

# The DNA Hydrogen Hub

MAY 2023



# Who we are: Decarbonization Network of Appalachia (DNA)

The DNA Project Team's goal: Investing in North Central Appalachia and protecting the future of our environment and economy through a regional “hydrogen hub”



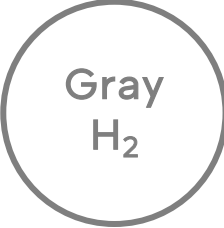
DNA's “hydrogen hub” would **bring low-carbon energy to Appalachia** and **strengthen existing industries** through the opportunity to lead in next-generation green manufacturing


To get there, we are building a broad coalition from the public and private sectors to support this project




From state governments, to labor unions, to local community groups, **we hope to bring together members of the North Central Appalachian community** with a stake in the region's future

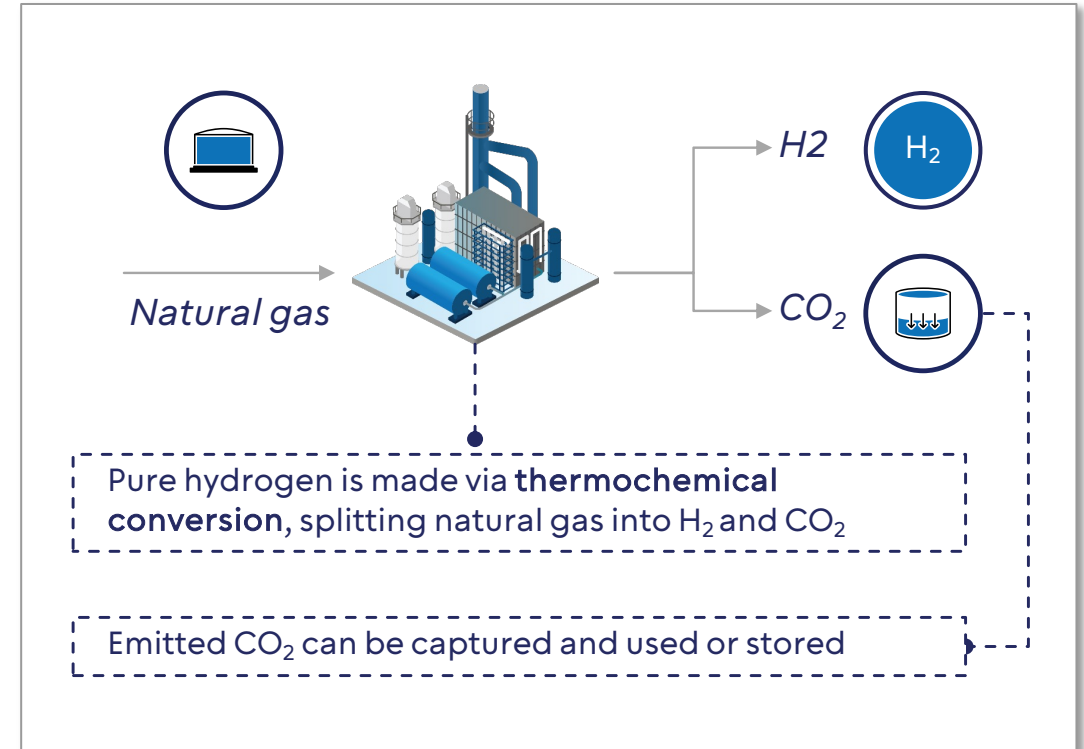
Blue hydrogen, from natural gas with carbon capture, creates low-carbon H<sub>2</sub> well-suited to Appalachia's resources, with minimal disruption to industries

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Gray H<sub>2</sub> Almost all current H<sub>2</sub> – produced from fossil fuels, releasing carbon dioxide emissions into the atmosphere
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Blue H<sub>2</sub> Produced from natural gas with emissions capture technology for **low-carbon H<sub>2</sub>**
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Green H<sub>2</sub> Made using electricity from renewable energy sources at significantly higher cost than blue H<sub>2</sub>



Blue hydrogen is well suited to Appalachia, capitalizing on the region's abundant natural resources, depth of industrial consumers, and existing workforce experienced in energy production

# Hydrogen can serve as a low-carbon energy source and bring next generation energy to existing industries in North Central Appalachia

Hydrogen can be a scalable, efficient, low-carbon source of energy...

