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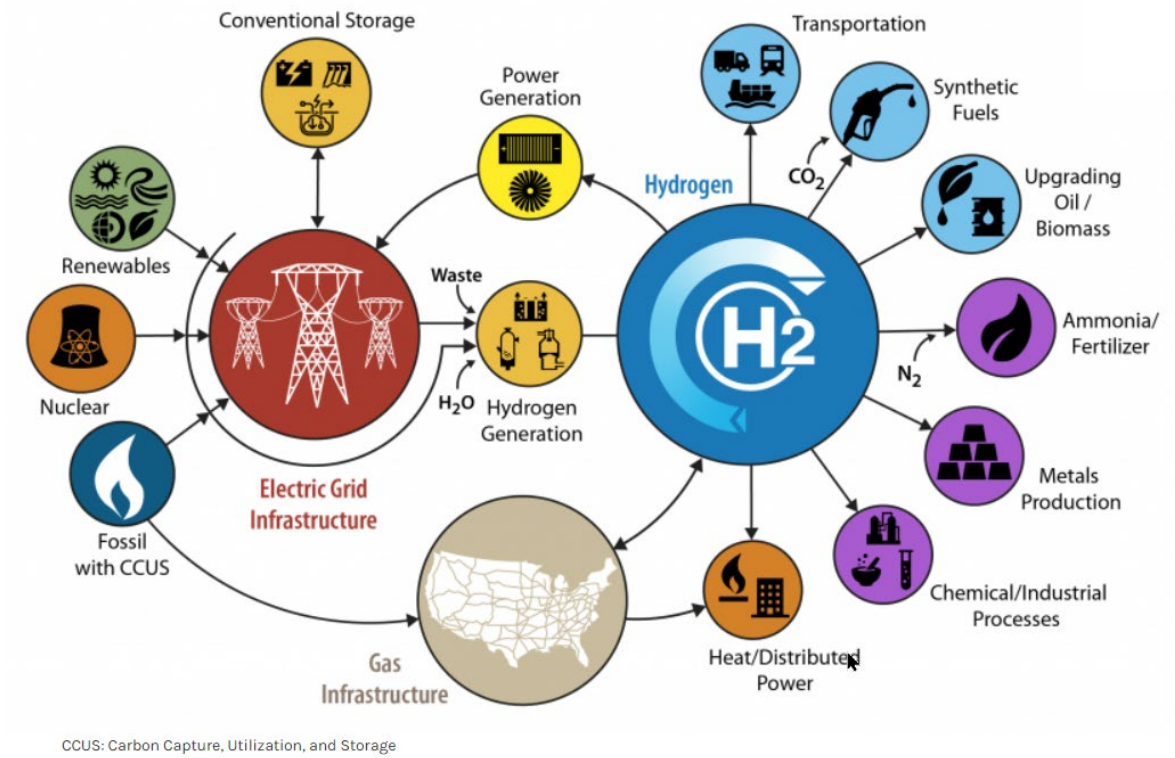
INDIAN ENERGY MINERALS FORUM

June 16, 2022



CCUS: Carbon Capture, Utilization, and Storage

Why the Buzz About Hydrogen?

What is in it for Indian County?

Edward Saltzberg, Ph.D.
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Sovereign Resiliency Partners
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H2 Hubs -- What is in it for Tribes?

Topics

- **SRP in Indian Country**
- Why is Hydrogen Energy Important?
- **Where are the Hydrogen Economy Business Opportunities**
- What Should Tribes be Thinking/Doing?
- **Osage Minerals Council Approach – Getting Started**

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Introducing Sovereign Resiliency Partners LLC

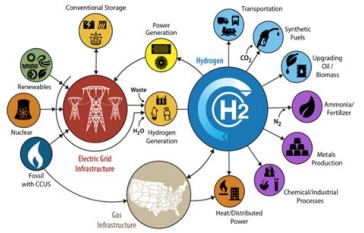
Optimal Energy and Resource Management Solutions for Native American Tribes

Tule River Tribe
Smart Reservation Program

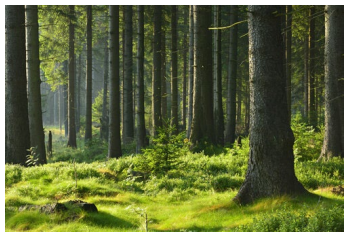
Osage Minerals Council
Aggregates Feasibility Study

Illinois Institute of Technology
Smart Campus Program

Osage Minerals Council
Hydrogen Roadmap



The Confederated Tribes of the Colville Reservation
Carbon Offset Program



Tejon Community Center
Smart Energy Vision

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Why is Hydrogen Energy Important?

Hydrogen Energy Economy

A powerful enabler for clean energy system transitions but still costly

Why the Interest?

1. Burns clean, energy storage and transport

   H2 + O2 = Water + Energy (heat, electricity)

2. More energy units than wind and solar

Can Be Made Cleanly But is Costly Now

- Methane + O_2 + heat = H_2 + CO_2 (sequestration)
- H_2O + Electricity = H_2 + O_2

What Will Bring Down the Cost

- Technology and Research
- Market development (DOE: $8 B on H2 Hubs, $400 M in other funding)
- State and private sector funding

Existing Hydrogen Economy - *Economic*

- Steel and Metals Manufacturing
- Ammonia and Fertilizer
- Chemical Feedstocks
- Industrial Processes

New Energy Applications for Hydrogen - *Potentially Economic*

- Electric Grid
- Trucks, Planes, and Ship Power
- Energy Storage
- Industrial Process Heat
- Building Heat

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Where are the Hydrogen Economy Business Opportunities?

