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solutions that transform

The Role of CO2 Infrastructure in Achieving US Economy-Wide Net-Zero Emissions

Derek Wissmiller, *PhD, Director of Energy Systems Modeling*

DOE CO2 Transport Workshop | 2/22/2023

Energy transitions will require development, deployment and adoption of **low-cost**, **low-carbon** energy **systems** at scale.

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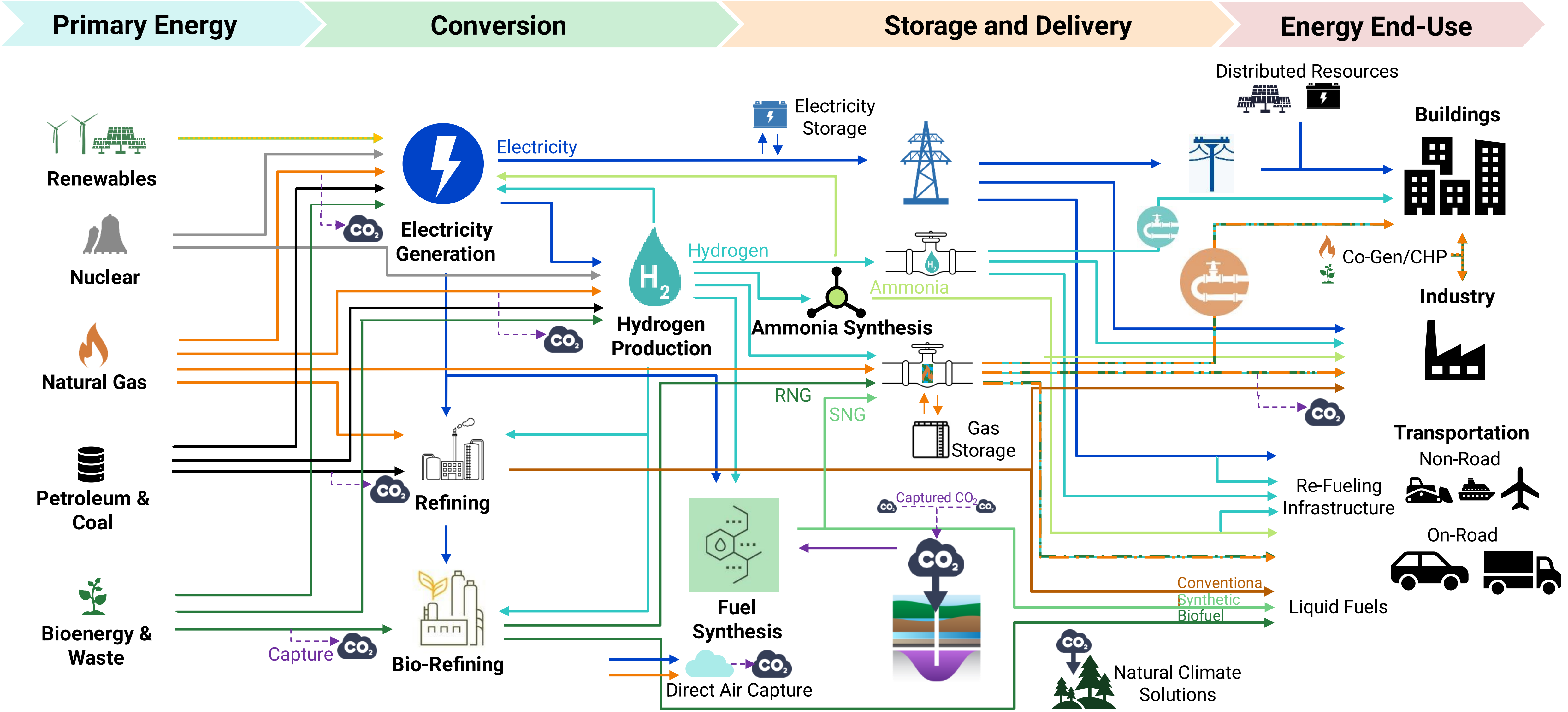
LOW-CARBON
RESOURCES INITIATIVE

Net-Zero 2050: U.S. Economy-Wide Deep Decarbonization Scenario Analysis

Report Available at:
lowcarbonlcri.com/netzero

Economy-Wide Net-Zero 2050 Analysis – Pathways



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Economy-Wide Net-Zero 2050 Analysis – Scenarios

LCRI LOW-CARBON RESOURCES INITIATIVE

	All Options	Higher Fuel Cost	Limited Options
Geologic Storage of CO_2	Lower Costs	Higher Costs	Not Available
Natural Gas Supply Costs	Lower Costs	Higher Costs	Lower Costs
Bioenergy Feedstock Supply	Full	Supply Limited	Supply Limited

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Economy-Wide Net-Zero 2050 Analysis – Scenarios

