

America Can't Wait:

A COST AND ENVIRONMENTAL ANALYSIS OF PROPANE AUTOGAS VS. GASOLINE

An Alternative Fuel Fact Brief – Presented by:



Abstract

Increased demand for oil worldwide, instability in the Middle East and a weakened U.S. dollar have all contributed to high gasoline prices during the past few years. This volatility in fuel prices threatens our country's energy security. The increased cost of transportation for consumers and businesses also jeopardizes economic recovery and growth.

In addition to higher fuel prices, businesses and government agencies that operate vehicle fleets are facing budget cuts and searching for ways to lower their transportation fuel costs. As prices for regular unleaded gasoline have topped \$4 per gallon in parts of the country during 2010 and 2011, alternative fuels have become a more attractive option. However, few alternative fuel technologies offer viable solutions to alleviate “the pain at the pump” right now. Other domestically produced alternative fuels are strongly promoted, but only autogas can provide the immediate relief public and private fleet managers desperately need.

Domestic offshore oil drilling will take years to yield fuel supply; using the entire Strategic Petroleum Reserve (SPR) would last approximately one month (U.S. Energy Information Administration, 2010), and alternative vehicle technologies like electric or hydrogen vehicles are not yet realistic for large-scale deployment. None of these options can make an immediate and significant impact on transportation fuel prices.

Autogas is right here, right now, and it's already powering 17 million vehicles worldwide. America can't afford to wait for other technologies to catch up.

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Introduction

Energy security and domestic gasoline prices are increasingly intertwined with international political events. Policymakers and business leaders have bemoaned the lack of domestic vehicle fuel sources for generations – particularly since the 1970s oil embargo, with its notorious long lines at the pump and record gasoline prices. Simultaneously, fears of climate change and pollution have fueled demands for greater environmental stewardship on the part of corporations and government agencies.

Unfortunately, American fleets have limited alternatives that offer immediate solutions to financial and environmental challenges. Among the alternatives, propane autogas is the most viable vehicle fuel available on the market today.

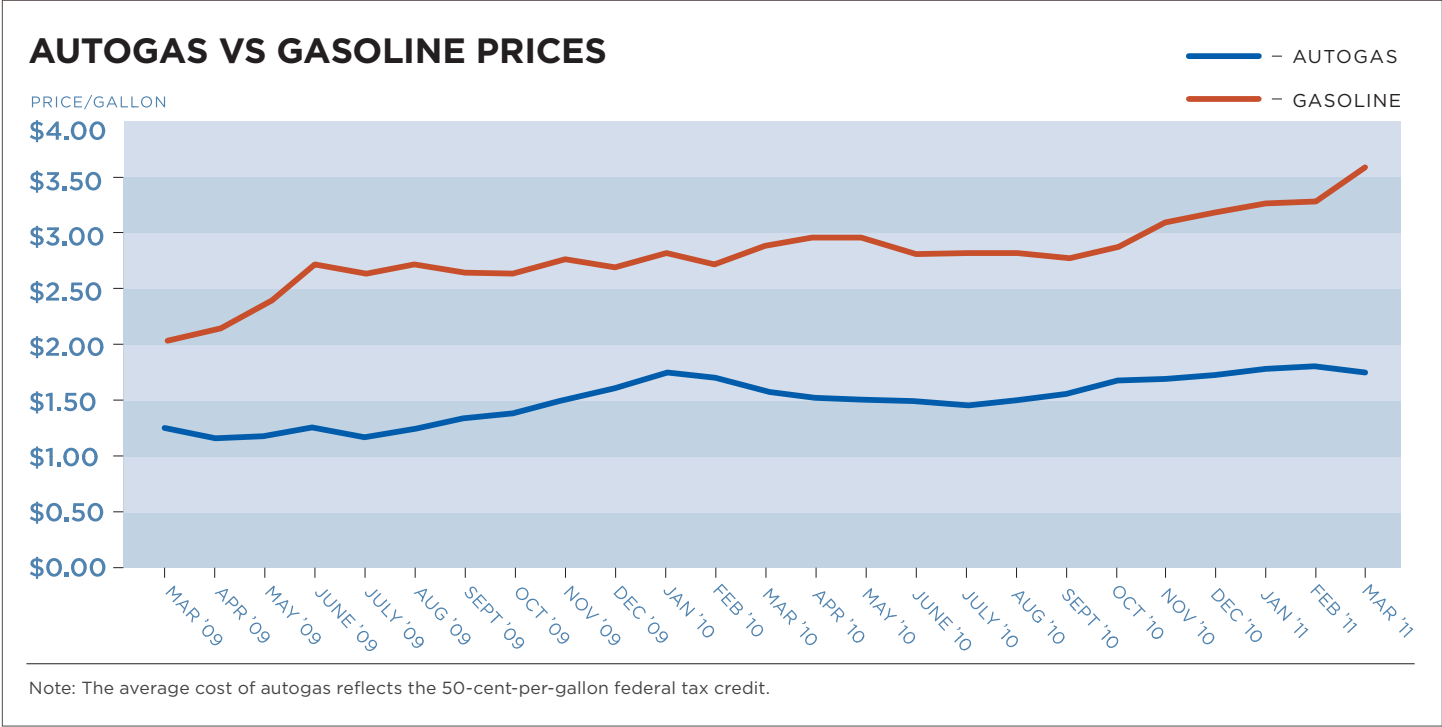
American-made, environmentally friendly and less expensive than gasoline, autogas is already the world's most widely used alternative fuel. In many countries where gasoline prices are more than double those of the United States, autogas is a proven alternative transportation fuel (Knox, 2009).