...with broad applications in the industries that make up the backbone of Appalachia



The **most abundant element in the universe**

Highly energy dense, containing **~3x as much energy as oil**

**Low carbon footprint** with some forms of production



**Steel**

*Ready substitute for coal in blast furnaces & can be used for H2-based DRI<sup>1</sup> to decarbonize steel production*



**Chemicals**

*Low-carbon alternative feedstock and fuel for chemical & polymer manufacturing*

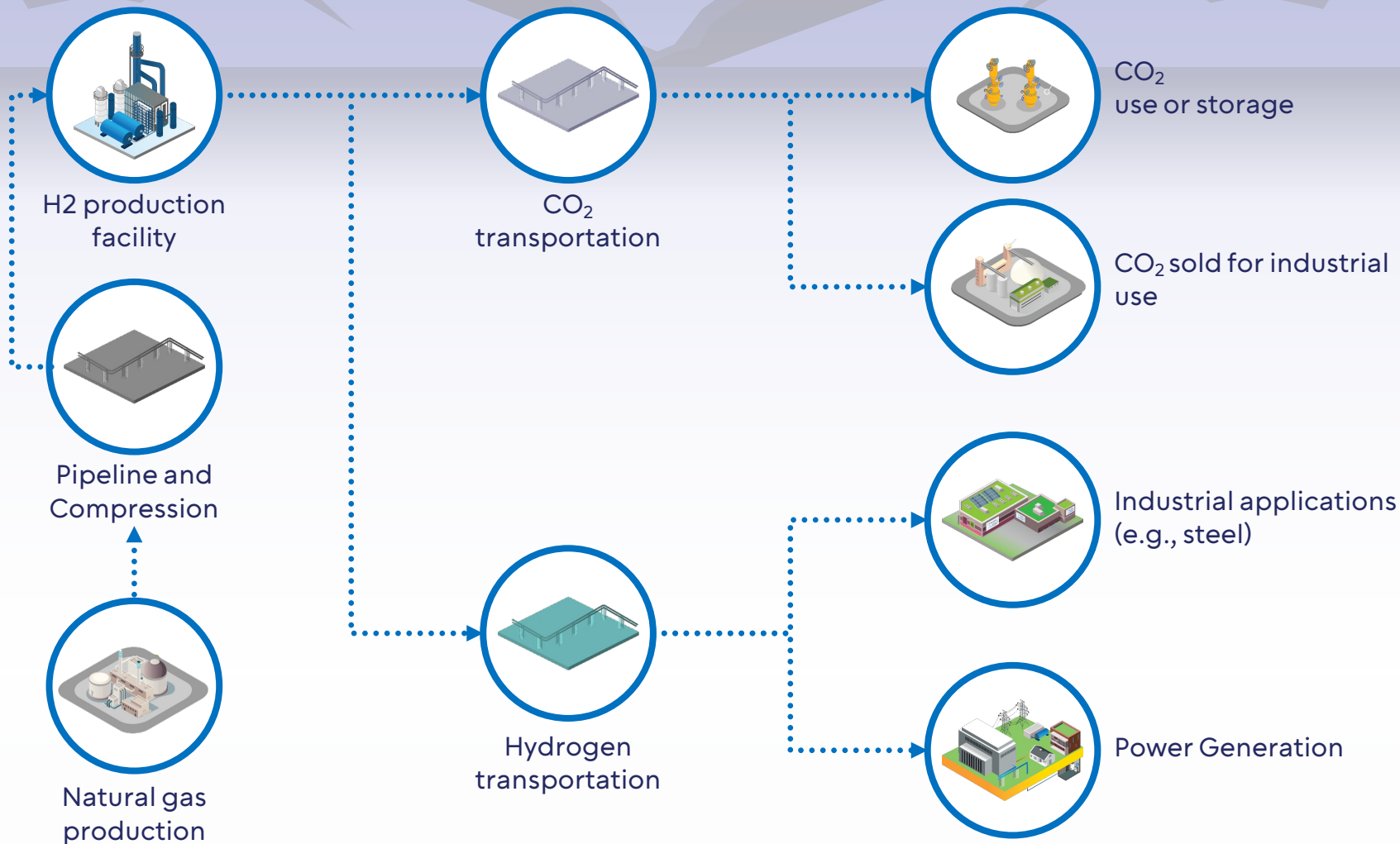


**Power**

*Blended with natural gas, provides lower-carbon substitute for power generation*

