



GTI ENERGY

solutions that transform

Regional Hydrogen Hubs

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GTI Energy

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Hydrogen Hubs Opportunity

Catalyze collaborative platforms for launching low carbon fuels

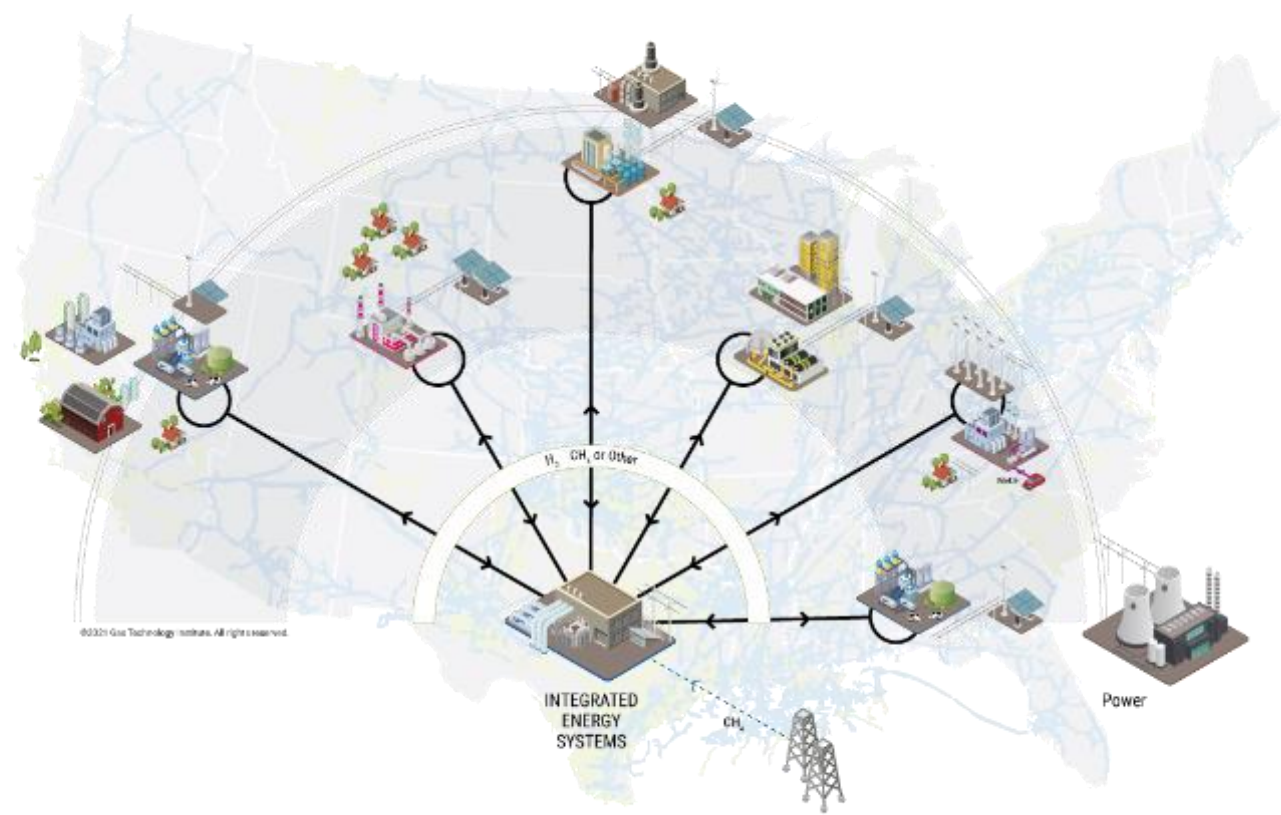
Leveraging existing energy infrastructure for advancement of emerging technologies

Market impact through deployment of commercial scale solutions

Creation of ecosystems needed for energy systems of the future

Intersection between tradition and innovation

Pathway for long-term growth







Hydrogen Hubs Announcement

- 7 Regional Hubs awarded – contract negotiations underway
- \$7 Billion Federal Funding and \$40 Billion cost share leverage from industry
- Represents 3 million metric tons of H₂ production, 25 million metric tons of CO₂ reductions = approx. 5.5 million gasoline cars' emissions
- GTI Energy is a part of 3 Regional Hydrogen Hubs
 - **HyVelocity (Gulf Coast Region)**
 - Program management/Hub lead & admin.
 - **ARCH2 (Appalachian Region)**
 - Deputy Program Manager - Technical lead for engineering, data analysis, Justice 40
 - **Mach H2 (Midwest Region)**
 - Develop and deploy the SWITCH Project: Solutions Working to transform Industry and Transportation to Clean Hydrogen
 - Equity Justice Officer



