



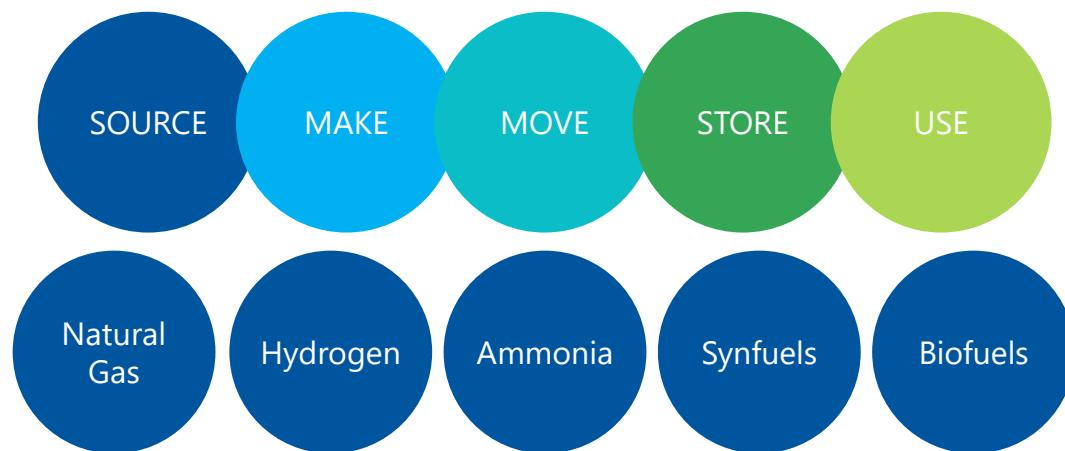
U. S Hydrogen Hubs- Summary & GTI Energy Roles

