Propane Education & Research Council

Delivering Resiliency and Building Decarbonization with Renewable Propane

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November 3rd, 2021
RG360 Webinar

ENERGY FOR EVERYONE
propane

Base Line Agreements

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

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

Propane Provides Clean Energy for Today and Tomorrow

More Propane Use Today Makes a Positive Climate Impact

Propane Helps Users Economically Meet Reduced Emissions Goals

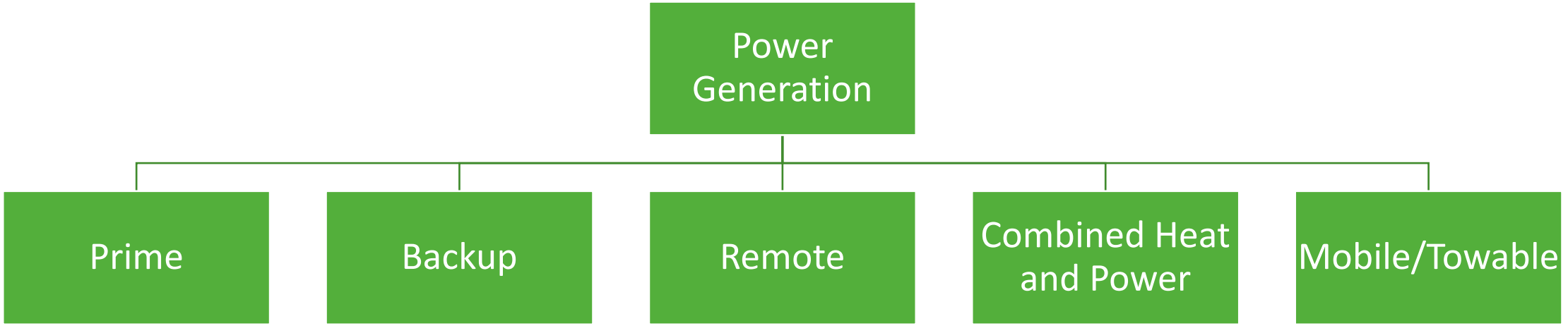
Propane Works Together with Other Renewable and Clean Energy Sources for Positive Environmental Impact


SOUTH
Sam Houston Tollway
NORTH 59 SOUTH
Downtown
Victoria
EXIT
ONLY

The Need for Reliable, Affordable Home Heating and Water Heating Continues to Grow

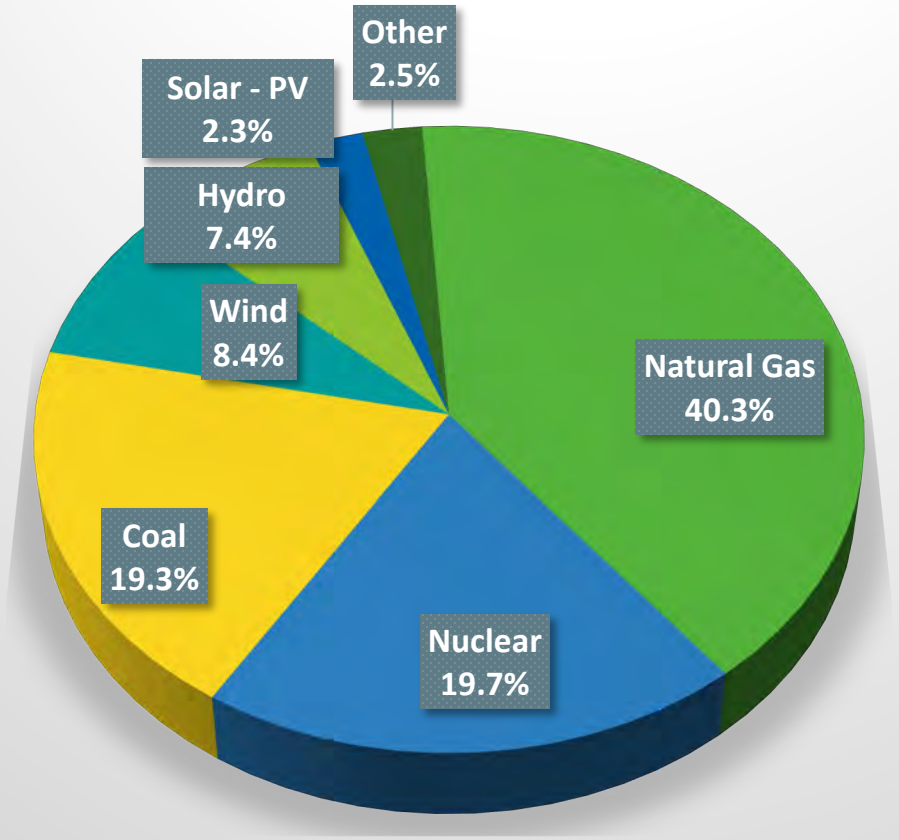
- Power outages can happen at any time and have the potential to cost American Households as much as $150 billion per year, according to data from the U.S. Department of Energy (DOE).
- The instability of the electric grid is driving a growing number of homeowners and businesses to incorporate backup power.