- Over 75 partners across 8 Midwest states, with projects concentrated in Illinois, Indiana, and Michigan.
- Rich diversity of existing and new clean generation resources including nuclear, renewables, and blue hydrogen production (natural gas with carbon capture and sequestration)
- Focused on decarbonizing sectors that are hard to decarbonize including heavy duty vehicles, aviation, and heavy industry (refining, steelmaking, and glassmaking).
- The Midwest brings together supply of clean energy, strong existing infrastructure, a highly skilled workforce, significant H2 demand, favorable geology and policy for carbon storage, and access to major freight routes

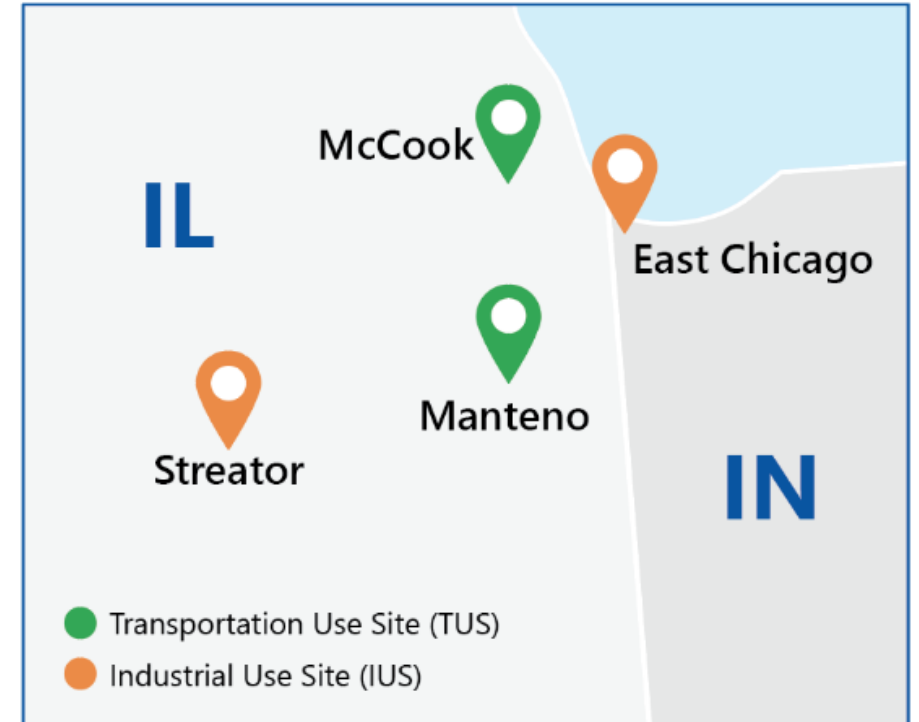
Major regional hydrogen value-chain partners In-place H2 offtake customers	Energy Feedstock • Renewables (wind) • Nuclear • Fossil fuels	End-Uses • Electrical power generation • Industrial • Transportation • Other (agricultural)	Production Technologies • Electrolysis • Thermal conversion	Connective Infrastructure • H2 pipelines • H2 carriers • Above ground H2 storage • H2 fueling stations
H2 technology RD&D expertise from leading National Labs and technology deployment organizations				
				
Leading research universities supporting workforce development and entrepreneurship				
				
Minority-serving Institutions (MSI) and DAC-serving institutions				
				
Local CBOs, non-profits, and government agencies				
				

Solutions Working “to transform” Industry and Transportation To Clean Hydrogen (SWITCH) Project as Part of MACH H2



Type	Location	Description	Initial Load	Load Potential
IUS	Streator, IL	Glass	1.9 tpd	9.4 tpd
IUS	East Chicago, IN	Building Materials	3.4 tpd	19 tpd
TUS	Manteno, IL	Regional Trucking	0.5 tpd (3 trucks)	3.4 tpd (60 trucks)
TUS	McCook, IL	Regional Trucking and Warehouse	0.1 tpd (2 trucks)	0.5 tpd (15 trucks)
		Totals	5.9 tpd	32.3 tpd

tpd = tons per day of hydrogen



GTI Energy Roles include:

- > Project Development, Management, and Deployment
- > Community Engagement – Lead Community Benefits Plan
- > Safety Training & Education – Jobs Creation

