

Today's Propane

National Propane Gas Association

*Clean, Low-Carbon,
Abundant American Energy*

NPGA
NATIONAL PROPANE GAS ASSOCIATION

Clean, Local, and Reliable

Propane has been providing the energy America relies on for more than 100 years. Propane is used in roughly 50 million American homes, with 11.9 million households using propane for either space or water heating, 5.8 million of which depend on propane as their primary space heating fuel.

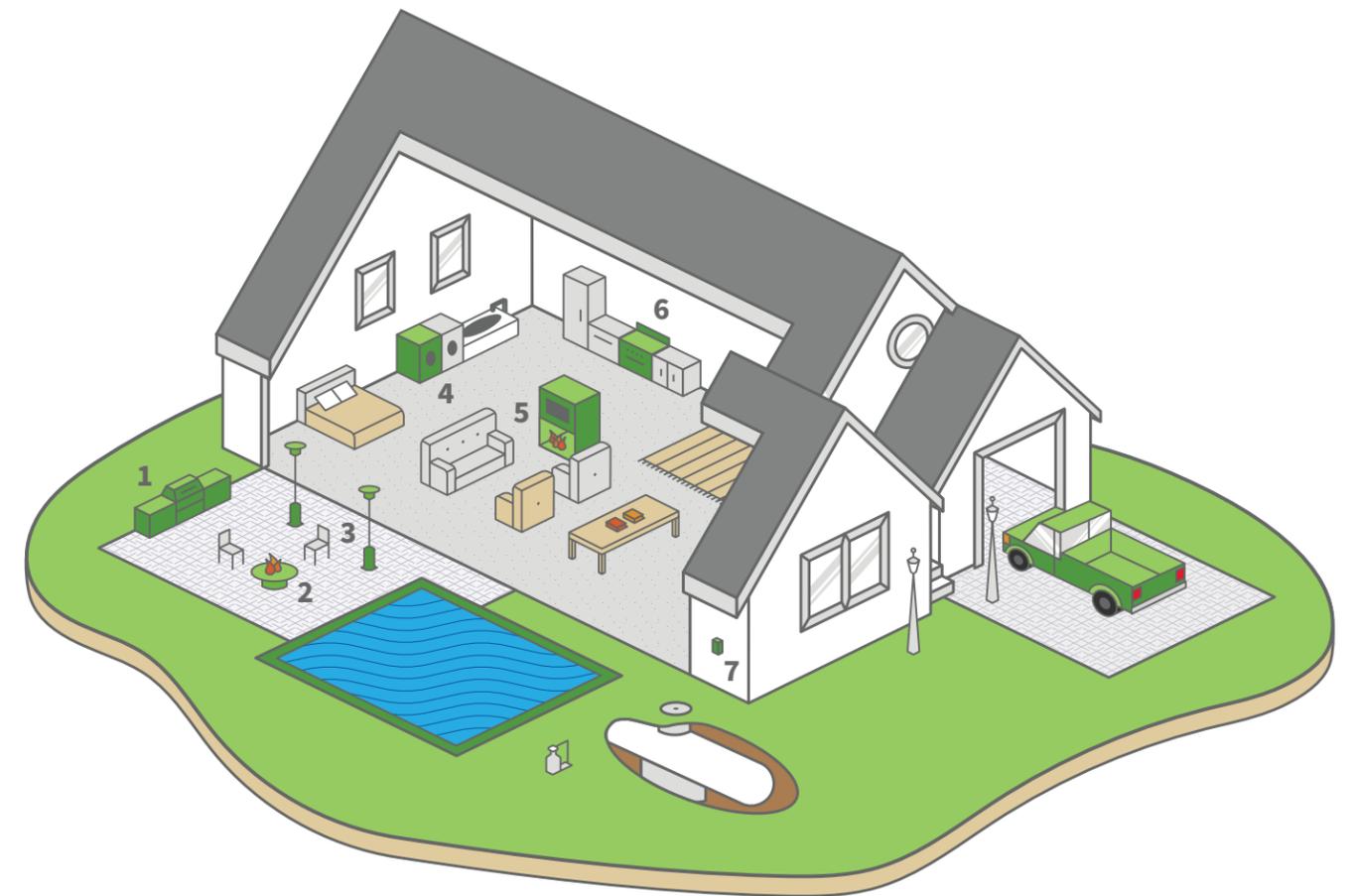
In addition to the significant role propane plays in the residential sector, the industry serves about 1.1 million commercial customers, 184,700 industrial customers, and 504,700 agricultural customers.

