



**Committee on Gas & Committee on  
Electricity Joint Session**  
Enhancing Energy System Reliability  
and Resilience in a Net-Zero  
Economy

This session will begin at 3:30 pm



# Pathways to a Net-Zero Economy

Enabling a Resilient  
Clean Energy Transition

**Neva Espinoza**

Vice President

EPRI

[nespinoza@epri.com](mailto:nespinoza@epri.com)

**Mike Rutkowski**

Senior Vice President

GTI Energy

[mrutkowski@gti.energy](mailto:mrutkowski@gti.energy)



**NARUC Summer Policy Summit**

July 2022



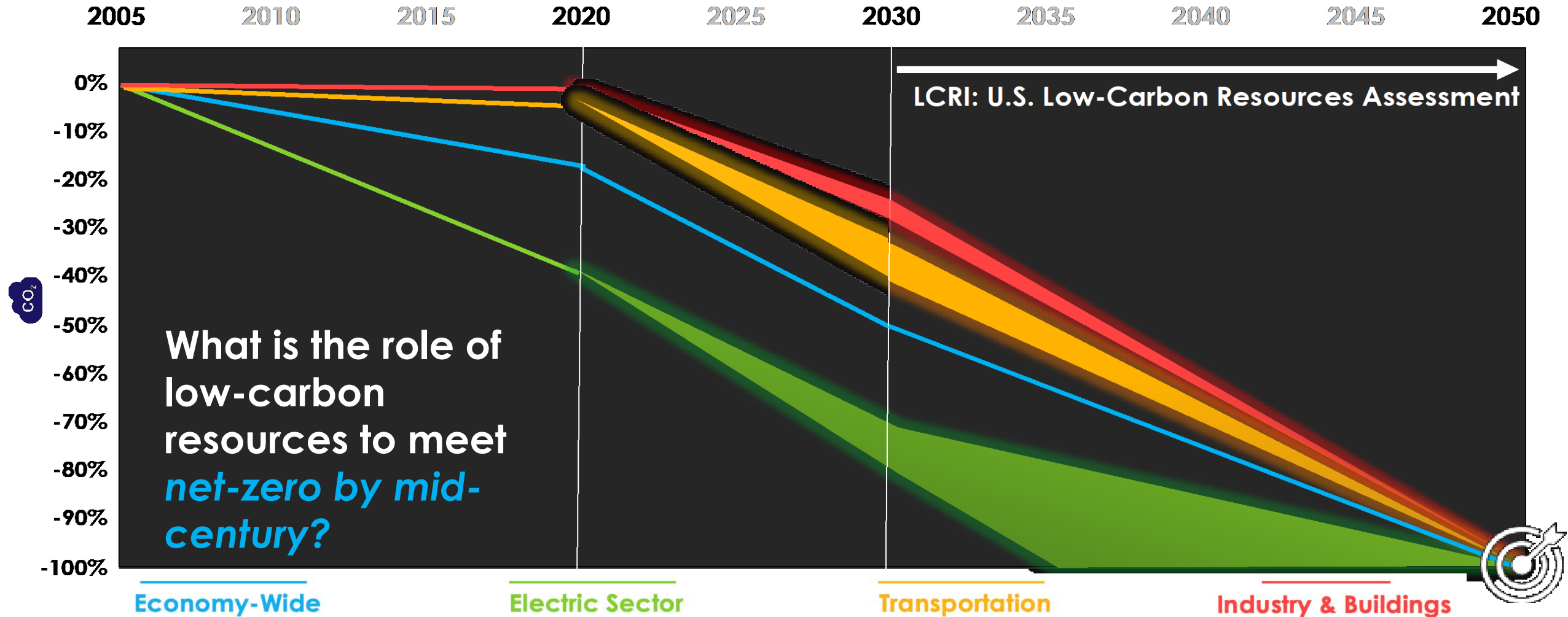
[www.epri.com](http://www.epri.com)  
[www.gti.energy](http://www.gti.energy)

[www.lowcarbonLCRI.com](http://www.lowcarbonLCRI.com)

© 2022 Electric Power Research Institute, Inc. All rights reserved. © 2022 GTI Energy. All Rights Reserved.

