

Hydrogen Development: Western Inter-States Hydrogen Hub, Green and Blue Hydrogen, Opportunities and Concerns

PREPARED FOR SENATOR ELIZABETH "LIZ" STEFANICS,
CHAIR, WATER AND NATURAL RESOURCES COMMITTEE
(WNRC)

Luis Cifuentes

Vice President, Research, Creativity and
Economic Development

August 8, 2023

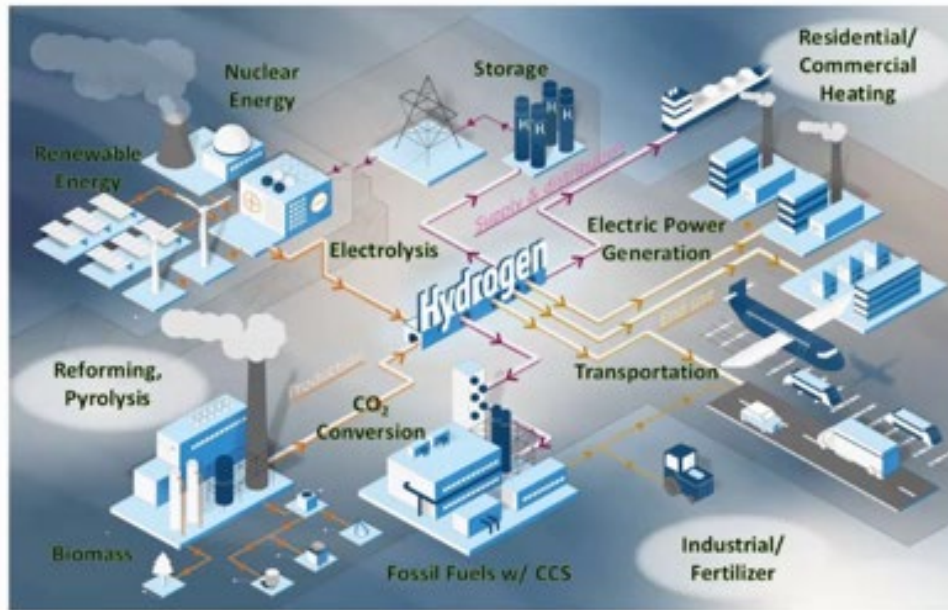
The logo for New Mexico State University, featuring the letters "NM" in a large, serif font above the words "STATE UNIVERSITY" in a smaller, sans-serif font. The logo is set against a white background within a dark red square.

NM
STATE
UNIVERSITY

BE BOLD. Shape the Future.

Hydrogen Hubs

Hubs Enable Multiple Feedstocks and End Uses



Additional Key Items beyond H₂ Technology:

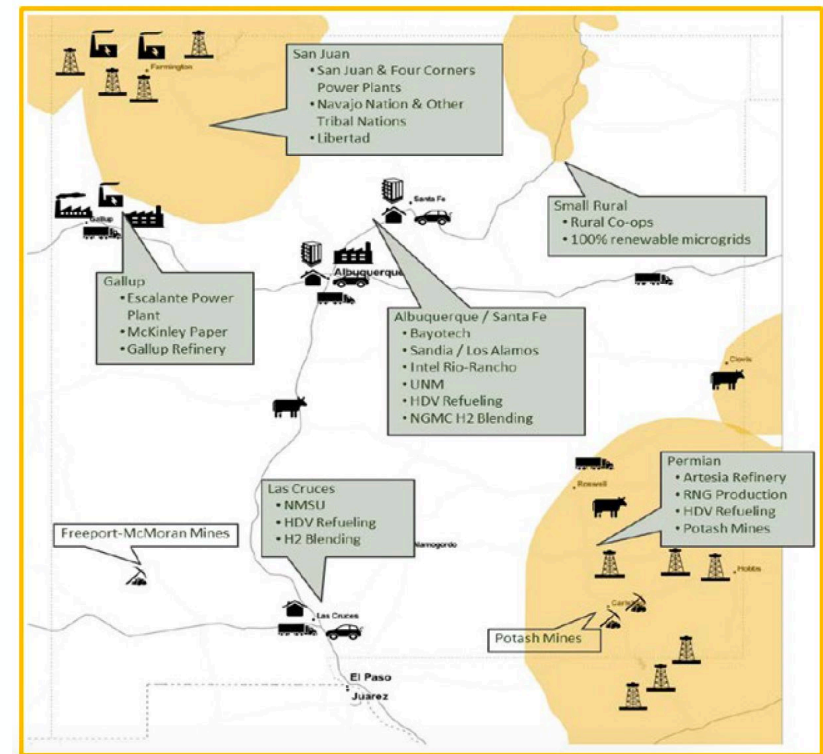
- Environmental Justice
- Community Engagement
- Job Creation
- Workforce Development
- Labor Standards
- Diversity, Equity, Inclusion
- Commercial Sustainability
- U.S. Manufacturing

