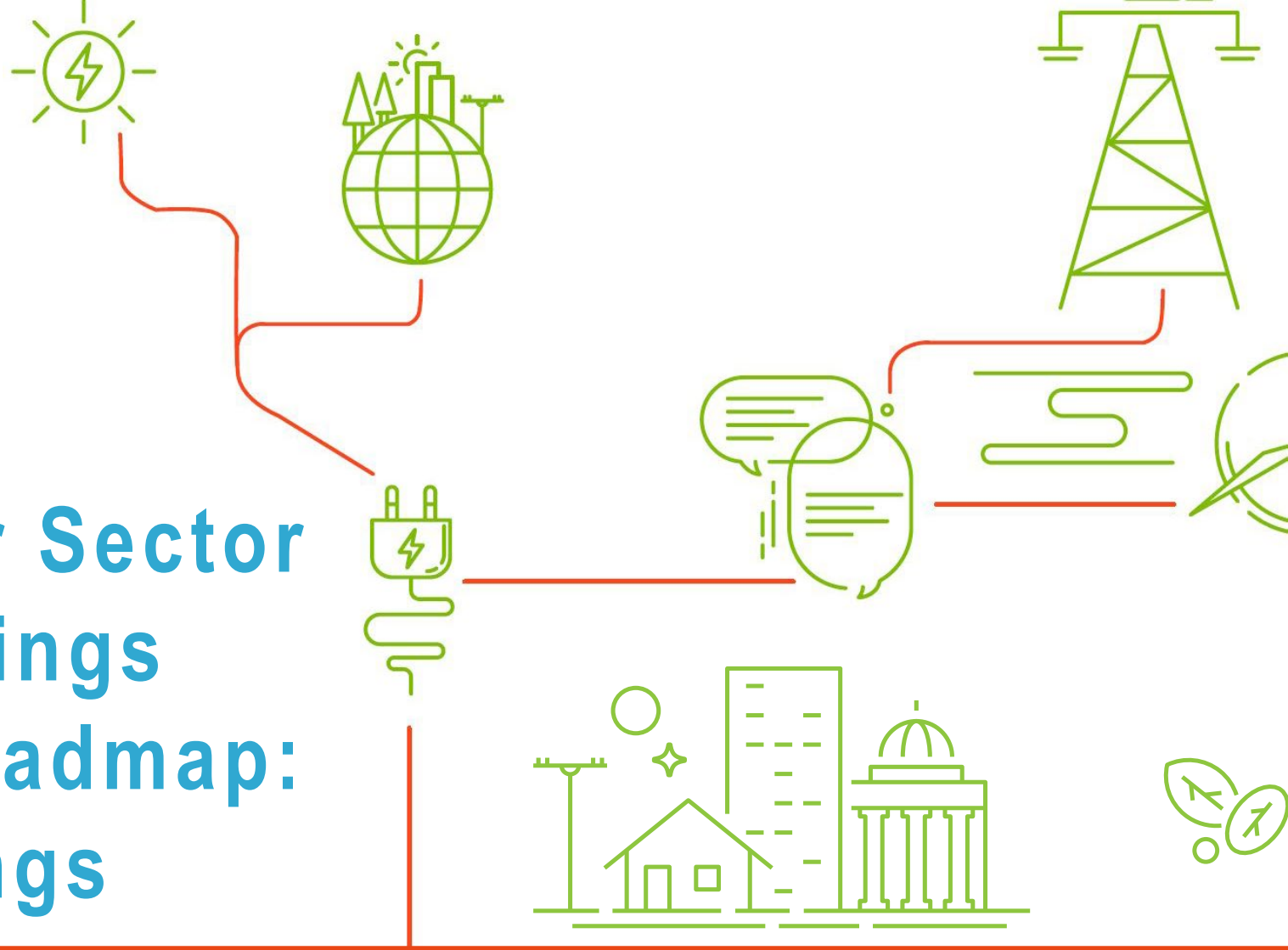


Midcontinent Power Sector Collaborative Buildings Decarbonization Roadmap: Analysis and Findings