Office of Clean Energy Demonstrations

Regional Clean Energy Hubs

Funding amount: $8 Billion

Objective: Animate the market for clean hydrogen energy by funding supply chain development.
Goal of $1 per 1 kilogram in 1 decade ("1 1 1") 50 -80% drop

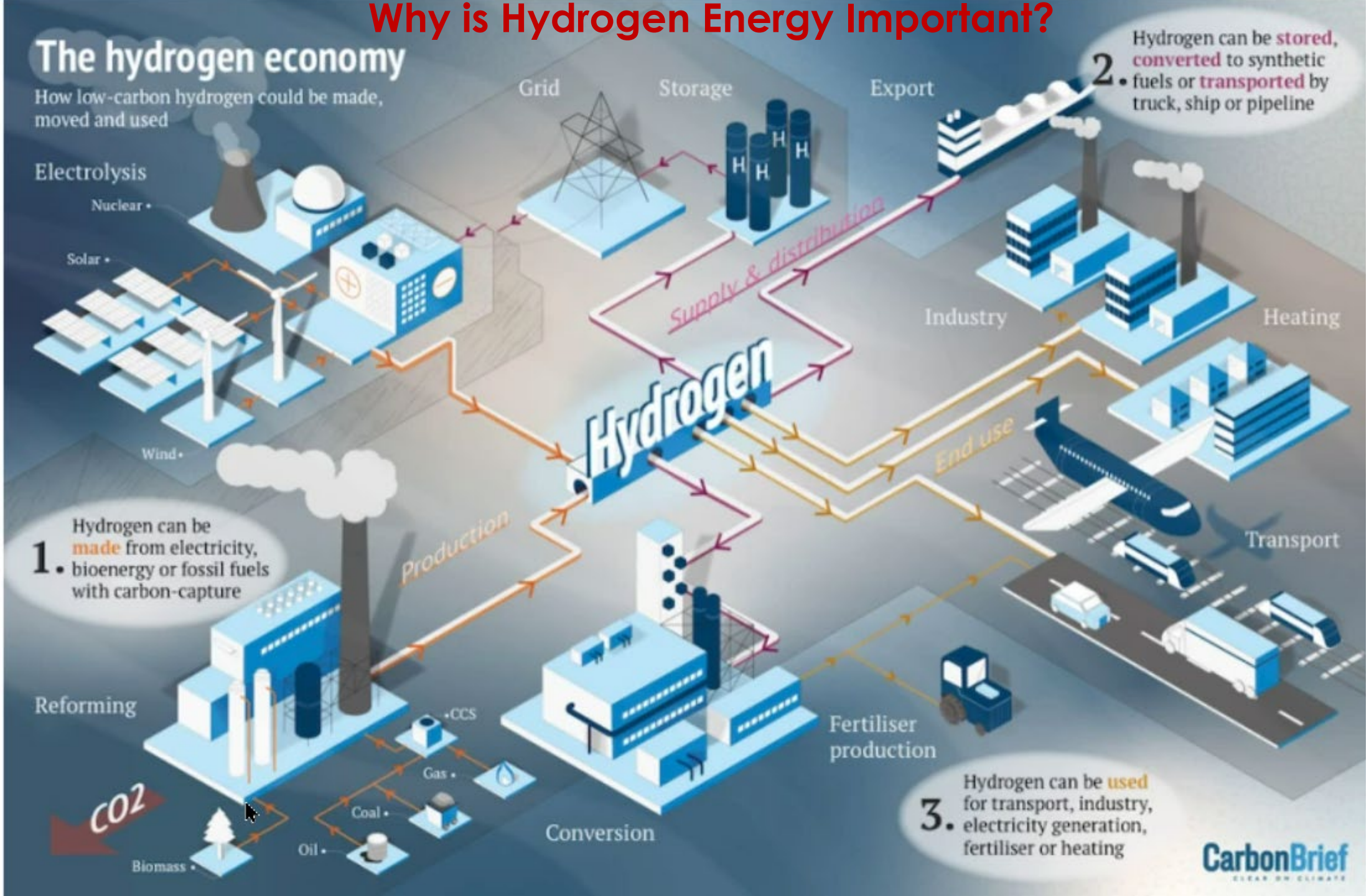
Funding Mechanism: Grant, Cooperative Agreement, or Other
New Program: Yes

Recipients: Technology Developers, Industry, Utilities, Universities, National Laboratories, Engineering and Construction firms, State and Local Governments, Tribal, Environmental Groups, and Community Based Organizations.

Description: Development of at least **4 regional clean hydrogen hubs** to improve clean hydrogen production, processing, delivery, storage, and end-use. – ***State teams forming for the RFP release in the Fall***.

Eligible Uses: Projects that demonstrate the production, processing, delivery, storage, and end-use of, clean hydrogen through regional clean hydrogen hubs, which are networks of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity.

Why is Hydrogen Energy Important?



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Where are the Hydrogen Economy Business Opportunities?

☆ Initial Application
◇ Go/No-Go Decisions

	Application	Phase 1: Detailed Plan	Phase 2: Develop, Permit, Finance	Phase 3: Install, Integrate, Construct	Phase 4: Ramp-Up & Operate
	Pre - DOE funding	**Up to $10M DOE Funding, Non-Federal Cost Share ≥ 50%, 12-18 Months**	**TBD DOE Funding, Non-Federal Cost Share ≥ 50%, 2-3 Years**	**TBD DOE Funding, Non-Federal Cost Share ≥ 50%, 2-4 Years**	**TBD DOE Funding, Non-Federal Cost Share ≥ 50%, 2-4 Years**
Engineering, Procurement, Construction, Operations	• Conceptual Design • Technical Readiness • Project Schedule • Total Project Cost Estimate	• Engineering & Design Documents • Technical Maturation Plans • Integrated Project Schedules	• Mature Engineering & Design • Technical Risk Management • Execution ready schedule & cost estimate, PM Tools • Operations Plan	• Ongoing execution reporting • Interim Go/No-Go reviews	• Ongoing performance Reporting • Technical risk updates, tracking • Final TPC accounting
Business Development & Management	• Business Strategy • Team Description • Workforce Plan • Finance Plan • Market potential analysis	• Project Management Plan • Risk Management Plan • Financial modelling • Site selection	• Finalized project structure, management, financing • Ongoing risk management • Final legal, workforce, procurement agreements • Feedstock & Offtake Plans	• Ongoing execution reporting • Ongoing risk management	• Updated financial analyses • Revised growth plans • Updated Risk Management
Permitting & Safety	• Safety history/culture description • Regulatory approval timeline overview	• Initial Hydrogen Safety Plan (HSP) & Site Safety Plan • Physical, Information, Cyber Security Plans • Environmental & Regulatory preparations	• Execution ready HSP and security plans • Permits & approvals in place for construction	• Ongoing permit, environmental, safety reporting • Permits & approvals in place for operations	• Ongoing permit, safety, and security reporting
Community Engagement & Impacts	• Initial Equity Plan addressing community engagement, Justice40, community consent or benefits agreements, job quality, workers rights, etc.	• Stakeholder engagement and Community Consent or Benefits Agreement drafts	• Finalized Equity Plan, Agreements • Community development targets identified, tracking plans	• Ongoing reporting on Equity Plan activities	• Revised community engagement plans for operations • Ongoing reporting and evaluation
Technical Data & Analysis	• Lifecycle Analysis • Techno-economic Analyses	• Project Production Model • Updated Lifecycle and Technoeconomic Analysis	• Final Lifecycle & Technoeconomic Analyses • V&V and Project Completion Testing Plans	• Periodic analyses updates • V&V data collection • Project completion testing and performance ramp V&V	• Validated performance model • Finalize lifecycle and technoeconomic analyses • Dissemination of analyses, lessons learned

