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Understanding Carbon Intensity

UNPACKING THE HIDDEN EMISSIONS IN THE GENERATION OF RESIDENTIAL ENERGY

As the national conversation around clean energy continues to intensify, full electrification of residential homes, appliances, and vehicles is frequently cited as a way for end users to cut emissions. But this strategy fails to account for the carbon emissions that are produced in the generation and distribution of electricity. Measuring a fuel's carbon intensity helps to capture emissions across the full life cycle of an energy carrier — and reveals the truth that conventional propane is often a cleaner residential energy choice than grid electricity.

Carbon intensity is the total carbon emissions (or total carbon footprint) embodied in an energy carrier such as propane or electricity right from the source to the point of use. For example, propane's carbon intensity would include the total carbon dioxide emissions from the production, transport, storage, and combustion of propane. Electricity's carbon intensity includes the total carbon dioxide emissions from extracting resources (such as coal, natural gas, materials for solar panels and wind turbines, etc.), generation of electricity, transmission and distribution of electricity, and end use of electricity. The units for carbon intensity are typically expressed in kg/mmBTU (million BTU) or grams/Megajoule.

79 g/MJ

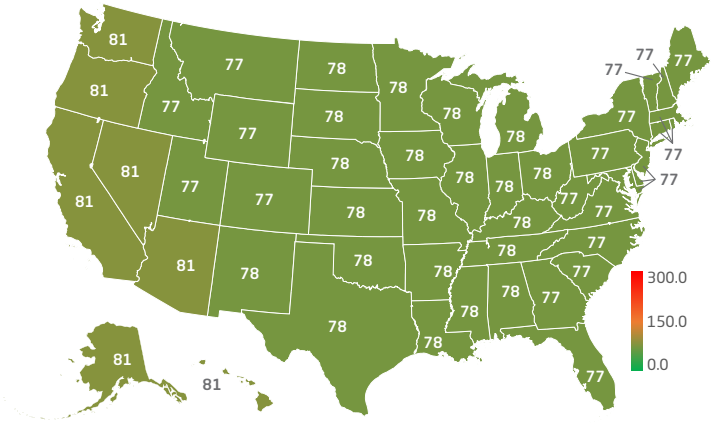
Carbon intensity of **conventional propane** for residential usage, national average

130 g/MJ

Carbon intensity of **grid electricity** for residential usage, national average

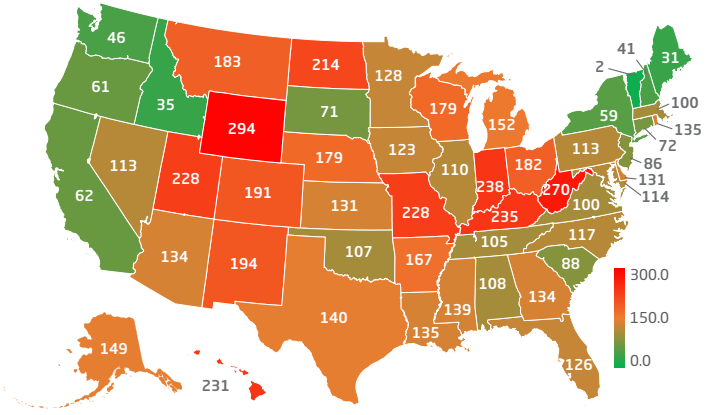
CONVENTIONAL PROPANE CARBON INTENSITY

(gCO2eq/MJ)



ELECTRIC GRID CARBON INTENSITY

(gCO2eq/MJ)



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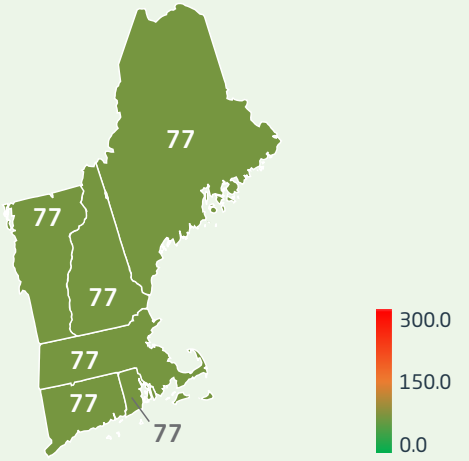
Carbon Intensity in New England

Electricity's carbon intensity includes the total carbon dioxide emissions from extracting resources (such as coal, natural gas, materials for solar panels and wind turbines, etc.), generation of electricity, transmission and distribution of electricity, and end use of electricity. The units for carbon intensity are typically expressed in kg/mmBTU (million BTU) or grams/Megajoule.

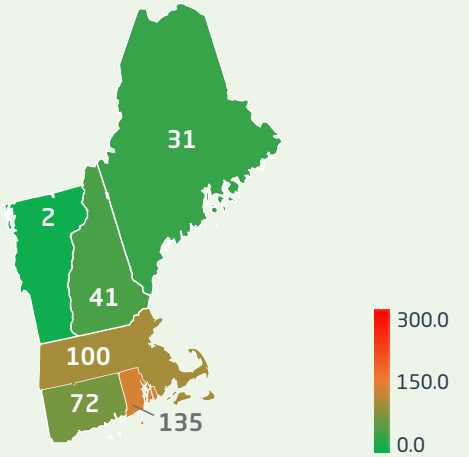
CONVENTIONAL PROPANE CARBON INTENSITY

(gCO2eq/MJ)



ELECTRIC GRID CARBON INTENSITY

(gCO2eq/MJ)



GHG FOOTPRINT OF ELECTRICITY

CONSIDER EVERY STEP OF THE PROCESS



Extraction

Electricity is not naturally occurring, so it must be produced using other resources like gas, coal, or nuclear.

approximately 9.9% CO2 eq emissions

Carbon intensity contribution:

13.6 g/MJ



Generation

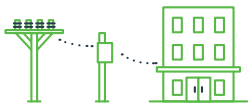
Power plant generates electricity.

Transformer steps up voltage for transmission.

approximately 75.6% CO2 eq emissions

Carbon intensity contribution:

110.8 g/MJ



Transmission & Distribution

The transmission lines carry electricity to transformers, which step down voltage. Electricity is delivered to the charging location.

approximately 4.5% CO2 eq emissions

Carbon intensity contribution:

5.2 g/MJ