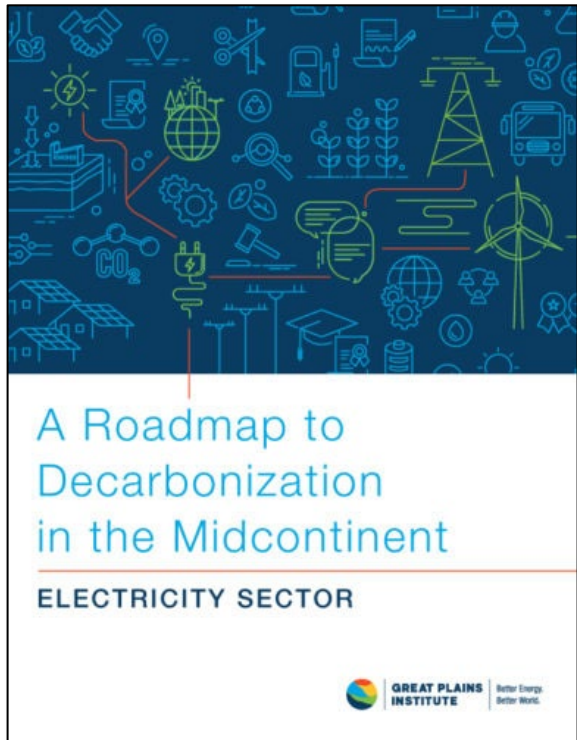
Jessi Wyatt

Great Plains Institute

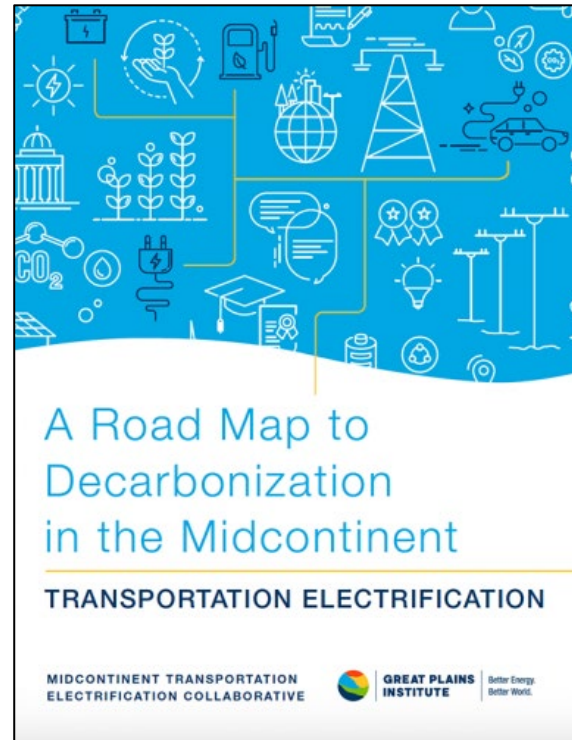


Roadmap to Decarbonization

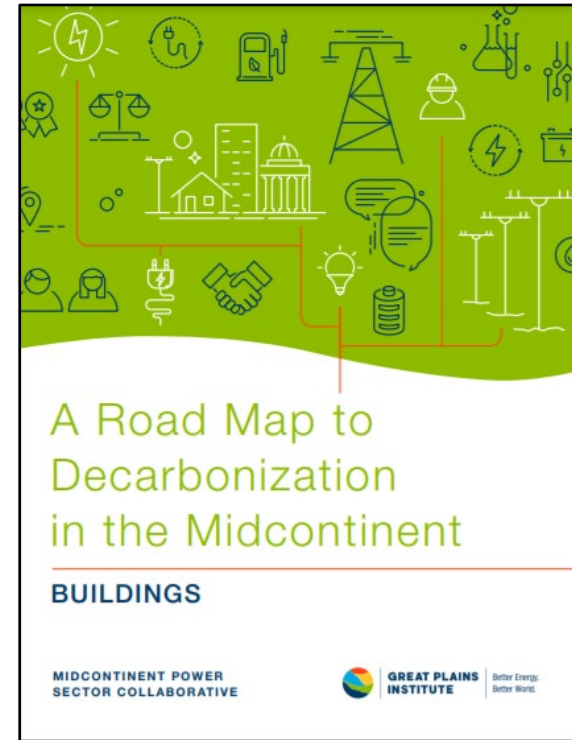
2018



2019



2021



Facilitated by Franz Litz, GPI

Available at:

roadmap.betterenergy.org



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Stakeholders

Alliant Energy

Center for Energy and Environment

Clean Wisconsin

Dairyland Power Cooperative

DTE Energy

Ecology Center

Energy

Madison Gas and Electric

Michigan Energy Innovation Business Council

Midwest Energy Efficiency Alliance

The Nature Conservancy

Union of Concerned Scientists

WEC Energy Group

Wolverine Power Cooperative

WPPI Energy

Xcel Energy

Also involved:

- *Michigan Department of Environmental Quality*
- *Consumers Center*

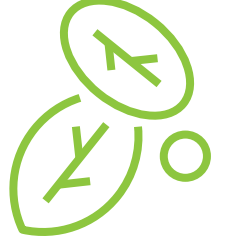
Available at:

roadmap.betterenergy.org/buildings



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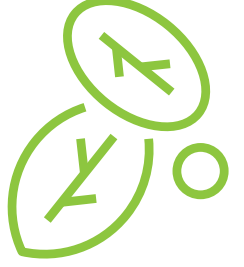
Strategies



