



January 12, 2015

City of Portland  
Planning and Sustainability Commission  
1900 S.W. Fourth Ave.  
Portland, OR 97201

Reference: **Pembina Pipeline Public Hearing**

Dear Commissioners,

My name is Darren Engle. I am the Director of Government Relations for Blue Star Gas, a family owned propane marketer in Oregon. I have worked in the propane industry for 28 years and currently chair the Propane Education & Research Council's (PERC) Research & Technology Development Advisory Committee. In addition, I serve on Governor Kitzhaber's Clean Fuels Advisory Committee as well as the Western Washington Clean Cities Coalition Steering Committee. I am submitting testimony today in support of the Pembina pipeline project.

Propane is a versatile fuel that is used in a variety of applications from home heating to fueling motor vehicles. It is the most widely used alternative fuel in the world with over 25 million vehicles currently in use. Sadly, the United States lags well behind the rest of the world in alternative fuel adoption. With over 250 million vehicles registered in the U.S., less than one million run on all the alternative fuels combined.

My primary concern is to ensure that the commission is fully aware of the benefits of Liquefied Petroleum Gas (LPG) autogas as an alternative low carbon fuel option. (The major hydrocarbon of LPG is propane; the terms LPG, propane and propane autogas are often used interchangeably.) LPG can play a vital role in meeting the state's Greenhouse Gas (GHG) reduction thresholds.

LPG is a derivative of the crude oil and natural gas industries. The produced fuel is clean, affordable and versatile, both readily available and in abundant supply in the U.S. The necessary technology and infrastructure for production, use, and deployment is already in place and the GHG savings over conventional fuels can make major and immediate contributions in achieving the state's desired carbon reduction goals. The lower carbon content of LPG compared to gasoline or diesel is well known. The combination of carbon content and fuel upstream energy results in a reduction of approximately 18 g of carbon dioxide equivalent emissions (g CO<sub>2</sub>e) per MegaJoule (MJ) fuel compared to gasoline or diesel, or about an 18% reduction in GHG emissions.

#### *Pollution & Toxic Substances*

Propane is a clean-burning fuel, emitting virtually no soot or Particulate Matter (PM) on combustion. Conversely, diesel-fueled vehicles can emit up to 30 times more PM than LPG vehicles. LPG combustion also generates low levels of criteria air contaminants (Carbon Monoxide (CO) and oxides of nitrogen (NO<sub>x</sub>)), which are the basic precursors of ground-level ozone, also known as smog. LPG vehicles reduce CO emissions by up to 60% when compared to gasoline alone. Also, fugitive leaks and losses from LPG production and use dissipate quickly and do not contaminate soil or water, unlike gasoline or diesel.

Motor vehicle exhaust is another major source of toxic substances in the atmosphere. Both gasoline and diesel refueling and combustion release toxins and air pollutants (Benzene, Acetaldehyde, Formaldehyde, and Butadiene). A study published by the World LP Gas Association on the air toxics emitted by different fuels during the well-to-wheels fuel cycle, shows that LPG emits 20-90% lower levels of air pollutants than both gasoline and diesel.



## LPG Vehicle Populations and Technology Penetration

LPG is a derivative of two large energy industries: the processing of natural gas liquids and the refining of crude oil. In both cases LPG is a by-product. Refineries want to produce “middle distillates” namely gasoline, jet fuel, diesel and heating oil but on the way to the desired products LPGs are first produced. Natural gas processors want grid quality natural gas, which is mostly methane. On the way to the methane slate, LPGs must first be dealt with. In recent years with shale oil and gas production increasing greatly, LPGs are finding a demand in exports to world markets. Meanwhile, with abundant supply in the U.S. and dedicated infrastructure already in place, the LPG industry has the ability to quickly and cost-effectively install additional infrastructure as needed to service specific fleets. LPG vehicles are already serving a broad variety of purposes, including busses, shuttle vans, forklifts, delivery trucks, taxis and pickups.

The first propane/butane vehicles in the U.S. began service in 1913. Ever since, LPG has been a reliable, cost-effective, low emission, domestically produced transportation fuel. Worldwide, there are more than 25 million LPG fueled vehicles in operation today – a number that is growing every year. In the U.S., there are approximately 140,000 vehicles on the road and over 2,700 public fuel outlets across the country. In addition, there are several thousand private refueling dispensers demonstrating the ease and low cost of refueling installations.

Other attributes of LPG vehicles include:

- Refueling nozzles are tightly secured to the fill connector minimizing fugitive emissions upon disconnect.
- Refueling time is 8-12 gallons per minute with very low cost for pumping time. Refueling is simply transferring a liquid LPG from one container to another.
- Driving range of an LPG vehicle is typically 300-400 miles between fuel stops. Dual fuel, using both LPG and gasoline as separate fuel systems, can increase driving range to 600-700 miles.
- LPG vehicles are quieter than diesel, they start easily in below zero weather (one reason school bus operators favor LPG), the fuel system has no vents or openings to the atmosphere and are fully warranted.
- Vehicle fuel systems are either vapor, liquid, port injected or liquid injected. Direct injection systems are now in the regulatory approval process.

I hope that these comments demonstrate that LPG is a viable alternative fuel option that can help meet the carbon reduction goals of the state and the region. Some of the benefits of using LPG over conventional fuels outlined in these comments are highlighted below.

- **LPG vehicles have a lower carbon footprint than gasoline;**
  - to 18% less Greenhouse Gases (GHGs)
- **LPG vehicles emit fewer criteria air pollutants than gasoline and diesel;**
  - Up to 60% less CO emissions compared to gasoline.
  - Diesel-fuelled vehicles emit up to 30 times more PM than LPG vehicles
- **LPG vehicles emit significantly less harmful toxic substances than gasoline**
  - 20-90% less Benzene, Acetaldehyde, Formaldehyde, and Butadiene
- **LPG Vehicles have lower maintenance costs than gasoline and diesel**
  - Propane burns cleaner, experiences significantly less carbon build-up, and has the potential for increased engine life.



Thank you for taking the time to read these comments, I hope that I have illustrated the positive environmental benefits of using LPG, the worlds most widely used alternative fuel. Please do not hesitate to contact me if you have any questions or need further information.

Sincerely,

Darren Engle  
Director of Government Relations  
3837 Portland Road NE  
Salem, OR 97301  
(530) 945-8604  
[dengle@bluestargas.com](mailto:dengle@bluestargas.com)  
[www.bluestargas.com](http://www.bluestargas.com)