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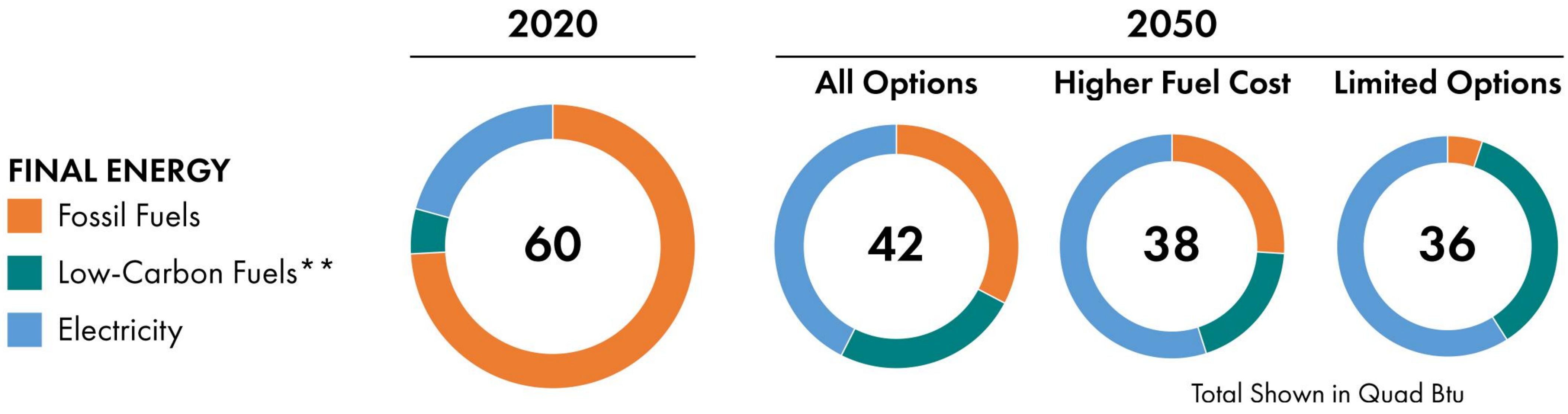
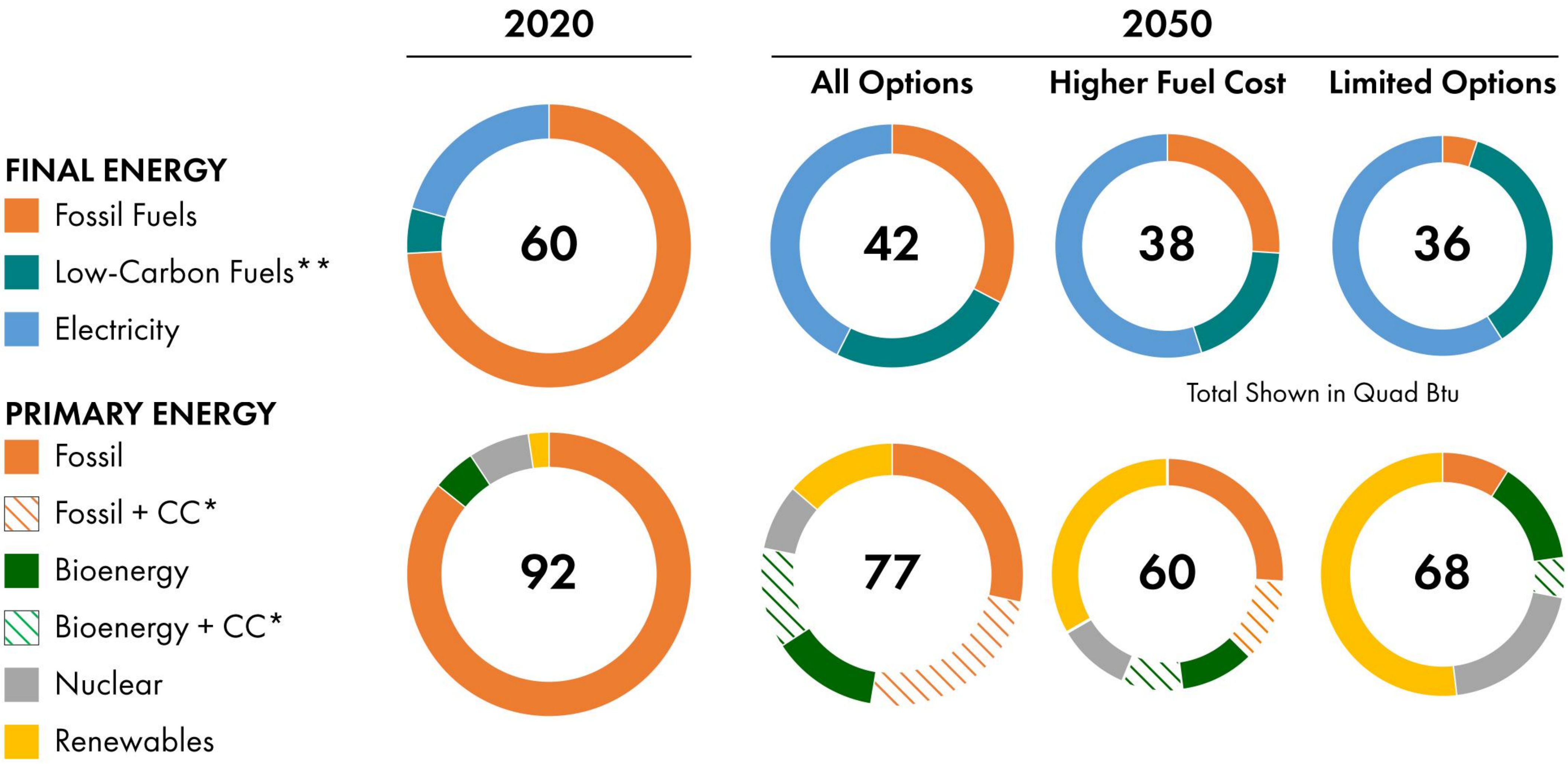
Primary and Final Energy in Net-Zero 2050 Scenarios



**Carbon capture, with storage or utilization*

***Low-carbon fuels include hydrogen, hydrogen-derived fuels (e.g., synthetic fuels and ammonia) and bioenergy.*

Primary and Final Energy in Net-Zero 2050 Scenarios



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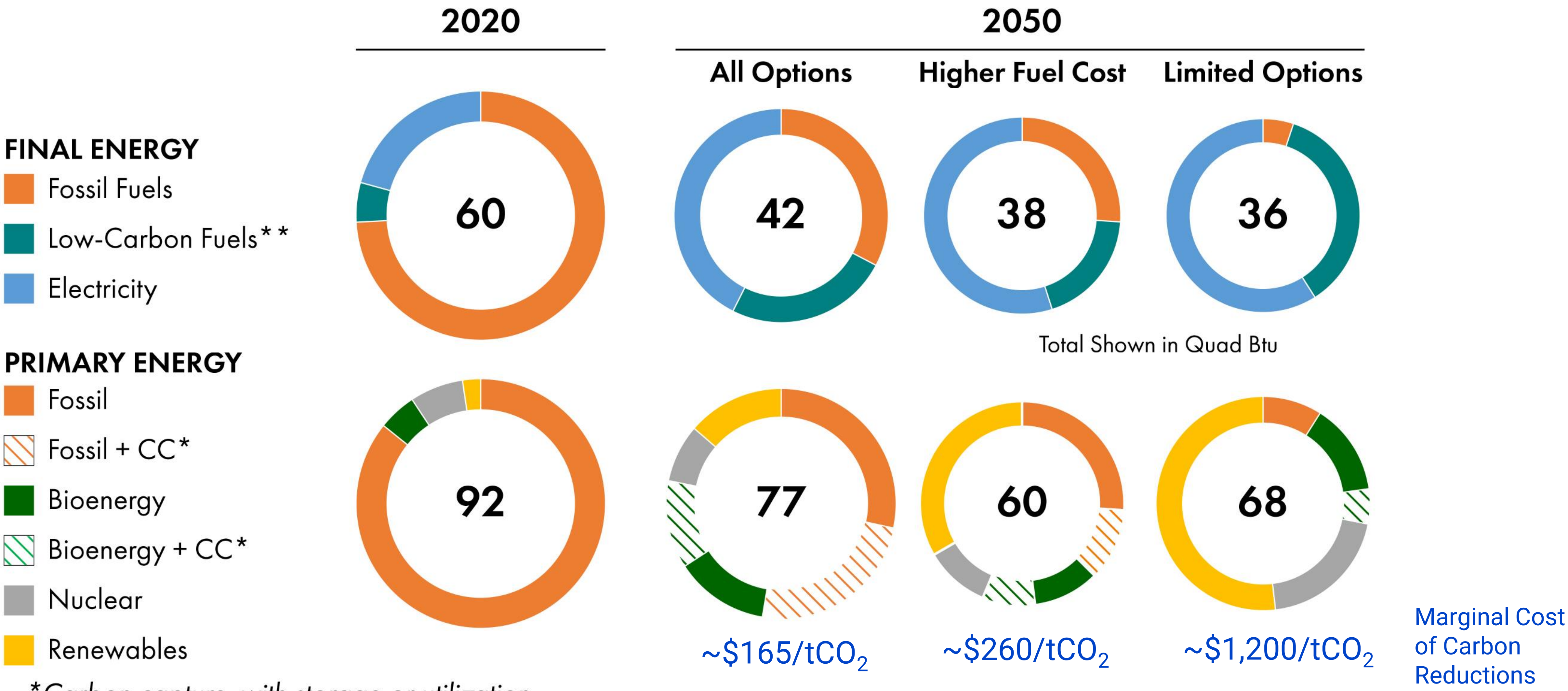

