



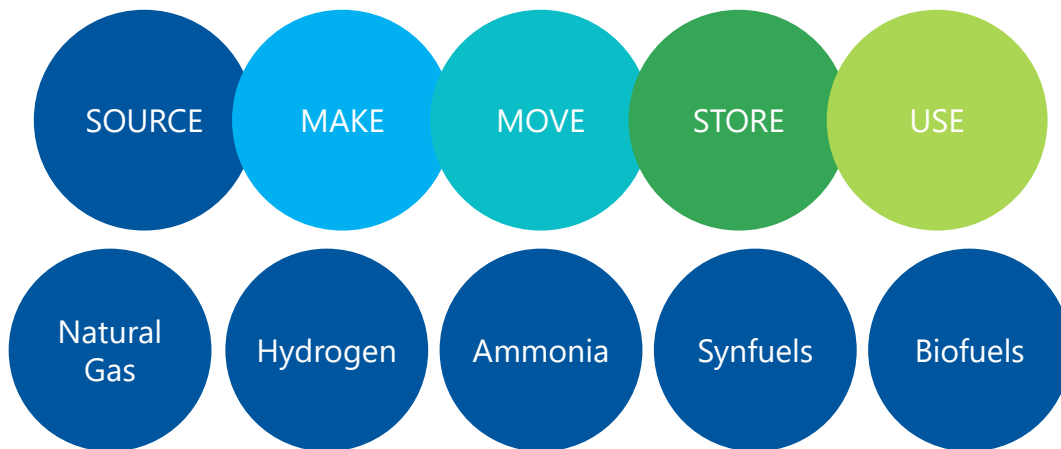
U. S Hydrogen Hubs- Summary & GTI Energy Roles

G. (Subbu) Subbaraman
Institute Fellow and Project
Development Director

Ammonia Energy Association
Global Certification Standards and Schemes
November 12, New Orleans LA



- Non-profit energy research center since 1941
- Headquartered in Des Plaines, IL
- 500 enterprise employees
- Our research