Hydrogen Hub Criteria

- **Feedstock diversity** – at least one hub shall demonstrate the production of clean hydrogen from fossil fuels, one hub from renewable energy, and one hub from nuclear energy.
- **End-use diversity** – at least one hub shall demonstrate the end-use of clean hydrogen in the electric power generation sector, one in the industrial sector, one in the residential and commercial heating sector, and one in the transportation sector.
- **Geographic diversity** – each regional clean hydrogen hub shall be located in a different region of the United States and shall use energy resources that are abundant in that region.
- **Hubs in natural gas-producing regions** – at least two regional clean hydrogen hubs shall be located in the regions of the United States with the greatest natural gas resources.

Hydrogen Development in NM

- Can lead nation in Carbon Capture, Utilization and Sequestration (CCUS)
- Intrinsic geographic and infrastructure advantages
- Leverage opportunities to pair hydrogen production and renewable energy
- Opportunities for economic development



Western Interstate Hydrogen Hub (WISHH)

DOE Funding H2 Hubs Opportunity:

- Up to \$7 billion to establish six to 10 regional clean hydrogen hubs across America
- H2Hubs projects will demonstrate the production, processing, delivery, storage, and end-use

STATES: New Mexico, Colorado, Wyoming, Utah

CONNECTIVITY between east and west COASTS

CORPORATE PARTNERS in New Mexico:

Escalante/Tallgrass

Avangrid

Libertad

Navajo Agricultural Products Industries (NAPI)



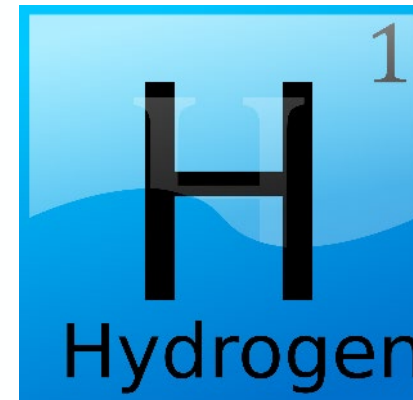
NAPI Transition to Hydrogen Energy Project

- A mission-critical project supporting the Navajo Nation and NAPI's pivot from high-economic dependency on coal-fired electricity power plants while increasing electricity reliability at lower future prices.
- Clean H₂ energy to build economic sustainability into NAPI - a large commercial farm owned by the Navajo Nation.

