

Liquefied Petroleum Gas (LPG)

Liquefied petroleum gas, most commonly referred to as LPG, is a widely available product of oil and gas refining. LPG is characterized as a mixture of propane, butane and small quantities of various other hydrocarbons. LPG is transferred and stored as a pressurized liquid; however it vaporizes easily under ambient conditions, making it an excellent gaseous fuel source for engines and turbines.

Common commercially available types of LPG are described below:

Special Duty Propane (ASTM D1835 or HD-5) Lower Grade Commercial Propane Commercial Butane Propane-Butane (PB) Mixtures LPG/Air Mixtures > 90% propane, < 5% propylene⁽¹⁾
> 90% propane, < 10% propylene⁽¹⁾
> 90% butane
All other mixtures < 90% propane or butane⁽¹⁾
Any above LPG, blended with air

LPG in Microturbines

Capstone's microturbines are able to operate using Special Duty Propane and Propane-Butane mixtures up to 40% butane, which meet all other specified contaminant limits. LPG microturbine models have internal heat tracing and insulation in order to ensure proper dew point suppression at higher butane levels. LPG/Air mixtures, which can be used for synthetic natural gas or increasing fuel volatility, are also suitable for microturbines as long as they meet the microturbine fuel requirements.

LPG Features and Benefits

Clean Burning:	Allows LPG systems to operate in strictly regulated areas	
Energy Dense:	Occupies a small footprint for onsite storage	
Transportable:	Easily stored and transferred but difficult to steal; storage tank can be located far away from microturbine without issue	
Ease of Operation:	Sites can run unmanned and can operate several months before requiring refills	
Black Start:	LPG fuel systems can be designed to startup without any external power source	
Multi-use:	Excellent fuel for ancillary equipment such as boilers, dual fired chillers and other commercial appliances	
Availability:	LPG is one of the most widely available fuels in the world	
Safety:	LPG storage tanks are 20 times more puncture-proof than conventional gas tanks	
Versatility:	LPG streams may be blended with air in order to improve the fuel properties	

Fuel System Block Diagram



LPG Microturbine vs Diesel Genset

	LPG CAPSTONE MICROTURBINE	DIESEL GENSET
Ultra-low Emissions	\checkmark	×
Wide Range of Allowable Fuels	\checkmark	Diesel Only
24/7 Operation	\checkmark	×
Integrated Heat Recovery	\checkmark	×
Maintenance Free Fuel Storage	\checkmark	×
Turndown without Negative Effects	\checkmark	High Maintenance, Shorter Lifecycle
Extended Routine Maintenance Intervals	\checkmark	×
Oil Free; No Coolants or Lubricants Required	Patented Air Bearings	×
Integrated Power Electronics	\checkmark	Requires External Synchronizer
Flexible Equipment Layout	\checkmark	×
Compact Footprint	\checkmark	×
Integrated Sound Attenuation	\checkmark	×

For distributor information, please visit www.capstoneturbine.com/distributors

Worldwide LPG Installations





Remote Russian Ski Resort - 38 Capstone microturbines provide onsite power and heat for an off-the-grid ski resort in northern Russia. The 30 C60 and eight C65 microturbines run primarily on liquefied methane, but can also use a propane-butane mixture as back-up fuel. Clean and reliable power is generated for the hotel, ski lifts, cottages, office buildings, cafes, restaurants, ice skating rink, as well as the ski slopes at night. The system has experienced 100% reliability since being commissioned in 2008.



Mountain and Ski Resort Hotel - Four Capstone C65 microturbines operate on liquefied petroleum gas (LPG) and generate all electrical and thermal power for a hotel in southern Chile. The microturbine array was installed in 2013 to support 100% of the hotel's power demand, and the thermal energy from the exhaust is recovered to provide space heating and sanitary hot water. With energy efficiency levels nearing 80%, this onsite power system reduces the resorts' carbon footprint and is key to meeting their environment-friendly mission.



Electric Delivery Company - A Capstone C65 microturbine is among nine distributed generation resources that power a grid-tied system consisting of four interconnected microgrids in northeast Texas. Commissioned in 2014, the microgrid system has a total peak capacity of 900kW, however, it is scalable to meet just about any need. The propane-fueled 65kW microturbine is able to parallel load with all other technologies onsite, including solar, wind and renewable generators, to allow for continuous site operations during extended storm outages and other critical events.



Remote Utility Company - 23 Capstone C65 microturbines supply approximately 1.5MW of electrical power to a small island off the coast of southern California. The microturbines are fueled by special duty propane and power a diverse marketplace year-round. The site has been in operation since 2011 and has reduced the customer's consumption of diesel fuel by 200,000 gallons annually. After installing the microturbines, the island's overall emissions profile improved with annual reductions of smog-forming nitrogen oxide emissions by about 8% and diesel particulates by about 9.5%.

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