1. Direct Reduced Iron – an input for steel manufacturing traditionally created using fossil fuels

Hydrogen Hubs bring diverse supply chain pieces together, connecting energy production with applications & demand



A Hydrogen Hub will create growth opportunities for the wide set of industries that have a role to play in the hydrogen and carbon supply chains



# A hydrogen hub is a chance to invest in and protect Appalachia's future



## Investing in our communities

- Capitalizing on economic growth to reinvest in our infrastructure, schools, and other resources
- Increasing access to well-paying jobs
- Creating new opportunities for SMBs



## Preserving our environment

- Reducing pollution to help ensure cleaner air for current and future generations
- Transitioning to a low-carbon, more just energy source while leveraging existing infrastructure



## Maximizing opportunities for our industries

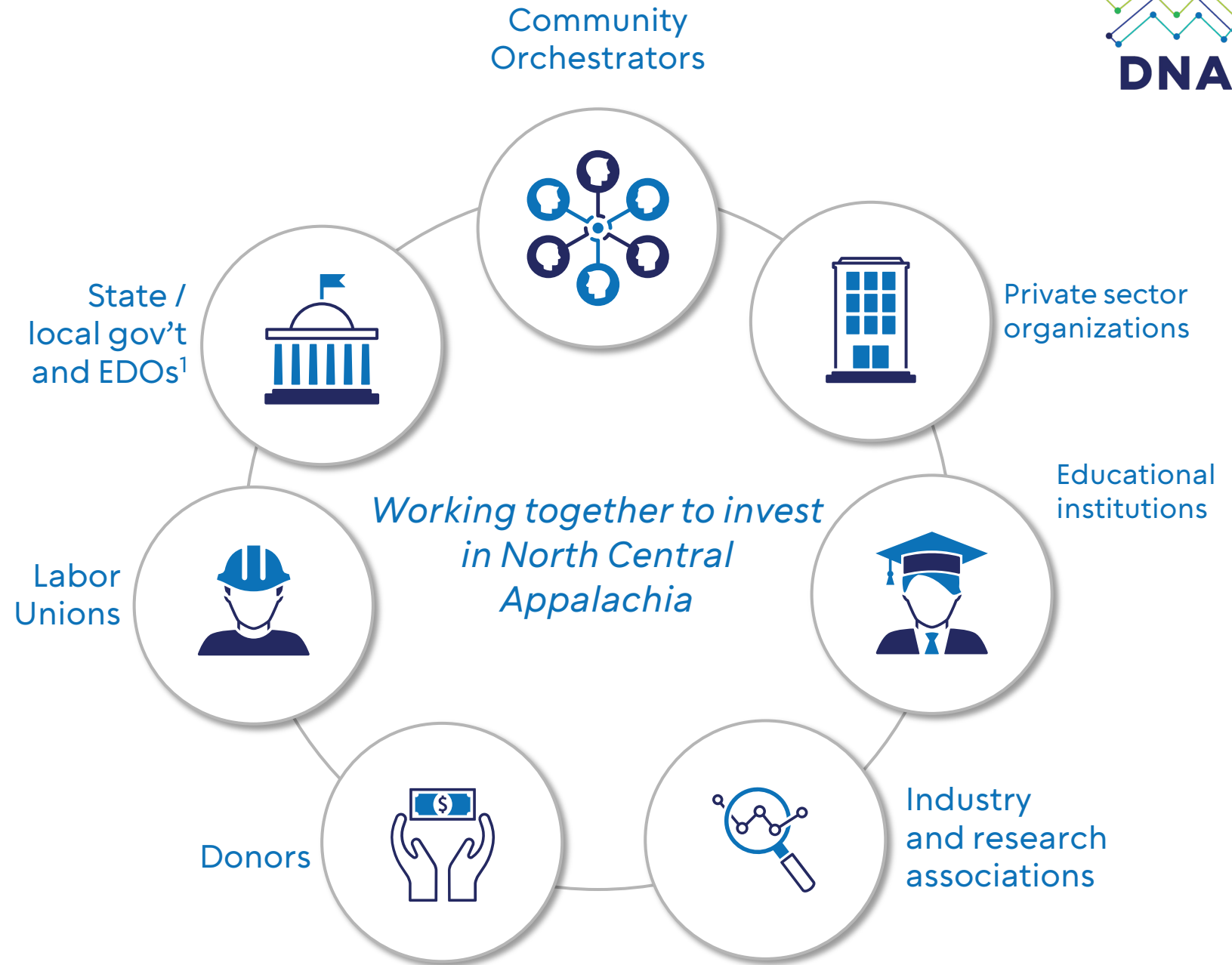
- Creating opportunities for the region to lead in low-carbon manufacturing
- Lowering the barrier for existing industries to meet decarbonization goals