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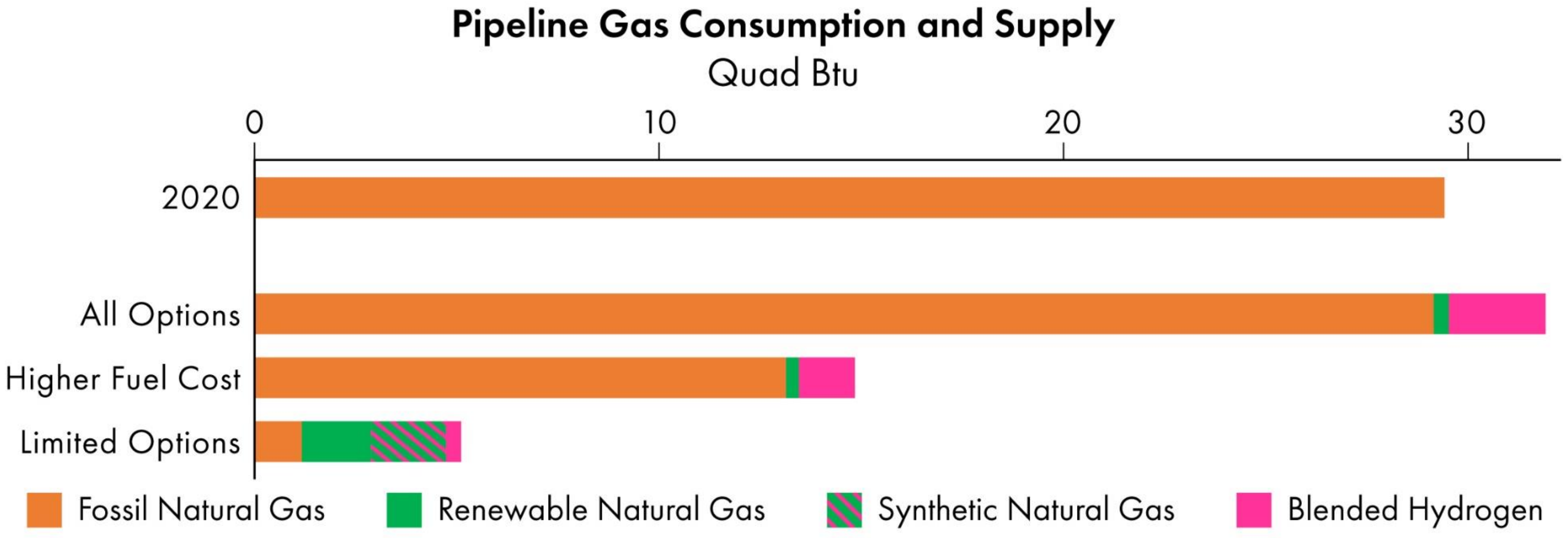
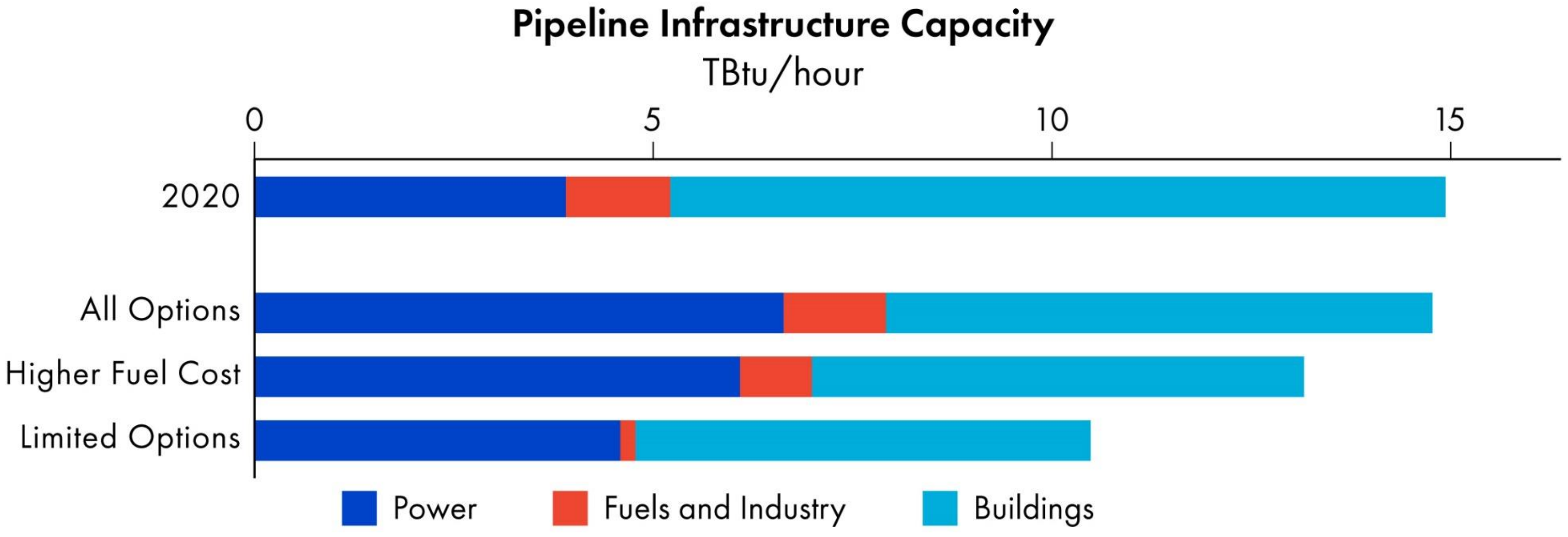
Pipeline Gas Supply and Infrastructure in Net-Zero Scenarios





