

Alternative Fuel Toolkit for Fleets



Why is it important to learn about alternative fuels?

Alternative fuel vehicles can become an integral part of a fleet. These vehicles offer long-time cost savings and have the same performance quality of internal combustion engine vehicles, but without the air pollution that comes with it.

Policies for the acquisition of alternative fuel vehicles may already be in your organization’s larger long-term energy plan or Climate Action Plan. A majority of municipalities and public agencies throughout the San Diego region have already referenced the increased procurement of alternative fuel vehicles as a way to reduce greenhouse gas (GHG) emissions that cause climate change.

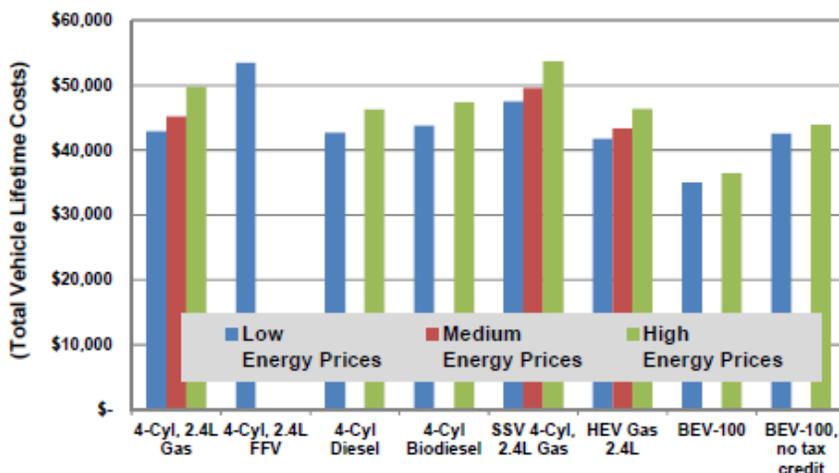
Not only are local governments thinking about alternative fuels, but there are several state-level policies and strategies that promote the increased use of alternative fuels.

How do I use this tool kit?

This toolkit provides resources that fleets have identified as being very desirable for further training and assistance in the transition into alternative fuel vehicles. The toolkit involves the following resources:

- Guidance on availability of funding for alternative fuel vehicles and infrastructure installation projects
- Fact sheets or reference guides on general information about alternative fuels
- Case studies of jurisdictions or private fleets that use alternative fuels

Estimated Total Cost of Ownership Comparison for Mid-Size Light-Duty Vehicle Options with 120,000 Lifetime Miles, United States: 2012



Source: Pike Research, Forbes.com



Propane Autogas

FACTS ABOUT PROPANE AUTOGAS

What is Propane?

Propane is also known as liquefied petroleum autogas (LPG). It is produced as a by-product of natural gas processing and crude oil refining.

While gaining popularity as an alternative fuel in the United States, propane is the third most common transportation fuel in the world.

Nearly all U.S. propane is produced domestically and over half of it is a byproduct from natural gas purification.

Propane is nontoxic and is a clean burning fossil fuel.

How many public propane stations are in the San Diego region?

There are 15 public propane stations in the San Diego region.

How much does it cost to fuel my vehicle?



- There are over 80,000 bus, taxi, and delivery services that use propane autogas in their fleets
- Propane autogas is the third most common transportation fuel in the world
- Propane accounts for 2% of the nation's energy use

What kind of vehicles use propane?

- Forklifts
- Low-Speed Vehicles
- Buses
- Lawn equipment
- Trucks
- Vanpool – Shuttle



Where can I learn more?

- Alternative Fuel Data Center: www.afdc.energy.gov/fuels/propane.html
- Gas Technology Institute: www.gastechnology.org
- National Propane Association: www.npga.org
- Propane Education and Research Council: www.propanecouncil.org
- Autogas USA: www.autogasusa.org



Determining if Propane Vehicles are for your Fleet

You may not be sure whether or not a natural gas vehicle is the right decision for you. The following tools and resources are available to help guide you through your decision-making process.

Case Studies

Propane School Bus Fleets: School bus fleets using propane autogas have saved school districts nearly 50% on a cost per mile basis for fuel and maintenance. This case study highlights four school bus fleets in Texas and one in Virginia. Read more at: <http://www.afdc.energy.gov/uploads/publication/case-study-propane-school-bus-fleets.pdf>.