Autogas historically costs \$1.25 per gallon less than gasoline.

Affordable & Predictable

Traditional vehicle fuels continue to dominate the market, even though gasoline prices have nearly doubled since early 2009 (U.S. Energy Information Administration, 2011). The economic advantage of alternative fuel technologies must be significant in order for them to garner greater market share (U.S. Office of Energy Efficiency and Renewable Energy, 2011b). Autogas historically costs \$1.25 per gallon less than gasoline, including a 50-cent-per gallon federal alternative fuel tax credit (Alliance AutoGas, 2011). Individual states may also provide incentives for alternative fuel use.

For most organizations, budgetary pressures are a source of concern; the variability in the price of oil and gasoline can make financial projections difficult. An analysis of the volatility of the per-gallon prices for gasoline and autogas from February 2009 to March 2011 yielded higher variation for gasoline prices. This means that gasoline prices were not only more expensive but also more volatile during recent years than autogas prices, making predictions of future prices difficult.



Over 90 percent of the propane autogas consumed in this country is made in America, with seven percent imported from our Canadian neighbors.

American-made, Abundant and Ready Now

Independent studies confirm that over 90 percent of the propane autogas consumed in this country is made in America, with seven percent imported from our Canadian neighbors. Approximately 60 percent of our autogas comes from natural gas sources, while the remaining 40 percent is derived from crude oil refining (Werpy et al., 2010, p. 18). In fact, the U.S. and Canada remain the “world’s largest producers of LPG, together accounting for about 24% of supply” (p. 13).

With the dramatic increase in known natural gas reserves in the United States, the domestic supply of natural gas liquids (NGLs), including propane, will increase as well (Bennett, 2011). So, even as the U.S. continues to rely on foreign crude for the vast majority of its gasoline supply, domestically produced autogas will continue to become more abundant and competitive in the market. Increased autogas vehicle deployment will lead to more foreign oil displacement.

Unlike natural gas, propane distribution and infrastructure does not rely on an inflexible underground pipeline network. Propane is easily transported over land, and fueling station placement does not depend on proximity to gas pipelines, as is necessary for compressed natural gas (CNG) stations (Werpy et al., 2010, p. 6). Additionally, propane autogas has the most extensive infrastructure network for any alternative fuel in the country. The U.S. Department of Energy’s Alternative Fuels Data Center (AFDC) estimates there are over 2,500 autogas fueling stations in the continental United States.

Q: How does autogas compare to other alternative fuels?

A: Autogas vehicles are perhaps the most affordable alternative fuel vehicles (AFVs) on the market today – especially the light-duty trucks and passenger cars that most Americans drive. Autogas infrastructure and incremental costs are much lower than those for compressed natural gas (CNG), and autogas fueling takes about the same amount of time as for gasoline vehicles (Werpy et al., 2010, p. 4). In contrast, electric vehicles can take up to 8 hours to completely charge – and the range for the most popular all-electric vehicle in the U.S. is less than 100 miles per charge (Austin, 2010). Autogas vehicles achieve about 90 percent of the miles per tank compared to gasoline (Autogas for America, 2010).