## Building a foundation for a vibrant and sustainable future for Appalachia

- Setting the region up for continued resilience and growth
- Helping to ensure Appalachia remains an energy powerhouse in the years to come
- Leading the low-carbon industrial revolution and establishing the area as a hub for innovation

To maximize benefit of this project to the region, **DNA** is bringing together a **group of collaborators** to execute on project objectives and track against **project goals**



We are engaging stakeholders to define and execute on strategies for community engagement, workforce & economic development, and overall program monitoring



## Economic development

- Cultivating a **local supply** chain
- Creating **equal opportunities** for small and women / minority owned businesses
- Investing in **research and incubators** to set the region apart as a hub for green tech innovation



## Workforce development

- **Developing training** and credentialing requirements for a clean energy workforce
- **Conducting training** and apprenticeship programs
- Finding and **recruiting workers** for jobs and training opportunities



## Community development

- **Ensuring equal access** to new opportunities
- **Directing investment dollars** toward efforts that will drive value for surrounding communities



## Engagement & advocacy

- **Convening community and environmental groups**
- Creating **education and informational materials** needed to promote H2 awareness
- **Advocating for policy** frameworks to support the clean energy revolution



## Outcomes tracking & monitoring

- **Data collection** and analyses to **monitor progress** against Equity & Environmental Justice (EEJ) goals
- Publishing thought pieces and supporting research



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# Appendix

We believe federal “Hydrogen Hub” funding presents a historic opportunity to secure a multi-billion dollar investment in the future of Northern Appalachia



U.S. DEPARTMENT OF  
**ENERGY**

## Regional Clean Hydrogen Hubs (\$7B)

*Part of the Bipartisan Infrastructure Law*

The Regional Clean Hydrogen Hub program includes up to **\$7 billion to establish between 6 and 10 regional clean hydrogen hubs** across America

Clean hydrogen hubs will create **networks of hydrogen producers, consumers, and the local connective infrastructure** to accelerate the use of hydrogen as a low-carbon energy carrier that can deliver or store tremendous amounts of energy

**Decarbonization Network of Appalachia (DNA)** has a shared vision for emissions reduction through low-carbon hydrogen solutions