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

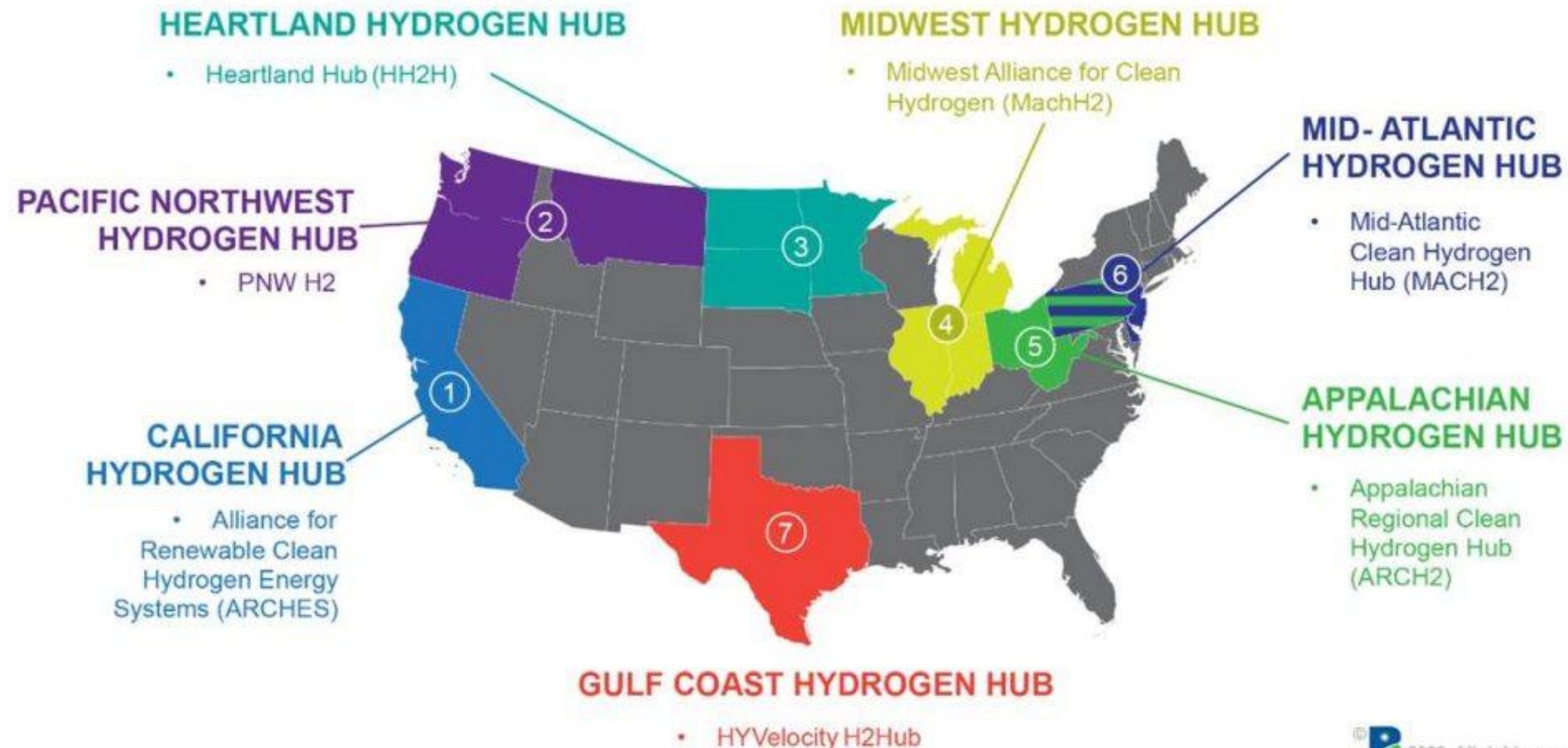


Accelerating developments needed to produce, store, deliver and use low-carbon alternative energy carriers