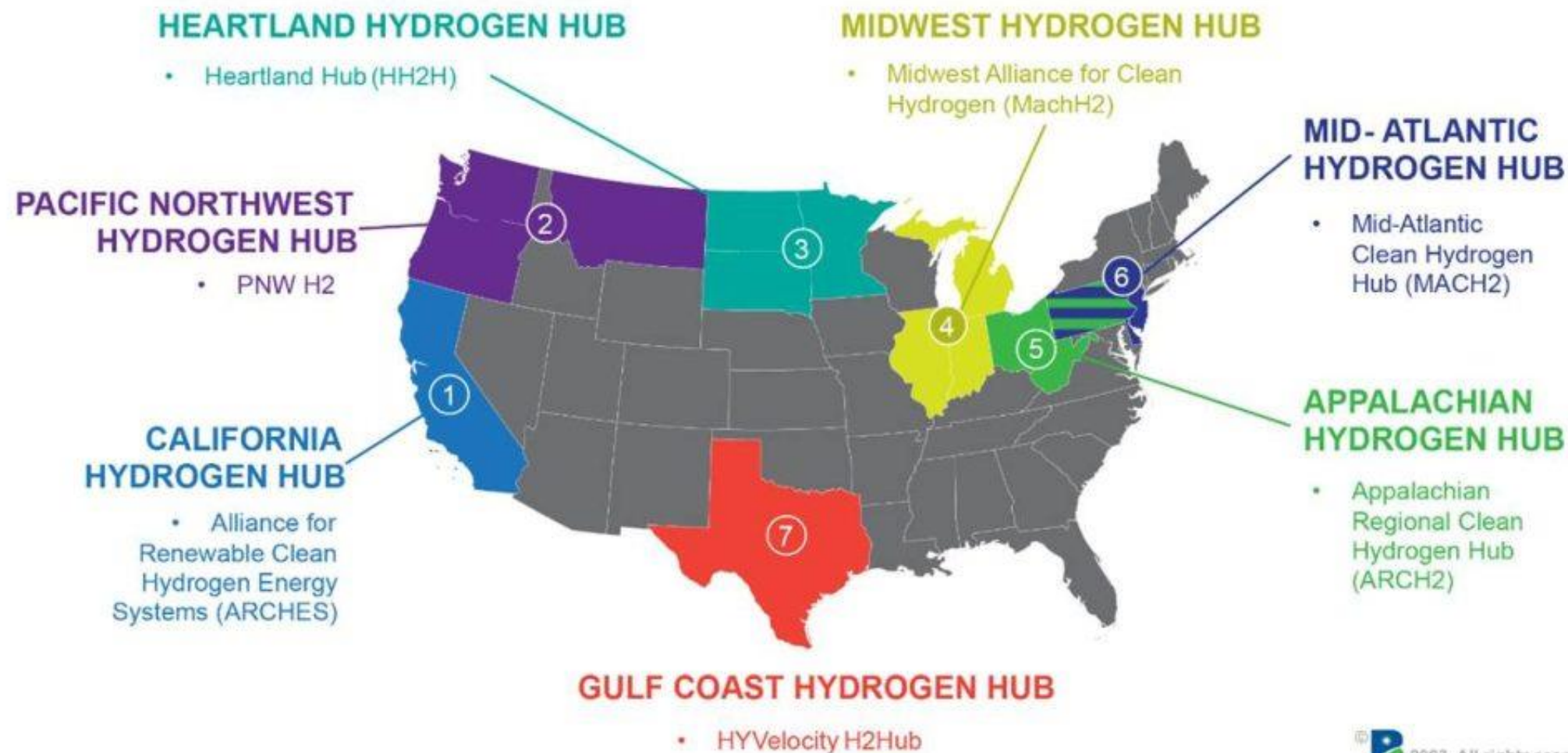


Accelerating developments needed to produce, store, deliver and use low-carbon alternative energy carriers

Ammonia Portfolio

- AEA members since 2019, attendees since 2017
- FEED on WVR 1600mtpd ammonia plant
- ARPA-E ammonia cracking membrane reactor with RPI and U South Carolina
- GTI Patented System and Method to Synthesize Ammonia, US 10,974,970 B2
- US DOE funded Gas Turbine Ammonia Combustion Project with partners Electric Power Research Institute, Georgia Institute of Technology, University of Central Florida, and CrafTech Industries, Inc.
- Ammonia as aviation fuel project with RTX, APRA-E
- NH_3 based heat pump(s) development and deployment
- Hydrazine Fuel Cell Program with Diahatsu (2007-2010)