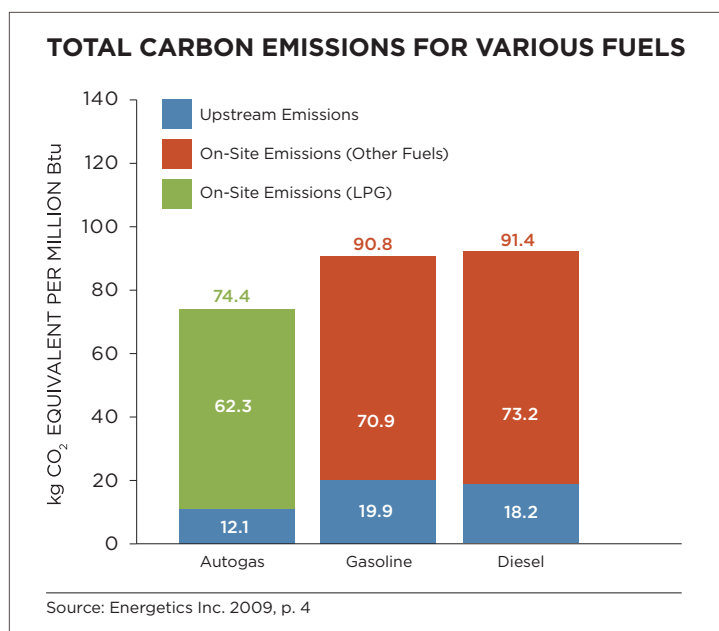
In a third-party analysis, autogas was found to reduce CO₂ equivalents by up to 22 percent. Other studies of specific autogas vehicles found that pollutants like nitrogen oxide (NO_x) were reduced between 42 and 78 percent.

Environmentally Friendly

Autogas is helping businesses and consumers achieve another key objective in the 21st century: reducing carbon emissions and lowering output of other harmful pollutants. School buses, police cruisers, light-duty trucks and even farm equipment that run on autogas have all been shown to reduce pollution and greenhouse gases (GHG) in significant amounts when compared to their gasoline or diesel counterparts. In a third-party analysis, autogas was found to reduce CO₂ equivalents by nearly 20 percent. Other studies of specific autogas vehicles found that pollutants like nitrogen oxide (NO_x) were reduced between 42 and 78 percent.

Autogas is an economically feasible alternative that can also help to mitigate the threat posed by Black Carbon - a major contributor to global warming (Jacobson 2007, as cited in World LP Gas, 2010). Black Carbon (BC), better known as soot or char, is the charcoal-like substance commonly seen as the dark residue expelled from diesel trucks' exhaust pipes and is the second leading cause of global warming (World LP Gas, 2010).

NASA researcher Drew Shindell found that "half or more of the warming measured in the Arctic from 1976-2007 is due to BC plus OC (organic carbon)" (Kintisch, 2009, as cited in World LP Gas, 2010). Other studies have linked BC to respiratory and cardiovascular disease (Stedman and King, 2002 and Wichmann, 2004, as cited in World LP Gas, 2010). Converting American vehicles to run on autogas would greatly reduce black carbon emissions in a relatively short time (World LP Gas, 2010).



Many of these targeted incentives do not produce an adequate return on investment (ROI), and distort the market in favor of the least cost-effective technologies.

Ensuring an Even Playing Field

The autogas industry is comprised of a diverse group of propane marketers, OEM manufacturers, vehicle conversion centers and equipment suppliers that are contributing to the alternative fuel industry. The use of autogas creates jobs and spreads economic benefits across the nation.

Recently, some commentators and energy industry representatives have criticized the support of alternative fuels by policymakers. The fact is, what we pay for gasoline does not reflect the real cost of gasoline in the long term. According to one alternative energy expert, “No [traditional] energy price expresses the real cost of the delivered service, as the costs of often significant environmental and health externalities are not included in the prices of fuels or electricity” (Smil, 2010, p. 15). A lack of energy security is also a negative externality, the cost of which may not be adequately priced into our country’s major fuel sources. Breaking the monopoly of gasoline and diesel is essential for a transition to domestic fuels.

A significant associated cost advantage is necessary in order to motivate changes in consumer action in favor of alternative vehicle fuels. Incentives are given to some of the most expensive technologies: a \$7,500 tax credit for new electric vehicles (EVs), mandates and import tariffs to support ethanol, and other proposed incentives that would yield substantial earnings for natural gas vehicle industry stakeholders. This demonstrates that legislators, and even members of the public, believe that an investment in alternatives is necessary to move America away from foreign oil and toward cleaner energy sources. However, many of these targeted incentives do not produce an adequate return on investment (ROI), and distort the market in favor of the least cost-effective technologies.

In Vaclav Smil’s landmark study of the world’s transition to alternative fuels, he notes that “an imminent demise of the gasoline-fueled internal combustion engine is highly unlikely” to occur with technologies like EVs, hydrogen fuel cell and ethanol (pp. 128, 139, 146). These technologies cannot offer similar vehicle performance to their gasoline counterparts at reasonable expense. Autogas stands alone in its ability to provide an economical vehicle fueling solution that achieves range, payload and infrastructure costs comparable to gasoline (Autogas for America, 2011).