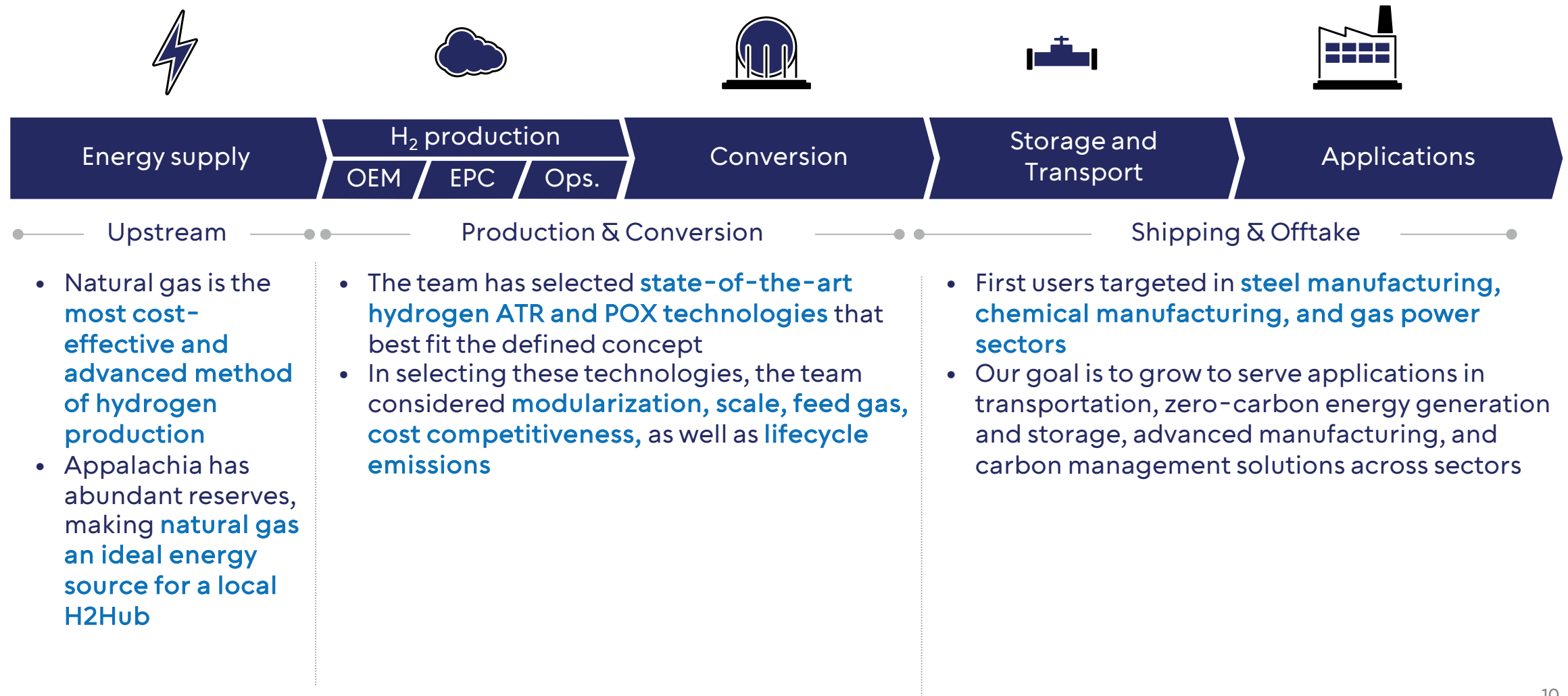
Appalachia stands out as **a key region for energy production in the US**—from being the birthplace of US oil production and commercial nuclear to a critical producer of coal and natural gas

As a center for steel and plastics manufacturing and refining activities in the US, **Appalachia is at the core of almost every aspect of US production**