Of the 4,000 propane companies throughout the United States, more than 70 percent are independent, family-owned businesses, employing more than 57,000 people. Local businesses are the primary drivers of growth and jobs in America. Support for these local propane businesses is essential to the future economic health and stability of the United States.



Propane can be an evergreen energy. Paired with solar panels to create micro-combined heat and power systems, propane can meet zero net energy goals and relieve pressure from the electric grid. Renewable propane produced in the U.S. and Europe can replace traditional propane without equipment or engine modifications.

The Propane Home



Key

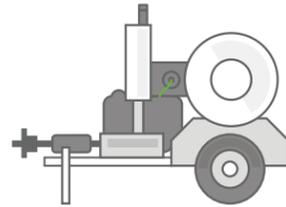
- 1 Propane grills give precision temperature control for a perfect meal, and with no coals, soot, or ash.
- 2 Propane fire pits have real flames and warmth at the flip of a switch without messy clean-up.
- 3 Patio heaters can raise the nearby outdoor temperature up to 30 degrees Fahrenheit.
- 4 Propane clothes dryers save 20 percent in average energy costs annually compared with electric models. Over its lifespan, a propane clothes dryer saves over 2,000 pounds of CO2 emissions compared to an electric model.
- 5 Propane fireplaces deliver five to six times the heating capacity of electric fireplaces. Propane carries a smaller environmental footprint and produces fewer particulate emissions and less carbon monoxide than wood-burning units.
- 6 96% of professional chefs prefer cooking with gas because of instant heat, more precise temperature control, and greater efficiency.
- 7 Propane tankless water heaters deliver endless supplies of hot water while saving an average of \$150/year in energy costs compared to typical electric storage water heaters and saving roughly half the CO2 emissions of electric storage tank systems.

Beyond the BBQ

Propane is portable and can be used almost anywhere. From emergency generators to airport shuttles, propane can quickly and reliably meet a variety of energy needs.



Residential and Commercial Space Heating And Cooling



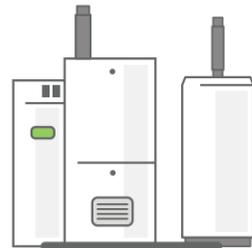
Irrigation Engines



Generators



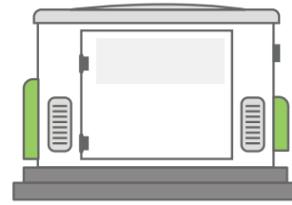
Mowers



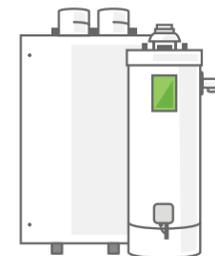
Combined Heat and Power



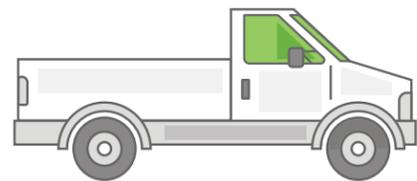
Terminal Tractors



On-Site Power Generation



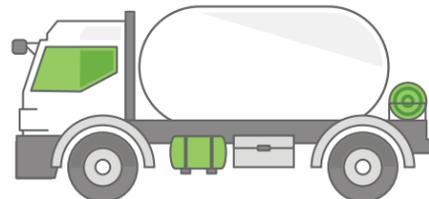
Residential and Commercial Water Heating



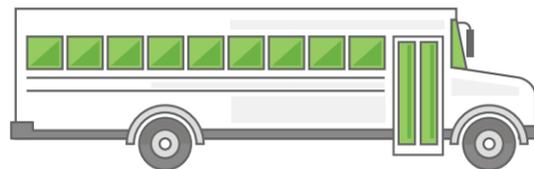
Light-Duty Trucks



Forklifts



Bobtail Trucks



School Buses and Shuttles



Utility Cargo Vans

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Propane is clean, low-carbon energy that produces fewer greenhouse gas emissions than many other energy options.

Direct use of propane for space heating, water heating, cooking, and clothes drying reduces greenhouse gas emissions up to 50 percent compared to electricity.