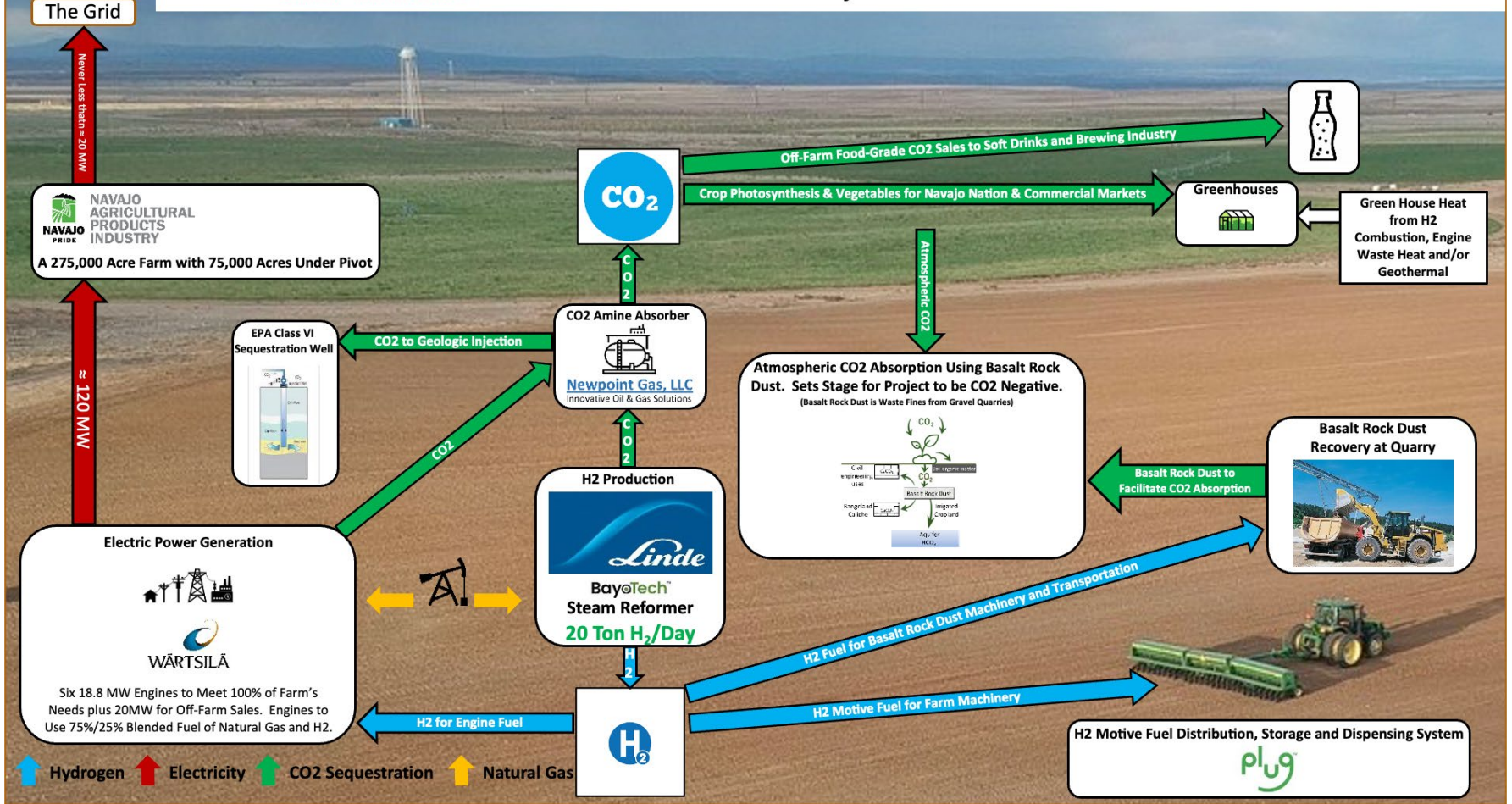


NAPI Transition to Hydrogen Energy Project

- Clean H₂ energy high-wage jobs in the Navajo Nation and San Juan County can replace lost high-wage jobs with the closing of San Juan Generating Station.
- Arizona Public Service Company is closing SJ County's remaining coal-fired power plant in 2031. Clean H₂ energy could replace lost revenue.