Still time for Tribes to Participate

- Five-year phase-in
- Spending starts slow and ramps up
- Tribal collaborations scores HH proposal points.

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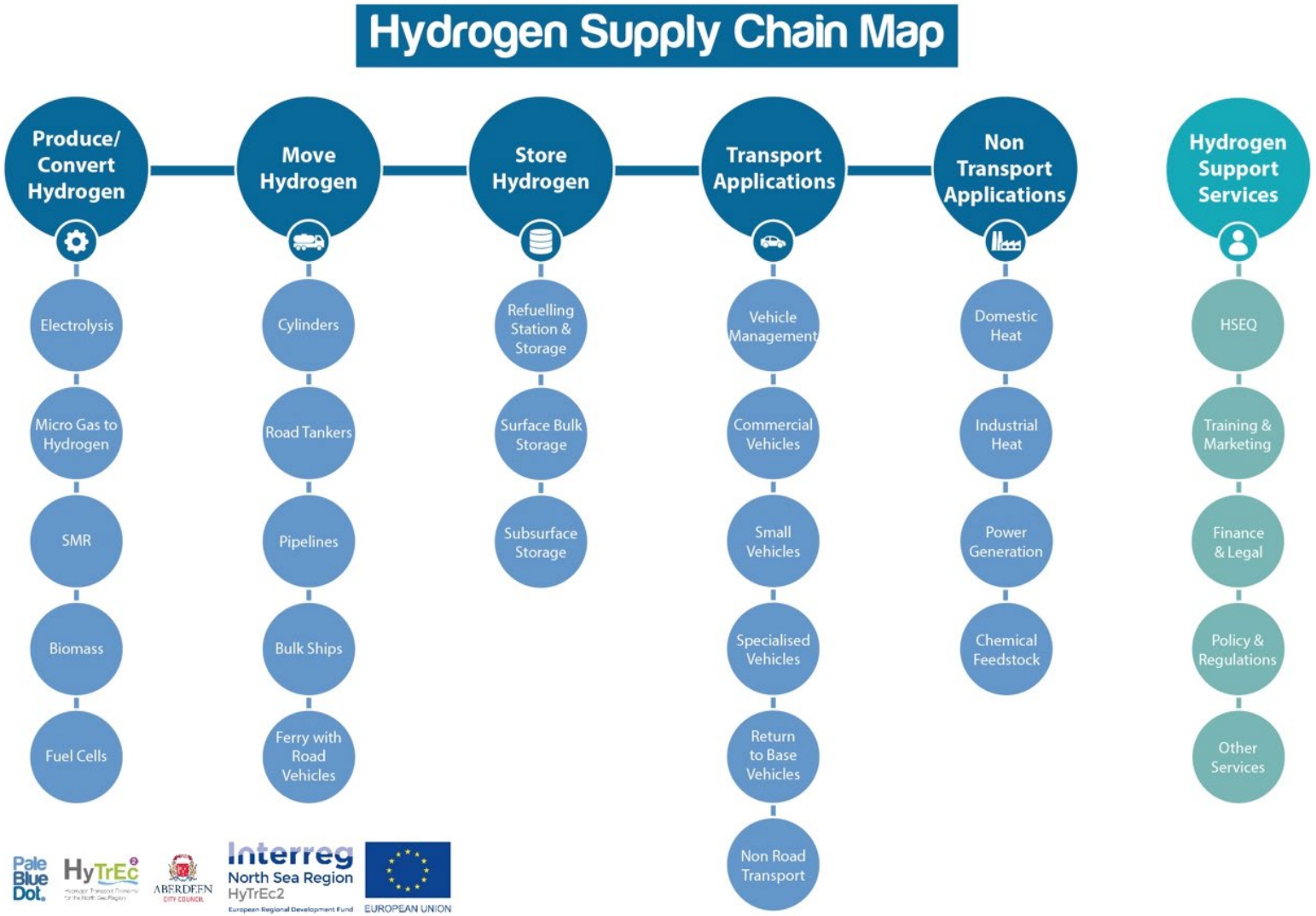
Where are the Hydrogen Economy Business Opportunities?



