



# Ohio Clean Hydrogen Hub Alliance

# Agenda

- H2 Hub Defined
- Battelle Introduction
- Summary of DOE RFI
- Path Forward



Don LaMonaca

- Critical Infrastructure Business Line Director
- 25 years experience managing research and development and technology integration for transportation and energy markets



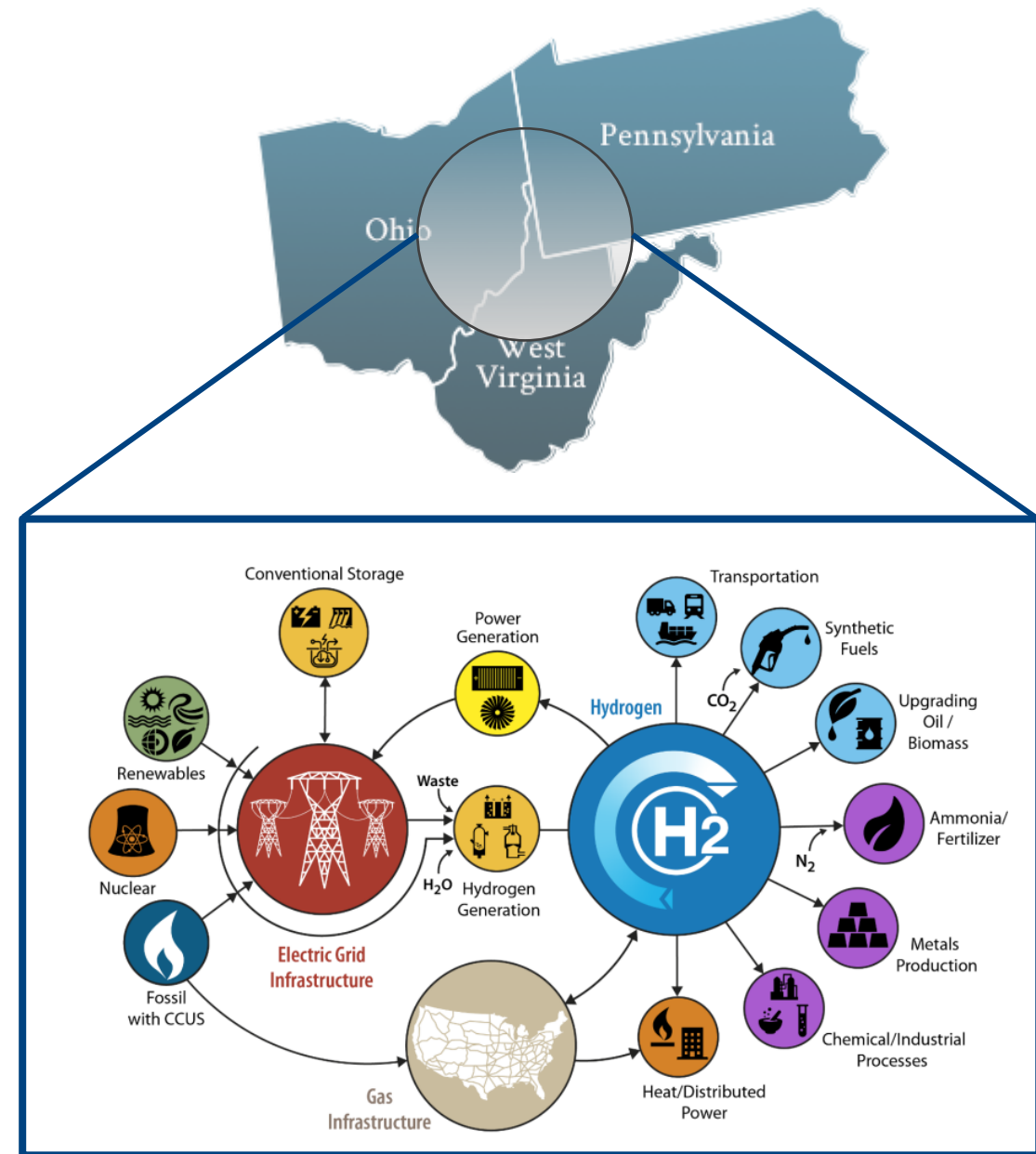
Dr. Neeraj Gupta

- Technical Director Carbon Management
- 30 years carbon management and subsurface exploration experience
- Principal Investigator for numerous DOE projects and partnership programs