Power Generation Opportunities



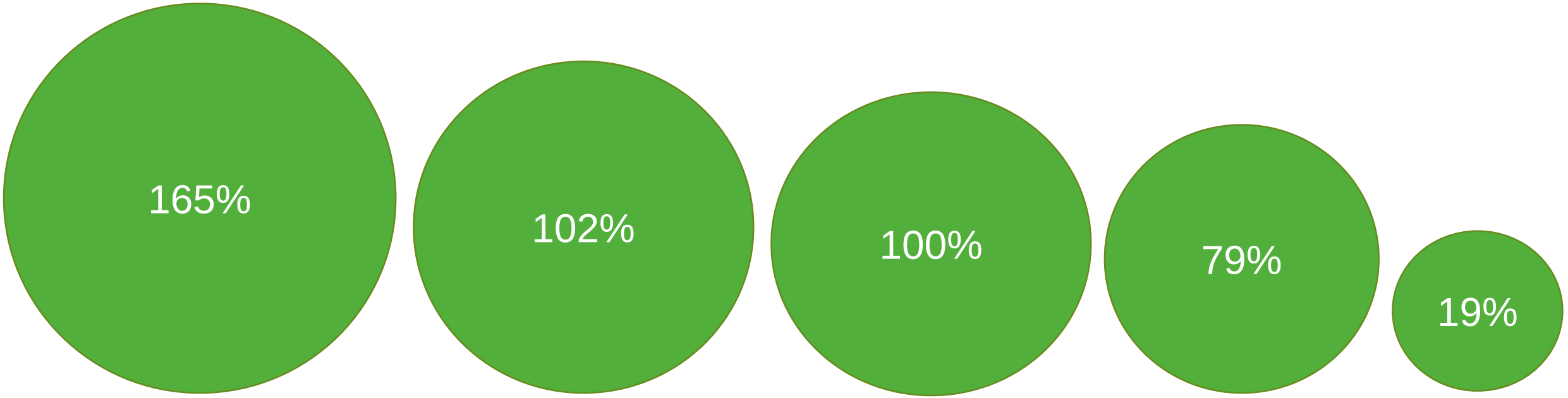
- Weaved into all of this are microgrids