# BEYOND THIS DECADE

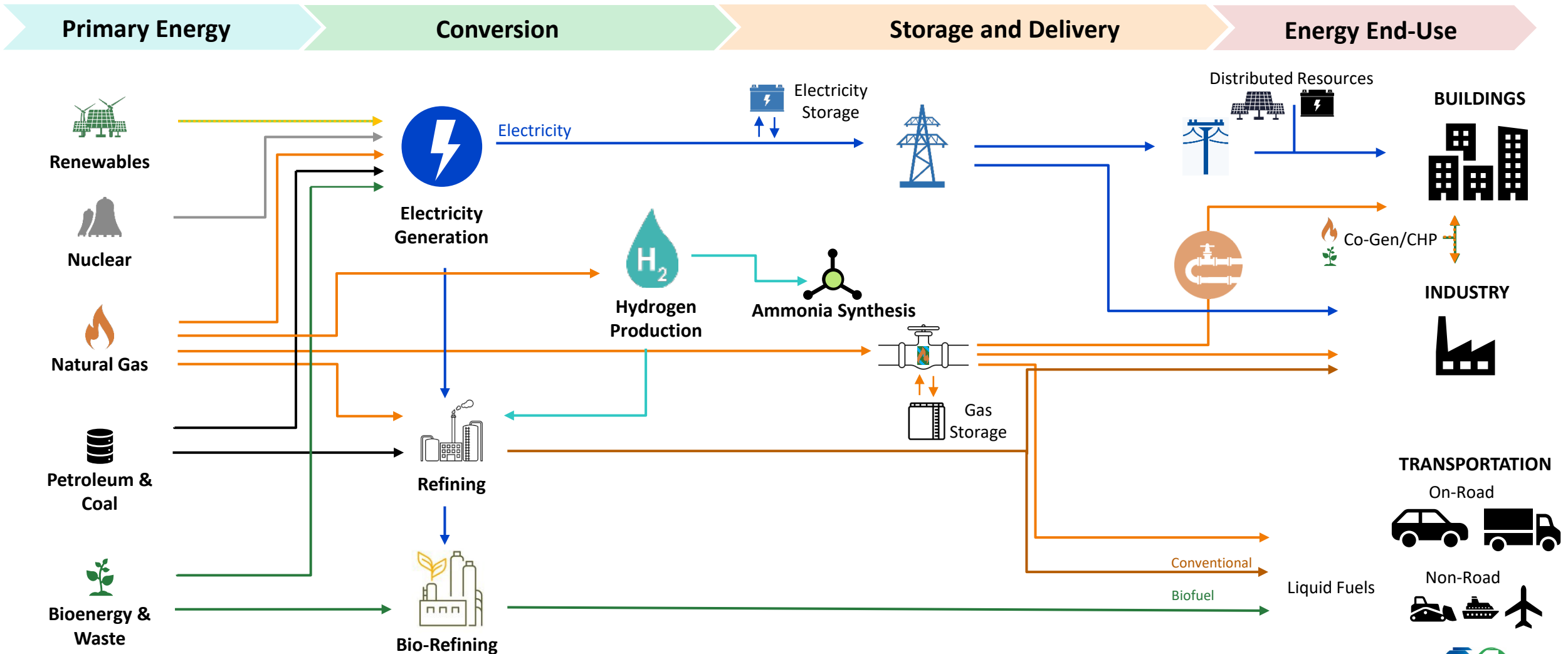
Pathway to Net-Zero  
more technology needed



