



PROPANE & NET ZERO



WHY NET ZERO IS IMPORTANT

“Net zero” refers to achieving an overall balance between emissions produced and emissions taken out of the atmosphere. Propane can help reduce CO2 emissions by replacing heavy carbons like coal, oil and even wood. Its affordability also ensures every consumer can share equitably in the benefits propane brings.

PROPANE DECARBONIZES

Cleaner and renewable energy like propane **accelerates decarbonization**.

- Decarbonization requires more cleaner energy options. The U.S. Department of Energy’s (DOE) Office of Scientific and Technical Information [says](#) that large emissions reductions are achievable through a broad range of opportunities, including the use of low- or zero-carbon alternatives.
- The electric grid isn’t always the cleanest answer. [Currently](#), propane-fueled medium- and heavy-duty vehicles provide a lower carbon footprint solution in 38 U.S. states when compared to medium- and heavy-duty EVs charged from the electrical grid.
- Propane is innovating everyday. It is, in fact, the [new diesel](#). [Six](#) propane-related projects were part of DOE’s 2020 \$139 million effort to advance innovative vehicle technologies.
- [Ocean-going](#) cargo ships need to reduce sulfur emissions by more than 80%. Propane is replacing heavy carbon fuels because it meets all current global emissions standards today.
- [Propane](#) makes ultra-efficient Combined Heat and Power (CHP) technology possible. CHP is on-site generation capable of providing reliable electricity. Unlike centralized electrical generation plants that operate at only 33% efficiency, CHP systems capture heat and achieve total system efficiencies of 60-80% for producing electricity and useful thermal energy. Some systems achieve efficiencies approaching 90%.
- [Solar](#) and wind have improved greatly but can’t improve much more. The physics boundary for silicon photovoltaic cells, the Shockley-Queisser Limit, is a maximum conversion of 34% of photons into electrons; the best commercial PV technology today exceeds 26%. For wind turbines, the Betz Limit is a maximum capture of 60% of kinetic energy in moving air. Today’s commercial turbines achieve 45%.

PROPANE ENSURES EQUITY

Access to cleaner, **affordable** and renewable energy like propane **ensures equity** on the path to zero.

- [Urban](#) and rural low-income households, especially African American and Latinx households, spend roughly three times as much of their income on energy costs as non-low-income households. [In](#) February 2021, EIA reported that electricity was 68% more expensive per million BTUs than propane.
- [Energy](#) should be affordable, so that no one has to go without, but the share of income that low-income households spent on electricity rose by 1/3 in the last decade.
- [Everyone](#) should have access to clean energy and home energy management tools, but utility programs that promote rooftop solar power, electric vehicles, and home energy storage are largely inaccessible to low-income households.
- [Emission-free](#) renewable energy isn’t free. Net-metering gives solar customers a credit on their bill when their rooftop panels generate excess power and the utility buys back the power. The power is paid for by other non-solar customers, including low-income households.
- [Escalating](#) electricity prices are regressive—poorer people pay a higher proportion of their incomes heating and cooling their houses than do richer people.
- [Electrifying](#) everything will cost an estimated \$20-\$25 trillion dollars over the next 20 years.
- [At least](#) 100 pounds of materials are mined, moved and processed for every pound of battery fabricated and [Amnesty](#) International has reported on the prevalent use of child labor in mining of materials like cobalt and lithium.

IT'S BETTER WITH PROPANE

- **It's better than grid electricity** – because [more than 60%](#) of energy used for electricity generation is lost in conversion and [nearly 25%](#) of grid electricity comes from coal. Propane has a great [source-site ratio](#) of 1.01, compared to 2.80 for electricity from the grid. Almost no energy is lost as it travels from tank to application.
- **It's better than natural gas** – because propane is methane-free. Over a 20-year period, one ton of methane has a global warming potential that is [84 to 87 times](#) more than CO2.

It's better than liquid fuels – because it vaporizes when exposed to air. It won't harm soil, drinking water or marine ecosystems and is not reactive in the air.

[Versus](#) gasoline, propane autogas-powered vehicles significantly reduce emissions: 12% less CO2, 20% less NOx, 25% fewer greenhouse gases and up to 60% less carbon monoxide. The numbers versus diesel are even better, plus propane emits virtually no particulate matter [PM 2.5].

- **It's WAY better than coal** – because it is [low carbon](#). That's why the U.S. Dept. of Energy classifies it as a clean alternative fuel.
- **And it's renewable** – because it is being [made today](#) by converting plant and vegetable oils, waste greases and animal fat into fuel, all of which are MUCH better than disposal.

PROPANE'S NET ZERO Q&A

Propane is a fossil fuel, so that's bad, right?

Fuels are not only clean or only dirty. Some are much cleaner than others, and it is to our overwhelming benefit to use cleaner fuels wisely while quickly phasing out the use of heavy carbon energy sources like coal.

All-electrification is the only way to save the planet from climate change.

What if we could decarbonize faster than all-electrification? Wouldn't that be better? We can. Dense applications like medium-duty or heavy-duty transportation where range and payload matter, water heating and grain drying are a few examples where the inefficiency of electricity actually harms the environment more than it helps.

Shouldn't we all switch to electric cars?

EVs are going to play an important role in decarbonization, and they should. The entire transportation sector is the [largest](#) source of emissions in the U.S., so vehicles need to be doing their part.

You might be surprised to know, however, that about 50% of the lifetime carbon-dioxide emissions from an EV come from the energy used to produce the car, especially in the mining and processing of raw materials needed for the battery.

It would be easy to switch to all-electrification. We should do it right away.

To electrify everything, EV production would have to increase by 4X within three to five years, battery production by 16X, wind turbine build/installs by 12X and solar modules by 10X their current production. All of this new load requires expanding the size of the grid by 3X to 4X at a cost of \$20-\$25 trillion.

You say propane is cleaner, but what does that mean?

What makes a fuel cleaner is the energy it takes to find it, produce it, transport it, store it, use it and dispose of what is left over. This is called the "full fuel cycle." It adds a lot of complexity to the decarbonization conversation, but it all has to be considered in order for the solutions to be effective.

Anything else?

Renewable propane! It's not a fossil fuel. It's made from plant and vegetable oils, waste greases and animal fat.

And we're innovating everyday. We can now blend renewable propane with another gas called DME. It's a great energy for heavy-duty engines and when used, it actually takes carbon out of the air.

Interested to learn more? Check out the Fast Facts at <https://propane.com/environment/>