

# ENERGY 2050

## A POLICY BRIEFING SERIES

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### *Facts and Statistics on Alternative Fuels*

Alternative fuels are substantially non-petroleum based energy sources that provide energy security and environmental benefits. Most alternative fuels are intended to be used in transportation, often in converted vehicles built to operate on gasoline or diesel but modified to run on fuels such as compressed natural gas or propane. As defined by the Energy Policy Act of 1993, the Department of Energy (DOE) currently recognizes the following as alternative fuels:

- Mixtures containing 85 percent or more by volume of alcohol fuel, including methanol and denatured ethanol
- Natural gas (compressed or liquefied)
- Liquefied petroleum gas - LPG (propane)
- Hydrogen
- Coal-derived liquid fuels
- Fuels derived from biological materials
- Electricity (including electricity from solar energy)
- 100 percent biodiesel

**Detailed information about each of these fuels is shown in the attached DOE chart.**

#### **Emissions Reductions**

All available alternative fuels reduce some emissions. However, each fuel has its own characteristics, as does each vehicle type. For example, biodiesel reduces particulate matter and greenhouse gas emissions compared to conventional diesel, but may increase nitrogen oxide emissions. Some types of compressed natural gas vehicles may reduce carbondioxide and nitrogen oxide compared to some conventional fuels but may increase hydrocarbon emissions. Electric vehicles have zero tailpipe emissions but electric power generation to charge batteries can contribute emissions.

#### **Gasoline Gallon Equivalent**

A “gasoline gallon equivalent” (GGE) is the amount of fuel required to equal the energy content of one liquid gallon of gasoline. A GGE is a way of comparing equivalent volumes of fuel based on the energy content in British thermal units (Btu). For example, because compressed natural gas (CNG) is not a liquid, its volume is measured in cubic feet (CF), rather than gallons. The GGE of CNG is 127 CF and its volume has the same energy content as one gallon of gasoline (based on 900 Btu/CF of CNG and 114,100 Btu/gallon of gasoline).

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### Prices of Alternative Fuels

Prices of alternative fuels, like gasoline and diesel, fluctuate with the cost of manufacturing and processing, feedstock prices, marketing and distribution, retail station operations, and taxes.

In addition, accessibility of alternative fuels varies widely by region and geographic location can greatly affect the price at the pump. Regional variables include:

- Propane is generally less expensive in Texas and Oklahoma, as well as other states close to the major supply sources in the Gulf Coast and the Midwest.
- Most ethanol is sold in the Midwest, where it is produced, which reduces the cost of transportation.
- LPG and compressed natural gas are used primarily in areas that have easy access to pipelines; natural gas is more economical in urban areas; and ethanol producers tend to sell their fuel in the Midwest to cut down on fuel transportation costs.

Since LPG and compressed natural gas also are used outside the transportation sector, factors such as imports, inventories, and oil prices make it difficult to isolate their prices at the pump.

### Incentives for Purchasing Alternative Fuel Vehicles (AFVs)

Federal income tax deductions are available for AFV owners. Additionally, many states offer incentives, and some original equipment manufacturers and private companies provide rebates or discounts. Most incentives offset a percentage of the incremental costs of designing and manufacturing an AFV. Federal and state laws also help keep the cost of alternative fuels competitive with gasoline or diesel.