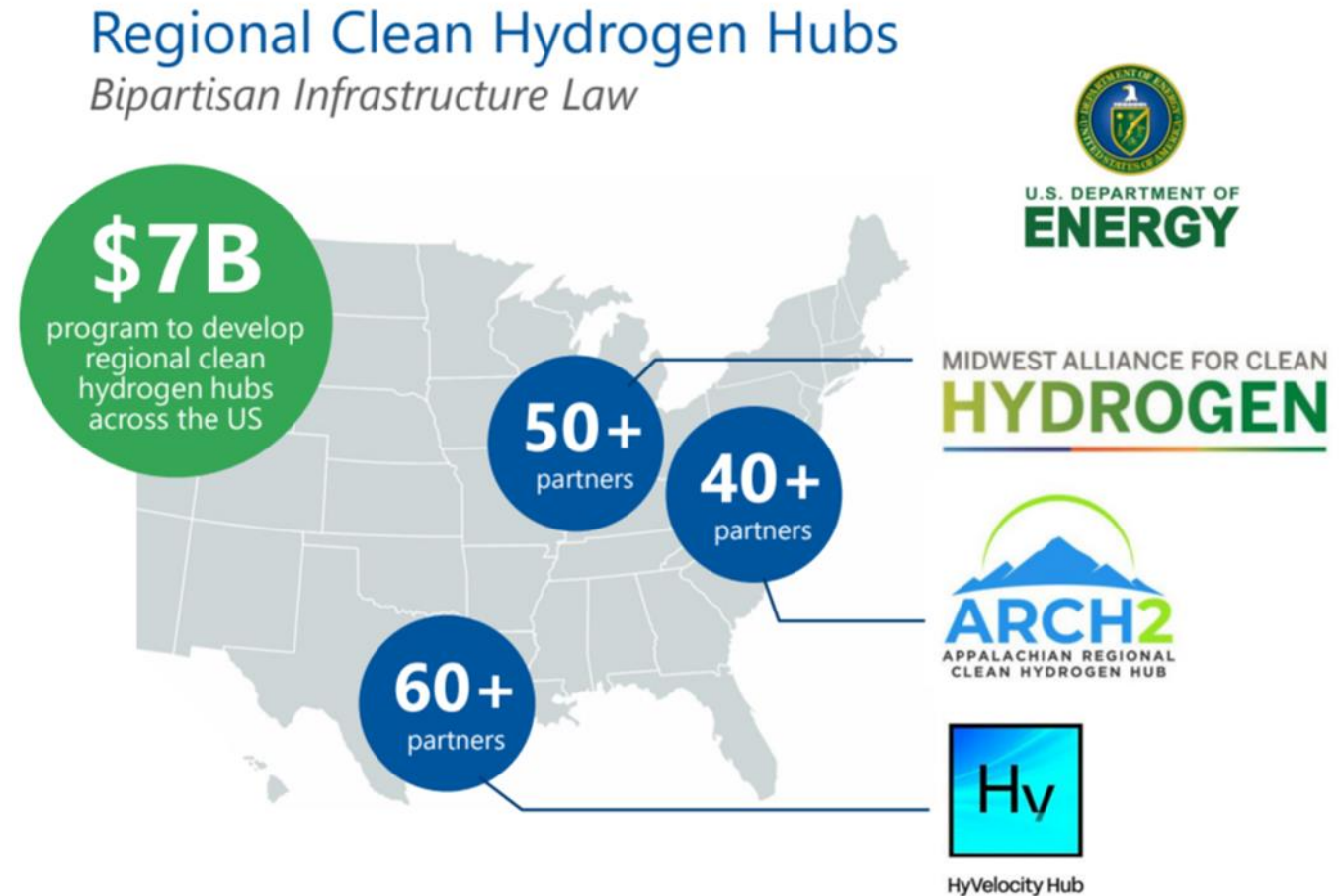
DOE CLEAN HYDROGEN HUBS SELECTED OCT 2023