Residential Space Heating

Propane is used in 11.9 million households as well as many businesses for heat and water heating, indoor cooking, clothes drying, and backup power. More than 50 million homes use propane for outdoor grilling and heating.

Off-Road Applications

Many of the leading commercial mower manufacturers offer propane-powered mower options, with more than 150 different models. These clean-fuel-burning mowers are exempt from ozone action days, and can operate when gasoline and diesel mowers are sidelined.

More than 500,000 forklifts in the U.S. are powered by propane. Best-in-class propane forklift engines can produce 97 percent fewer hydrocarbon and nitrogen oxide emissions when compared to similarly sized diesel forklift engines.

Agriculture

Propane can be found on 40 percent of American farms in a variety of applications, including livestock heating, crop drying, and sanitation.

Farmers using propane irrigation engines report savings up to 50 percent compared to diesel engines. New propane-powered engines typically cost 20 to 40 percent less than new diesel engines for comparable power, and for many farms, propane engines are cost-competitive to electric pumps while providing independence from the grid.

Propane Autogas

Every day, nearly 20,000 propane-powered school buses transport more than 1.2 million school children from more than 980 school districts.

Transportation demand accounts for nearly 5 percent of U.S. retail propane demand.

More than 150,000 vehicles in the U.S. are powered by propane.

Did You Know?

More than 57,000 workers across the U.S. are employed in propane production, transportation, and distribution.



Renewable Propane

Renewable propane groups in the United States and Europe have developed ways to produce propane from renewable sources such as biomass, animal fat, and vegetable oil.

Renewable propane technology is developing to contribute to environmental goals as well as energy independence. When looking at the total life cycle emissions, the carbon intensity for renewable propane can be as low as 19 g CO₂/MJ versus a carbon intensity of 40 g CO₂/MJ for California's electricity, for example.

Overseas, units that can produce 20 million gallons of propane a year from renewable sources are being tested.

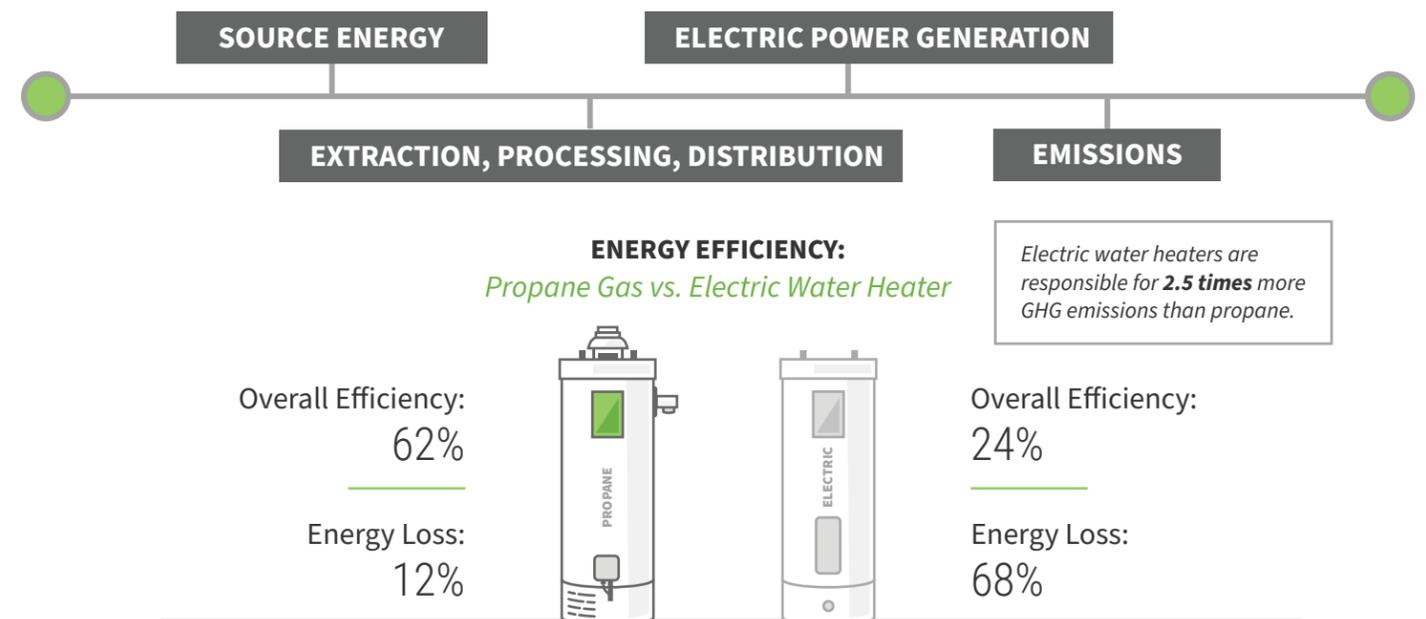
The propane produced in this process has all the benefits of traditional propane. It's clean, affordable, and reliable. It also has an ultra-low carbon footprint compared to electricity. Unlike other renewable fuels, propane can be used in all the same applications as standard propane without additional modifications or investment.