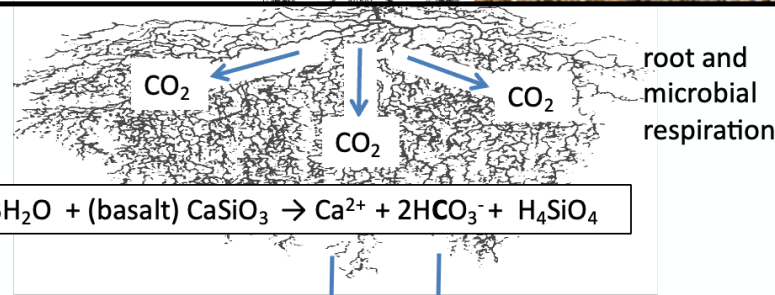
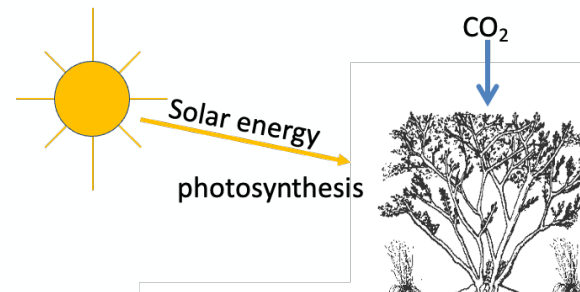
THE NAPI CLEAN H2 ENERGY TRANSITION DEMONSTRATION PROJECT – PHASE 3 YEAR 5 OR BEFORE TO COMPLETION



BE BOLD. Shape the Future.

Carbon Capture, Utilization and Sequestration (CCUS)

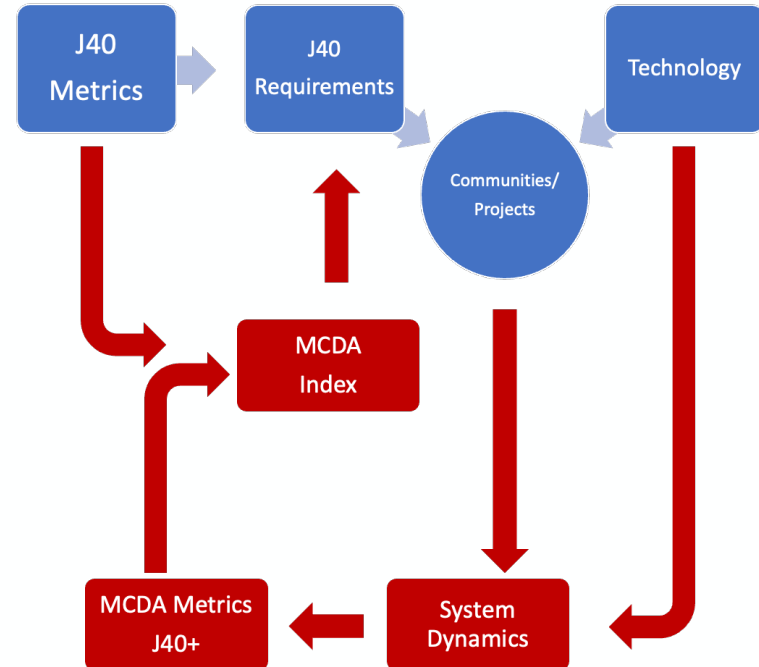
1. Cover Crops
2. Reduced Tillage
3. Biochar