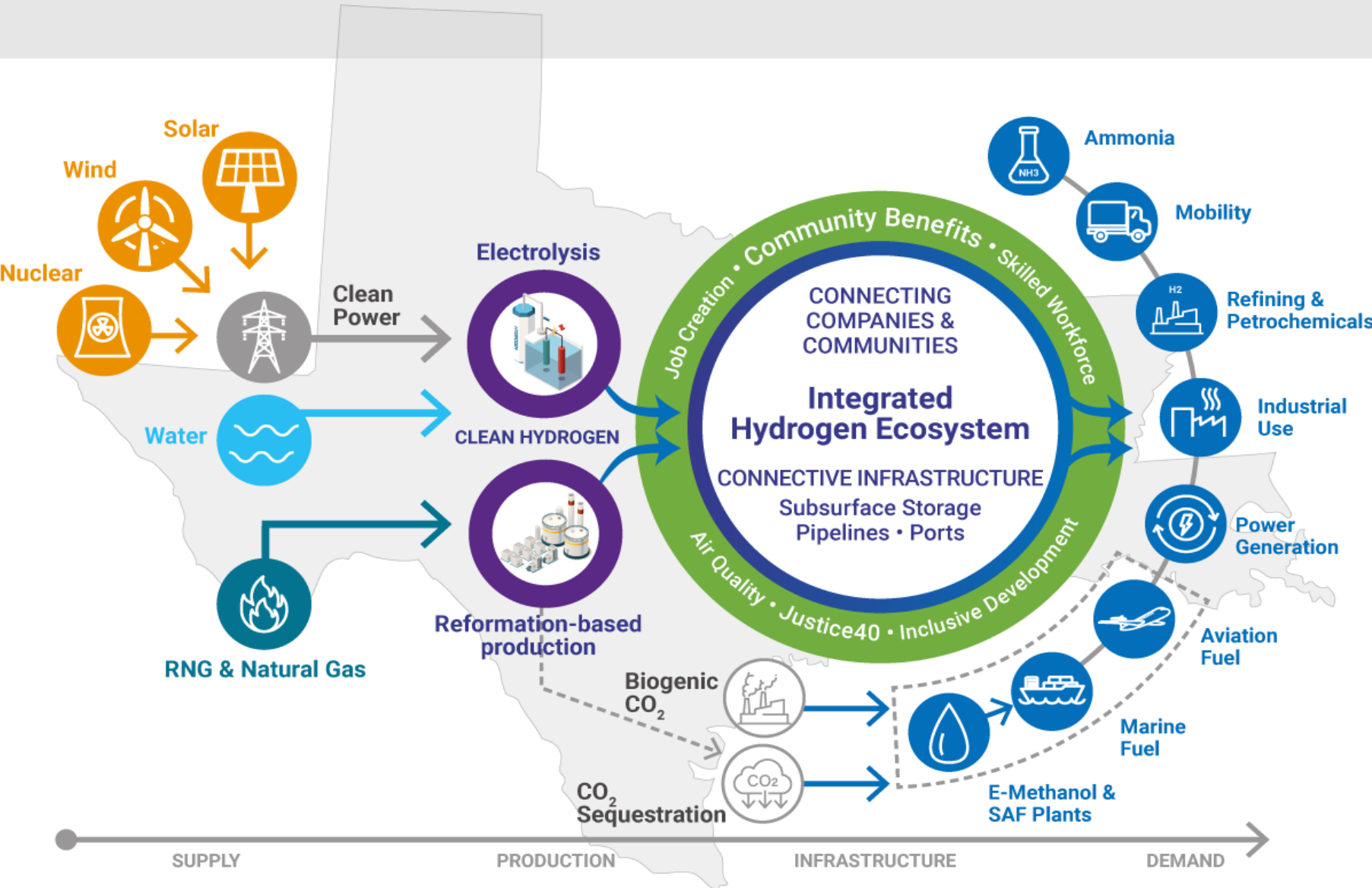
GTI Energy is a part of three Regional Hydrogen Hubs