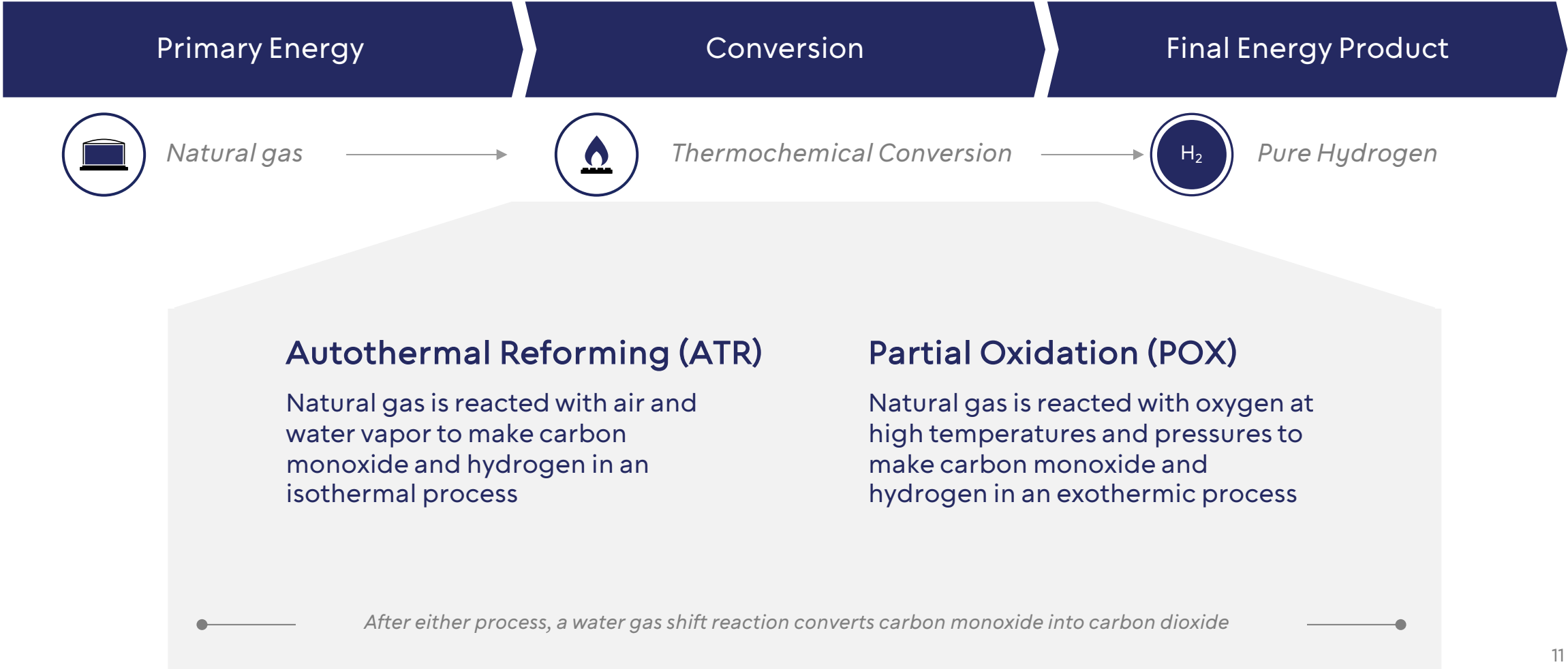
Given the region's critical role in energy & manufacturing, **investment in clean Hydrogen would establish Appalachia as a leader in the clean energy transition**

To catalyze that leadership, **the DNA Hydrogen Hub will produce hydrogen from the nation's cleanest natural gas**, capturing and storing carbon emissions underground. The region will use the hydrogen to **cleanly power the steel, chemicals, and power plants that form the backbone of regional industry**