U.S. Electricity Generation Fuel Shares – 2020



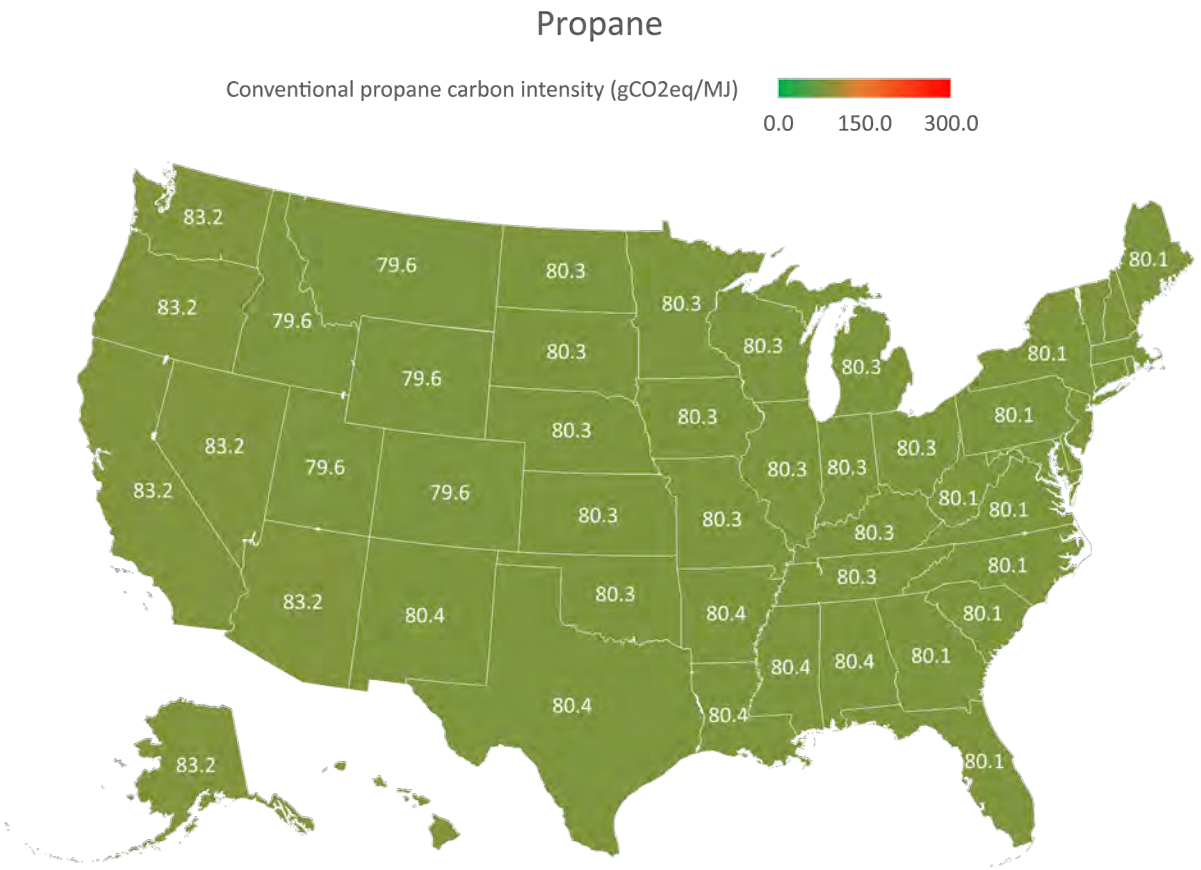
Source: Nuclear Energy Institute

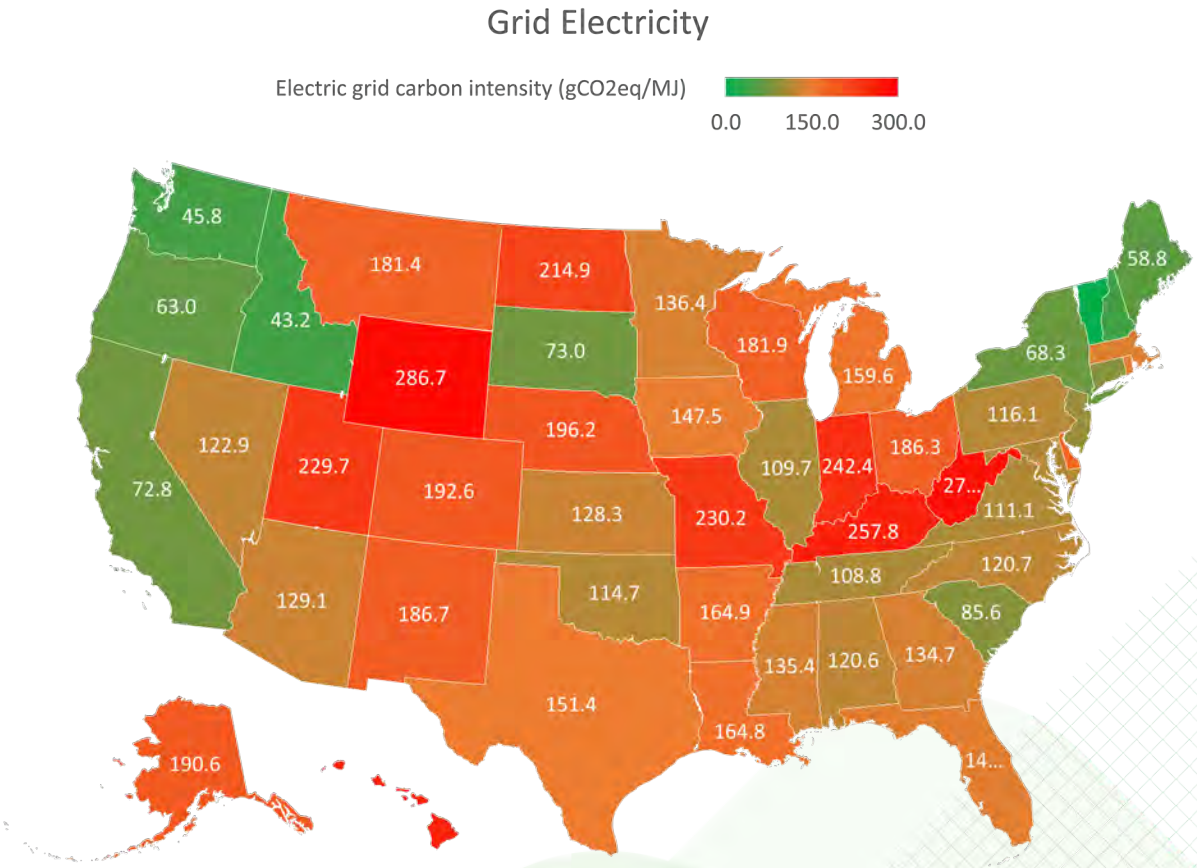
Carbon Intensity



Electricity | Conventional Diesel | Gasoline | Conventional Propane | Renewable Propane