Take Aways

- Markets poised to form in **regional hubs** with significant and stable H2 demand
- Cost effective **H2 transportation and storage** is a necessity for widespread adoption
- Existing **natural gas infrastructure** can be leveraged in an Integrated Energy System to help to lower the cost of meeting our decarbonization goals.
- Increased hydrogen use will **require changes** in operations, engineering design, system maintenance procedures, etc, and limits must consider end use equipment tolerances
- Pipeline infrastructure is needed to enable increased variable **renewable energy** and to affordably serve difficult to decarbonize buildings and heavy industry
- Hydrogen offers opportunity to engage **local communities, create new sustainable jobs,** and next generation of energy leaders



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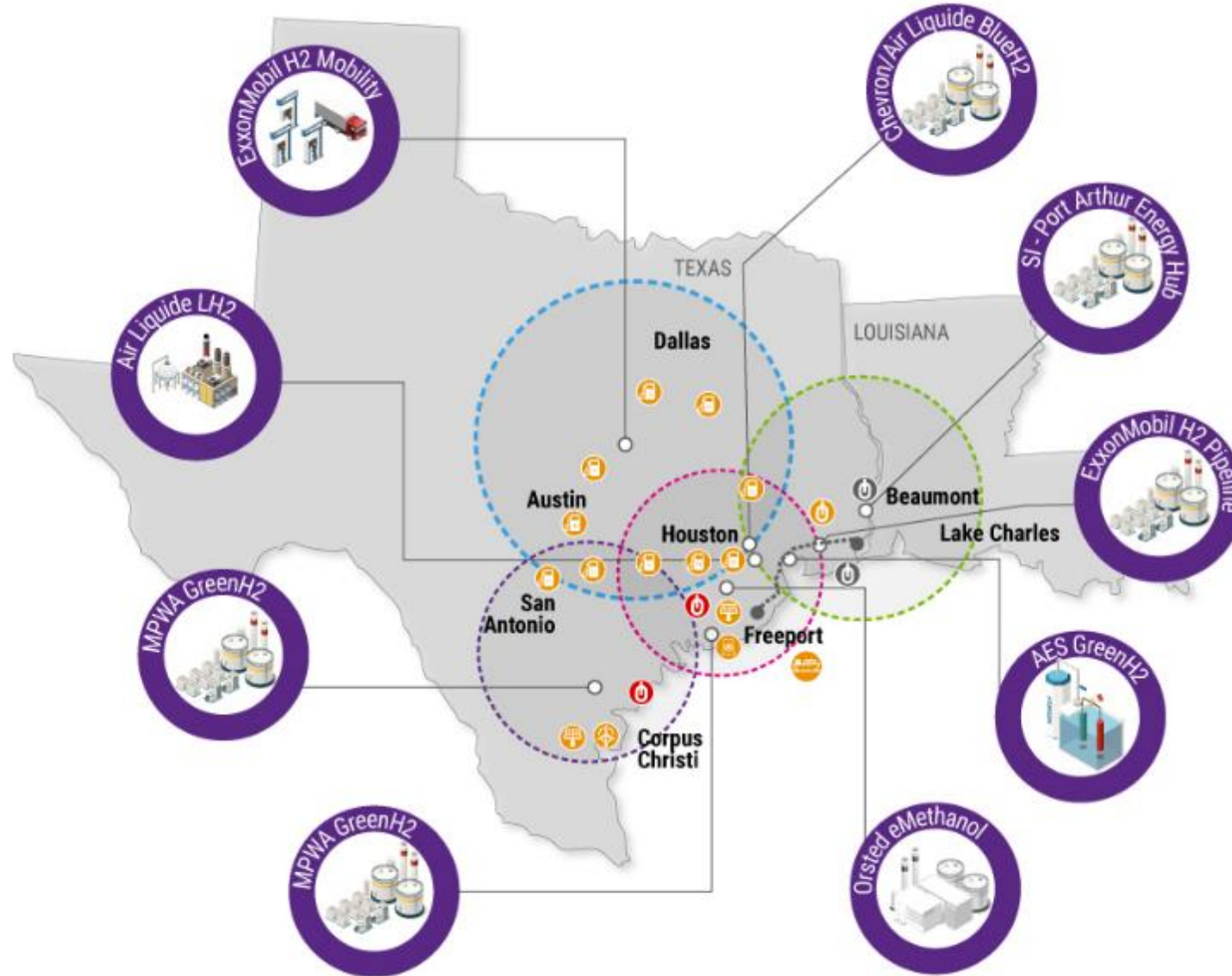
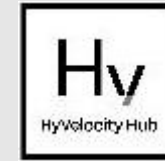
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GTI Energy develops innovative solutions that transform lives, economies, and the environment

HyVelocity Hydrogen Hub



- Corpus Christi Demand Cluster
- Houston Demand Cluster
- BPA-Lake Charles Demand Cluster
- TX Triangle Demand Cluster

