

# Emissions Advantage for Propane Commercial Appliances

As states and municipalities adopt more demanding emissions standards, the value of clean burning propane will become more important than ever. This new report proves propane is the best choice construction professionals can make to help businesses, schools, and other properties reduce their emissions – without sacrificing the performance they need for space and water heating, combined heat and power, and power generation.

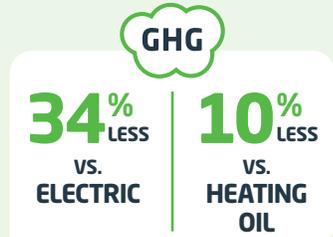
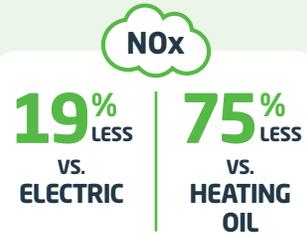
## METHODOLOGY

From August 2016 through January 2017, the Propane Education & Research Council contracted the Gas Technology Institute (GTI) to execute a comparative emissions analysis study of targeted applications in key propane markets, including commercial buildings. The report studied three emissions types: full-fuel-cycle energy consumption, greenhouse gas emissions, and criteria pollutant emissions (NO<sub>x</sub>, SO<sub>x</sub>).



## SPACE HEATING

Propane furnaces are a better, low-emissions choice than electric or heating oil. Beyond lowering emissions, propane produces a more comfortable heat in commercial applications than other power sources.



Based on a building energy model for a 2,000-square-foot fast food restaurant, with an annual heating/cooling load of 420MMBtu/413MMBtu.

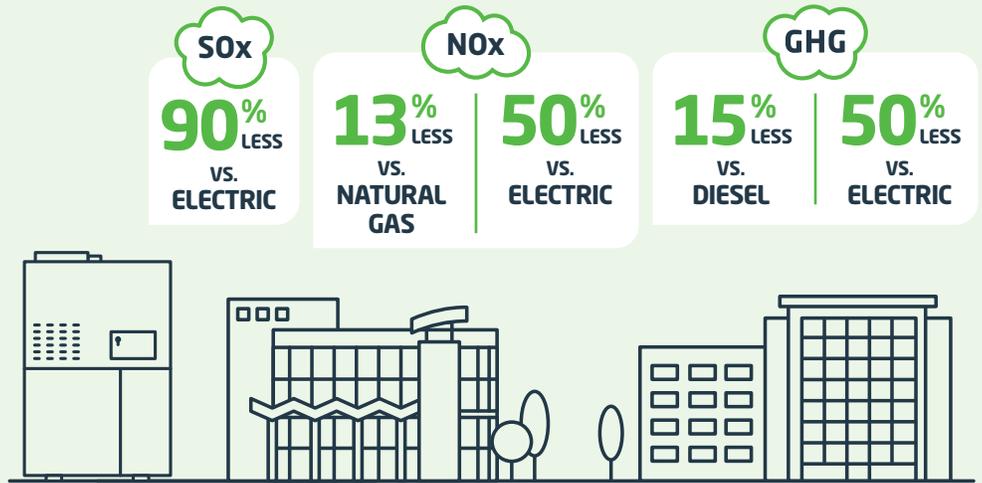


**SO<sub>x</sub>** = SULFUR OXIDE    **NO<sub>x</sub>** = NITROGEN OXIDE    **GHG** = GREENHOUSE GASES

### MICRO-COMBINED HEAT & POWER

These systems, powered by an internal combustion engine or microturbine, produce heat and electric power at a lower emissions rate than electricity and diesel. By operating more efficiently, mCHP systems cut energy costs as well as greenhouse gas, SOx, and NOx emissions.

