Alternative fuel vehicles

Kimberly Pons
Market Strategist – Wholesale Energy and Fuels
Alternative fuels landscape

The Energy Policy Act of 1992 defines an alternative fuel as:

- Biodiesel (B100)
- Natural gas and liquid fuels domestically produced from natural gas
- Propane (liquefied petroleum gas)
- Electricity
- Hydrogen
- Blends of 85% or more of methanol, denatured ethanol, and other alcohols with gasoline or other fuels
- Methanol, denatured ethanol, and other alcohols
- Coal-derived, domestically produced liquid fuels
- Fuels (other than alcohol) derived from biological materials
- P-series fuels

https://www.afdc.energy.gov/fuels/
Alternative fuels landscape

“Economic factors are the primary reason consumers switch from one fuel to another”

Phil Squair, senior vice president of governmental and public affairs at the National Propane Gas Association

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<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Type</th>
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<tbody>
<tr>
<td>Nov. 4, 2017</td>
<td>Electric Vehicles Charge up at State Parks in West Virginia</td>
<td>Video</td>
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<td>Oct. 20, 2017</td>
<td>Michigan School Buses Get Rolling on Propane</td>
<td>Web Story</td>
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<td>Oct. 14, 2017</td>
<td>Emergency Alternatives</td>
<td>Video</td>
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<td>Oct. 7, 2017</td>
<td>North Carolina Commits to Clean Energy with EV Charging</td>
<td>Video</td>
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<td>Sept. 16, 2017</td>
<td>National Park Saves Natural Resources with Alternative Fuels</td>
<td>Video</td>
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<td>Aug. 26, 2017</td>
<td>Phoenix Utility Fleet Drives Smarter with Biodiesel</td>
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<td>Aug. 4, 2017</td>
<td>Idaho Surges Ahead with Electric Vehicle Charging</td>
<td>Video</td>
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Electric Light Duty Vehicles

Fun to Drive

Fuel and Maintenance Savings

Environment

Energy Security

Grid Benefits
What are the differences in electric vehicles?

**Hybrid electric vehicle (HEV):**
Internal combustion engine (ICE) + Electric motor/battery
Battery charged via regenerative braking and ICE

**Plug-in hybrid electric vehicle (PHEV):**
Internal combustion engine (ICE) + Electric motor/battery
Battery is charged by plugging into a source of power

**Battery electric vehicle (BEV):**
Electric motor/battery
Battery is charged by plugging into a source of power.

If it has a plug = PEV
Current market landscape

- Over 40 PEV models available from more than a dozen manufacturers
  - PHEV
    - Electric range 15-55 miles
- All electric:
  - 62-335 mile range
  - 18-100 kWh battery
  - $23-140K Manufacturer suggested retail price (MSRP)

36 more models expected in the next 4 years with a range of 200-400 miles

Even Dyson has announced an electric car that will reach the market in 2020.

James Dyson to invest £2.5bn on 'radically different' electric car

Current market landscape

Governments announcing/considering plans to ban sales of gasoline and diesel-fueled vehicles:

- UK (2040)
- France (2040)
- Netherlands (by 2030)
- India (2030)
- China
- Germany (some towns/cities)
- California

Others that have set official targets for electric car sales:

Austria
Denmark
Ireland
Netherlands

Portugal
Korea
Spain

China
Current market landscape

U.S. sales:

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Sales</th>
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</thead>
<tbody>
<tr>
<td>FCEV</td>
<td>3,084</td>
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<tr>
<td>BEV</td>
<td>362,058</td>
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<tr>
<td>PHEV</td>
<td>356,664</td>
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<tr>
<td>HEV</td>
<td>2,689,900</td>
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<tr>
<td>All</td>
<td>3,411,706</td>
</tr>
</tbody>
</table>

Current market landscape

Wisconsin sales (21st): 6,315 vehicles: 3,428 BEV; 2,887 PEV

Current market landscape

Volvo Cars to go all electric
https://www.media.volvocars.com/global/en-gb/media/pressreleases/210058/volkswagen-cars-to-go-all-electric

GENERAL MOTORS IS GOING ALL ELECTRIC
https://www.wired.com/story/general-motors-electric-cars-plan-gm/

Renault-Nissan-Mitsubishi to launch 12 zero-emission vehicles and a robo-taxi by 2022, chief says

Ford creates team to ramp up electric vehicle development

Jaguar Land Rover to make only electric or hybrid cars from 2020

Toyota announces major expansion of its electric car plans: 10 new BEVs, all models to have electric motors
https://electrek.co/2017/12/18/toyota-electric-car-plans/
Current market landscape

**Volkswagen to offer electric versions of all of its vehicles by 2030**


**Hyundai-Kia: eight electric cars by 2022, dedicated EV platform**


**Two-Thirds Of 2030 Hondas Will Be Electrified Or Zero Emission: CEO**


**Mercedes-Benz plans electric versions of all its models by 2022**


**BMW readies mass production of electric cars, 12 models by 2025**

Expected Vehicle Releases

Incentives

- Up to $7,500 federal tax credit for purchase of BEV or PHEV
- Credit phases out by manufacturer when 200,000 vehicles are registered

Other incentives may be available from manufacturers, local or state government and utilities.
How much does it cost?

Scenario:
- 15,000 annual miles
- Federal tax credit applied
- $2.49/gallon

https://www.afdc.energy.gov/calc/
Resources

- www.afdc/energy.gov
- www.fueleconomy.gov
- www.plugincars.com
- www.evtide.com
- www.autoalliance.org
- www.wicleancities.org
- https://www.we-energies.com/business/energyeff/plugin_vehicles.htm

Just Google it!