Advanced technologies are available with ultra low-NO_x engines. These advancements deliver major environmental and public health gains, particularly for transportation and stationary engines used in agriculture.

For builders, renewable propane addresses the need for states to generate energy from renewable sources. For commercial applications, renewable propane provides substantial potential reductions in criteria pollutants and diesel particulate matter.

Full Fuel Cycle: The Facts

Full Fuel Cycle (FFC) analysis is the most accurate way to calculate energy use and environmental emissions. FFC accounts for:



Electricity loses nearly 68 percent of its energy in generation, transmission, and distribution compared to about 12 percent energy loss for propane.

FFC MEASUREMENT enables a more comprehensive analysis of the total energy use and environmental impacts and should be included in any energy efficiency rating, building energy consumption, energy use, and energy savings test. It can be applied to everything from appliances to motor vehicles to small or large buildings.

List of organizations that support or endorse FFC:



U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA)



American Council for an Energy Efficiency Economy (ACEEE)

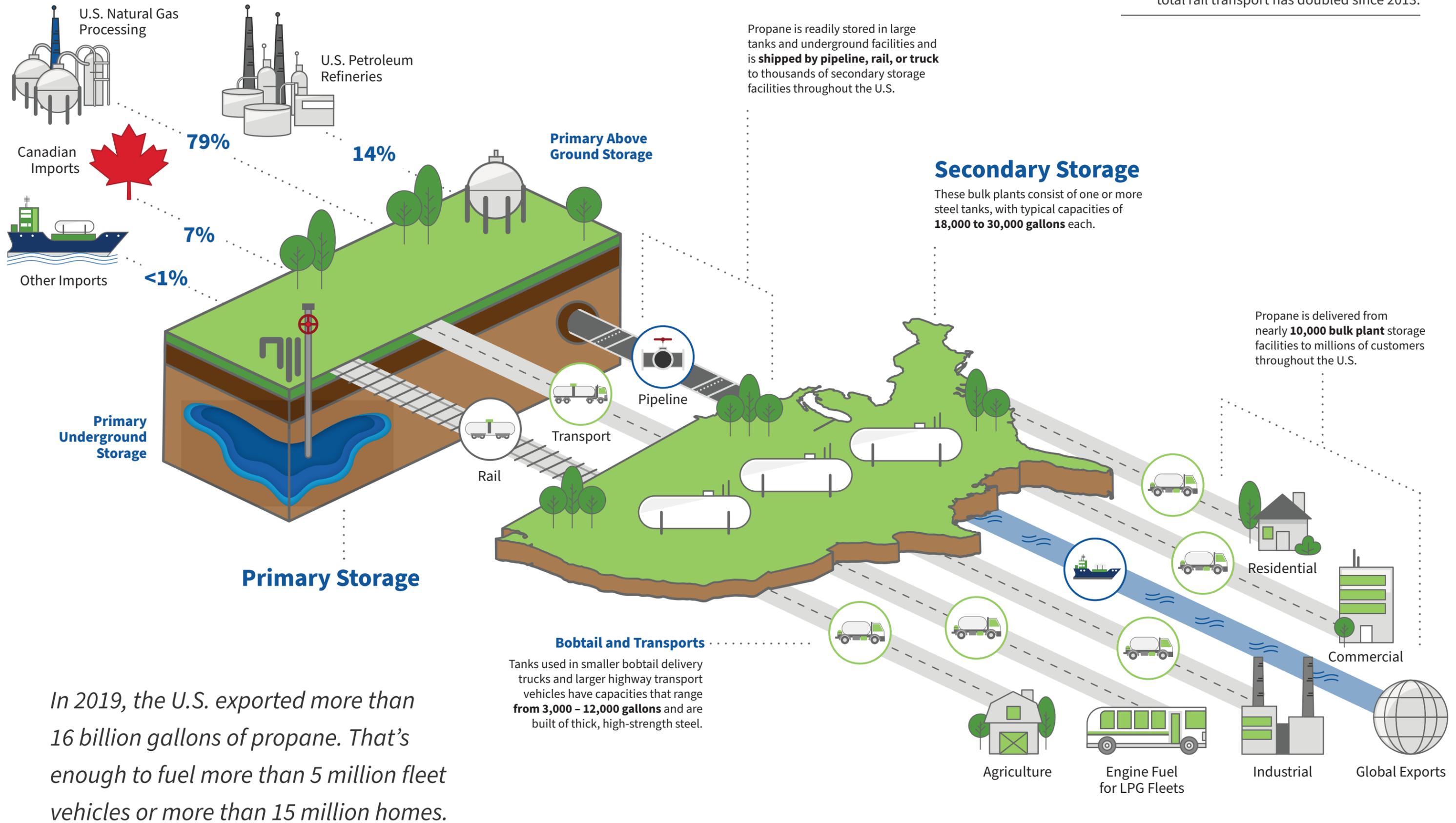


National Academy of Sciences (NAS)



U.S. Green Building Code Council and International Code Council

According to EIA data, total rail transport has doubled since 2013.



In 2019, the U.S. exported more than 16 billion gallons of propane. That's enough to fuel more than 5 million fleet vehicles or more than 15 million homes.

Autogas

200,000

Approximately 200,000 vehicles in the U.S. have been purchased or converted to propane autogas. Propane fuels police fleets, school buses, and delivery trucks through a nationwide infrastructure of +3,600 public and private refueling stations.

The cost of operation per mile is lower than gasoline or diesel.

5%

Transportation demand accounts for nearly 5 percent of American retail propane demand.

920%

The propane school bus fleet has grown approximately 920% since 2012.



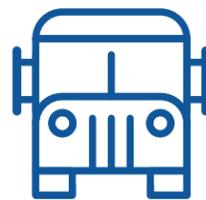