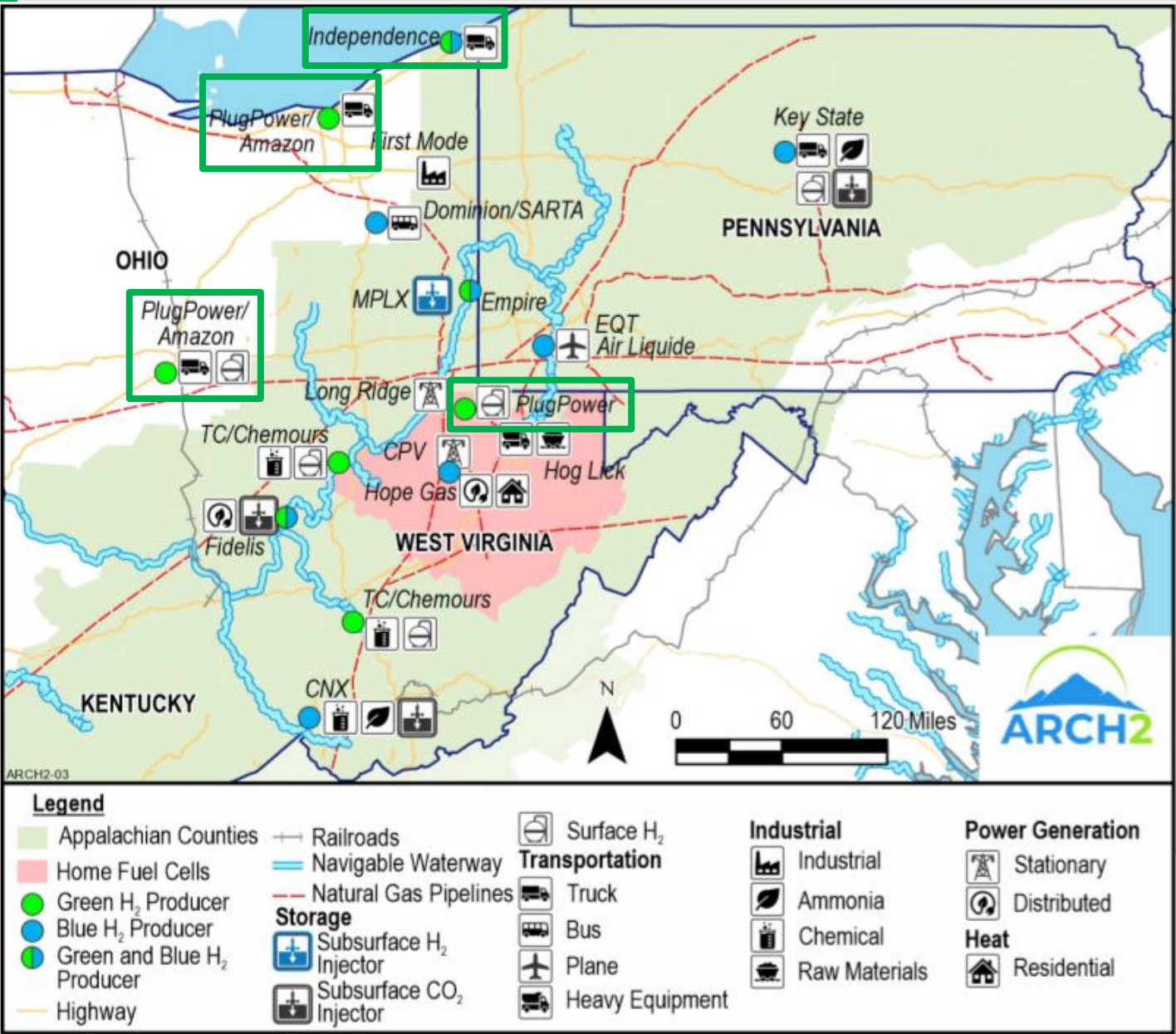
- HyVelocity
 - Program management/Hub lead
 - Hub Administrator
- ARCH2
 - Technical Lead for
 - Engineering Procurement & Construction Operations
 - Technical Data Analysis
 - Justice 40
- MachH2
 - SWITCH Project lead
 - Equity Justice Officer



HyVelocity Envisioned Projects



ARCH2 Envisioned Projects



PROGRAM MANAGEMENT AND TECHNICAL SUPPORT	
PROJECT DEVELOPERS	
ARCH2 ECOSYSTEM	
Executive Board	
Advisory Board	
Educational Alliance	
Transit Authorities	
Connective Infrastructure	
Community/Business Groups	

Note: Proposed project locations based on preliminary siting are subject to change during the detailed planning phase (phase 1).

MachH2 Projects

Projects to Establish and Integrate the Regional H2 Hub

- 1 **Nuclear-Powered Electrolysis**
Constellation Energy
- 2 **Liquid H2 to Decarbonize Midwest Logistics**
Invenergy and Air Liquide
- 3 **Northern Indiana Clean H2 Node**
bp
- 4 **SWITCH – Solutions Working to transform Industry and Transportation to Clean H2**
GTI Energy