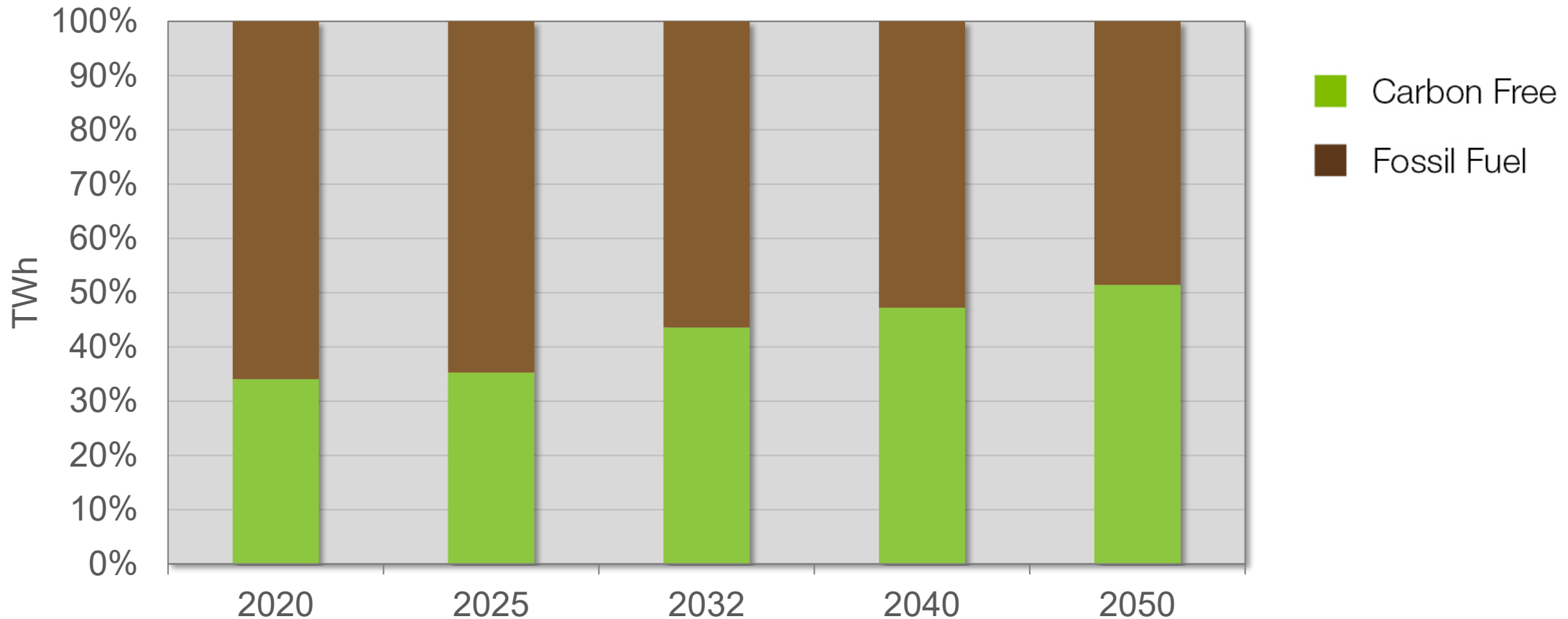
- **Energy Efficiency and Green Design in New and Existing Buildings**
- **Deployment of Alternatives to Fossil Fuels**
- **Advancing Heating and Cooling Technologies, specifically Heat Pumps**



