



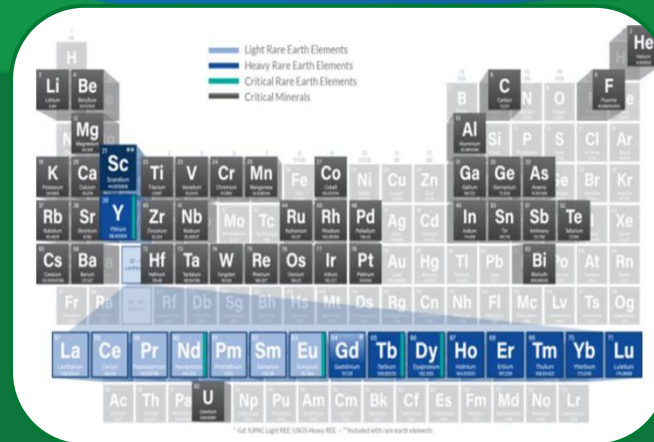
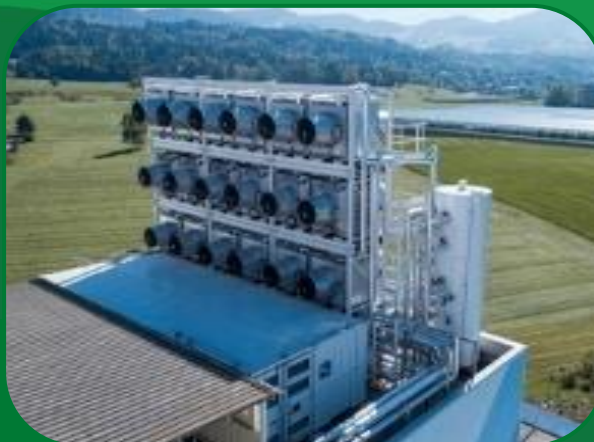
U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Summary of Thermal Conversion with CCS Hydrogen Shot Summit Breakout Session

## NETL and GTI Hydrogen Workshop

September 27 and 28, 2021



# FECM Investments in Hydrogen R&D

- Carbon-neutral hydrogen production using gasification, reforming and SOEC technologies
- Hydrogen transport infrastructure
- Hydrogen storage
- Hydrogen use for electricity generation, fuels, and manufacturing

## GOALS:

- Clean hydrogen produced at \$1/kg or less
- Gas turbines firing zero-carbon fuels
- Solid oxide fuel cells and electrolytic cells that can generate hydrogen or produce electricity, with reversible architecture
- Carbon capture rates >95% for fossil H<sub>2</sub> production



# Thermal Conversion Breakout - Overview

**Objective:** the Thermal Conversion with Carbon Capture and Storage Panel Session focuses on the gasification of coal/biomass/plastic waste streams and natural gas to produce clean hydrogen

- Start the dialogue on how to achieve \$1/kg hydrogen production through thermal conversion pathways with CCUS
- Hear from experts in the field on ongoing thermal conversion pathway projects and their thoughts on what can be done to lower the cost of clean hydrogen

Breakout Organization:

- Two expert presentations to “set the stage” for Thermal Conversion Integrated Pathway Analysis
- Five expert panels:
  - Methane pyrolysis panel
  - Plasma technologies panel
  - Transformational natural gas conversion panel
  - Gasification for clean hydrogen panel
  - Advanced gasification pathways to clean hydrogen panel

# Thermal Conversion Breakout – Key Points of Discussion – Day 1

- **Make Prudent Investments Across Technical Readiness Level (TRL) Scale**
  - Pilot and large demonstrations projects drive momentum in the research community
  - Long lead investments by Government can lower technology risk
  - Government/Private Partnerships are critical
- **Incubate Multiple Production Pathways**
  - Production pathways may have regional applications and benefits
  - Scale up and infrastructure reliability are critical
- **Continue Hosting Workshops on Hydrogen**
  - Production/Consumption hydrogen hubs
  - Bulk hydrogen storage
  - Hydrogen production pathways
  - Information on funding mechanism and engagement
- **Lifecycle analyses across the entire hydrogen value chain are critical to validate hydrogen's benefits and justify a hydrogen-enabled economy.**

# Thermal Conversion Breakout – Key Points of Discussion – Day 2

- **Multiple Demonstration Projects are needed to drive innovation**
  - Pilot and large demonstrations projects drive momentum in the research community
  - Policy incentives and investments by Government can lower technology risk
  - Public/Private Partnerships are critical
- **Hydrogen Consumers are Needed to Offtake Hydrogen from Large Demos**
  - Policy incentives are needed to offset cost difference during early-stage production
- **Biomass will be Key to Achieving Net-Zero Hydrogen from Thermal Conversion**
  - Regional availability varies
- **Clean Hydrogen will be a Key Driver for Decarbonization of the Overall Economy**
  - Medium and heavy-duty transportation
  - Industrial heat and process feedstock
  - Demand balancing for electric grid



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# Questions?

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Hydrogen with Carbon Management

