Ratings | Find and Compare Cars | USA.gov | Info for Auto Dealers | Privacy/Security | Feedback

No AFV? Drive smarter!



Selling Your Car?

Advertise its fuel economy with Used Car Label tool.

Can a Hybrid Save Me Money?

This tool compares the costs of a selected hybrid with a comparably equipped non-hybrid from the same manufacturer.

2015 Toyota Prius c One

Personalize

Vehicle Comparison

Hybrid	Non-hybrid	
2015 Toyota Prius c One	2015 Toyota Yaris 5-Door LE	
1.5 L, 4 cyl, Automatic (variable gear ratios)	1.5 L, 4 cyl, Automatic 4-spd	
Combined MPG		
49	33	
MSRP		
\$20,365	\$18,034	
The hybrid vehicle's MSRP is \$2,331 more.		
Fuel Cost Savings with Hybrid		
Weekly	Monthly	Yearly
\$6.37	\$27.58	\$331
Payback Period		
7.0 years		

+ What if I add the extra cost to my loan?

Note: This tool compares vehicles based on fuel cost and vehicle price only. Other factors, such as insurance, maintenance, or resale value, are not considered since they can vary widely.

Welcome to My MPG!

We've created "My MPG" to help you calculate and track your fuel economy and compare it with EPA test ratings. You can also share your MPG with other users.

Benefits of Registering

If you register, you will be able to save your MPG information and view, edit, or update it later. You will also be able to share your MPG with others. Fueleconomy.gov retains no information that could be used to identify any individual with a user name or password.

As a non-registered guest, you still have access to all MPG tools, but you cannot save your data or share your MPG.

We Can Help You...

- [Calculate Your MPG](#)
- [Maintain a Fuel Purchase Record](#)

Other Useful Tools

- [Our Printable Form for Recording Fuel Purchases](#)
- [MPG Estimates from Drivers Like You](#)

Tracking Your MPG Just Got Easier

Now you can enter "My MPG" data at the pump from your mobile device at fueleconomy.gov/m!

Find & Compare Cars



- Compare Side-by-Side
- Power Search
- Mobile Find-a-Car

Calculators and Other Tools

- Fuel Savings Calculator
- Trip Calculator
- Can a Hybrid Save Me Money?
- My Plug-in Hybrid Calculator
- Used Car Label Tool
- Developer Tools
- Find a Car Widget

Thank you

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