Carbon Intensity Comparisons of “Fuel” ($gCO2_{eq}$/MJ) in Residential Use





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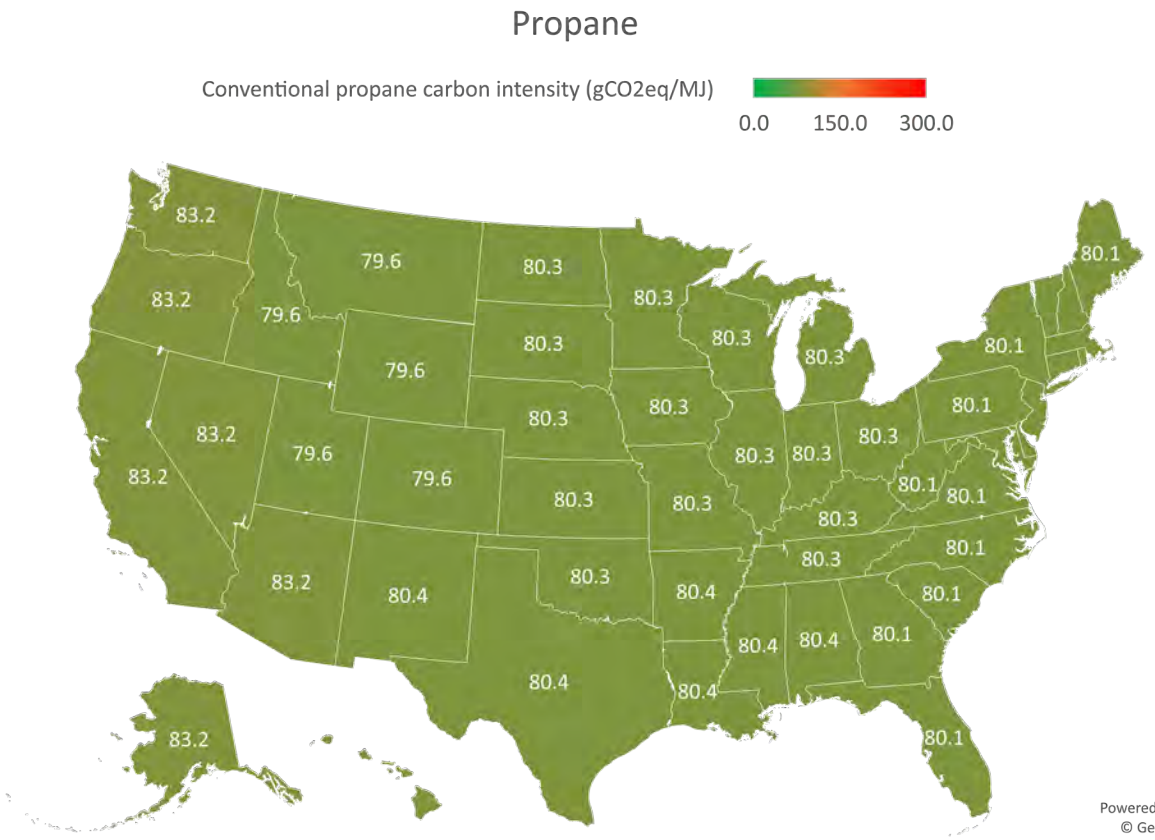
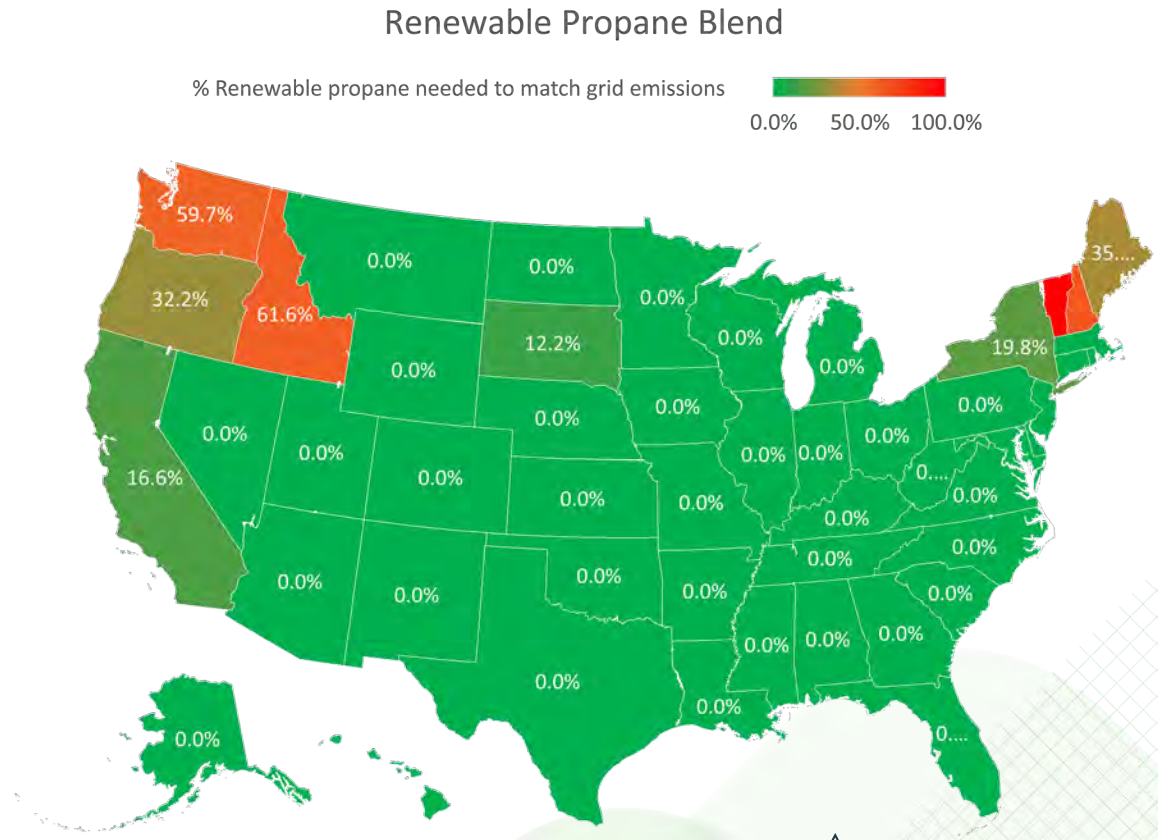
Percentage Blend of rP Required to Match Grid Emissions