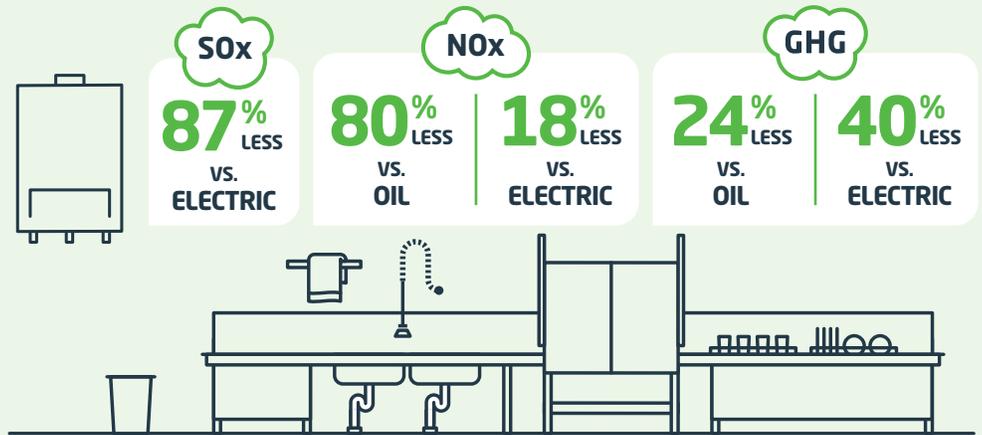
The study compared emissions for two mCHP applications – a 10kW engine-based system and a 30kW microturbine system – each with 3,000 hours of operation.



### WATER HEATING

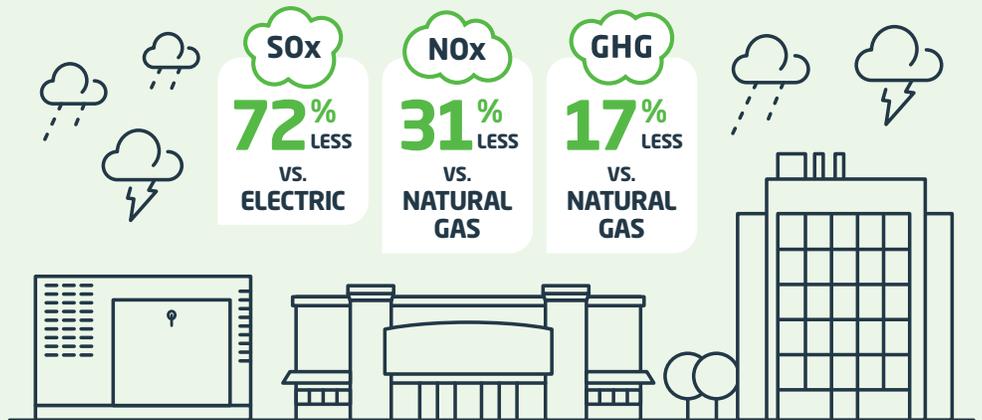
For reduced emissions, both propane storage tank and tankless water heaters outperform electric and oil-fueled models. Buildings with high energy usage have a major opportunity to reduce harmful emissions with propane water heaters.

Based on a building energy model for a 2,000-square foot fast food restaurant, with the delivered energy of 410MMBtu for water heating assumed.



### POWER GENERATION

Besides reducing emissions, on-site propane generators provide the ultimate peace of mind for commercial buildings during and after severe weather and power outages. Propane can maintain essential lighting, heating, air conditioning, and refrigeration – must-haves for a variety of commercial buildings.



The study assumed engine-driven generators at full load (7kW or 100kW). 7kW applications operated for 100 hours/year, 100kW applications for 1,000 hours/year. Propane and diesel GHG emissions based on EPA on-road vehicle emissions factors. SEEAT GHG emissions factors used for natural gas and electricity. All source energy, NOx, and SOx emission factors were based on SEEAT.

### FOR MORE INFORMATION

To learn more about propane appliances, visit [Propane.com](http://Propane.com).

THE PROPANE EDUCATION & RESEARCH COUNCIL was authorized by the U.S. Congress with the passage of Public Law 104-284, the Propane Education and Research Act (PERA), signed into law on October 11, 1996. The mission of the Propane Education & Research Council is to promote the safe, efficient use of odorized propane gas as a preferred energy source.

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