Portland Public Schools report that propane autogas buses run up to 30,000 miles longer than those fueled by gasoline, and Boston Public Schools save an estimated \$1,000 in fuel costs per day by using propane powered buses compared to diesel.

22%

Propane autogas vehicles can produce up to 22 percent fewer greenhouse gas emissions than gasoline vehicles throughout the full fuel cycle. In a study by West Virginia University's Center for Alternative Fuels Engines and Emissions, propane-powered school buses reduced NOx by 96 percent and carbon dioxide by 13 percent compared to a diesel-powered school bus.

20,000

There are nearly 20,000 propane autogas school buses in use by more than 980 school districts and bus contractors in 48 states across the country, safely and efficiently transporting more than 1.2 million students to school every day.



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School Bus

School buses transport 25 million children across the U.S. to and from school each year. Because of the stop-and-go driving conditions, diesel buses emit increased exhaust emissions filled with tiny soot particles and toxic gases. Using the Volkswagen Environmental Mitigation Trust (EMT) to fund the purchase of propane buses enables states to meaningfully reduce this harmful exposure, which benefits our nation's children.



Propane

Purchase price: \$95,000
NOx reduced: 1,048.9 lbs.

Cost per pound of NOx reduced: \$91



Diesel

Purchase price: \$90,000
NOx reduced: 67.7 lbs.

Cost per pound of NOx reduced: \$1,330



Electric

Purchase price: \$300,000
NOx reduced: 1,119 lbs.

Cost per pound of NOx reduced: \$268

93% more cost-effective than diesel school buses

66% more cost-effective than electric school buses

90% Two OEMs introduced ultra-low NOx propane autogas engines that are 90 percent cleaner than mandated Environmental Protection Agency standards and certified to the optional ultra-low NOx emissions standard as defined by the California Air Resources Board for heavy-duty engines with .02 grams per brake horsepower-hour.

Best Total Cost of Ownership

By switching from diesel to propane, fleets can lower their fuel costs up to 50 percent and enjoy increased up-time with reduced maintenance.