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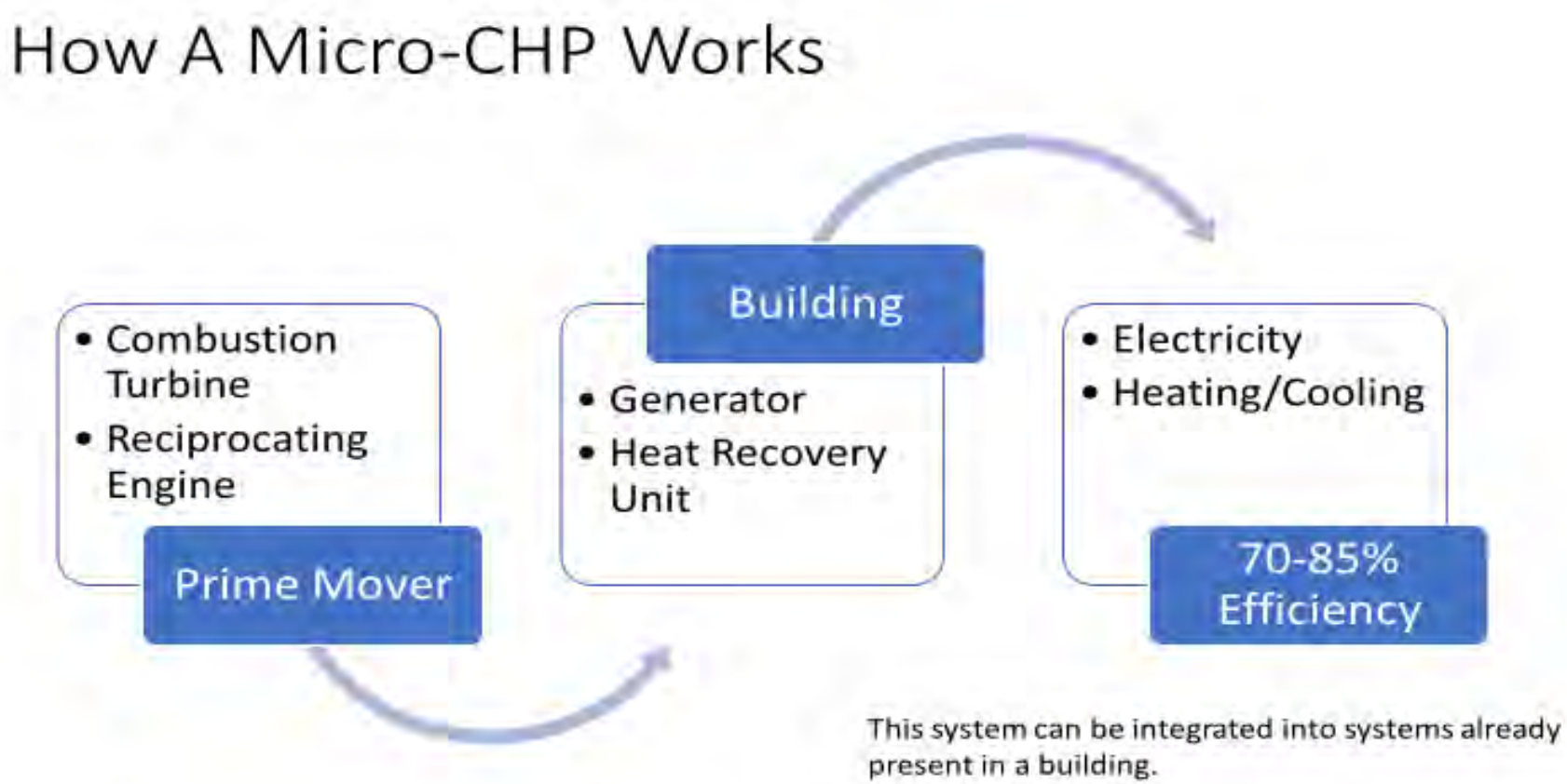
rP Gallons Needed to Match Grid CI Today