# H2 Hub Defined

# H2 Hub Defined

- The Bi-Partisan Infrastructure Law defines a “regional clean hydrogen hub” as “a network of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity.”
- To support:
  - The Biden Administration’s goal to achieve a carbon-free electric grid by 2035 and a net zero emissions economy by 2050.
  - The creation of good-paying jobs with the free and fair choice to join a union, the incorporation of strong labor standards, and training and placement programs, especially registered apprenticeship.
- H2 Hubs shall:
  - Demonstrably aid the achievement of the clean hydrogen production standard
  - Demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen, and
  - Can be developed into a national clean hydrogen network to facilitate a clean hydrogen economy.





# H2 Hub Defined

BIL authorizes appropriations of \$8 billion over 5 years (2022-2026) for the development of H2Hubs.

## Feedstock Diversity

Produce clean hydrogen from:

1. fossil fuels
2. renewable energy
3. nuclear energy.

## End-Use Diversity

End-use of clean hydrogen in:

1. Electrical power generation
2. Industrial sector
3. Residential/Comm heating
4. Transportation sector

## Geographic Diversity

- Located in different U.S. regions
- Use energy resources abundant in the region

## Additional Criteria

- At least 2 hubs in regions with greatest natural gas resources
- Priority to hubs likely to create long term employment to greatest number of residents

DOE must solicit proposals within 180 days of the BIL enactment and make at least four selections within a year of proposal receipt.