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Carbon management in net-zero energy systems

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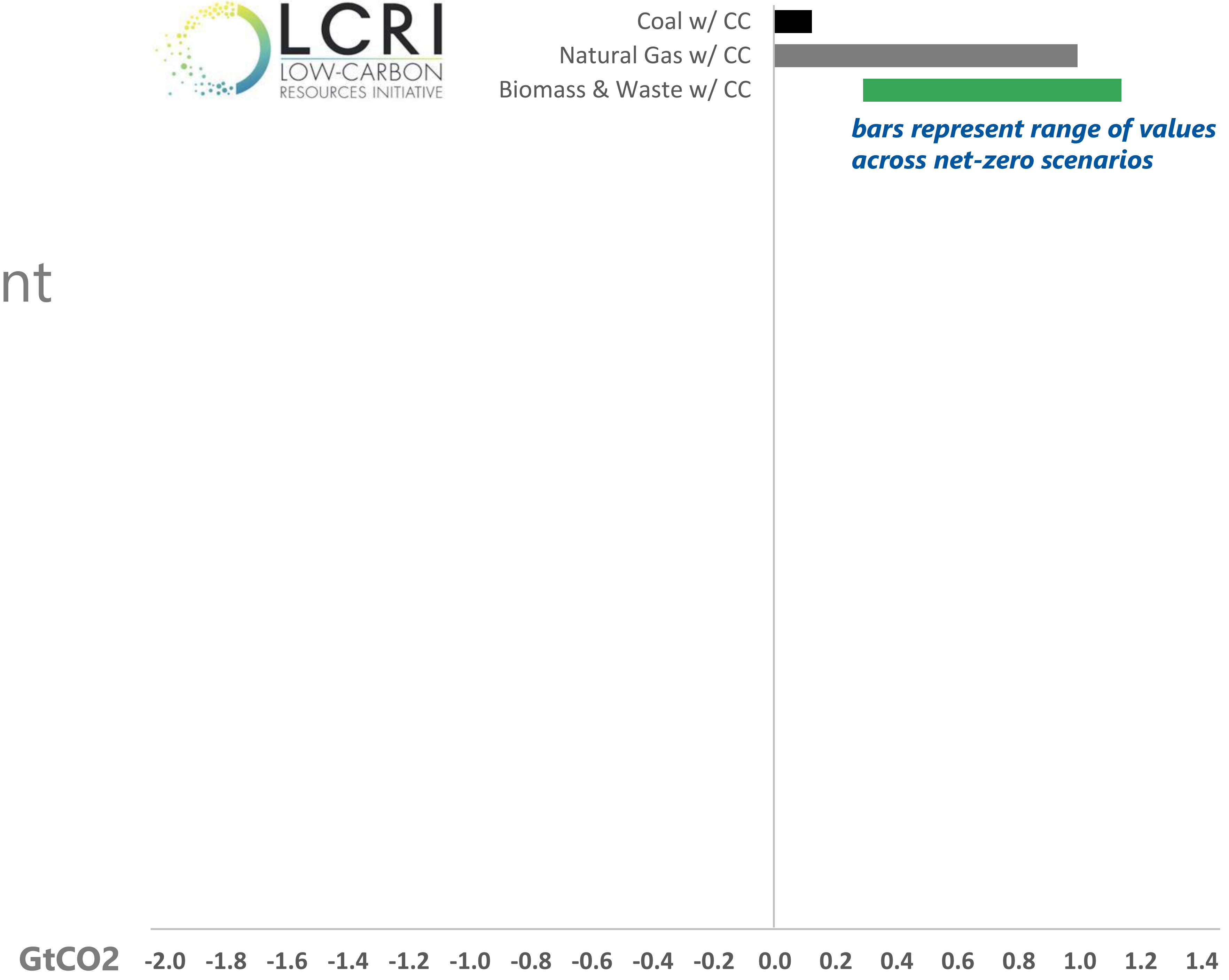
Carbon management in net-zero energy systems