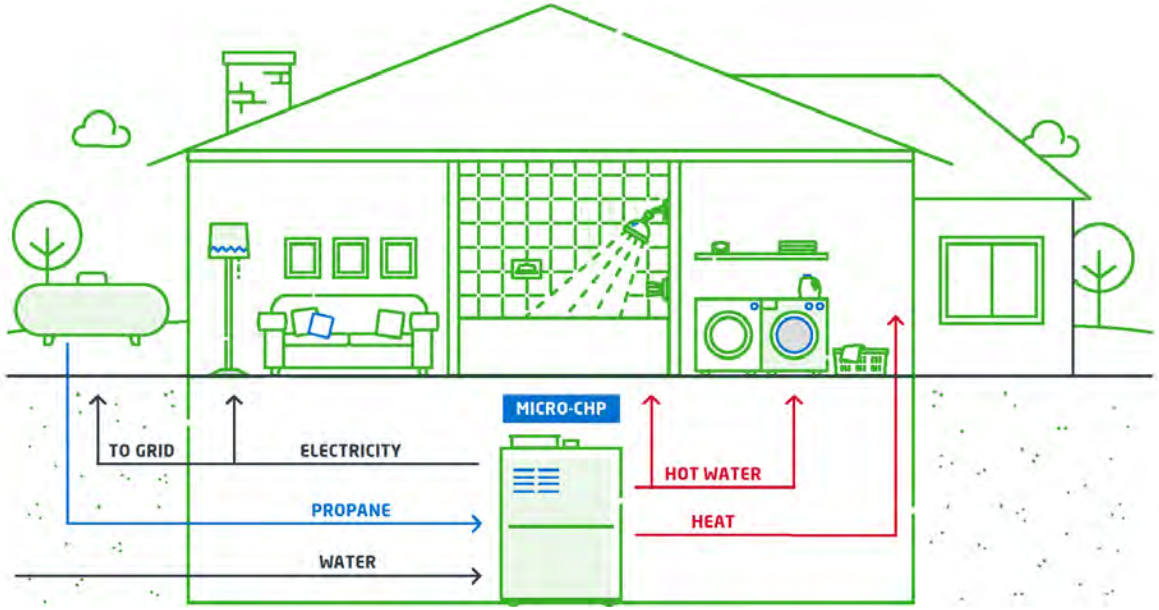
State	2019 Residential Gallons	% of rP needed	gallons of rP needed
ME	86,252,000	36%	30,791,964.00
NH	114,755,000	65%	74,590,750.00
VT	76,434,000	100%	76,434,000.00
NY	301,025,000	20%	59,602,950.00
SD	62,611,000	12%	7,638,542.00
ID	56,889,000	62%	35,043,624.00
CA	246,745,000	17%	40,959,670.00
OR	32,780,000	32%	10,555,160.00
WA	109,730,000	60%	65,508,810.00
			401,125,470.00

Precision Energy

What is CHP?