Propane is a Reliable Fleet Fuel: This case study notes how successful propane autogas has been as a fleet fuel. This discusses how several fleets across the country have found success with propane. Read more at <http://www.afdc.energy.gov/case/2043>.

Several San Diego fleets also use propane autogas:

- DHL
- Old Town Trolley
- UPS

How does Propane Compare?

The Propane Education and Research Council provides helpful fact sheets that compare propane autogas with compressed natural gas (CNG), gasoline, and diesel. They can be found here: <http://www.propane.com/on-road-fleets/case-studies-and-fact-sheets/>.

****Placeholder for Local Propane Autogas Case Study****



Financing your Propane Vehicle and Equipment

You've decided that it makes sense to consider adopting propane autogas into your fleet. However, it is still unclear what it will cost and how much infrastructure will cost. These tools are intended to help you better understand the financial benefits of adopting propane vehicles and the costs associated with their procurement.

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

The AFLEET tool is developed by the Department of Energy's Clean Cities Program. It estimates the environmental and economic costs of adopting alternative fuel vehicles into your fleet. It takes into consideration fuel costs, fuel types, and vehicle purchase price. Before getting started with this tool, fleet managers may work to gather the following pieces of data:

- Vehicle class that your fleet would likely adopt.
- Annual vehicle miles covered by a single vehicle in your fleet.
- Purchase price of vehicles.
- How long the fleet plans on keeping a new vehicle.
- Will there be a loan to help procure the vehicles? If so, what are the terms of the loan?

Take advantage of this tool here: <https://greet.es.anl.gov/afleet>.

Savings in Fuel Costs

There are tools available to estimate your fuel savings when switching to a propane vehicle. The basic information to have on-hand when using these tools are:

- Average number of miles driven per year
- Average MPG of the fleet vehicle
- Number of vehicles to be switched to propane

The [Alternative Fuel Data Center's Vehicle Cost Calculator](http://www.afdc.energy.gov/calculator/) shows the total cost of ownership and emissions for a large variety of makes and models of most vehicles, including alternative fuel vehicles. You can also create your own custom vehicle if you cannot find the model you want. The tool is: <http://www.afdc.energy.gov/calculator/>.

[Propane Autogas Calculator](http://www.propanecostcalculator.com/autogas/) allows users to compare propane autogas to diesel and gasoline. This tool will determine lifetime operating costs for a propane autogas vehicle as well as its lifetime ownership costs. The web tool is found: <http://www.propanecostcalculator.com/autogas/>. Additionally, the Propane Education and Research Council offers apps for your phones to calculate propane cost savings: <http://www.propane.com/on-road-fleets/calculator/>.

Incentives

There are various incentives available.