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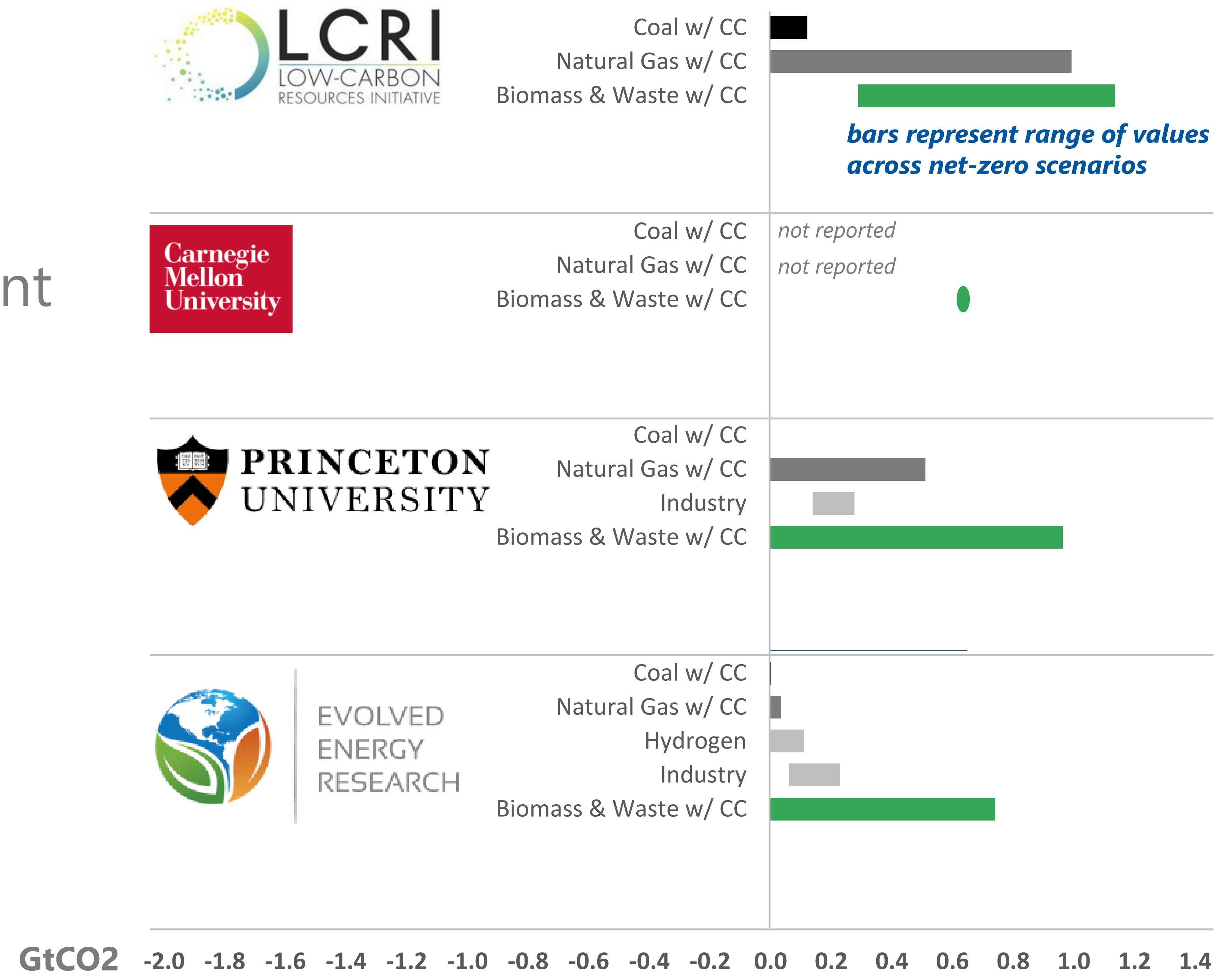

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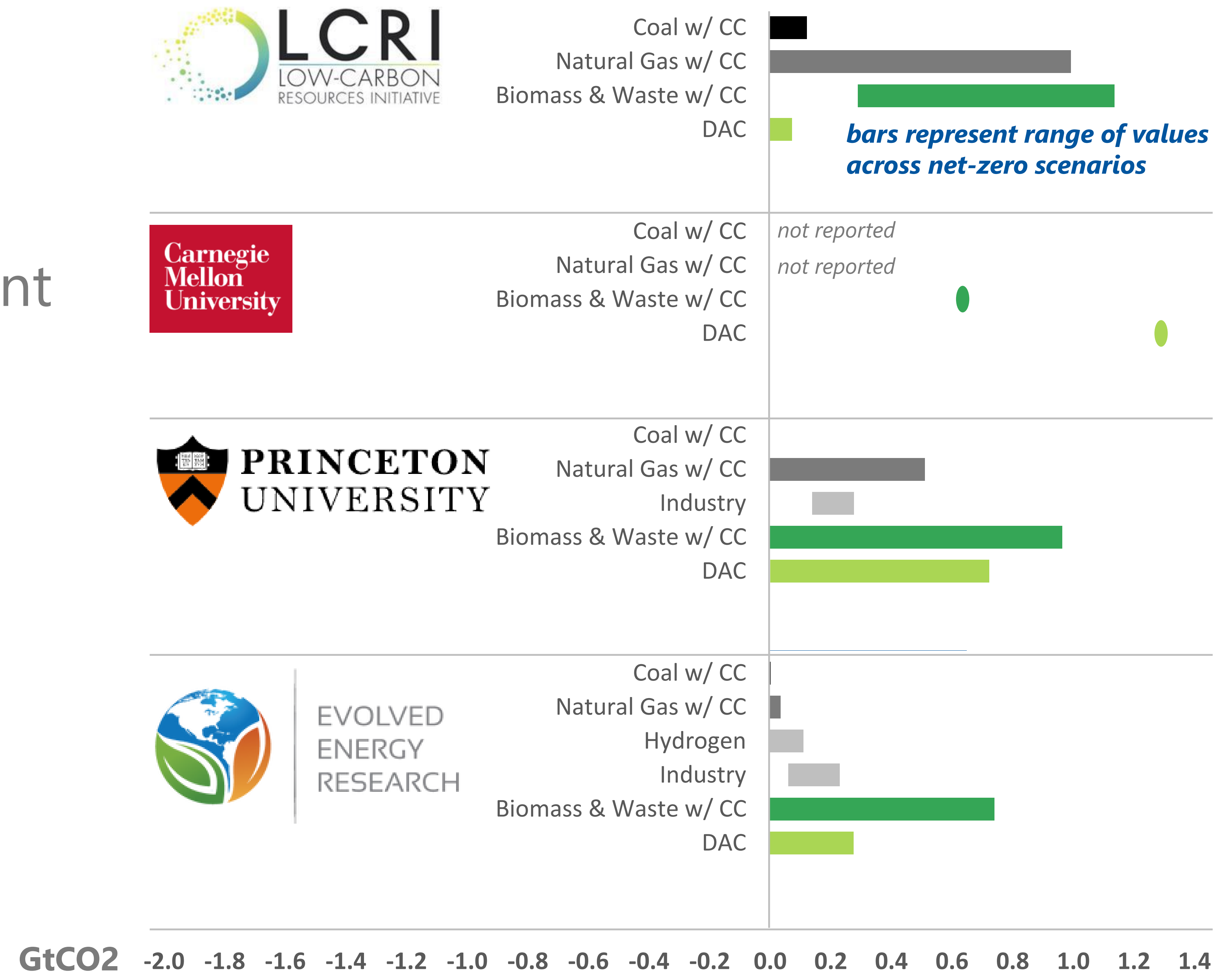