The benefits of autogas are many – it is an American-made fuel, abundant in supply, less expensive than gasoline, cleaner-burning and easily transported. The current and future costs of gasoline’s monopoly of the transportation fuel market are equally plentiful. Dependence on foreign oil exposes an energy-reliant American economy to the impulses of unstable foreign governments and commodities trading. America can’t afford to wait, and doesn’t have to - autogas should be a big part of the solution, right now.

References

- Alliance AutoGas. (2010). *Saving money is easier than you think*. Retrieved April 21, 2011, from Alliance AutoGas: <http://www.allianceautogas.com/why-autogas/save-money>
- Austin, Michael. (2010). *2011 Nissan Leaf EPA Ratings Released*. Retrieved August 2, 2011, from Car and Driver: <http://blog.caranddriver.com/2011-nissan-leaf-epa-ratings-released>
- Autogas for America. (2011). *American, Abundant... and Affordable?* Retrieved July 29, 2011, from Autogas for America: <http://www.autogasforamerica.org/resources/fact-briefs>
- Autogas for Fleets*. (2011). Retrieved June 30, 2011, from Use Propane Autogas: <http://www.usepropaneautogas.com/autogas-for-fleets>
- Bennet, A. (n.d.). *Gas volumes jump with more liquids-led drilling in West Virginia: analysts*. Retrieved July 8, 2011, from Platts: <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/NaturalGas/8024320>
- Energetics, I. (2009). *Propane reduces greenhouse gases: a comparative analysis*. Propane Education & Research Council.
- Jacobson, M.Z. (2007). Black carbon and global warming. U.H.o. Representatives. Washington DC.
- Kintisch, E. (2009). New push focuses on quick ways to curb global warming. *Science*, 324 (5925).
- Knox, J. (2009, October). *Autogas - the industry's "third fuel" of choice*. (Automotive Industries, pp. 10-11) Retrieved May 10, 2011, from World LP Gas: http://www.worldlpgas.com/page_attachment/0000/2191/WLPGA_ARTICLE.pdf
- Montana tourism official: \$4 gas is a "tipping point"*. (2009, February 25). Retrieved June 30, 2011, from USA Today: http://www.usatoday.com/travel/destinations/2009-02-25-montana-gas-prices_N.htm
- Saving money is easier than you think*. (2010). Retrieved April 21, 2011, from Alliance AutoGas: <http://www.allianceautogas.com/why-autogas/save-money>
- Smil, V. (2010). *Energy Transitions: History Requirements, Prospects*. Santa Barbara: Praeger.
- Stedman, J.R., K. King, et al. (2002). Quantification of the health effects of air pollution in the UK for revised PM10 objective analysis.
- U.S. Energy Information Administration, U.S. Department of Energy. (2010). *Oil: Crude and Petroleum Products Explained*. Retrieved June 30, 2011, from U.S. Energy Information Administration: http://www.eia.gov/energyexplained/index.cfm?page=oil_home#tab2.
- U.S. Energy Information Administration, U.S. Department of Energy. (2011). *Weekly Retail Gasoline and Diesel Prices*. Retrieved April 20, 2011, from U.S. Energy Information Administration: http://eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_m.htm

References (cont.)

- U.S. Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy. (2011). *Alternative Fueling Station Total Counts by State and Fuel Type*. Retrieved August 2, 2011, from the Advanced Fuels Data Center: http://www.afdc.energy.gov/afdc/fuels/stations_counts.html.
- U.S. Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy. (2011). *Clean Cities Alternative Fuel Price Report: April 2011*. Retrieved August 2, 2011, from the Advanced Fuels Data Center: http://www.afdc.energy.gov/afdc/pdfs/afpr_apr_11.pdf
- Welsh, J. (2011, April 29). *Is \$4 Still the Tipping Point?* Retrieved June 30, 2011, from Wall Street Journal: <http://blogs.wsj.com/drivers-seat/2011/04/29/gas-prices-is-4-still-the-tipping-point/>
- Werpy, R. W., Burnham, A., & Bertram, K. (2010). *Propane vehicles: status, challenges, and opportunities* (ANL/ESD/10-2). Argonne National Laboratory. Department of Energy.
- Wichmann, H.E. (2004). *Positive gesundheitliche Auswirkungen des Einsatzes von Partikelfiltern bei Dieselfahrzeugen - Risikoabschätzung für die Mortalität in Deutschland*. *Umweltmed Forsch Prax* 9(2): 58-99.
- World LP Gas Association. (2010). *Clearing the Air: Black Carbon, Climate Policy and LP Gas*. Retrieved (Date), from World LP Gas Association: http://www.worldlpgas.com/page_attachments/0000/3160/wlpga-black-carbon.pdf