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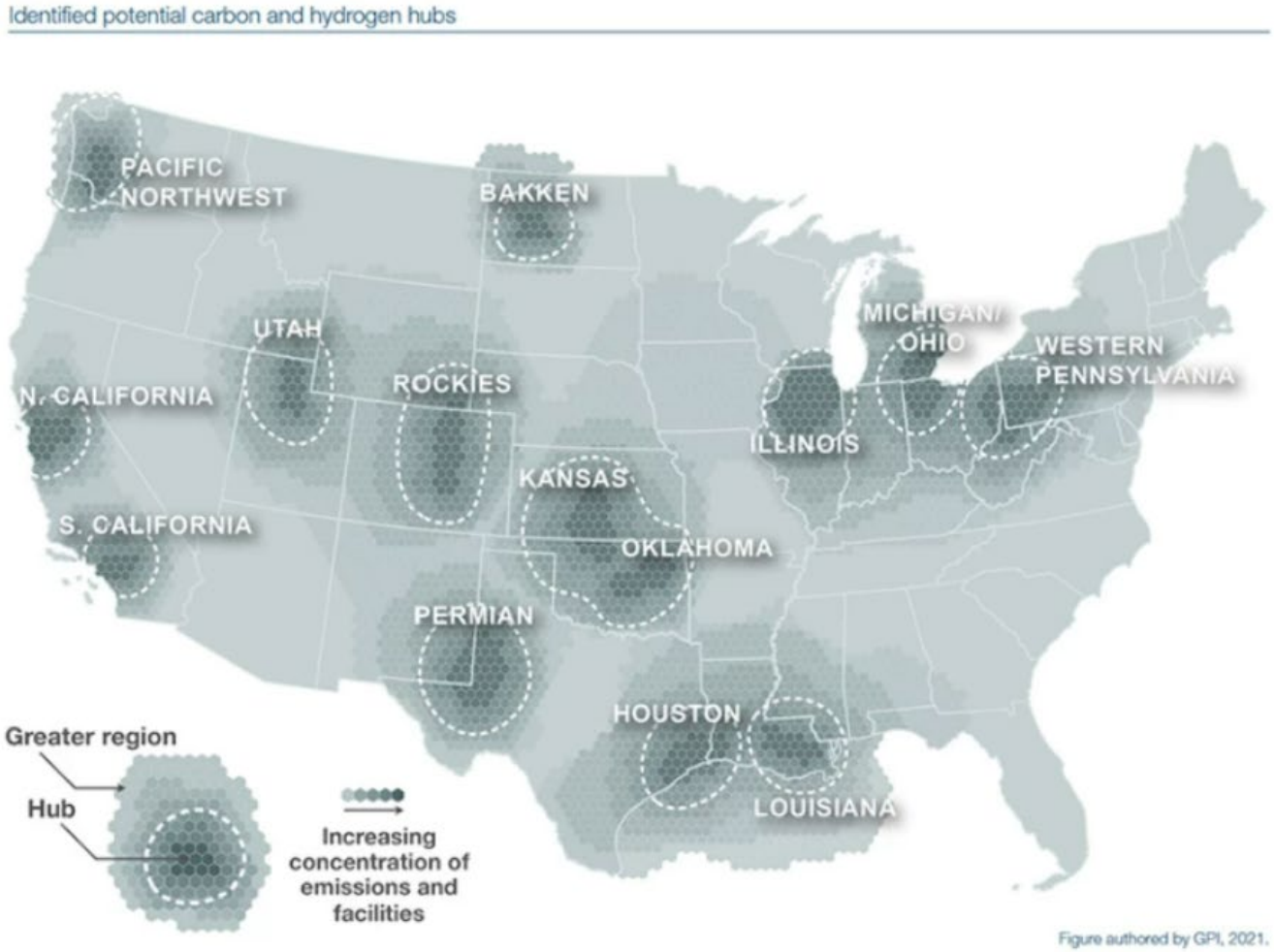
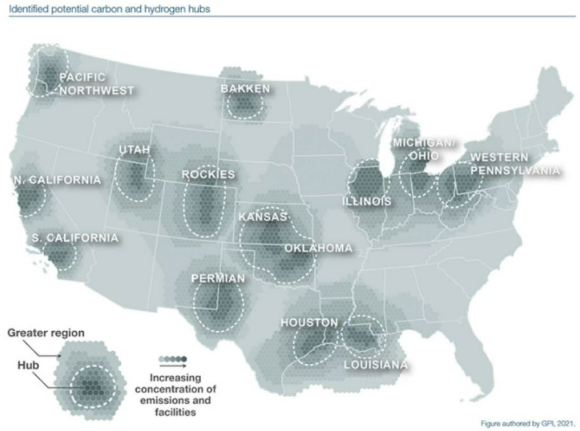


The Great Plains Institute identified 14 potential sites for hydrogen hubs based on factors including concentrations of emissions, availability of fossil fuel, potential for geologic storage of hydrogen and existing transportation and fuel distribution infrastructure.

Likely H2 Hub Contenders

- **New Jersey, Connecticut, Massachusetts,** and **New York** signed an agreement in a step toward hub development.
- With backing from U.S. Senators Joe Manchin and Shelley Capito, **West Virginia** is working on a proposal,
- As is a public-private group from the same region that would build on resources from **Ohio, Pennsylvania, and West Virginia**
- HALO hub coalition in **Louisiana, Arkansas, and Oklahoma;**
- A Gulf Coast hub in **Texas**
- Projects in both **Northern** and **Southern California**; and
- Independent hubs in **Washington**, **Arizona**, **Illinois**, **Nebraska,** and **Kentucky**.
- A hub being co-developed by **Utah**, **New Mexico, Wyoming and Colorado** would be built around a project in the Utah desert that aims to be the largest green hydrogen production and storage facility in the