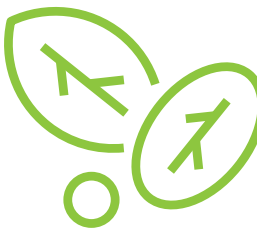
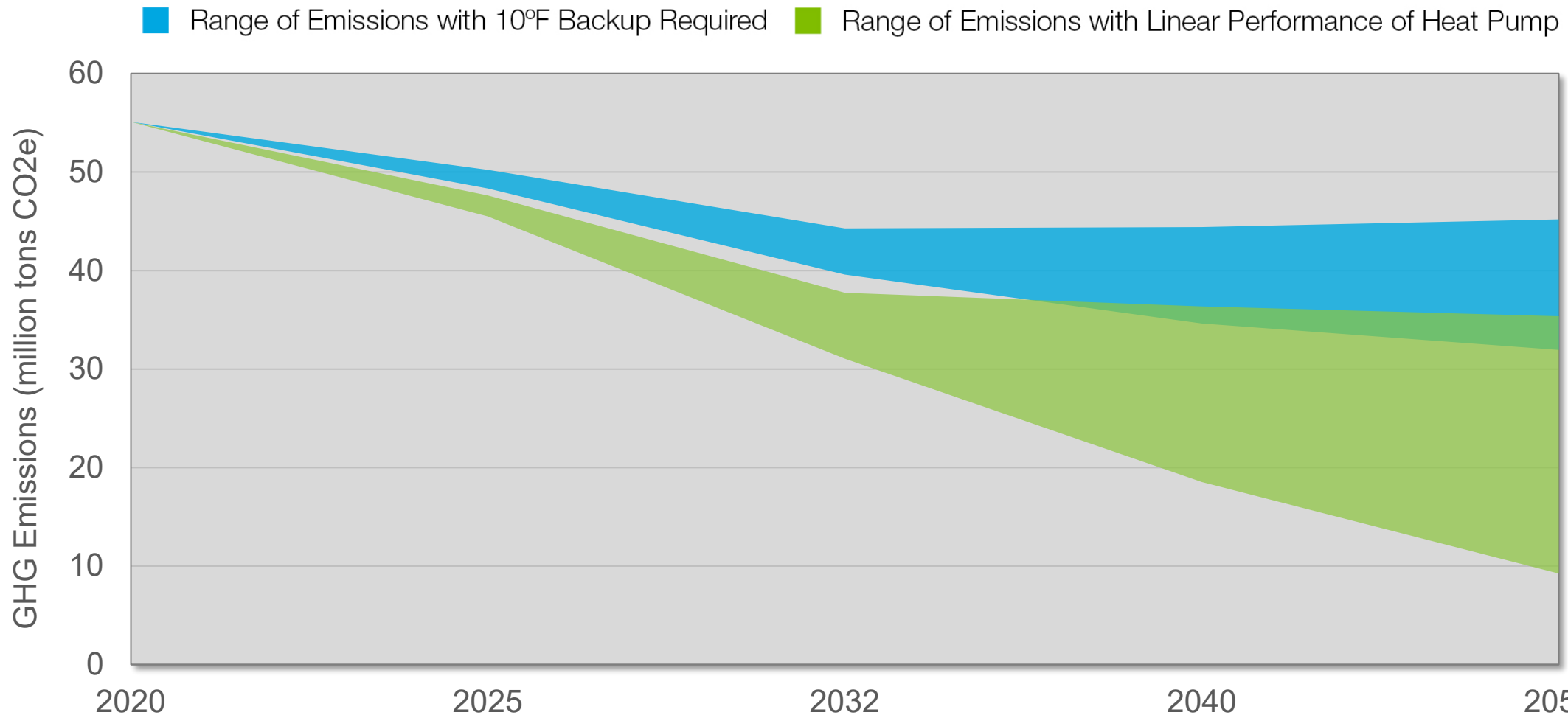
Share of Carbon-Free Electric Generation: Business-as-Usual Scenario



