LCRI

LOW-CARBON RESOURCES INITIATIVE

Enabling the Pathway to Economy-Wide Decarbonization

EPRI

www.lowcarbonLCRI.com

gti

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Decarbonization Pathways Enabled by Innovation

Decarbonization

Accelerate economy-wide, low-carbon solutions

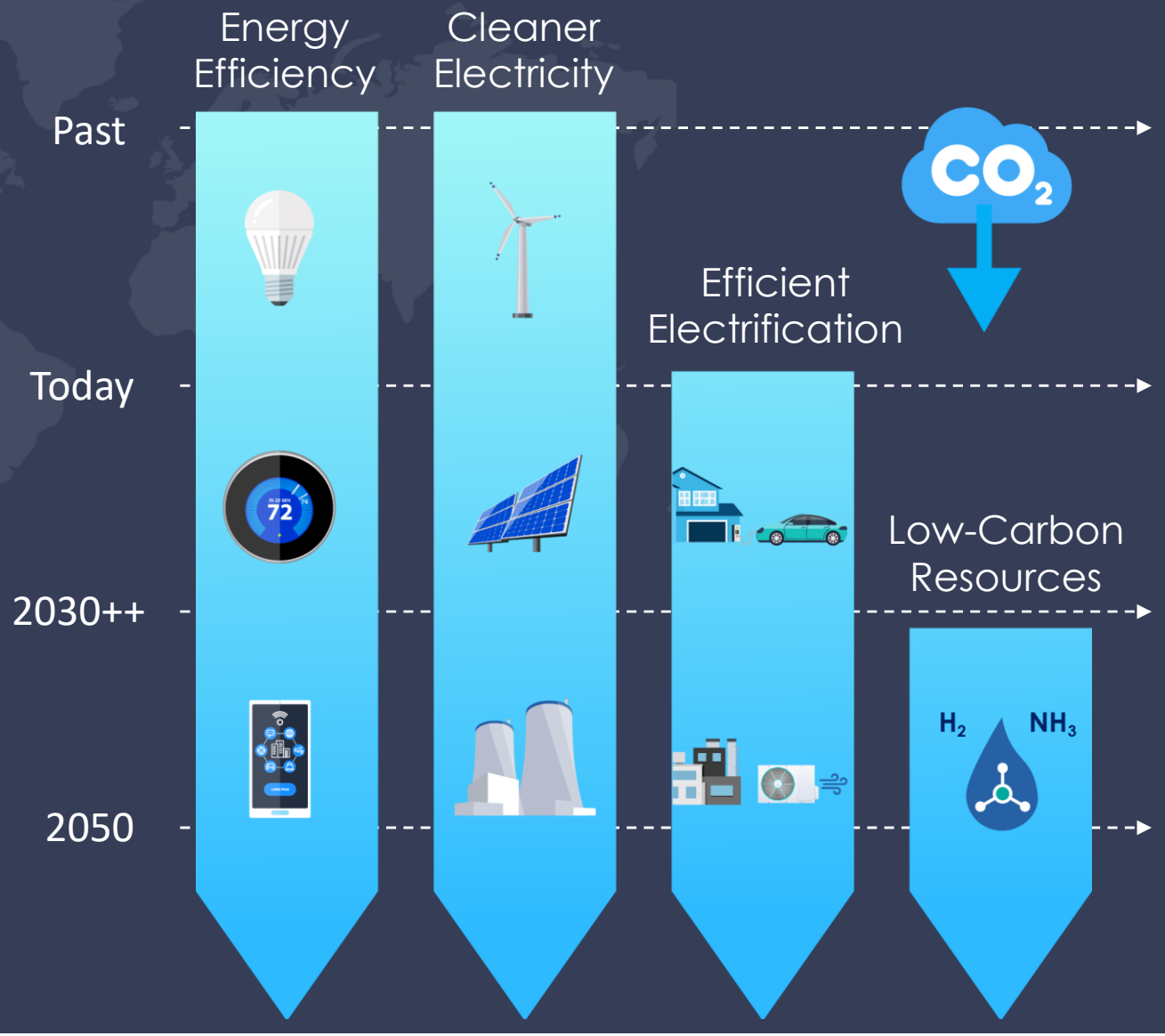
- Electric sector decarbonization
- Transmission and grid flexibility: storage, demand, EVs
- Efficient electrification