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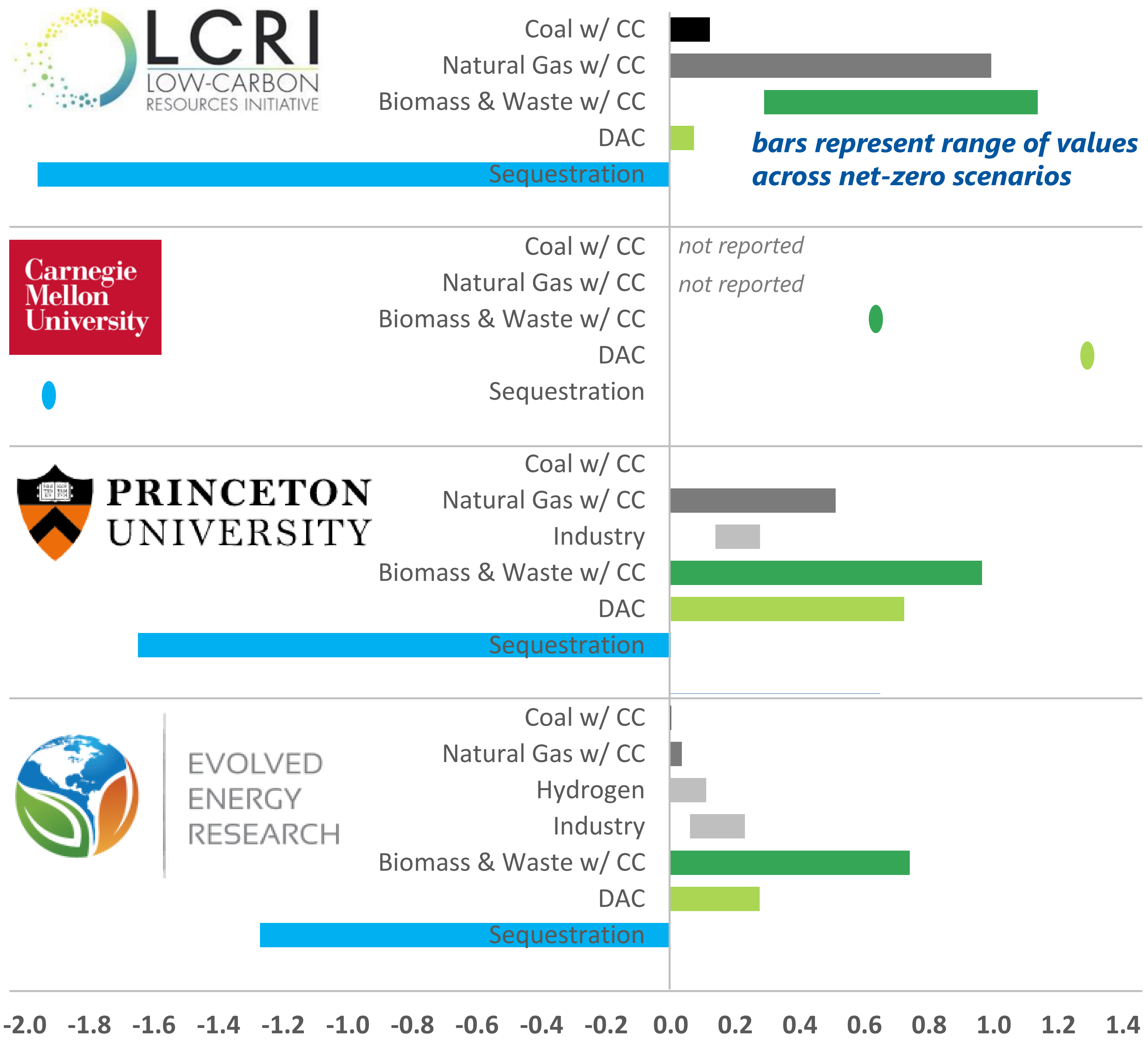

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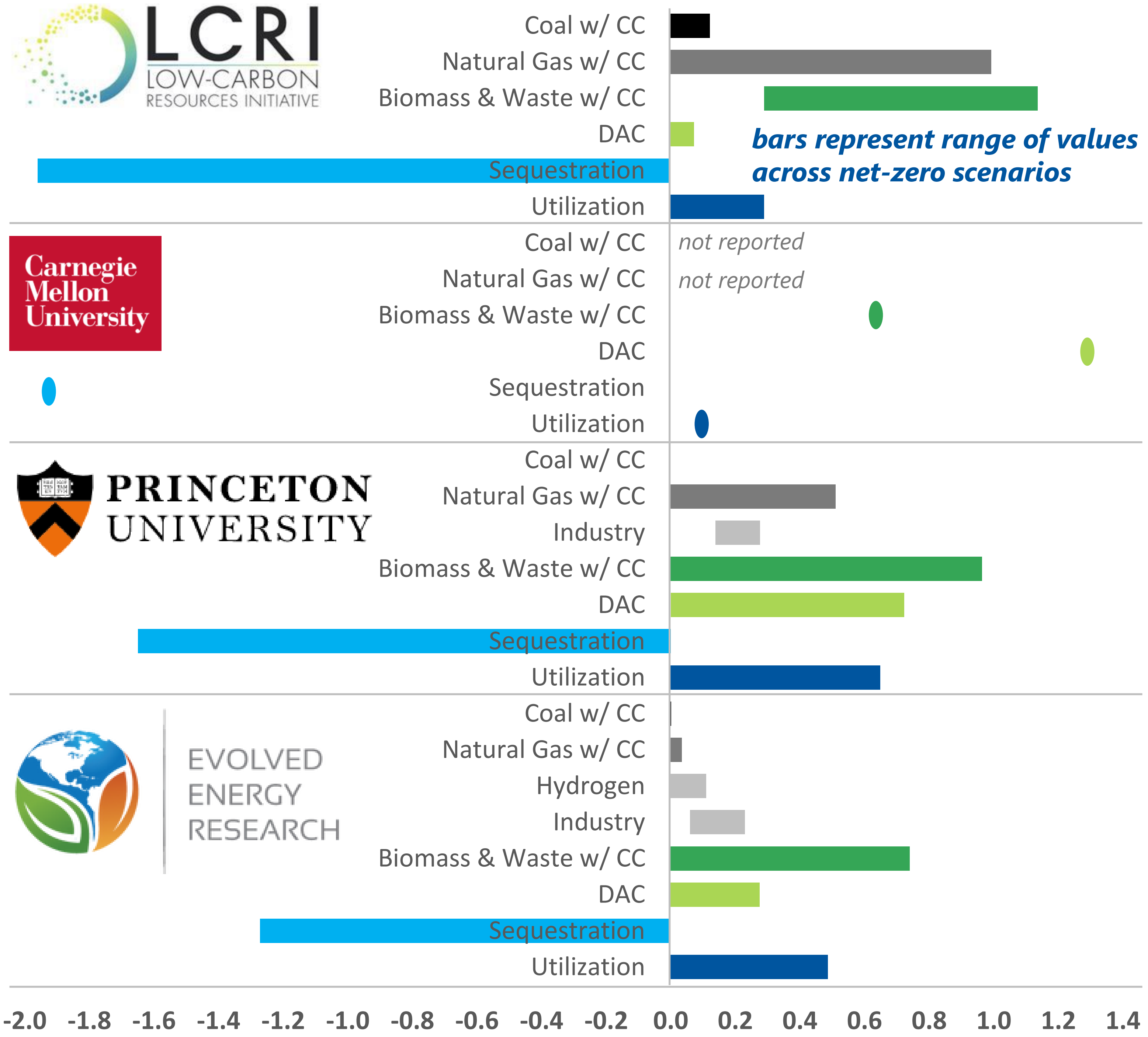
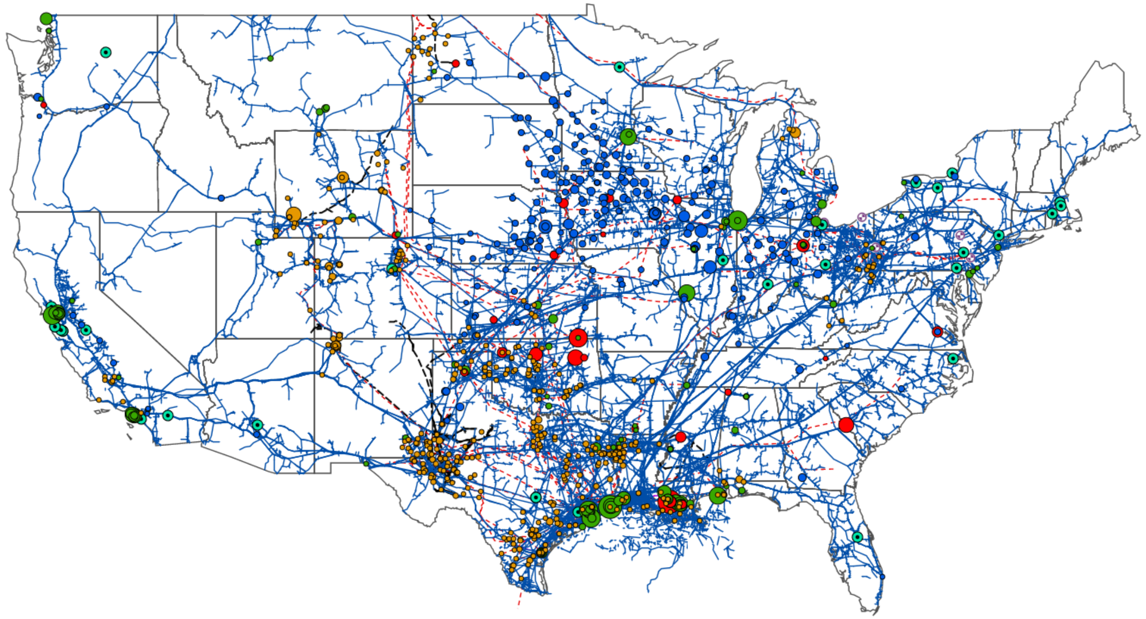