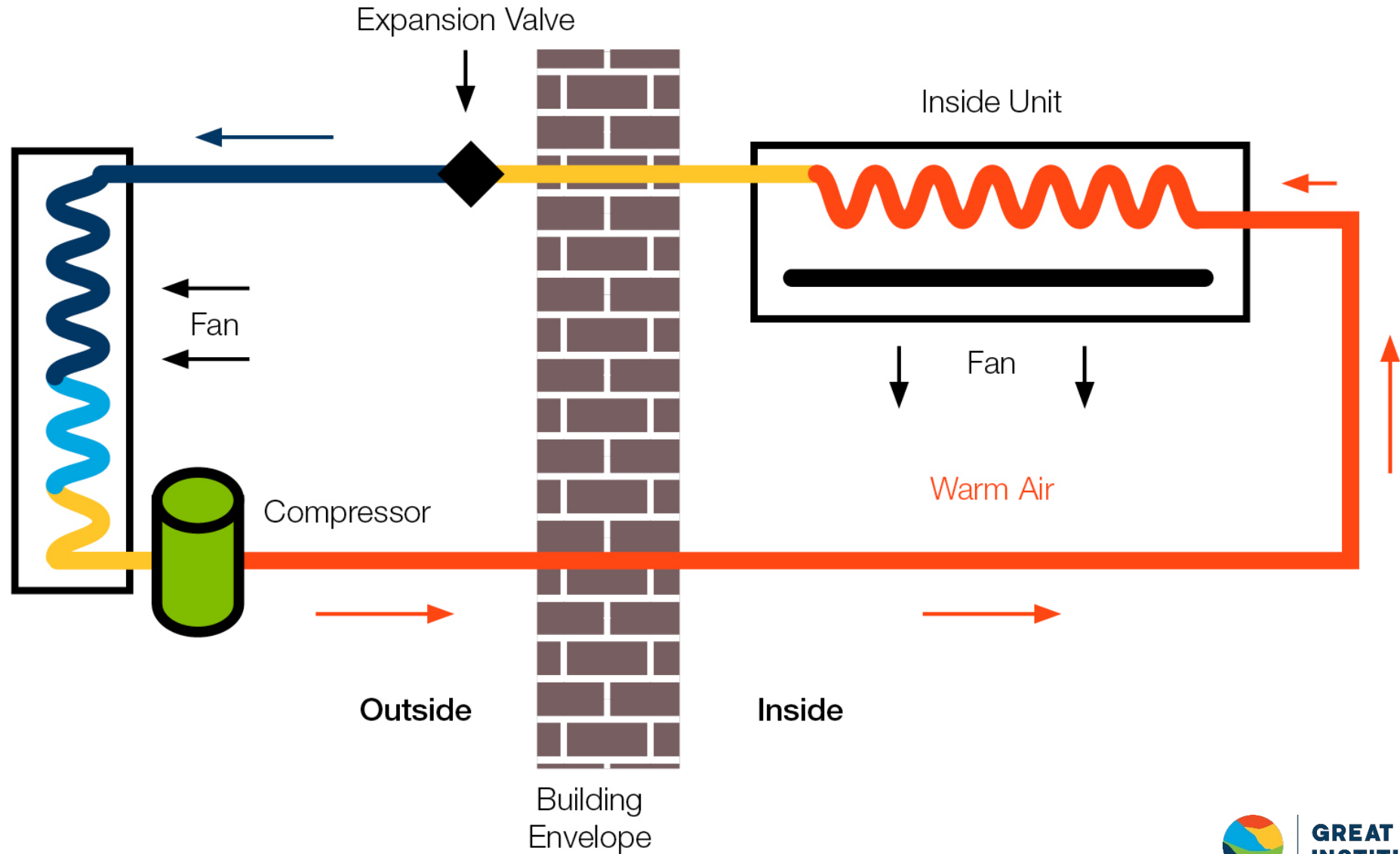
Market forces and existing incentives drive renewable, carbon-free generation to >50% by 2050



Residential Building Sector Emission Reductions Across Scenarios



Heat Pump Technology





Modeled Scenarios

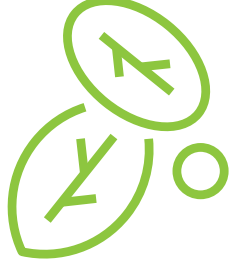
Midcontinent Power Sector Collaborative sought to understand what factors had greatest impact on reduction in building emissions and energy use.

The group explored:

- **Rapid Heat Pump Tech:** Rapid deployment of heat pump technology across the midcontinent
- **Linear Heat Pump Performance:** Linear heat pump technology (versus heat pump with back-up)
- **Low Investment Hurdle Rate:** Reduction of hurdle rate and barriers to technology adoption or building improvements
- **All Three:** A combination of all three levers