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

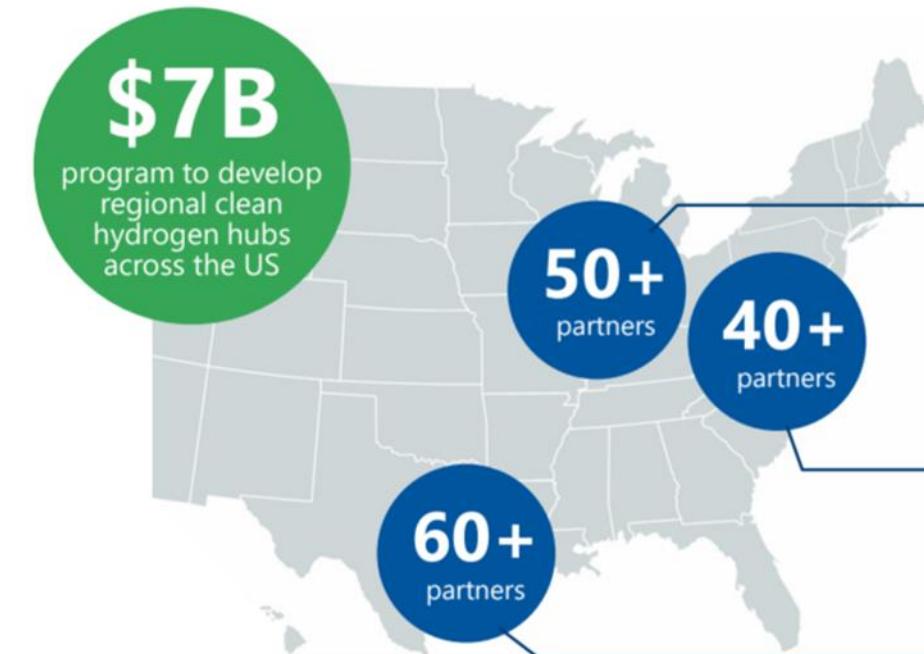


GTI Energy is a part of three Regional Hydrogen Hubs



- 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

Regional Clean Hydrogen Hubs *Bipartisan Infrastructure Law*



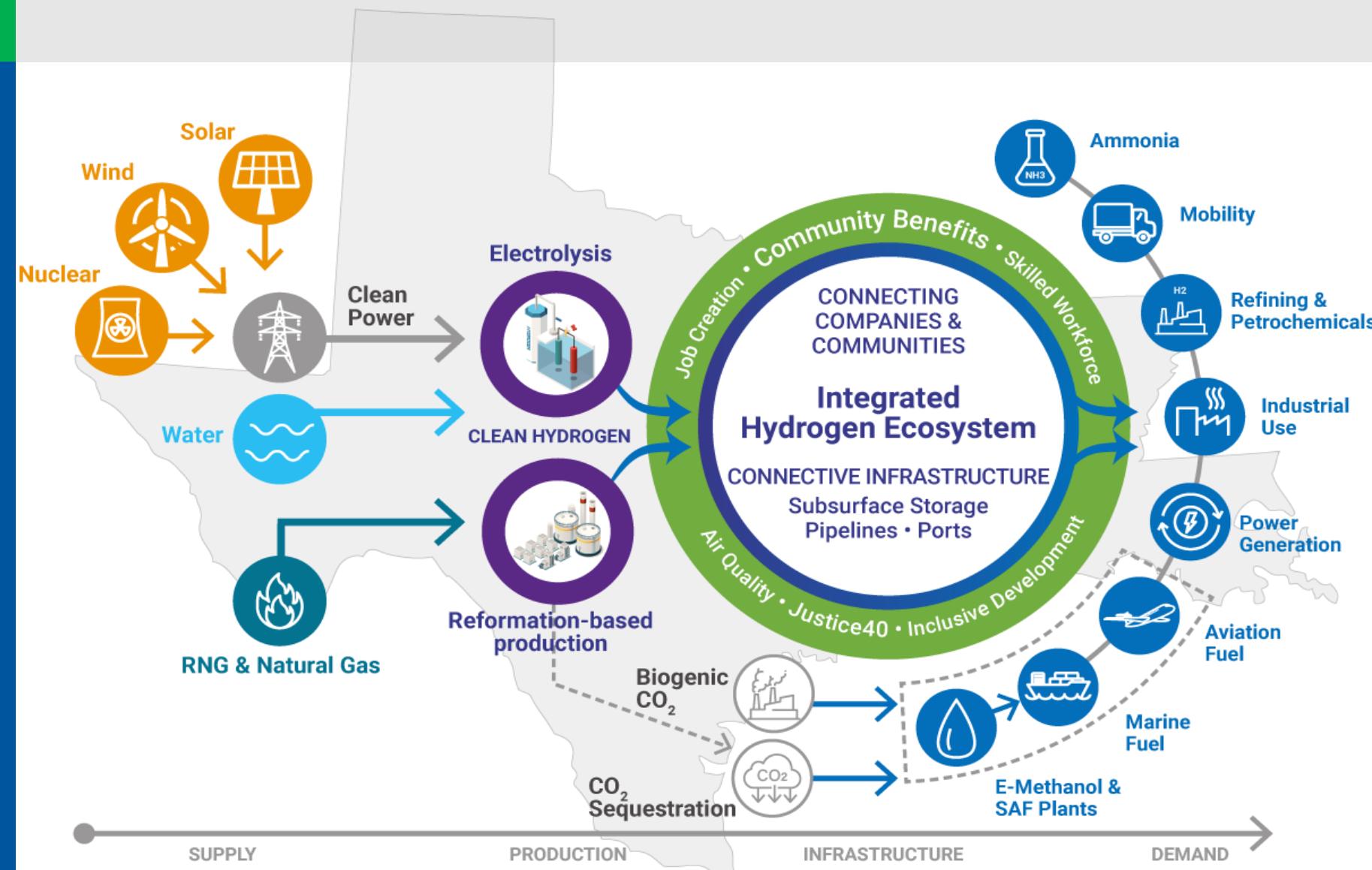
U.S. DEPARTMENT OF