Holistic Infrastructure Planning



GTI Energy ArcGIS Infrastructure Mapping Portal

Holistic Infrastructure Planning

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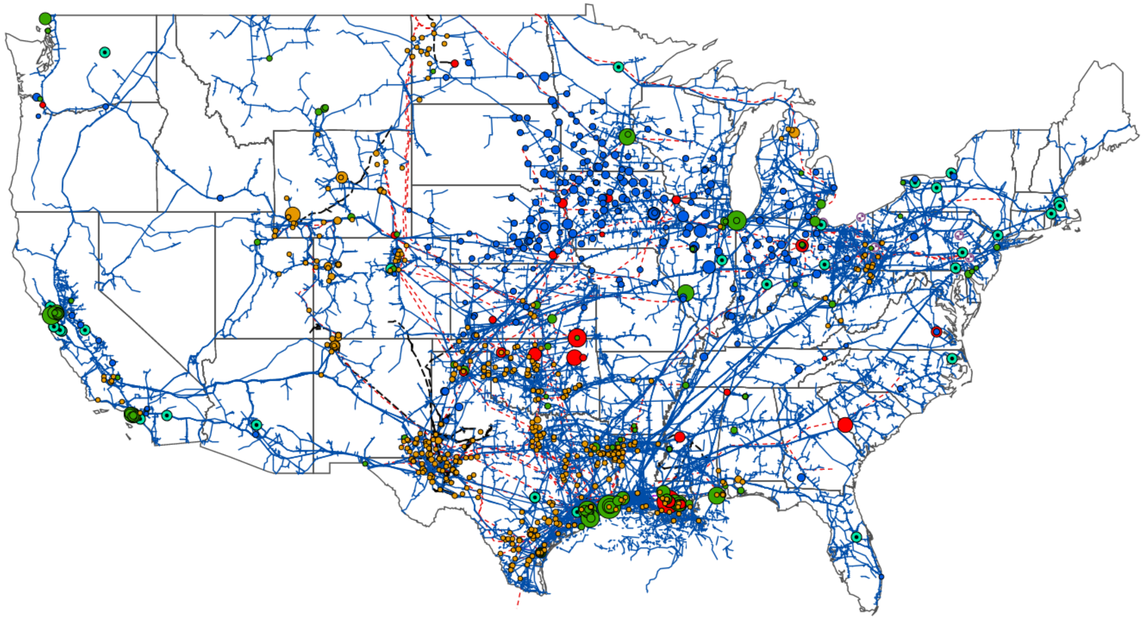

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NZIP

Net Zero Infrastructure Program

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solutions that transform

GTI Energy develops innovative solutions that transform lives, economies, and the environment