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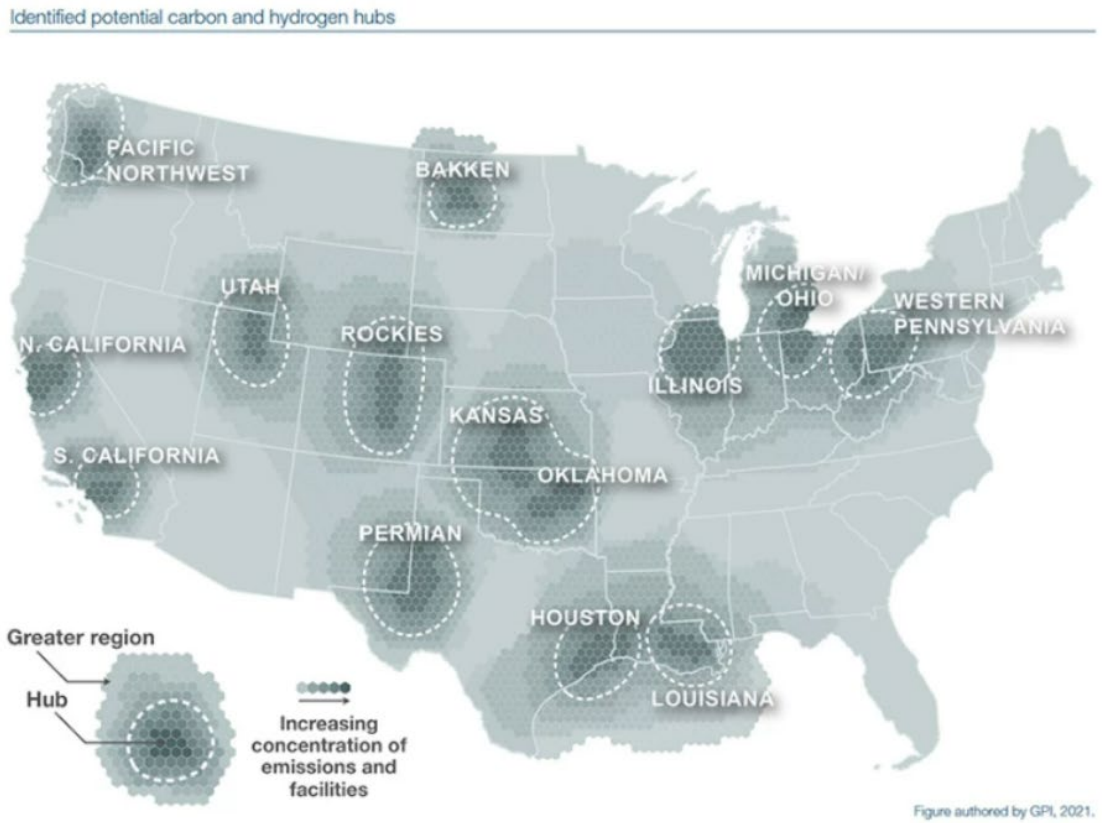
What Should Tribes be Thinking/Doing?

How do Tribal Locations Stack Up?



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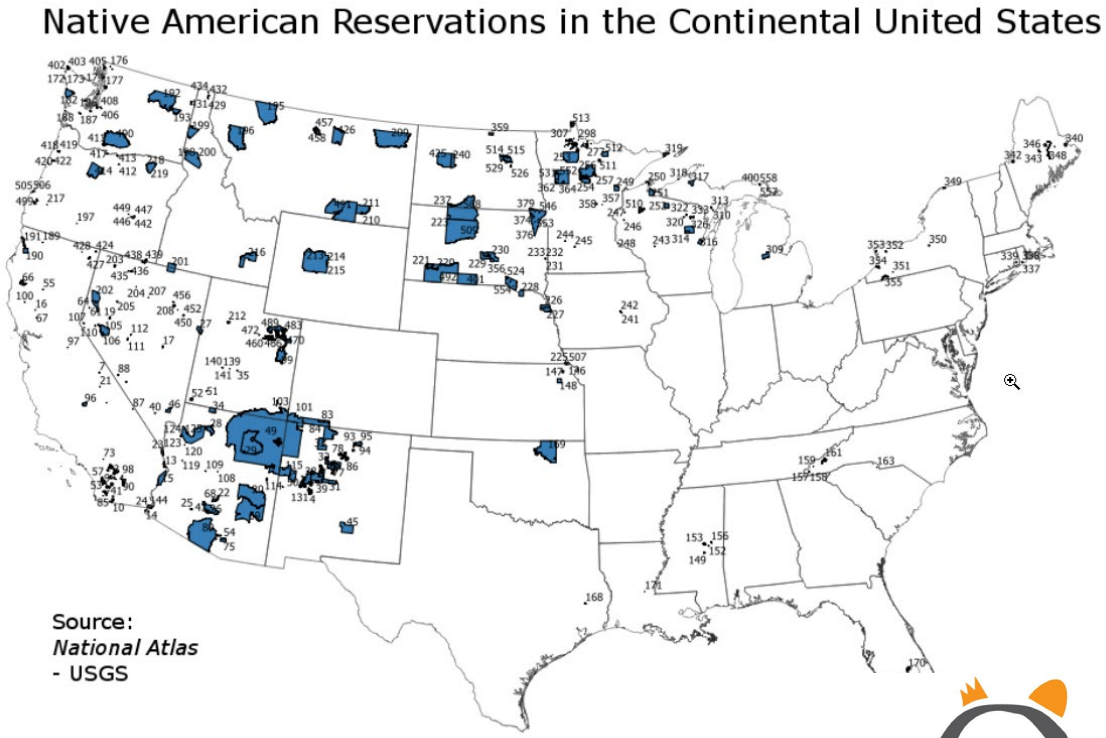