<https://www.youtube.com/watch?v=42UqxqCCYs4>

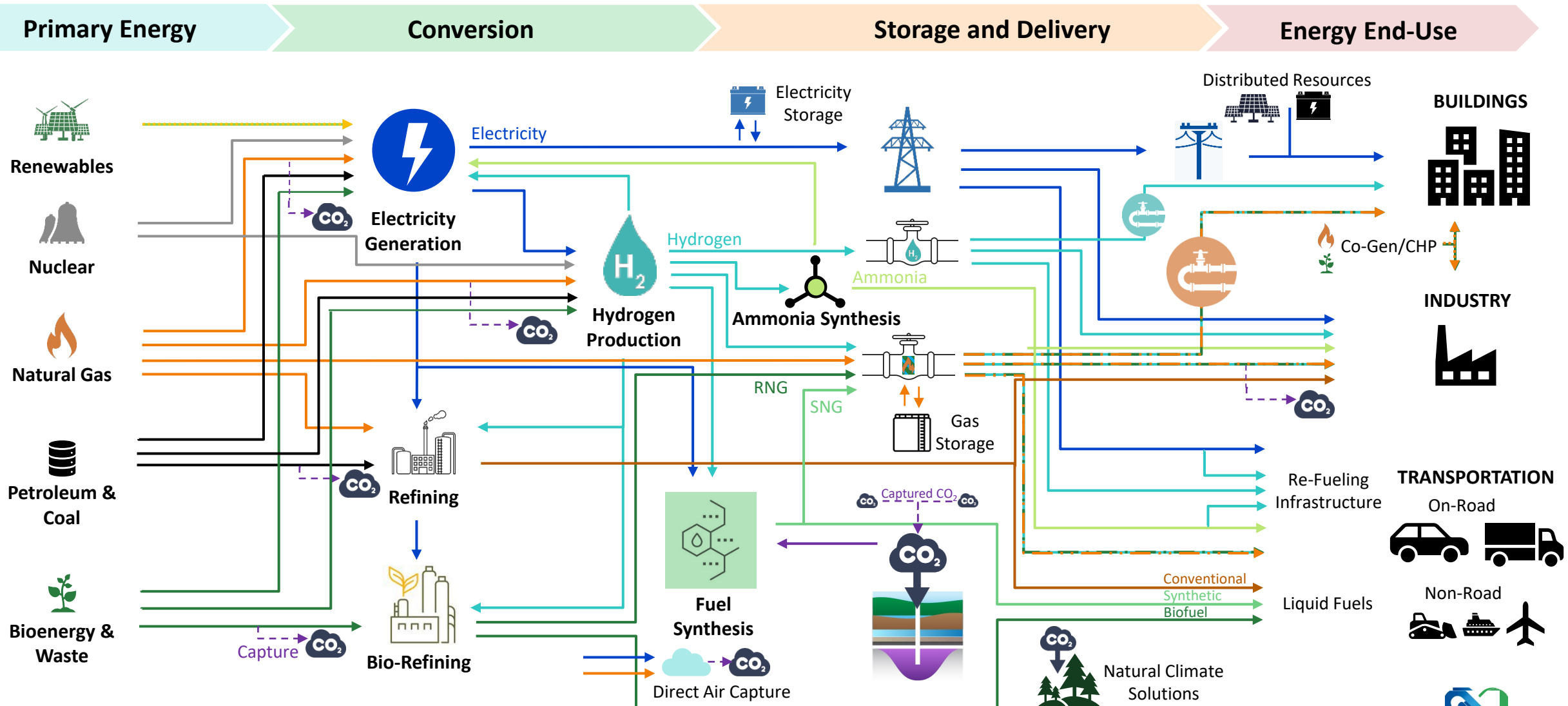
# TECHNOLOGY+++

Energy System  
won't be as 'simple' as today



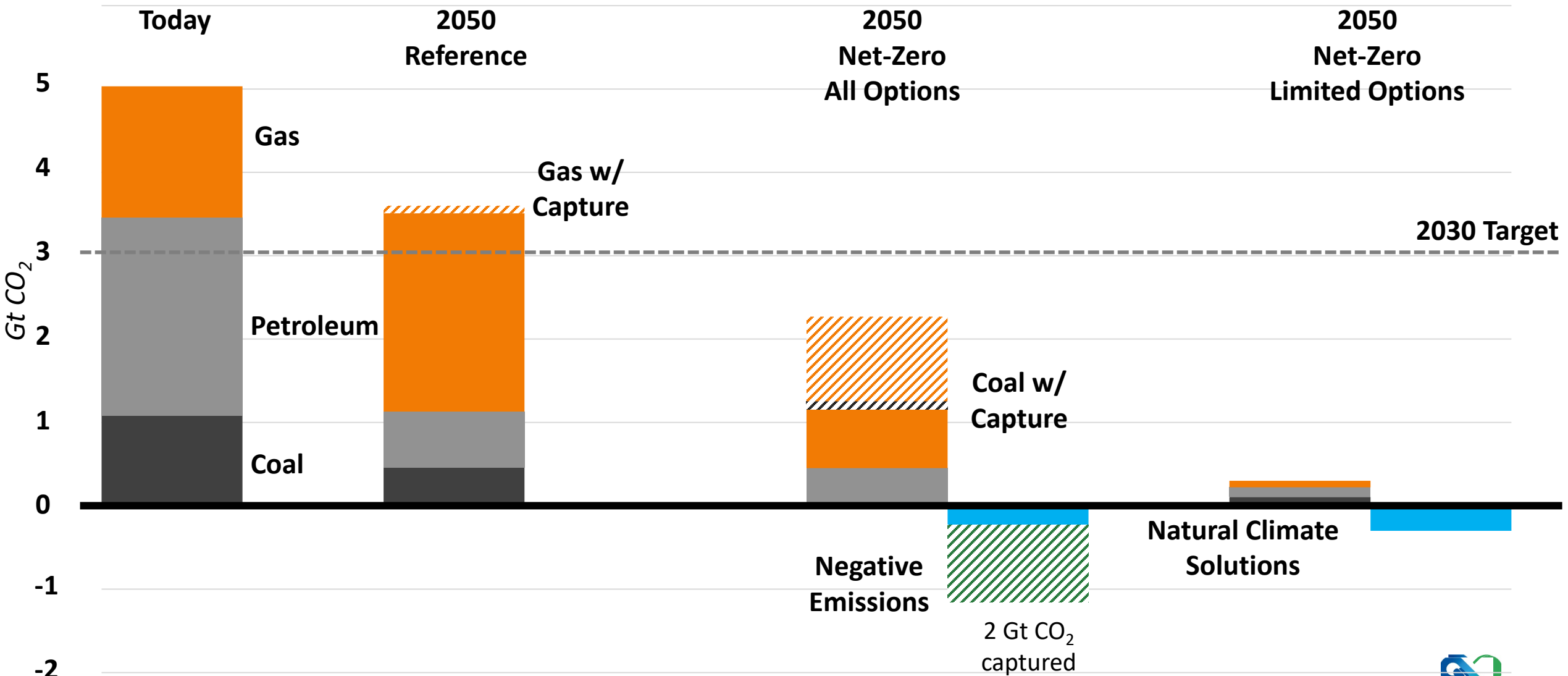
# COMPLEXITY

## New Resources and Players how will they fit and transition?



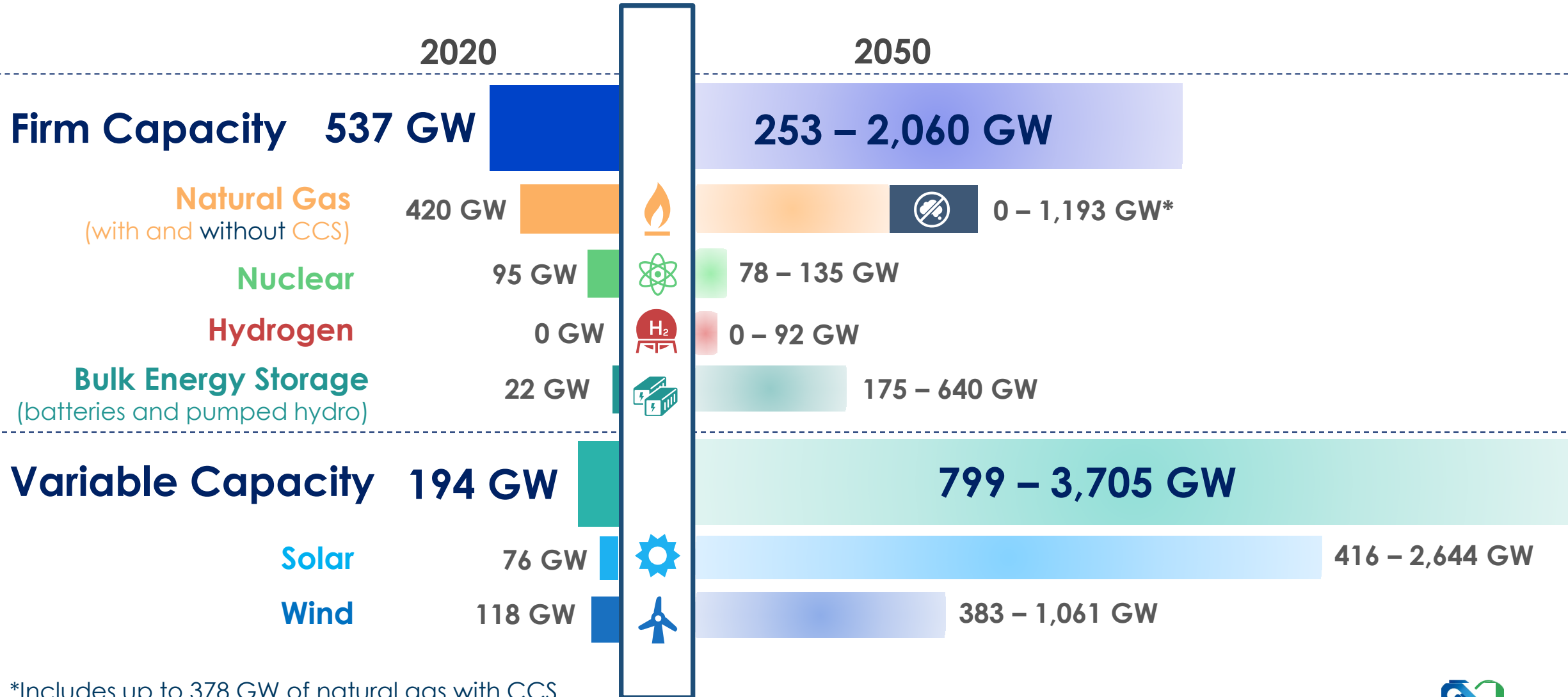
# NET-ZERO

## Many Pathways Different outcomes and needs



# GENERATION GROWTH

Expanding Clean Capacity  
for a net-zero energy future



\*Includes up to 378 GW of natural gas with CCS

# GAS

## A Bridge and Beyond a clean energy solution



Proven technology with dependable infrastructure that can enable a net-zero future and support low-carbon fuels.



Shift in the way we think about gaseous fuels, infrastructure, and assets.



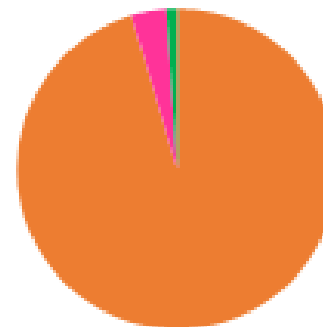
Significant differences in cost, sectors, use and regions, yet the need remains apparent.



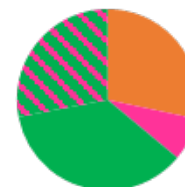
In ALL net-zero scenarios, pipeline gases provide clean firm energy capacity and help balance variable energy resources.