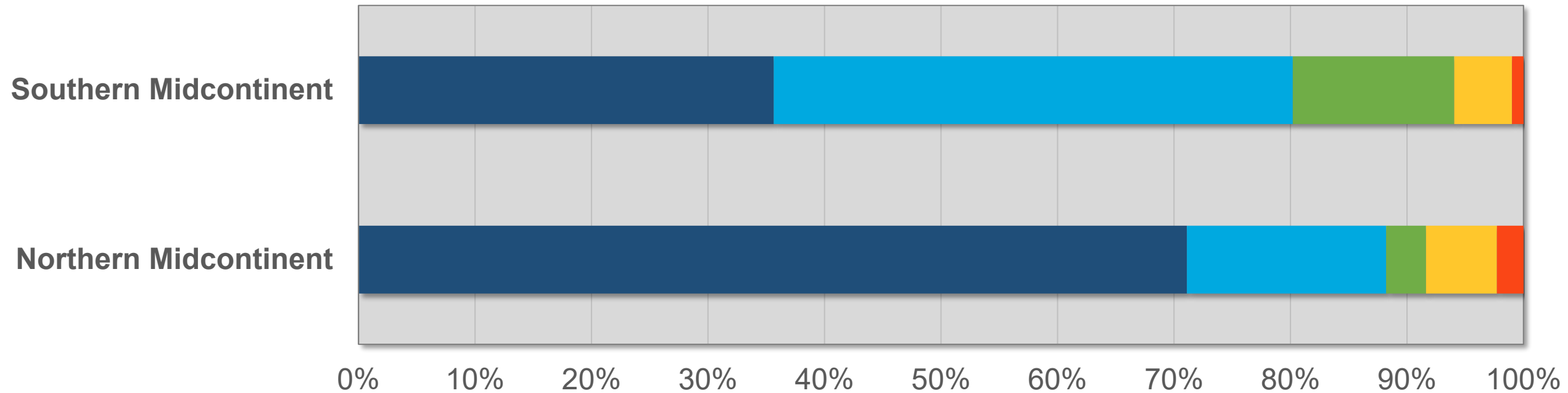
Heat Pump Technology



Heat pumps are already attractive in milder, Southern midcontinent region

Share of Household Heating Device Types

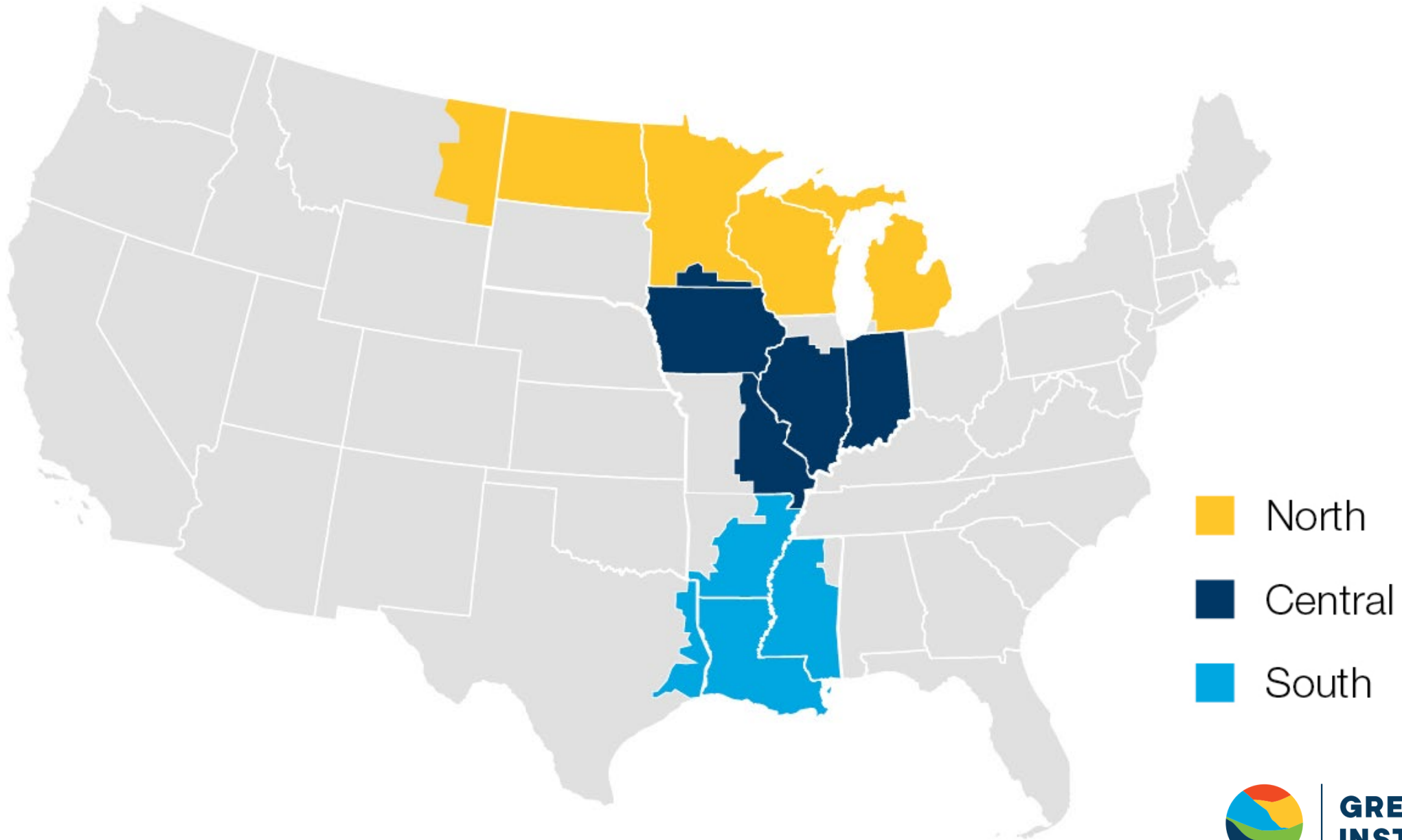
■ Natural gas ■ Electricity ■ Heat Pump ■ Propane ■ Wood