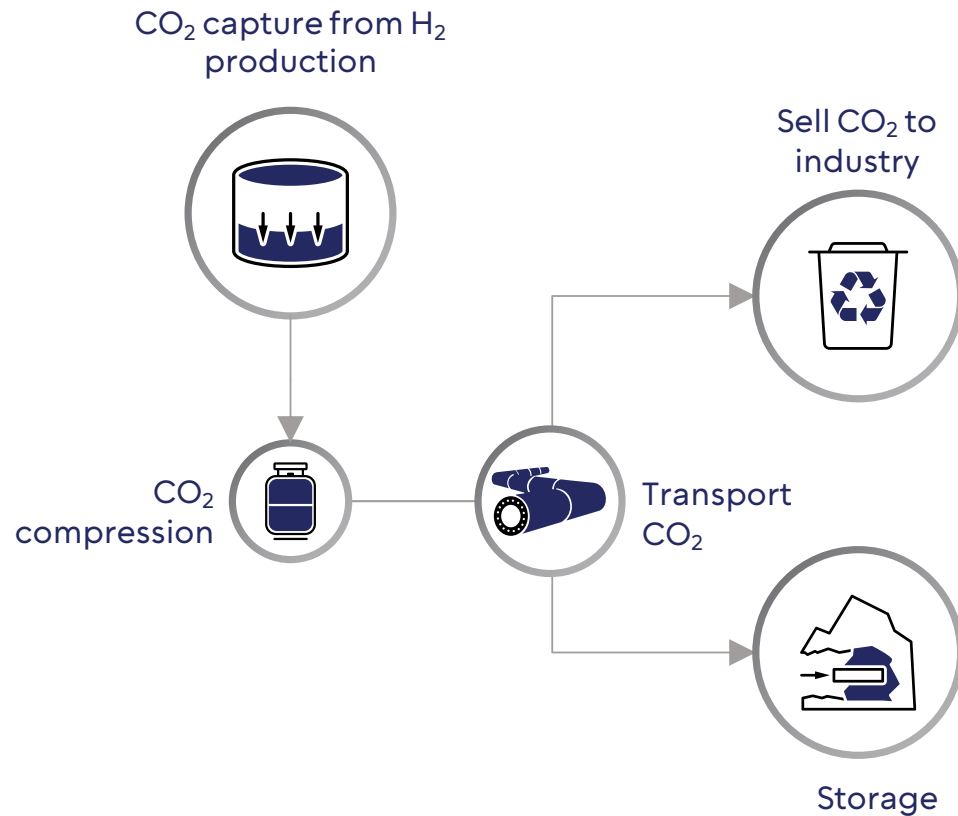
The DNA H2Hub will create a network of hydrogen producers, consumers, and local connective infrastructure to support production across the value chain



The DNA H2Hub will leverage two methods of conversion that will safely and efficiently produce H<sub>2</sub> from Appalachia's abundant natural gas resources



To help ensure hydrogen is clean, Carbon Capture, Utilization, & Storage tech will capture emissions from H<sub>2</sub> production before they reach the atmosphere



CCUS process

With blue hydrogen, H<sub>2</sub> production is combined with Carbon Capture, Utilization, & Storage (CCUS) to **capture emitted CO<sub>2</sub>** and store or sell it as an industrial input

**This makes blue hydrogen a much cleaner fuel source** than gray hydrogen that can generate low-carbon energy when used as a fuel source in energy production

In the race to accelerate the low-carbon energy transition, H<sub>2</sub> made from natural gas with carbon capture will be a critical tool in decarbonization



### Lower-carbon source of energy and feedstock for local industries

- Compared to traditional hydrogen production, **facilities purpose-built with carbon capture** allow for **80%-90% emissions reduction**
- Blue hydrogen can help **curb carbon emissions in local industries**, while allowing current hydrogen users, like plastics manufacturers, to reduce their overall carbon footprint



### Ready to immediately help cut emissions and clean the air

- Producible from available inputs, natural gas & carbon capture-based H<sub>2</sub> **promotes a transition to lower carbon fuels**, in-line with the urgency demanded to address climate change
- A proven technology, **H<sub>2</sub> & natural gas blends will leverage H<sub>2</sub> to reduce carbon emissions** as hydrogen production is scaled up



### Catalyst to kickstart green manufacturing leadership

- H<sub>2</sub> made from natural gas is **commercially viable now**—leveraging existing infrastructure for **2-3x cheaper production** vs. hydrogen made with renewable energy
- **Captured carbon creates additional economic opportunity** in downstream industrial uses
- With a long-term goal of zero-emissions, **investment in current production builds infrastructure** to support a lower carbon future



Our team is committed to actively identifying any potential challenges & will leverage our breadth of expertise & experience to mitigate their impacts

### Safety of new technologies

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*Public sector research organizations* bring deep knowledge on technical expertise and will ensure the safety and efficacy of new technologies

### Worker health, safety, and rights

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*Experienced private-sector operators* bring years of expertise safely and efficiently running and operating energy production facilities and are committed to creating quality jobs

### Environmental impact

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*Environmental monitoring organizations* stand ready to analyze and monitor operations to ensure environmental and social justice

Most importantly, to fully mitigate concerns and bring the most benefit to the community, **we want to work with you**