In ALL net-zero scenarios, gas assets are critical firm capacity resources for the electric grid.



**In the “All Options” scenario,** pipeline gas is ~1/4 of final energy



**In the “Limited Options” scenario,** pipeline gas is ~ 1/10 of final energy



Natural Gas



H<sub>2</sub> Blend



Renewable Natural Gas



Synthetic Natural Gas



# KEY INSIGHTS

## Exploring pathways to a net-zero energy economy



### Clean Energy Carriers Grow

Biofuels, hydrogen, and synthetic fuels help meet demands across difficult-to-decarbonize sectors



### Innovation and Infrastructure Advance

Changes in resource options, technology readiness, or electricity transmission or gas pipeline development could significantly impact the future energy mix



### Optionality Drives Affordability

Natural gas and biomass with CCS, along with direct air capture, are key to manage costs, while leveraging existing resources



### Pipeline Gas Continues to Serve

Key resource supports major swaths of end-use demand, with hydrogen blending and renewable natural gas becoming important parts of the gas mix



### Firm and Variable Generating Capacity Grow Substantially

Gas capacity and infrastructure are used and useful in all scenarios, with varying capacity factor and differences in the *types of gas* that will be used



### Net-Negative Technologies Help Minimize Costs

Allow unabated use of fossil fuel in some sectors

### Affordability & Equity Present a Constant Challenge

Reaching goals depends on 100M+ households and businesses participating and adopting low-carbon technologies



# LCRI

---

## LOW-CARBON RESOURCES INITIATIVE

Enabling the Pathway  
to Economy-Wide Decarbonization



[www.lowcarbonLCRI.com](http://www.lowcarbonLCRI.com)

© 2022 Electric Power Research Institute, Inc. All rights reserved. © 2022 GTI Energy. All Rights Reserved.





**Committee on Gas & Committee on  
Electricity Joint Session**  
Enhancing Energy System Reliability  
and Resilience in a Net-Zero  
Economy



Thanks for attending.  
The next session begins at 3:30 pm.