ENERGY

MIDWEST ALLIANCE FOR CLEAN
HYDROGEN

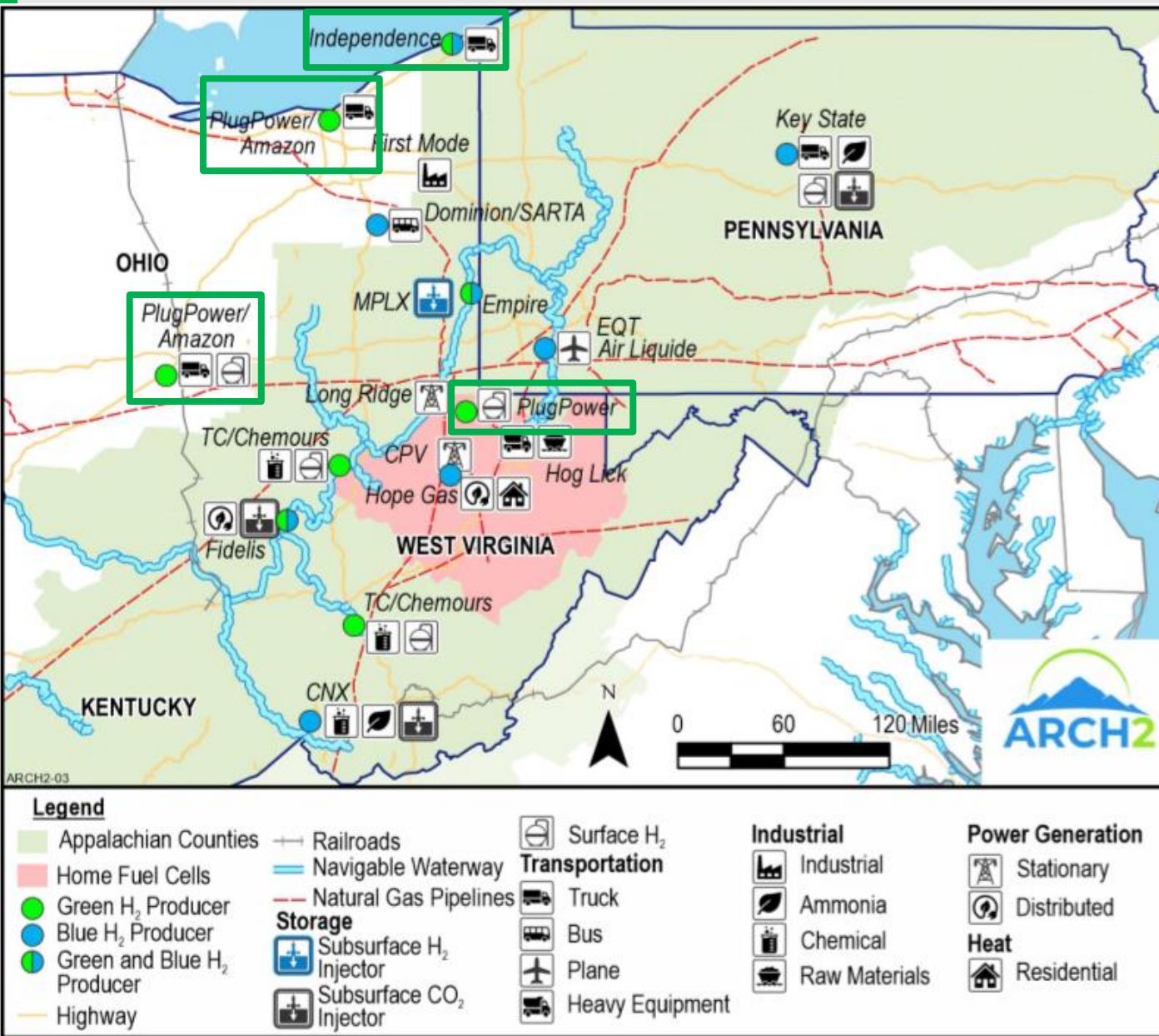

ARCH2
APPALACHIAN REGIONAL
CLEAN HYDROGEN HUB


HyVelocity Hub

HyVelocity Envisioned Projects



ARCH2 Envisioned Projects



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
Midwestern 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)