~10-15 years

Achieve a net-zero clean energy system

- Ubiquitous clean electricity: renewables, advanced nuclear, CCUS
- Negative-emission technologies
- Low-carbon resources: hydrogen and related, low-carbon fuels, biofuels, and biogas

~15-30 years



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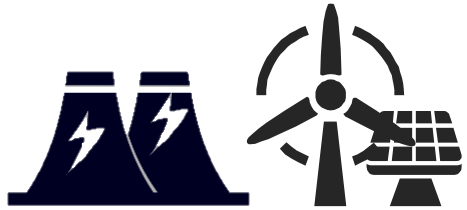


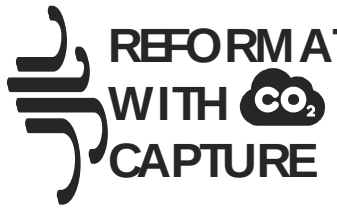
Carbon Free Generation

WITH CO_2 CAPTURE

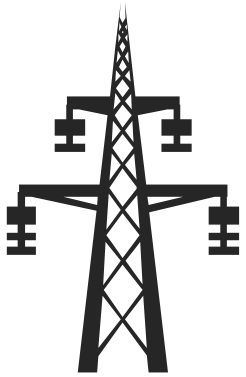
Fossil Generation with CCS

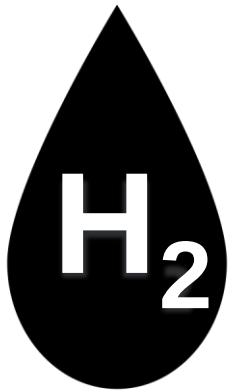
BIO

BioFuels



REFORMATION WITH CO_2 CAPTURE





ELECTRIFICATION

INDIRECT ELECTRIFICATION

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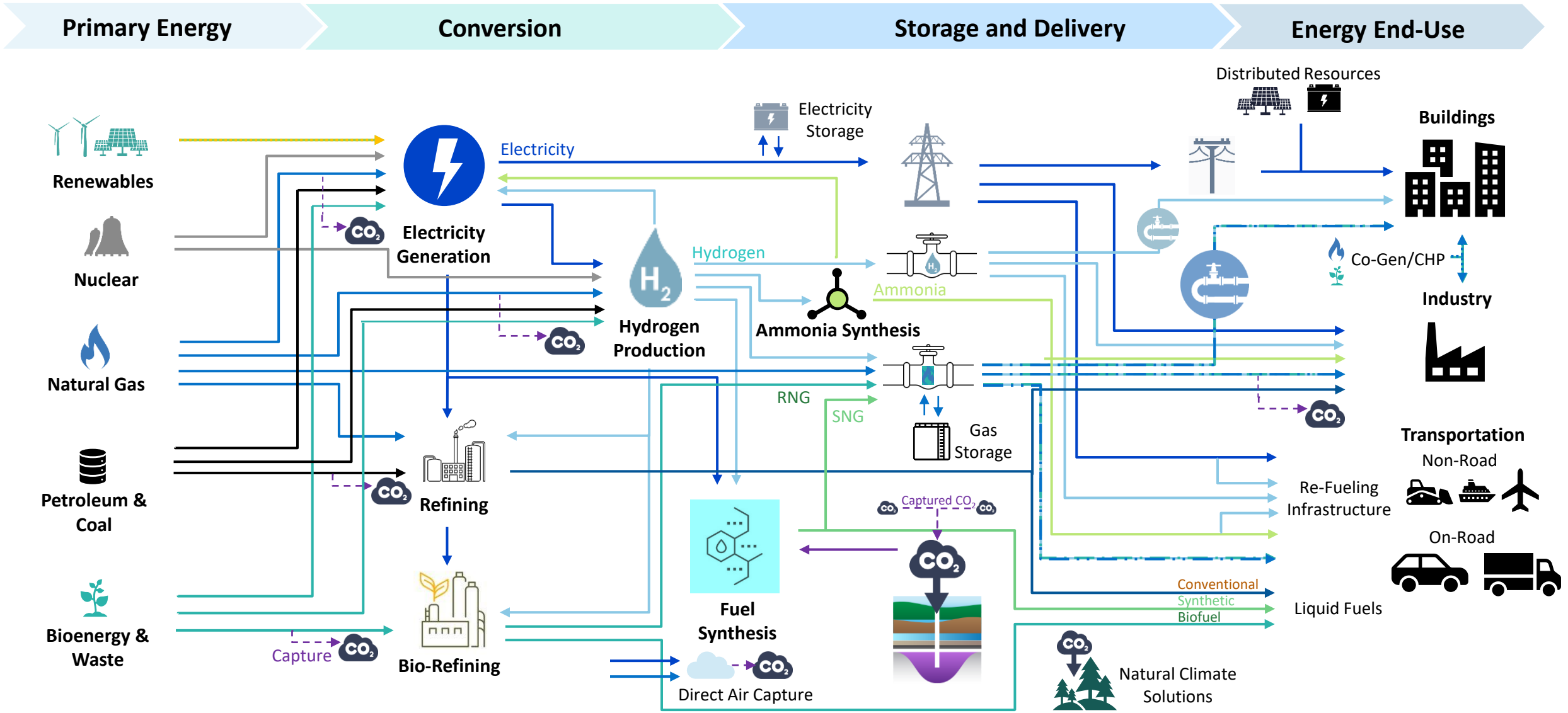
Economy-Wide Low-Carbon Energy Pathways