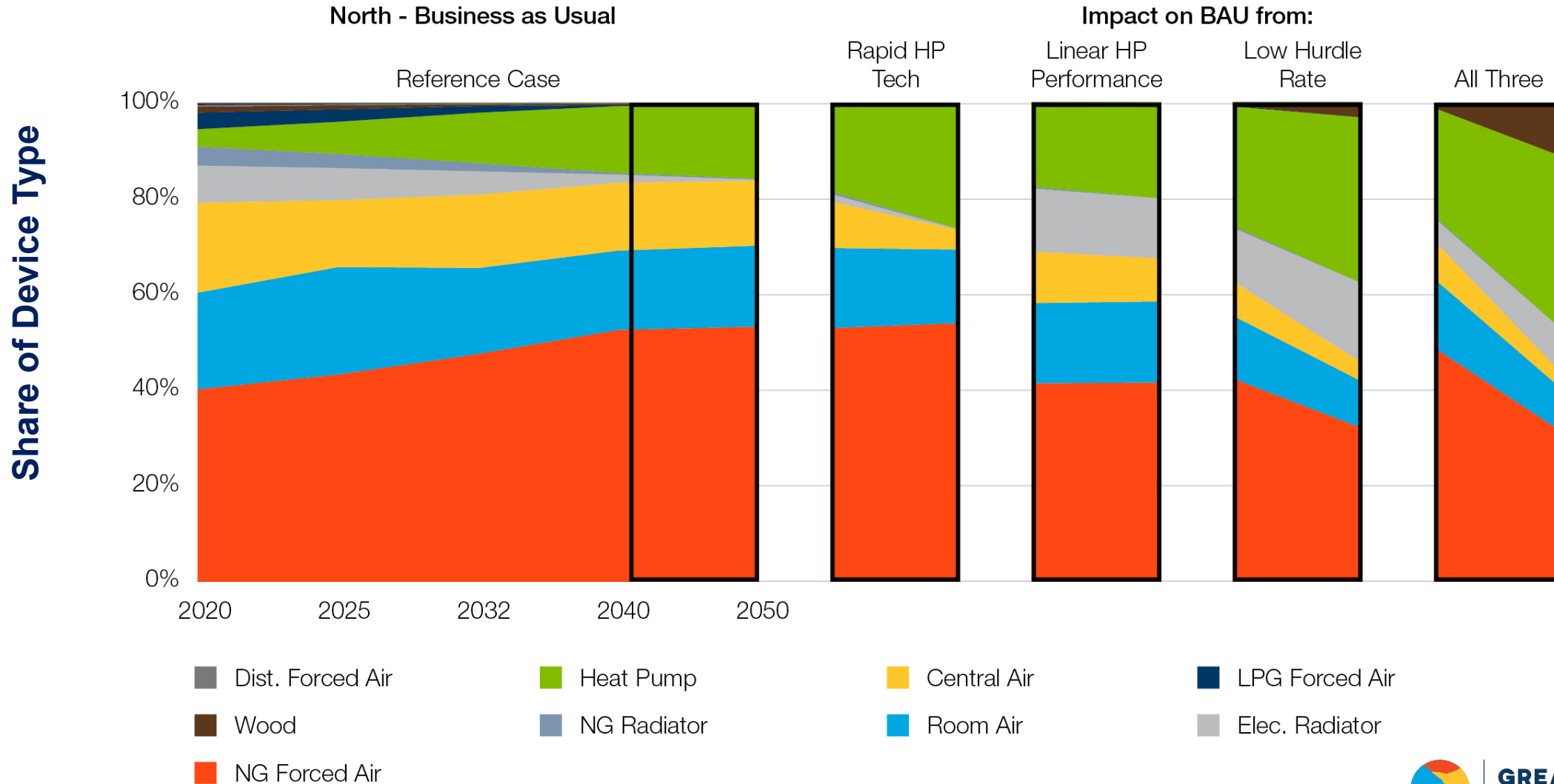
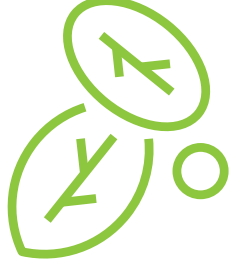
Source: Heat Pump Penetration in Northern and Southern Parts of Midcontinent According to 2018 American Housing Survey