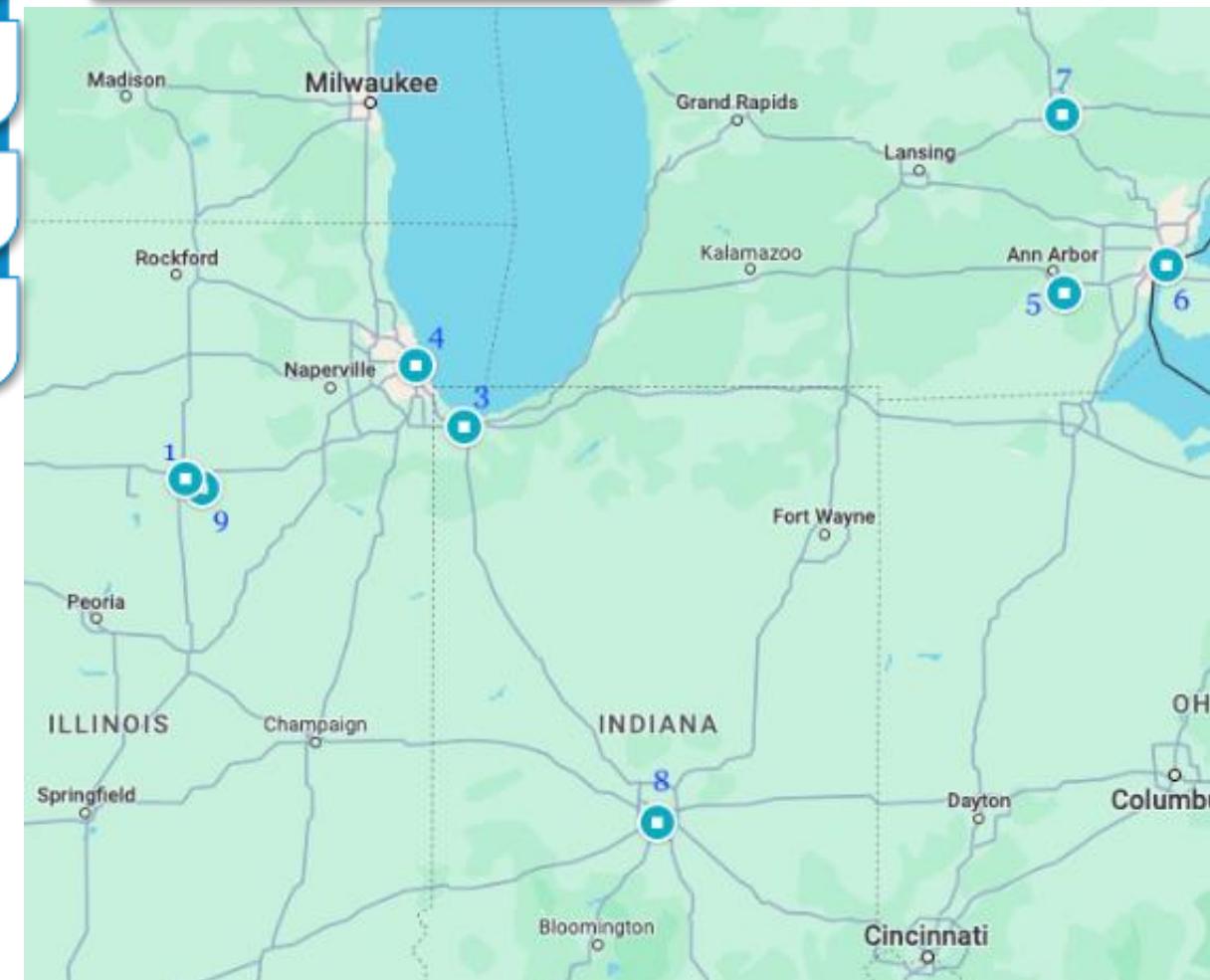
8 Midwest Mobility Project
Midwest Hydrogen Corridor
Coalition, LLC (MHCC)

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

H2 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

solutions that transform

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

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