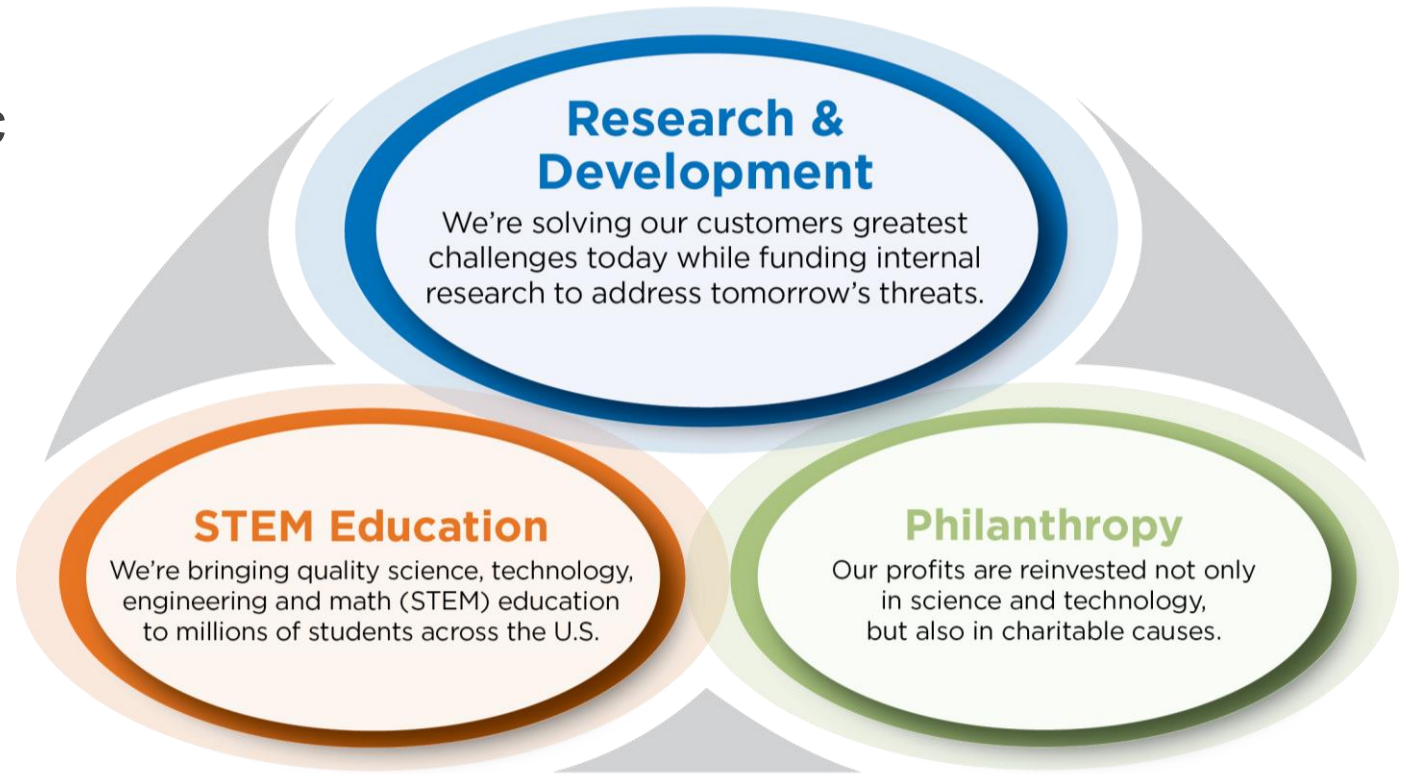
# Battelle Introduction

# Our mission and purpose

- Nonprofit, charitable trust formed in 1925
- Headquartered in Columbus, OH
- Our mission: To translate scientific discovery and technology advances into societal benefits



Gordon Battelle, Founder



# Our work

## Managing National Labs

Brookhaven National Laboratory

Oak Ridge National Laboratory

Pacific Northwest National Laboratory

Los Alamos National Laboratory

National Renewable Energy Laboratory

Idaho National Laboratory

Lawrence Livermore National Laboratory

National Biodefense Analysis Center

## Applied Science & Technology



ENVIRONMENT & INFRASTRUCTURE



NATIONAL SECURITY



HEALTH

## Philanthropy and Education

- STEM Education
- Charitable Giving
- Volunteerism





# Our qualifications

- Decades of experience working with the DOE and other Federal Government customers on large, complex infrastructure programs.
- Demonstrated success leading large collaborative Midwest regional partnerships and initiatives on behalf of DOE.
- Well experienced with programs involving complex regulatory and compliance issues, such as permitting, NEPA, safety, etc.
- More than twenty years of experience conducting science and technology research and development (R&D) to advance subsurface storage applications.
- As a non-profit, we execute objectively, managing the collective needs of all stakeholders while achieving our clients' expectations.

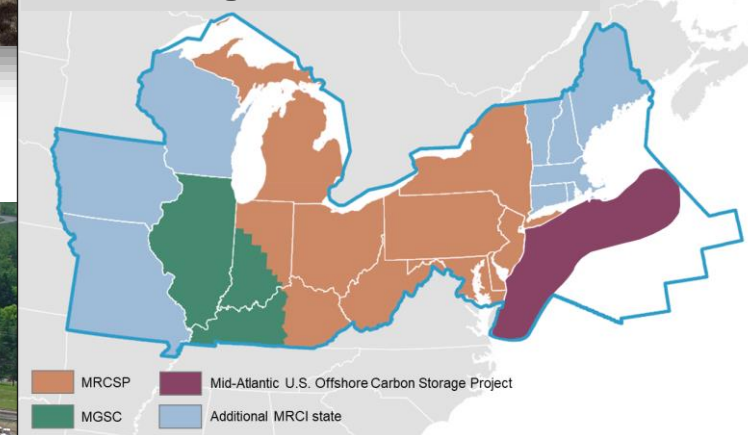
## National Ecological Observatory Network