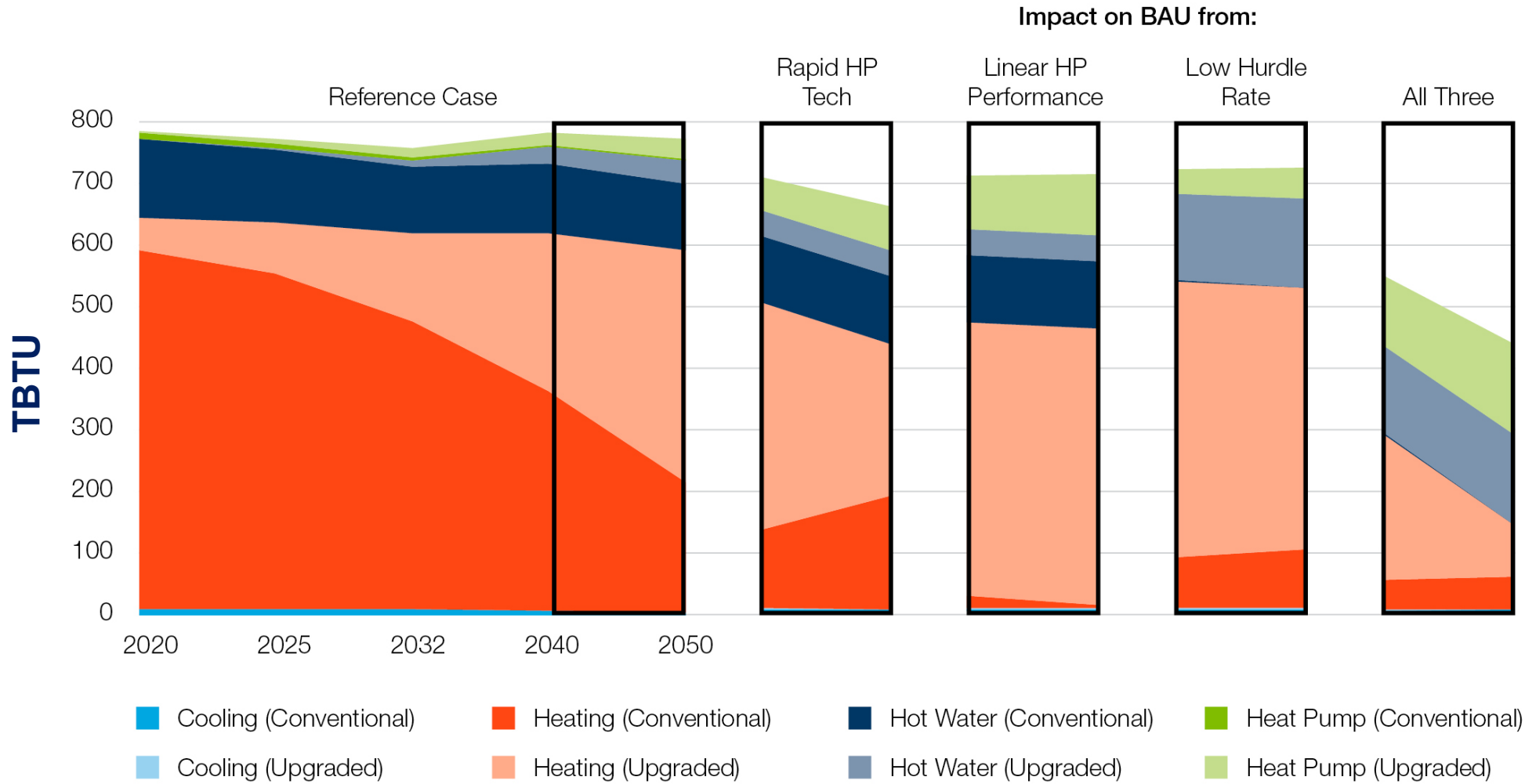
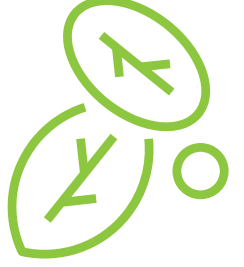
Midcontinent Regions within the MISO Territory



Heating Technology Use: Northern Region



Energy Consumption by End Use and Device Efficiency: Northern Region



Conclusion



Tremendous decarbonization opportunity through electric heat pumps



Energy efficiency is a no regrets strategy



Reducing barriers to heat pump adoption can significantly increase adoption

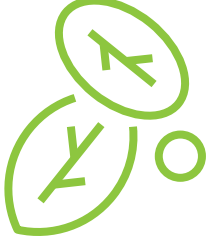


Necessary back-ups for heat pumps in cold climates can utilize alternative fuels



Emerging fuels, like hydrogen, SNG, RNG, will be crucial complements





Thank you!

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jwyatt@gpisd.net



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Better Energy.
Better World.