More information to be added about incentives here

Incentive Name	Incentive Description
PLACEHOLDER FOR INCENTIVES	

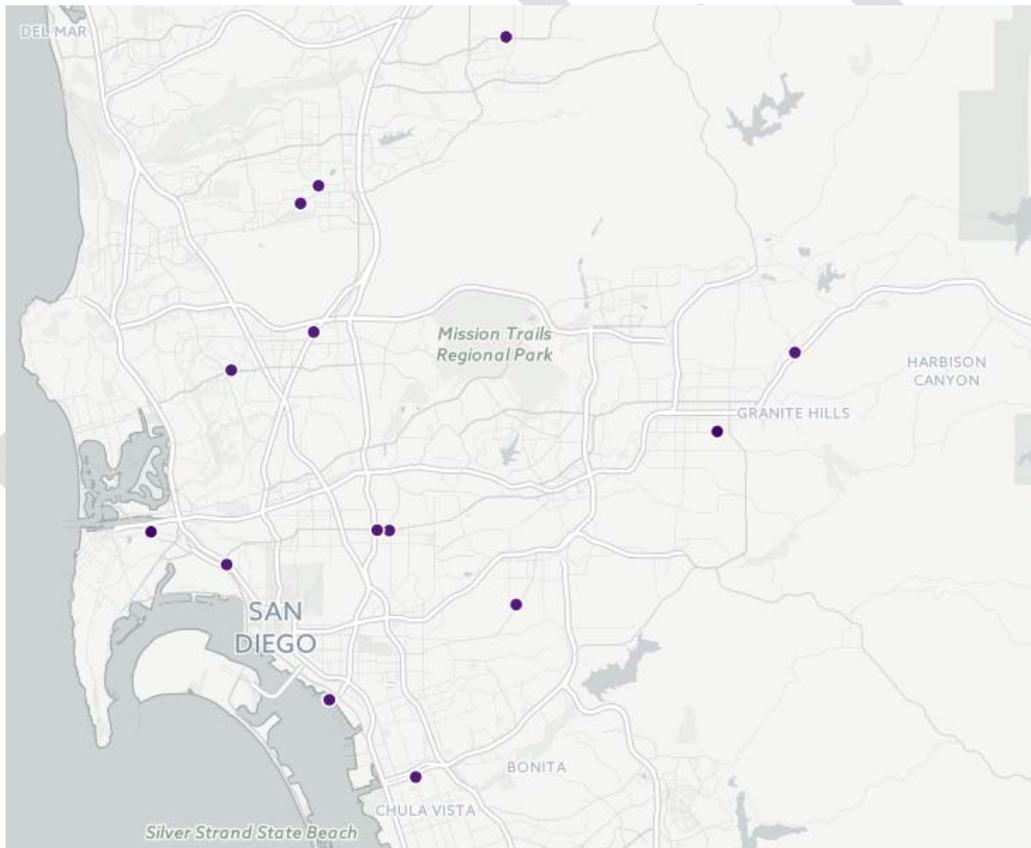
Fueling stations

Propane fueling stations and dispensers can be placed alongside gasoline, diesel, or other alternative fuels. The infrastructure is very similar to gasoline and diesel refueling equipment.

Ownership Models

1. **Owning a larger station:** Fleets can choose to own a large propane station in order to benefit from special fuel pricing. These stations can typically accept a full truck of autogas from the supplier (about 9,000 to 12,000 gallons).
2. **Leasing equipment:** Fleets who are new to propane or who have a small fleet size may lease the tank, pump, and dispensing equipment from a fuel supplier in return for a fuel supply contract. Infrastructure to support the equipment is paid for by the lessee.

Map of LPG Fueling Station in San Diego Region



http://www.afdc.energy.gov/fuels/propane_locations.html

What are the costs of installing a fueling station?

The Department of Energy has a comprehensive guide, *Costs Associated with Propane Vehicle Fueling Infrastructure* (http://www.afdc.energy.gov/uploads/publication/propane_costs.pdf), which detail cost ranges for infrastructure, cost considerations (such as permitting), with recommendations from the propane industry.

Estimated Propane Station Cost¹

Station Size	Cost Range
Small Station (Skid-Mounted) 1,000-gal storage tank 1 single-hose dispenser	Purchase new: \$45,000-\$60,000 Leasing: \$3,000-\$10,000
Small Station 2,000-gal storage with two 1,000-gal tanks 1 dual-hose dispenser	Purchase new: \$60,000-\$70,000 Leasing: \$5,000-\$12,000
Medium Station 12,000-gal storage tank 2 dual-hose dispensers	Purchase new: \$120,000-\$145,000 Leasing: \$15,000-\$50,000
Medium Station 18,000-gal storage tank 3 dual-hose dispensers	Purchase new: \$150,000-\$220,000 Leasing: \$15,000-\$50,000
Large Station 30,000-gal storage tank 4 dual-hose dispensers	Purchase new: \$225,000-\$300,000 Leasing: \$15,000-\$50,000

Codes and Standards

When installing a fueling station, it is important to adhere to the necessary codes and standards. This guidance document provides a thorough list of codes and standards when developing natural gas infrastructure:

<http://www.afdc.energy.gov/pdfs/48612.pdf>.

The general standards for propane fall under NFPA 58, Liquefied Petroleum Gas Code. This code addresses the construction, installation, and operation of propane fueling stations and equipment. It seeks to provide safe methods for propane storage, transportation, and use in order to mitigate fires and explosions. More specific codes and standards are in the table below.

¹ Summarized from AFDC's *Costs Associated with Propane Vehicle Fueling Infrastructure*. August 2014. http://www.afdc.energy.gov/uploads/publication/propane_costs.pdf.

Fueling Station Aspect	Pertinent Codes and Standards
Vehicle Fuel Dispense and Dispensing Systems	NFPA 58 UL 567
Storage Containers	NFPA 58 ASME Boiler and Pressure Vessel Code American Petroleum Institute (API)-ASME Code for Unfired Pressure Vessels for Petroleum Liquids and Gases CGA C-6 ASCE 7

DRAFT