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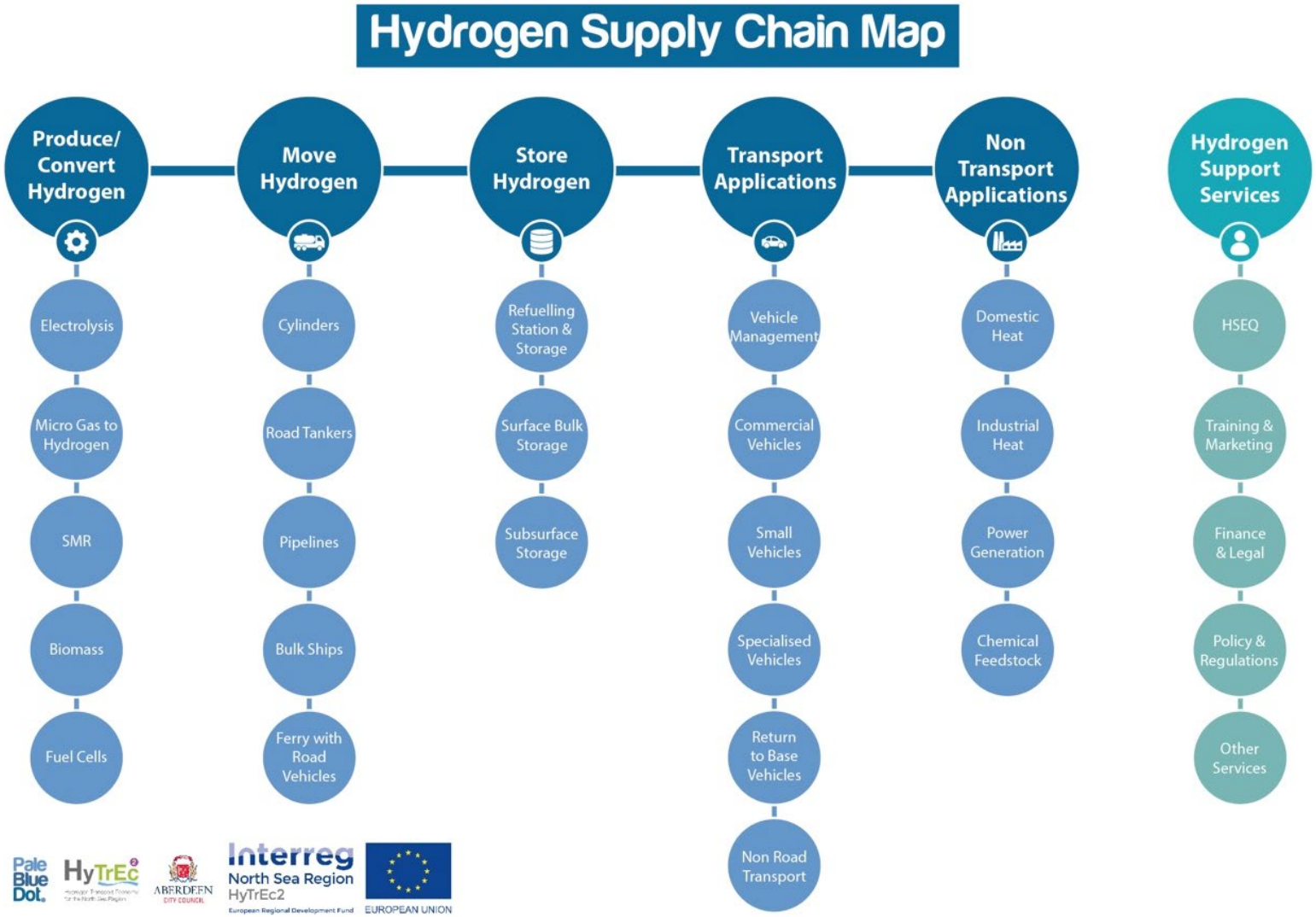
What Should Tribes be Thinking/Doing?



What Should Tribes be Thinking/Doing?

Oil and Gas Tribes Have an Advantage

- Mandan, Hidatsa, and Arikara Nation (MHA) in North Dakota
- Southern Ute Tribe in Colorado
- Wind River Eastern Shoshone and Northern Arapaho Tribes in Wyoming
- Jicarilla Apache Tribe in New Mexico,
- Navajo Nation in the Southwest
- Crow Nation in Montana
- ❖ The Osage Nation in Oklahoma.

Other Tribes Are Not Out of the Money

- Water resources for electrolysis
- Near manufacturing
- Transportation routes
- Workforce considerations

What To Do? -

- Seek out the Regional HH Leadership
- State Economic Offices
- See the Osage Minerals Cour Approach

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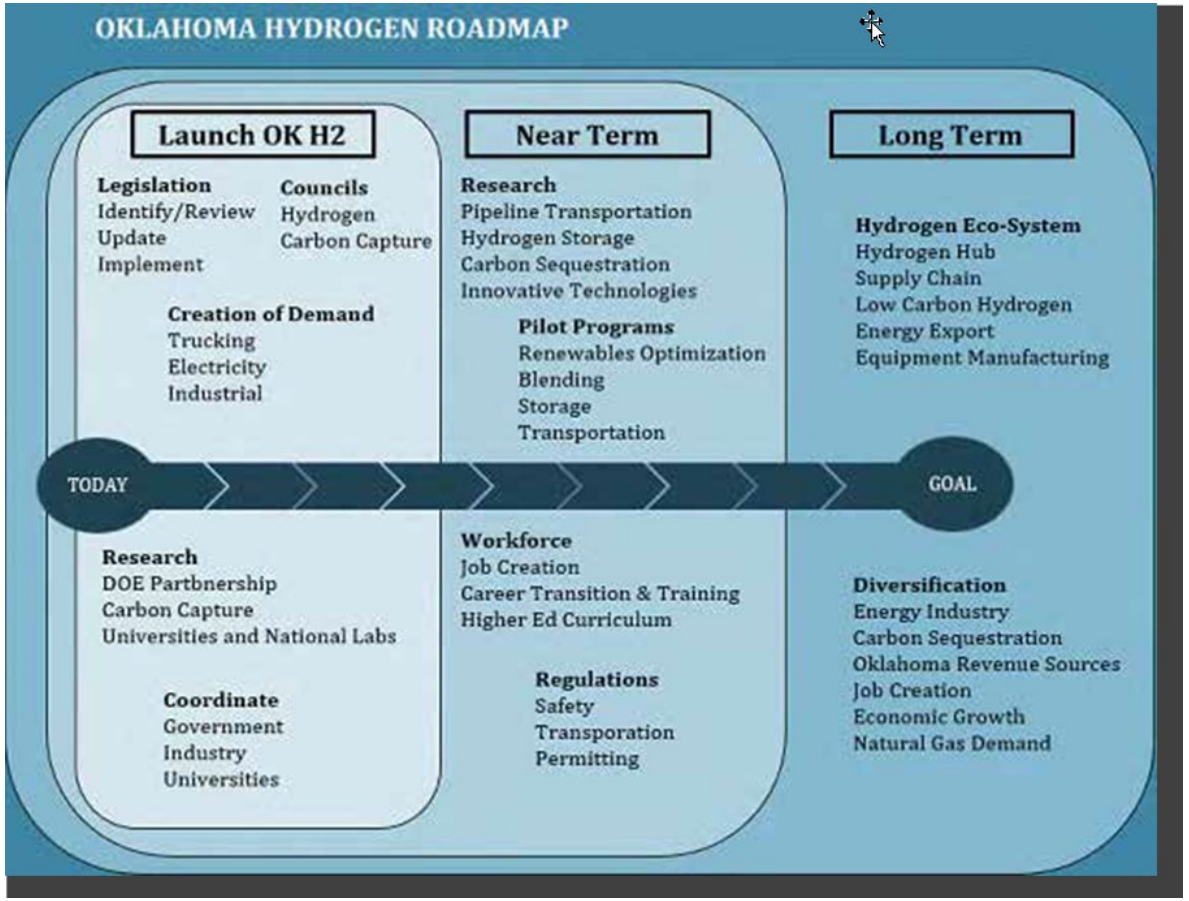
Osage Minerals Council Approach – Getting Started