How A Micro-CHP Works
• Combustion Turbine
• Reciprocating Engine
Prime Mover
Building
• Generator
• Heat Recovery Unit
• Electricity
• Heating/Cooling
70-85% Efficiency
This system can be integrated into systems already present in a building.

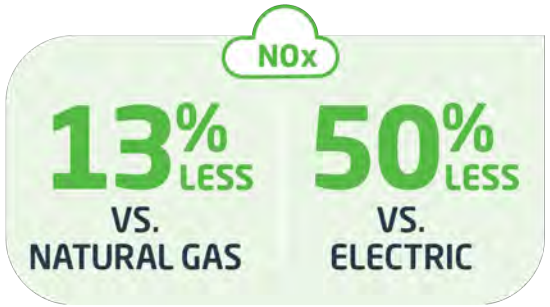
Reliable Energy for Homes and Businesses



- Propane-powered CHP units use a generator to produce electricity, capturing heat that warms the air and water.
- The result is reduced energy expenditures, eliminating efficiency losses between power plants and buildings, leading to a lower carbon footprint — an environmentally friendly, affordable and reliable energy source that won't go down with the electric grid.

Eliminate Efficiency Losses and Lead to a Smaller Carbon Footprint

COMMERCIAL MICRO-CHP



Propane-powered CHP and micro-CHP units far outpace the efficiency and emissions of traditional heating or water heating systems, surpassing energy savings from even the most efficient boilers.