## Arctic Research & Logistics Services



## Midwest Regional Carbon Initiative



Subsurface carbon storage

# Summary of DOE RFI

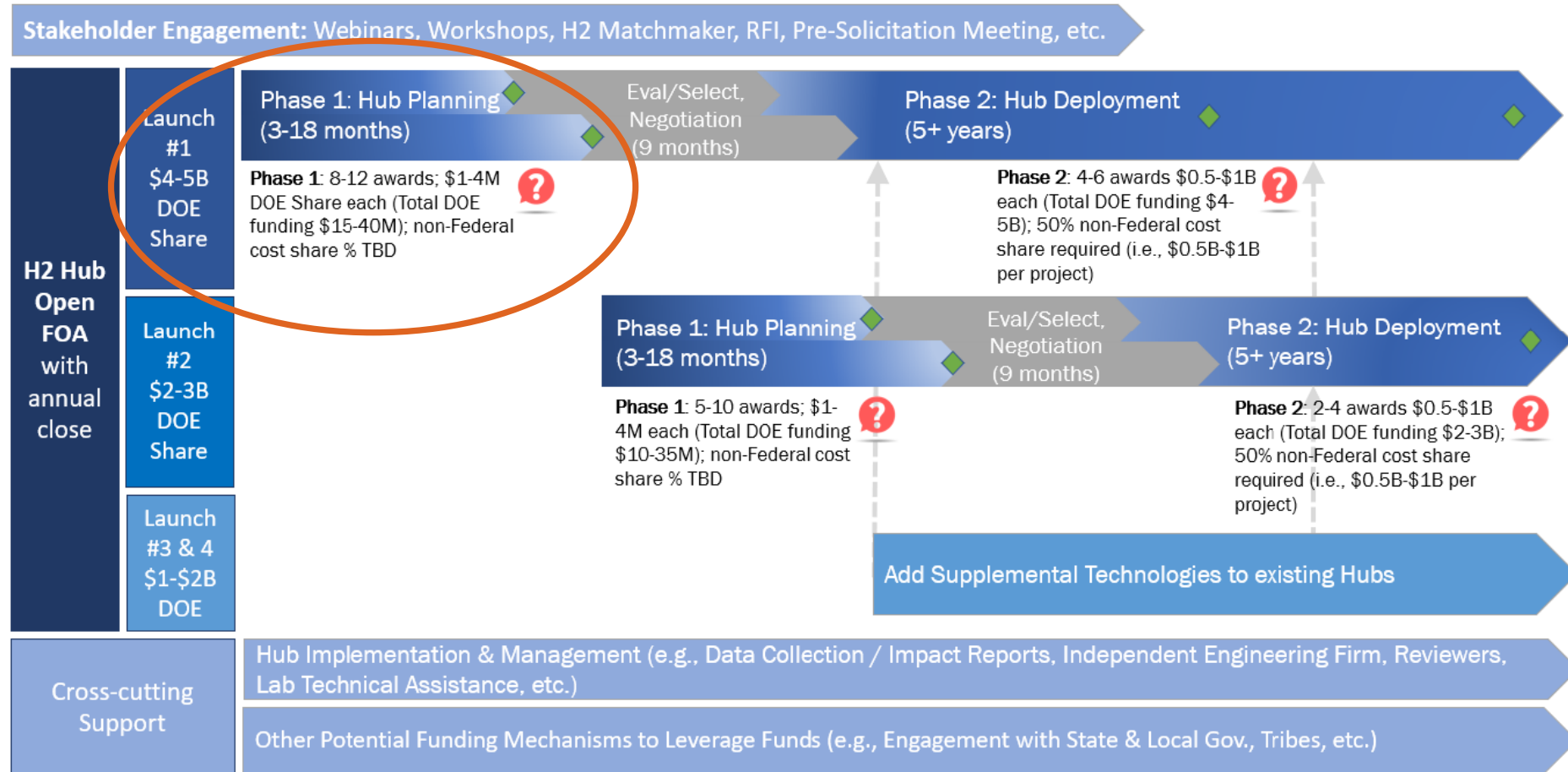
# Regional Clean Hydrogen Hubs Implementation Strategy