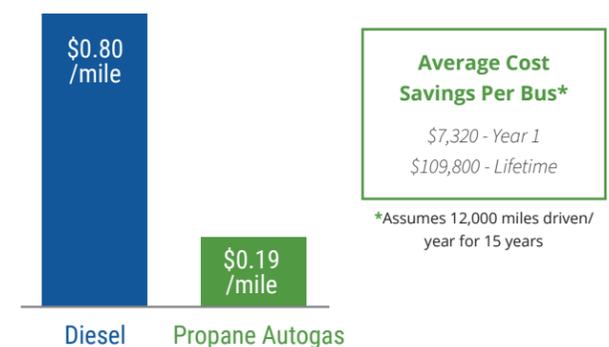
Uncompromised Safety

The Blue Bird Vision propane school bus is noticeably quieter than a diesel bus, enabling the driver to remain focused on both the children and the road ahead.

Clean American Energy

Propane autogas burns far cleaner than diesel. And, because it is domestically sourced, fleets are protected from the fuel price fluctuations that frequently occur with diesel.

Real-World School Bus Fleet Cost Per Mile



* Vehicle purchase price may vary by state. Calculations assume the full cost to deploy the cleanest commercially available Type C buses for each fuel type based on emission calculations from the 2017 ANL AFLEET Tool with diesel in-use adjustment.



Agriculture

Propane can be found on 40 percent of American farms.

Across the United States, thousands of farmers enjoy the benefits of irrigating with propane-powered engines. In addition to outstanding performance, they know propane-powered irrigation engines are clean, reliable, and cost-effective, particularly when compared with diesel-fueled engines. It's a decision that's good for the bottom line and good for the environment.

Research from the Gas Technology Institute shows that propane powered irrigation engines reduce greenhouse gas emissions up to 8 percent compared to diesel models and 18 percent less compared to gasoline engines.

800,000 American farms are powered by propane.

Safe from Wellhead to Burner Tip

Whether by pipeline, rail, or over the road, all propane transportation is regulated under the authority of the U.S. Department of Transportation (DOT), through the agency's federal hazardous materials regulations.

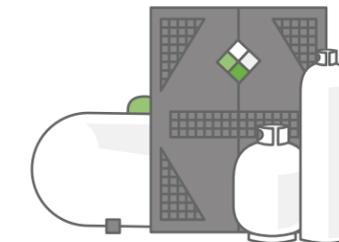
DOT's regulations for design, construction and maintenance ensures a propane container's integrity is maintained throughout its useful life. The agency's regulations for containers used on cargo tank motor vehicles and for cylinders specify that the containers must meet specific fabrication requirements, be appropriately marked, and comply with periodic inspection and requalification requirements.



Delivery

Propane is delivered by people who are qualified to transport hazardous materials in accordance with both DOT requirements and the National Fire Protection Association's (NFPA) LP-Gas Code (NFPA 58), which requires delivery personnel to be trained in safe work practices and the hazards associated with handling propane.

Delivery into stationary customer tanks is monitored continuously until the proper filling level is achieved. Delivery hoses and equipment are inspected during every transfer of product, and emergency shutoff equipment must be regularly tested.



Storage

The storage of propane and the containers in which it is stored is regulated by virtually every fire code used in the United States, all of which reference to NFPA 58.

Propane containers are installed in accordance with the requirements of NFPA 58, which specifies the minimum separation distances from buildings and property lines and provides strict requirements for, among many others, container protection and safe control of the fuel.



Use of Propane

Propane is used in a variety of applications. Numerous model codes, standards and regulations are in place to ensure that the piping, equipment, and appliances used are in compliance with appropriate safety and performance standards and to ensure that these products will perform safely over the life of the appliances and equipment.

Propane by the Numbers

The propane industry is growing. More than 9.4 billion gallons of propane was sold in 2018, up 13.6 percent since 2015. In 2018, the industry's direct contribution to America's GDP was \$46.4 billion, up nearly 15 percent since 2015. The industry is responsible for nearly 57,000 jobs.

Nationwide, propane is used in a variety of applications ranging from home heating to grain drying.