Preparing for Hydrogen Market Growth

Multi-Trillion Dollar Global Business (Reuters)



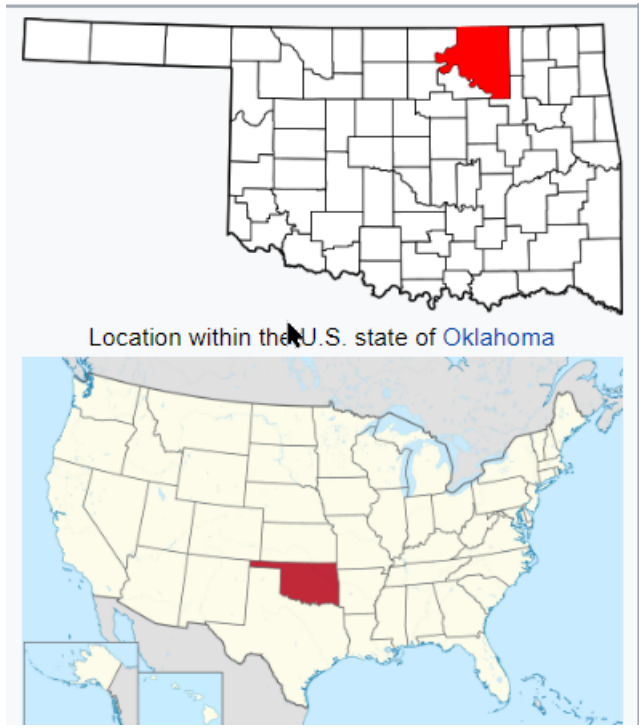
Oklahoma Hydrogen Task Force State-Wide Estimates

Direct Employment: 5000 for engineering, maintenance, and technical services

Supply Chain Employment: 15,000

Capital Investment: $3.2 Billion

Osage Minerals Council Approach – Getting Started



About the Osage Nation

- **The Osage Reservation:** Commensurate with the boundaries of current-day Osage County, Oklahoma - 1.5-million-acres
- **Members**: 20,000. 10,000 on the Reservation
- **Minerals Ownership:** The Osage Nation is the beneficial owner of the oil and gas and subsurface minerals in the County (1906 Osage Allotment Act)
- **The Osage Minerals Council (OMC):** Administers and develops the Osage Minerals Estate
- **Assets For the H_2 Economy**: Natural Gas and Water, Renewable energy, geologic structures, proximity to Tulsa,

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Osage Minerals Council Approach – Getting Started

Tribal Hydrogen Path Forward – Osage Minerals Council

Tribes with and without natural gas, water, geologic formations

- **Phase I: Feasibility Study** (BIA proposal) - Staying in Touch with the Market
  - **Technical Assessment**
    - ***Resources:*** *Inventory natural gas, water resources, geology, renewables*
    - ***Production and Manufacturing:*** *Local and Regional*
    - ***Storage:*** *Assess underground H2 and CO2 Storage Potential*
    - ***Transportation****: Rail, ships, roads, pipelines*
    - ***End Uses****: Reservation resilience, new manufacturing, utility grid services*
  - **Capacity Building Preparation**
    - ***Strategy and Marketing****: Sovereignty, jobs, training, economic diversification*
    - ***Stakeholder Alignment***
    - ***Permits and Compliance***
    - ***Business and Regulatory Structures***

- **Phase II:** 5-Year Osage Market Development Plan
- **Phase III:**10-Year Osage Investment Framework

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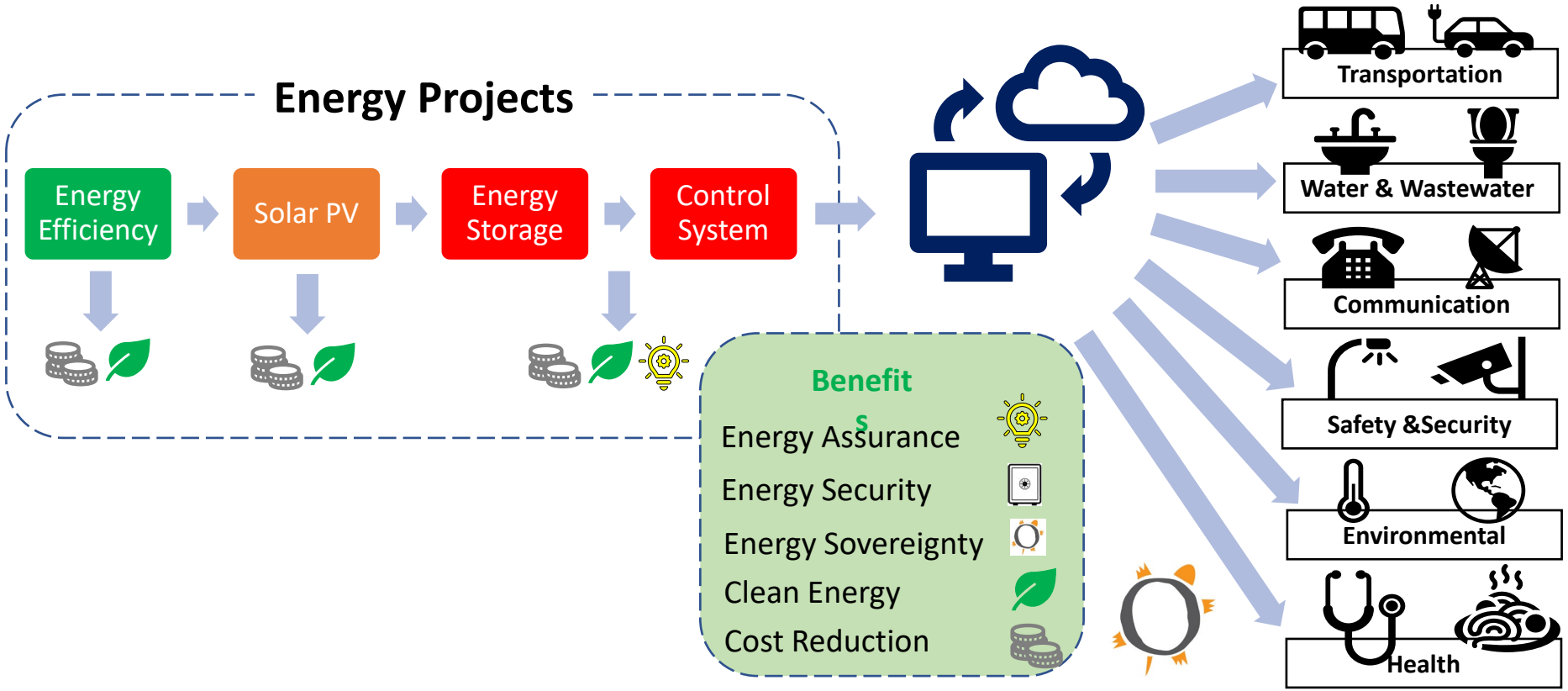
Osage Minerals Council Approach – Getting Started