- Request for Information # DE-FOA-0002664
- Issued: February 15, 2022
- Responses Due: March 8<sup>th</sup>, 2022, 5 PM ET to [H2Hubs@ee.doe.gov](mailto:H2Hubs@ee.doe.gov)
- RFI Intent: to obtain input regarding the solicitation process and structure of a DOE Funding Opportunity Announcement (FOA) to fund regional clean hydrogen hubs
  - 15 pages in length, 12-point font, 1-inch margins.
  - Draft FOA expected in May 2022 and a Pre-Solicitation Meeting to solicit additional public input before publishing the FOA later in 2022.

# Draft FOA Strategy

## Potential H2 Hub FOA Strategy (DRAFT) **\*\*All funding amounts are approximate and subject to change**

◆ "Go/No-Go" Decision Points



H2Hubs solicitation could be structured as a single, multi-year FOA with annual open and close dates for different “launches” over the FY 2022 – 2025 timeframe

# Phase 1 – Hub Planning

- \$1 to \$4M DOE share for each potential H2Hub, plus required cost share (% cost share TBD)
- Approximately 3-18 months
- Goal at the end of Phase 1 - full plan ready for the roll-out of the hub in Phase 2 to Include:
  - Analysis of key metrics such as the *decarbonization* potential and *energy resources/infrastructure/workforce* in the proposed region.
  - Preliminary engineering, construction and deployment designs. – (Pre-FEED or Project Definition?)
  - Potential critical reviews, approvals, or negotiations such as *NEPA, financing, permitting, safety, partnering agreements, power purchase agreements, long-term hub sustainability* have been evaluated and addressed as much as practical.
- Phase 2 would be Hub Construction and Deployment.
  - Anticipate awarding *4-6 Phase 2 projects in Launch 1 and an additional 2-4 Phase 2 projects in Launch 2* ( total goal of 6-10 phase 2 projects)
  - Awards from \$500M to \$1B to allow for a range of regional hub sizes and complexities



# RFI Categories

- **Category 1: Regional Clean Hydrogen Hub Provisions and Requirements**
  - Further breakdown the definition of Clean Hydrogen Hub such as providing a definition of close proximity, describing types of infrastructure and activities for sustainability.
  - Specify CO<sub>2</sub>e/kg H<sub>2</sub> anticipated at the point of production. Develop metrics of success in achieving emission reductions. Describe challenges of measuring CO<sub>2</sub> emissions as well as policy/infrastructure roadblocks . Describe pros and cons of having 4 hubs vs. 6-10 hubs of varying sizes.
  - Feedstock Diversity: Discuss if a minimum level of hydrogen production per hub should be established. Should DOE prioritize historic fossil fuel regions? How would production be constrained by the availability of clean electricity or natural gas supply and distribution?
  - End Use: Provide approaches to off-taker commitments and define how to assess climate benefits of different hydrogen end uses.
  - Describe if DOE should define regions and, if so, how. Provide requirements on what qualifies as a region with the “greatest natural gas resources”. Describe how can H<sub>2</sub>Hubs meet employment goals.