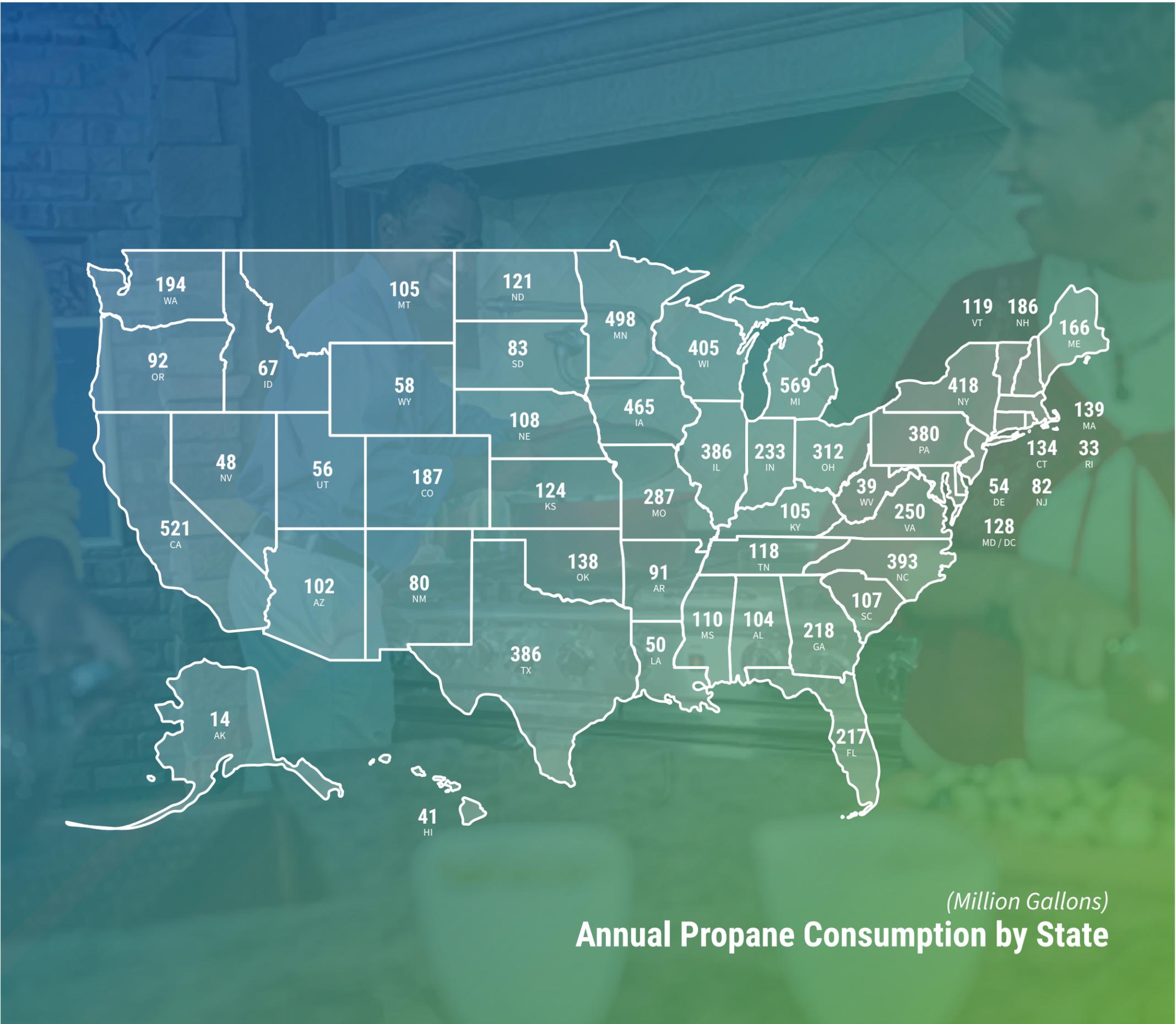
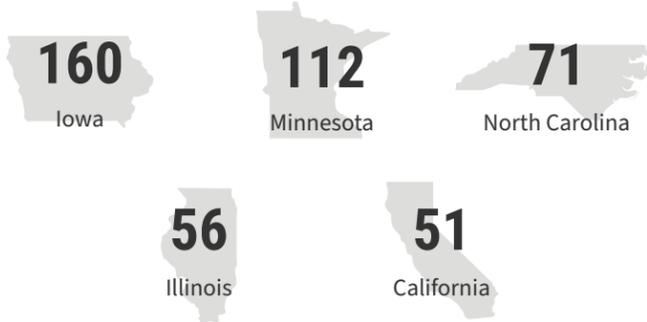
Top Retail Sales Overall



Top Residential/Commercial



Top Agriculture





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