Projects to Decarbonize Midwestern Transportation Corridors

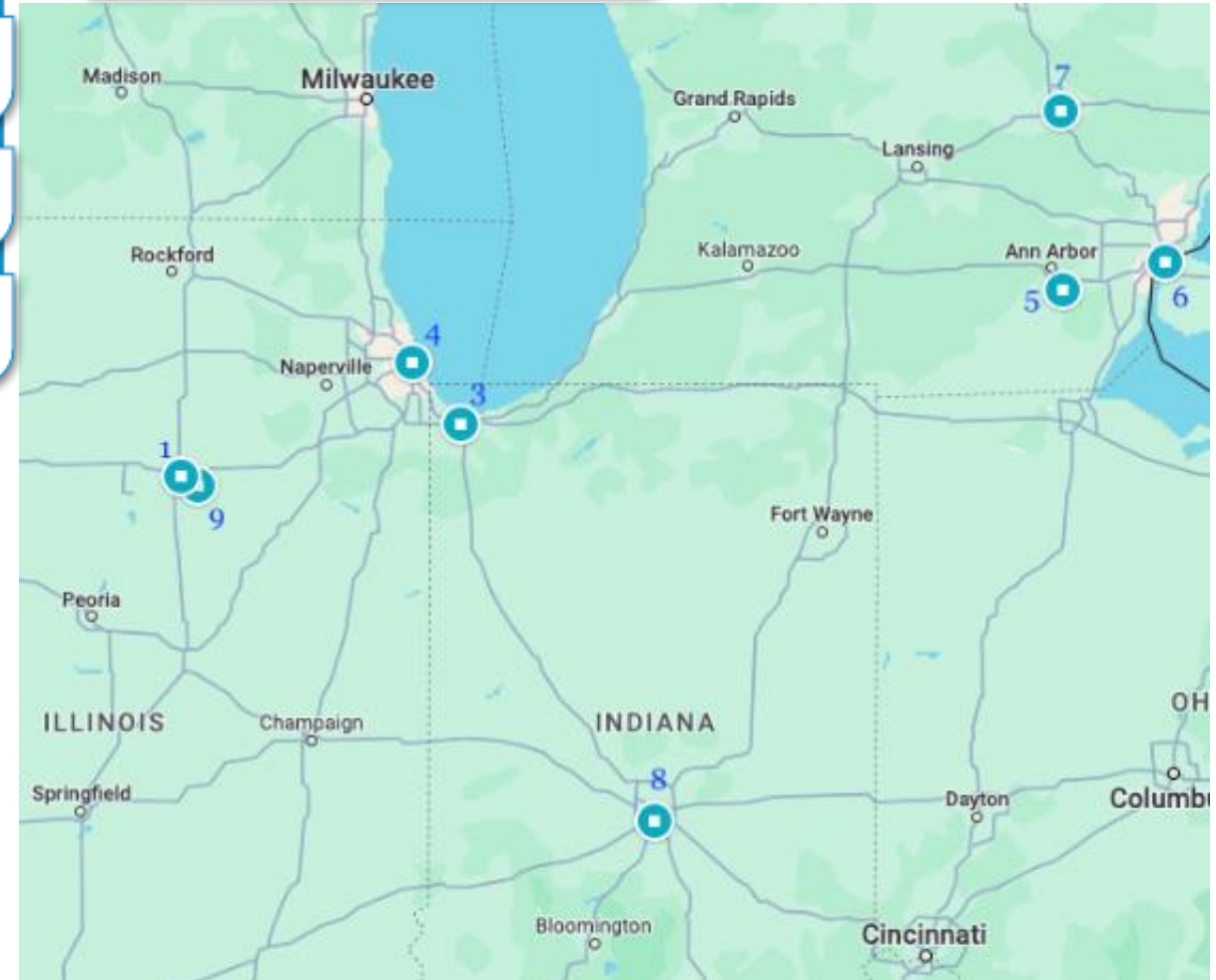
- 5 **H2 for MI Freight and Transit**
American Center for Mobility (ACM)
- 6 **H2 Truck Stop of the Future**
Michigan Infrastructure Office (MIO)
- 7 **H2 Fueling Station Expansion**
Mass Transportation Authority (MTA)
- 8 **Midwest Mobility Project**
Midwest Hydrogen Corridor Coalition, LLC (MHCC)

Projects to Decarbonize Industrial Processes and Products

- 9 **H2 Pipeline Distribution and End Use**
Nicor Gas

Information accurate as of August 7, 2023, note that project 2 location TBD

H ₂ Use	Location	Description
Industrial	Streator, IL	Glass
Industrial	East Chicago, IN	Building Materials
Transportation	Manteno, IL	Regional Trucking
Transportation	McCook, IL	Regional Trucking and Warehouse





GTI Energy develops innovative solutions that transform lives, economies, and the environment

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