# RFI Categories

- **Category 2: Solicitation Process, FOA Structure, and H2Hubs Implementation Strategy**
  - Provide input on funding mechanisms, review criteria, implementation strategy ( such as the multiple launch approach, requirements of Phase 1 v. Phase 2) , and funding levels.
  - Describe manufacturing, safety, community engagement needs.
- **Category 3: Equity, Environmental and Energy Justice (EEEJ) Priorities**
  - Address how strategies, policies, practices on H2Hubs can support EEEJ goals.
  - Develop metrics and evaluation criteria to track EEEJ progress.
  - Describe EEEJ concerns or priorities most relevant for the H2Hubs.
- **Category 4: Market Adoption and Sustainability of Hubs**
  - Describe mechanisms that could incentivize market-based supply and demand.
  - Provide input on how to demonstrate a path to economic viability for H2Hubs after funded phases.
- **Category 5: Other**

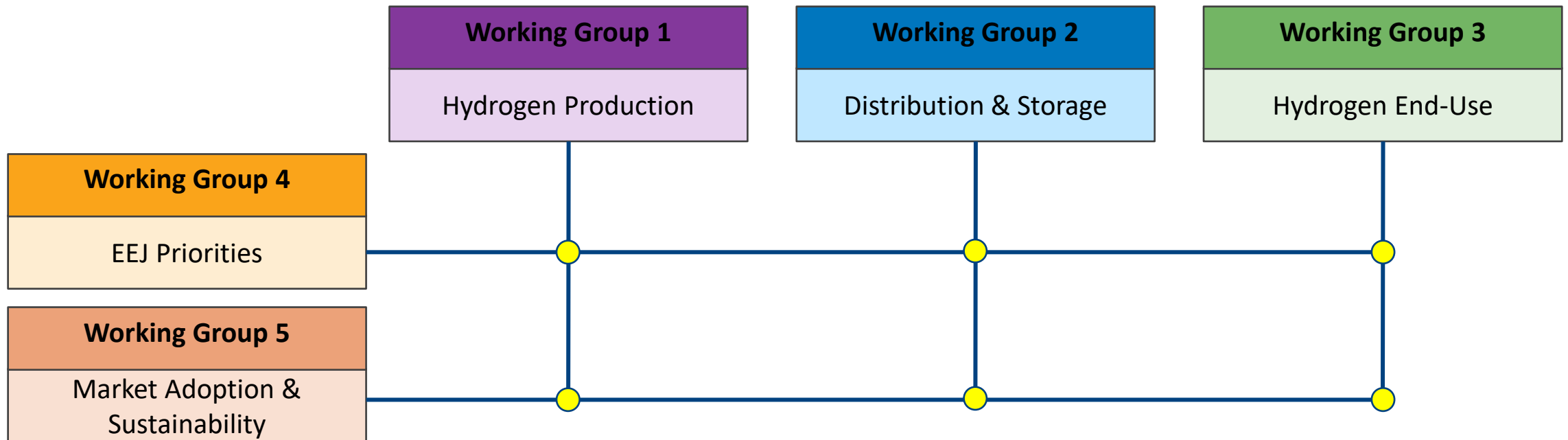
# RFI High Level Talking Points -

- Northern Appalachian/Upper Ohio Valley Corridor - parts of three states (E. Ohio, W. PA, N. WV as core area). A region connecting multiple projects under one umbrella hub
- Blue Hydrogen – largest natural gas producing area with Marcellus and Utica Shales. Possible use of coal, waste coal, biomass co-firing. Extensive subsurface and surface infrastructure as a foundation
- Full value chain for blue H<sub>2</sub> possible – production, transport, multiple end uses
- Proximity – determined by fossil infrastructure in the region – can't be just one plant and one user.
- Scalability to national network – possible in this region, connection to east coast, Midwest, and S. Appalachian regions
- Fully engaged industry with net-zero commitments and willingness to lead the energy transition
- Needs to be industry driven, community accepted, and policy enabled
- Need to show strong/direct connection to job creation, EJ, engagement – local colleges, training centers, trade unions, and community leaders.
- We strongly encourage coordinated response, with core messages and selected inputs based on respondent areas of expertise/interest. We also need input from stakeholders and subject matter experts.

# Path Forward

# Path Forward

- Coordinated RFI response → Due March 8
- Administer survey → Immediately after this meeting
- Hold workshops → Starting mid-March





***BATTELLE***

**It can be done**