backup

CO_2 Emission Reductions by Sector, 2005–2050
Net-Zero 2050 Scenarios

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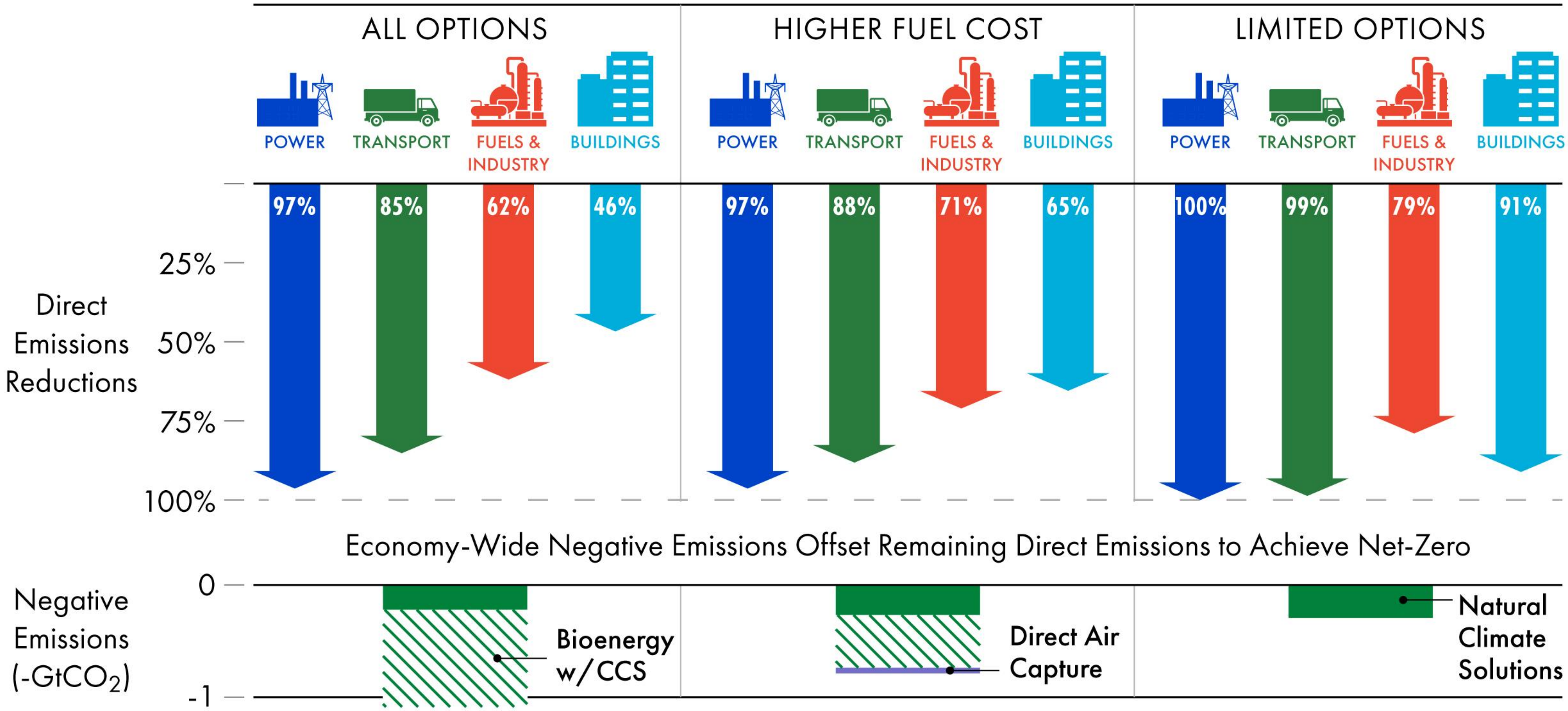

Marginal Cost of Carbon Reductions

~$165/tCO_2$ | ~$260/tCO_2$ | ~$1,200/tCO_2$

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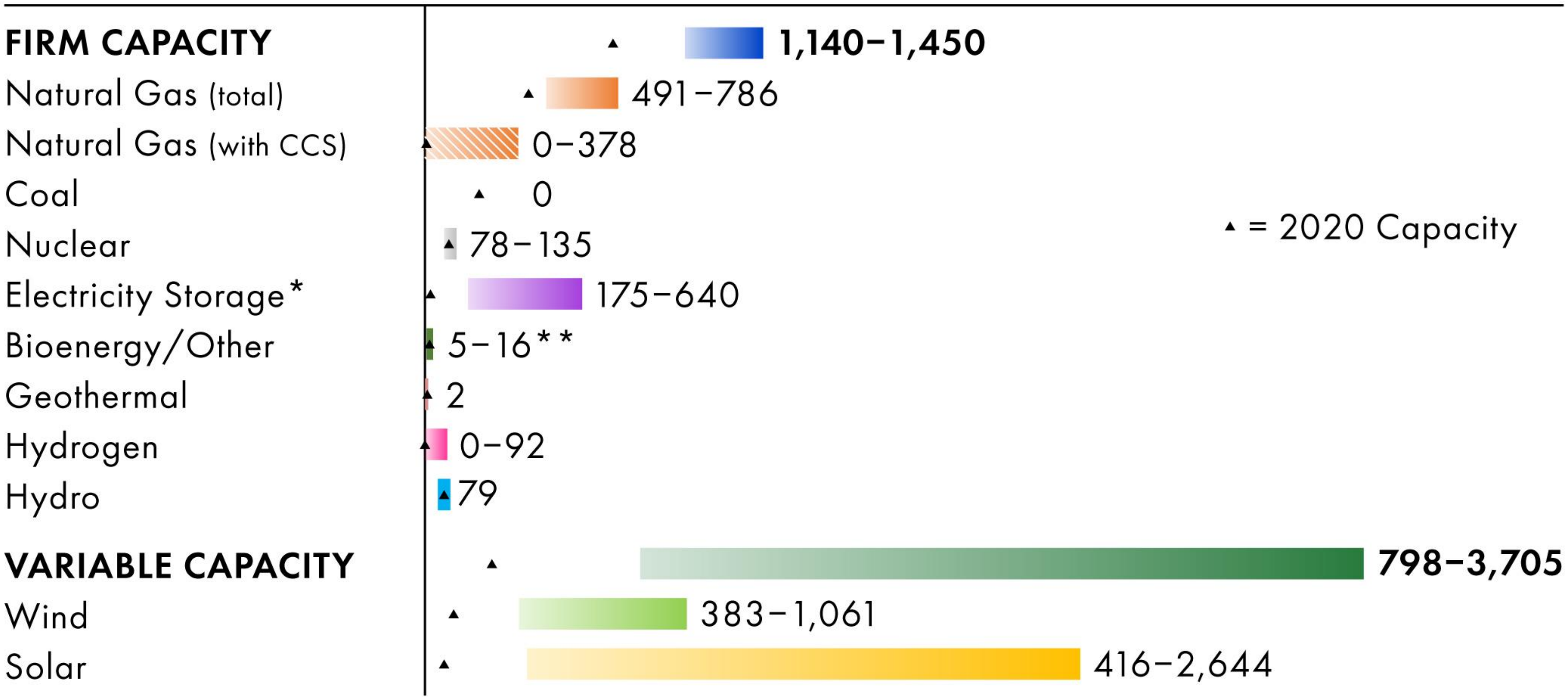
2050 Electric Generation Capacity By Resource

Ranges (GW) from Net-Zero 2050 Scenarios



*Batteries and pumped hydro

**Includes up to 11 GW of bioenergy with CCS