360-Degree Tribal Resilience

Vision of a Resilient Tribal Reservation



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Are many tribes involved in the hub teams?

Tribal Hydrogen Hubs? What could they be?

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Why the Buzz About Hydrogen?

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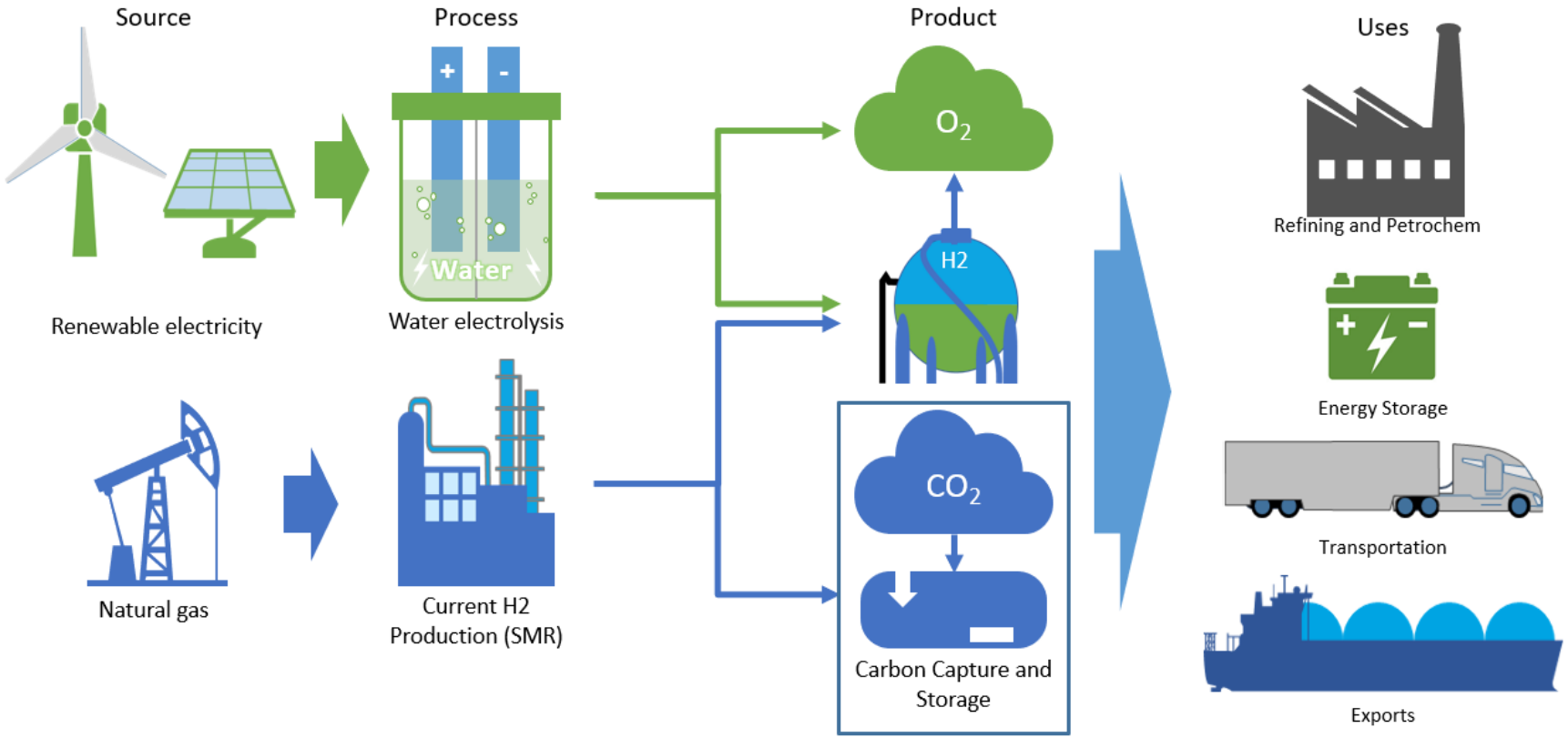
Typical Clean Hydrogen Production Options



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SRP Leadership Team

Energy and Resource Management Solutions for Native American Tribes

Mark Harding,
Tribal Relations Leader

Todd Isherwood,
Resilient Energy Project Manager

Mehdi Ganji, PhD.,
Smart Reservation Adviser

Hedi Bogda, JD,
Tribal Legal Advisor

Edward Saltzberg, Ph.D.,
Economic Development and Government Grants

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