Micro-CHP Partners

1-3 kW

- Aisin

3-10 kW

- Axiom Energy
- Enviro Power
- Others in testing

10-50 kW

- Lochinvar

50 kW - 1 MW

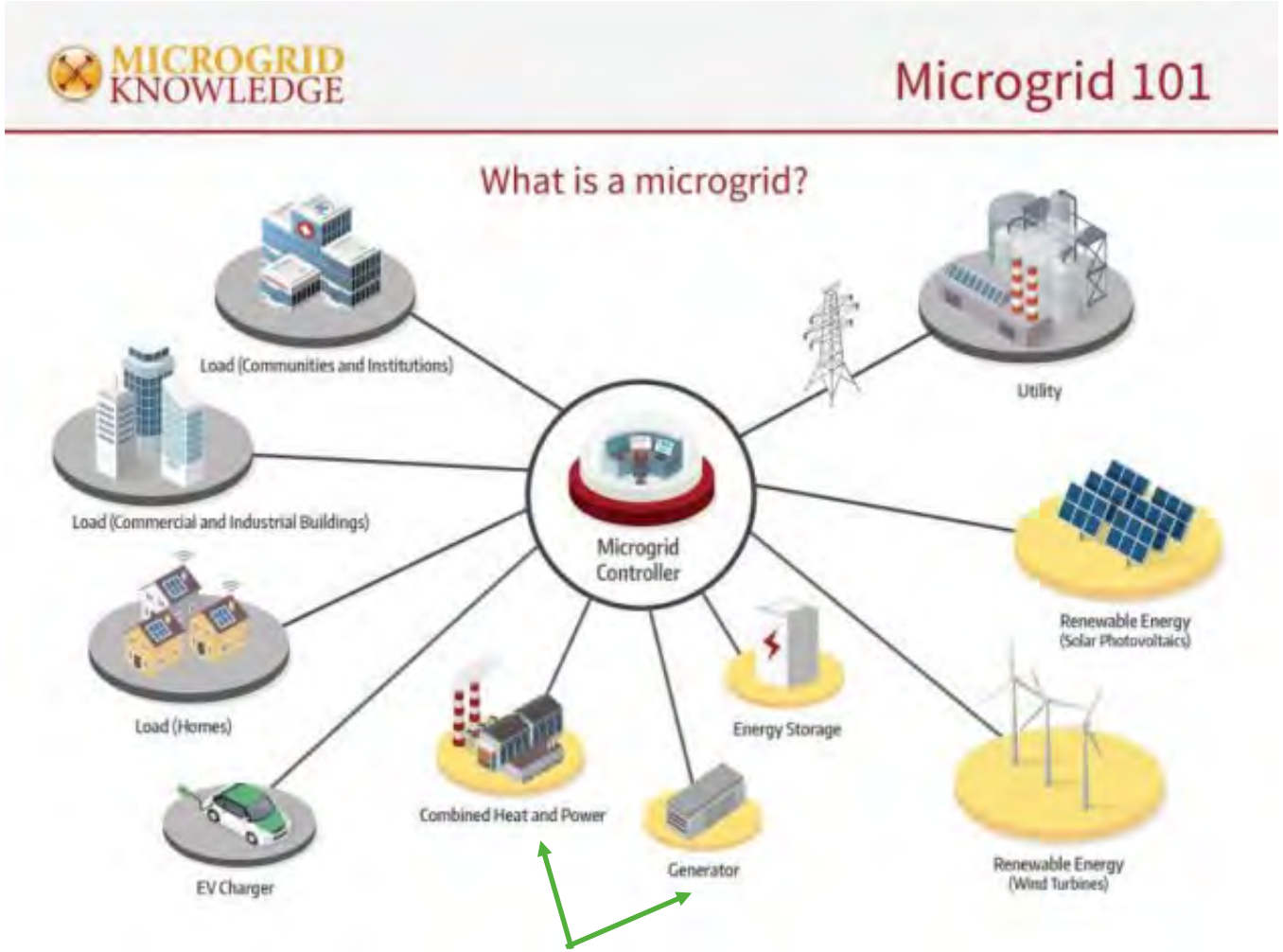
- Capstone

Micro-CHP

Large CHP

Residential | Light Commercial | Commercial | Industrial

What is a Microgrid?



- Microgrid is an independent energy delivery system serving an isolated area such as a college campus, business center, or community housing.
- Distributed energy resources (DERs) and may or may not be grid connected.
- Grid connected microgrids that can disconnect from the grid and operate independently are referred to "islanded". These systems provide reliability and resiliency.
- A Combined Heat and Power (CHP) system can be qualified as a microgrid if it is able to island.

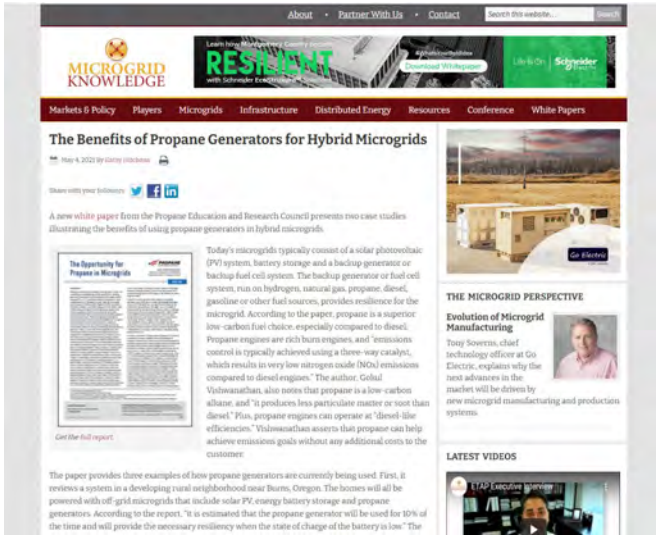
Source: https://microgridknowledge.com/microgrid-defined/

Examples of Existing Propane Microgrids

Image source: https://boxpower.io/boxpower-in-2020-annual-recap/

- Silvies Valley Ranch - Burns, OR: ~600 homes.
  - Solar PV, battery energy storage 30-70 kWh and propane generators
- Liberty utilities 97% renewable microgrid – Truckee, CA.
  - 20 kW solar PV, 68 kWh battery energy storage and Generac propane genset
  - Wildfire mitigation solution
- Kahauiki Village – Honolulu, HI.
  - Solar PV, battery backup (2.1 MWh) and propane generator (150 kW)
  - Propane generator to charge batteries when state of charge is low or during storms when demand charges are high

PERC's Whitepaper on Microgrids



- PERC published a white paper on the opportunity of propane for microgrids in Microgrid Knowledge, which is the leading publisher on microgrid news and articles.
- Whitepaper featured by Generac in their whitepaper library.
- Investigates the opportunity for propane in community and commercial microgrids in CA.
- Compares the economics and emissions benefits compared to diesel generators employed in microgrids.

Source: https://microgridknowledge.com/propane-generators-hybrid-microgrids/
https://www.generac.com/Industrial/professional-resources/news-whitepapers/whitepapers

“The Opportunity for Propane in Microgrids” Report

May 26, 2021

The quest for a more reliable, secure, and clean energy system is driving investment in microgrid technologies that can deliver superior reliability and resiliency than the nation’s aging and vulnerable grid.

Download here:

https://propane.com/2021/05/26/the-opportunity-for-propane-in-microgrids/