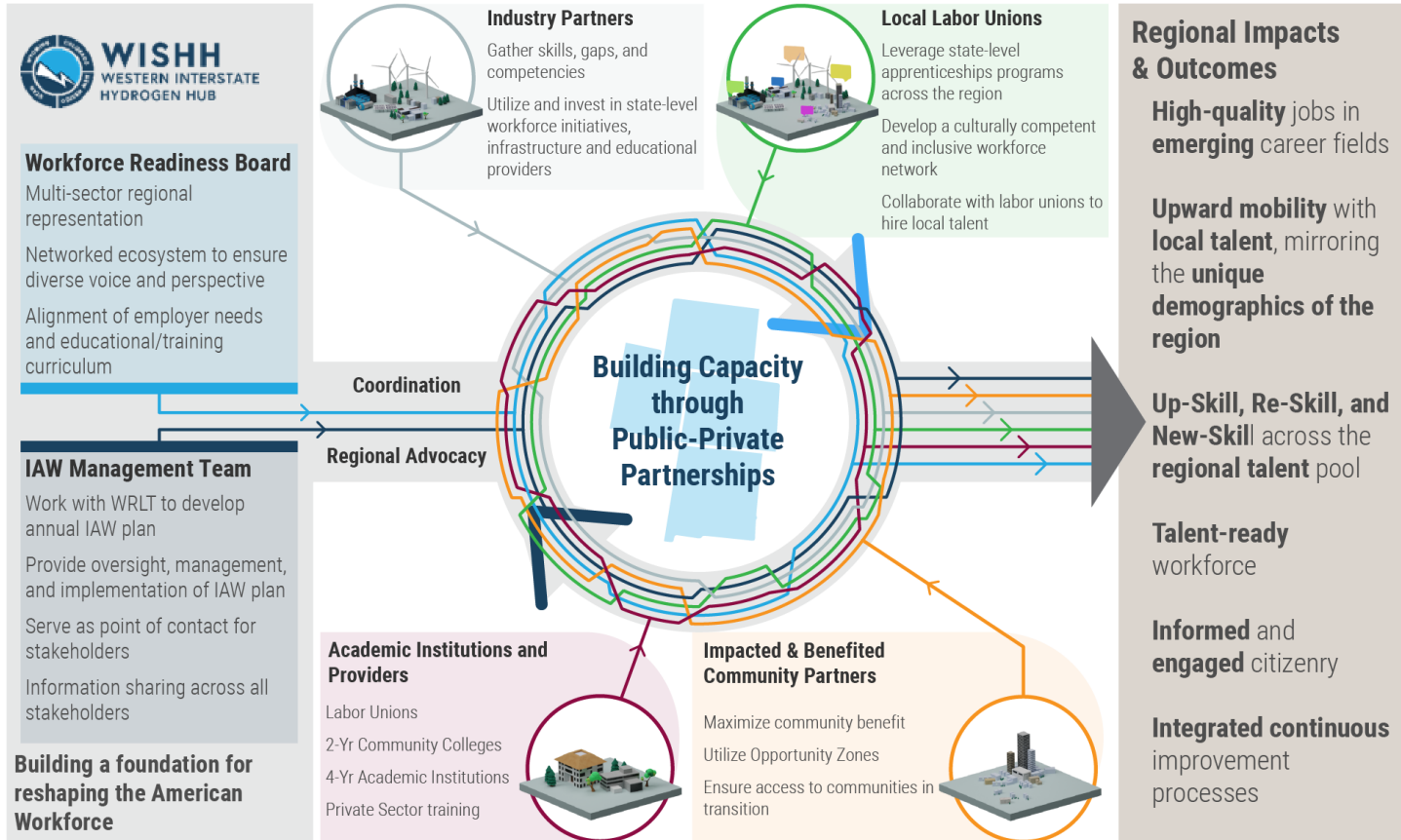
Proposed Modeling Tools

Supports Justice 40 requirements

- Multi Criteria Decision Analysis (MCDA)
 - Develops Goals, Importance, and Metrics
 - Baseline Index - comparison across communities
- Systems Dynamics Simulation
 - Develops relationship and feedback loops between disparate factors



Workforce Development



Hydrogen Hub Opportunity/ Concerns

- Matching funds
 - CCUS
 - EEEJ/Justice 40
 - Workforce Development
- Permanent investment sources
- Long-term sustainability



QUESTIONS



BE BOLD. Shape the Future.