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2020 | **2030** | 2050+

Beyond 2030

How might value chains incorporate low-carbon energy carriers?

LCRI Focus:

Hydrogen | Ammonia | Synfuels | Biofuels | CCS

- **Renewable Fuels**
- **Hydrocarbon-Based Processes**
- **Electrolytic Processes**
- **Delivery & Storage**
- **Power Generation**
- **Transportation, Industry, & Buildings**
- **Safety and Environmental Aspects**
- **Integrated Energy System Analysis**

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CARBON-FREE ENERGY FOR MANUFACTURING AND INDUSTRY

Slide borrowed from Clifford Ho, SNL

Energy StorM Workshop Intro

Make → Move → Store → Use

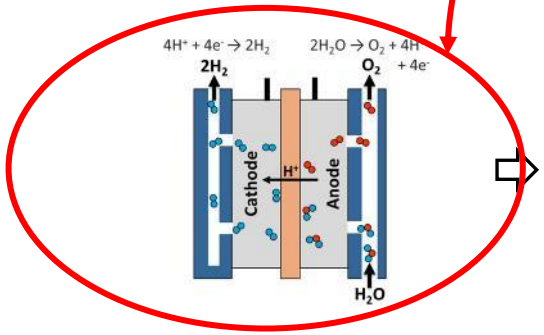
Electrical

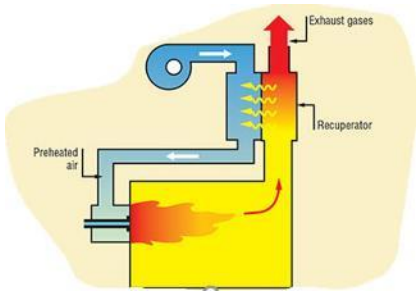



Thermal




Chemical



Working to Understand Electrolytic Hydrogen Production

PERFORMANCE COST LIFETIME

In the context of application and project life.

Portfolio Planning → Economic Fit → Project Design → Procurement → Operations → End-of-Life

To meet future Low-Carbon goals.

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Integration of Alternative Energy Carriers

H_2 Production

Nuclear

Electrolysis

Clean Generation

Natural Gas CCS

H_2 Delivery

Utilize Existing or Develop New Pipelines

H2 Storage and Transport

H_2 End-Use

Boiler

Heavy Duty Transportation

Electric Generation

Advanced Fuel Cell

Large Industry

Chemical Process

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Together...Shaping the Future of Energy®

Thank You!

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