HYVELOCITY HUB > INTEGRATED INFRASTRUCTURE

- Solar Farms
- Wind Farms
- CO2 Storage Cavern
- H2 Storage Cavern
- Future H2 Pipelines
- Future H2 Storage Cavern
- Maritime
- H2 Fueling Stations
- Nuclear
- HyVelocity Infrastructure Elements

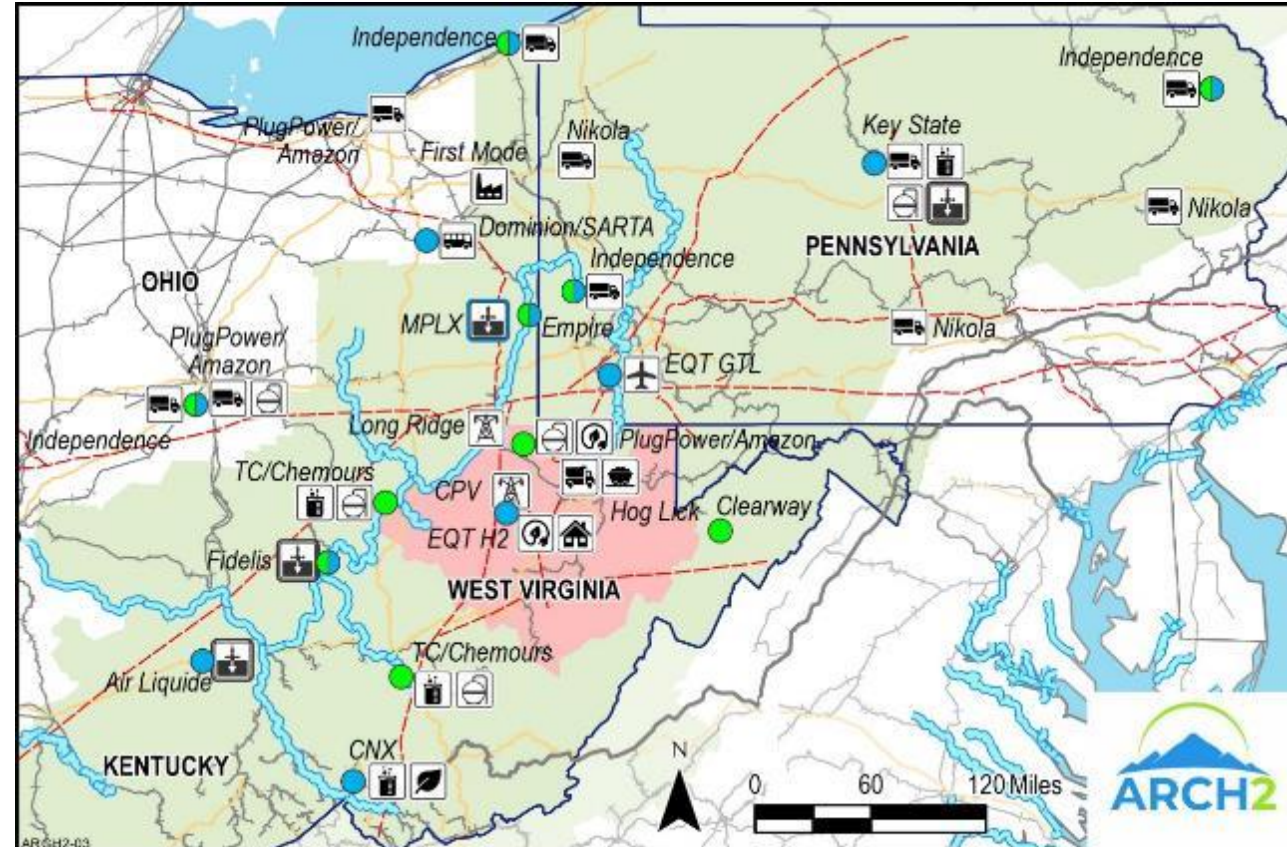
Appalachian Regional Clean Hydrogen Hub (ARCH2)



PROGRAM MANAGEMENT AND TECHNICAL SUPPORT

BATTELLE **AST** **NATIONAL ENERGY TECHNOLOGY LABORATORY**

PROJECT DEVELOPERS



Legend

Appalachian Counties	Railroads	Surface H ₂ Transportation	Industrial	Power Generation Stationary
Home Fuel Cells	Navigable Waterway	Bus	Fertilizer	Distributed
Green H ₂ Producer	Natural Gas Pipelines	Plane	Chemical	Heat Residential
Blue H ₂ Producer	Storage	Heavy Equipment	Raw Materials	
Green and Blue H ₂ Producer	Subsurface H ₂ Injector			
Highway	Subsurface CO ₂ Injector			