Hydrogen Energy in New Mexico

Joseph Hernandez, James Povijua, Sammi Kao

Grey hydrogen

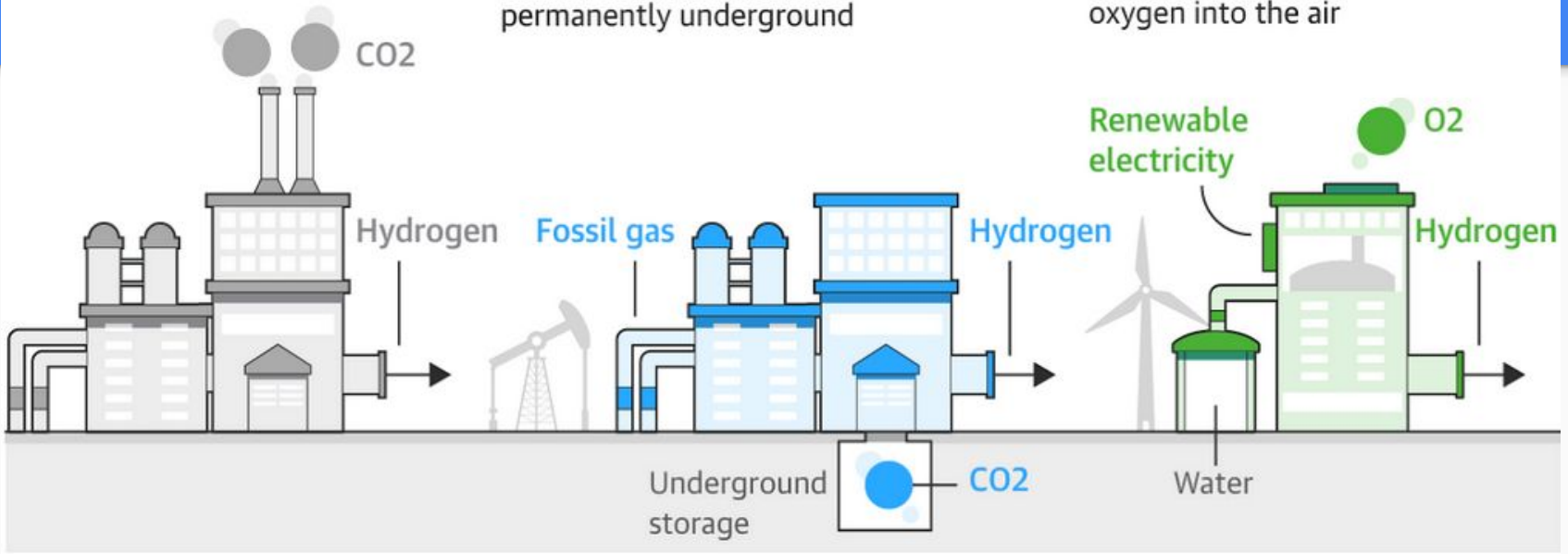
Hydrogen is extracted from fossil gas releasing CO2 emissions into the air

Blue hydrogen

Hydrogen is extracted from fossil gas before CO2 emissions are trapped and stored permanently underground

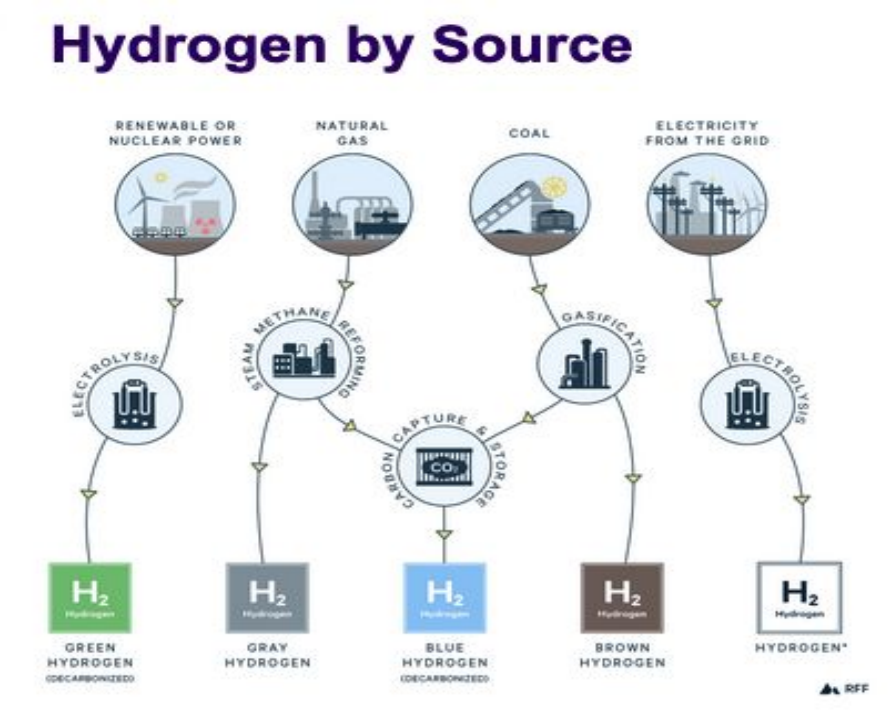
Green hydrogen

Hydrogen is extracted from water using renewable electricity and releasing oxygen into the air



The combustion and use of hydrogen, on its own, does not emit carbon dioxide.

Blue vs. Green Hydrogen



- 2019: 98% of worldwide hydrogen production came from fossil fuels (**gray and brown hydrogen**)
- **Blue hydrogen** uses carbon capture and sequestration
- **Green hydrogen** uses renewable energy to split water molecule to isolate hydrogen molecule for energy

Hydrogen’s Greenhouse Gas Footprint

- Blue hydrogen only emits about 9-12% less total CO2 than grey hydrogen
  - Some CO2 escapes during the production process, and not all CO2 can get captured
  - No analysis has been done, yet, on how much methane is emitted in association with natural gas production for hydrogen
- Reported carbon capture efficiencies are between 53-90%

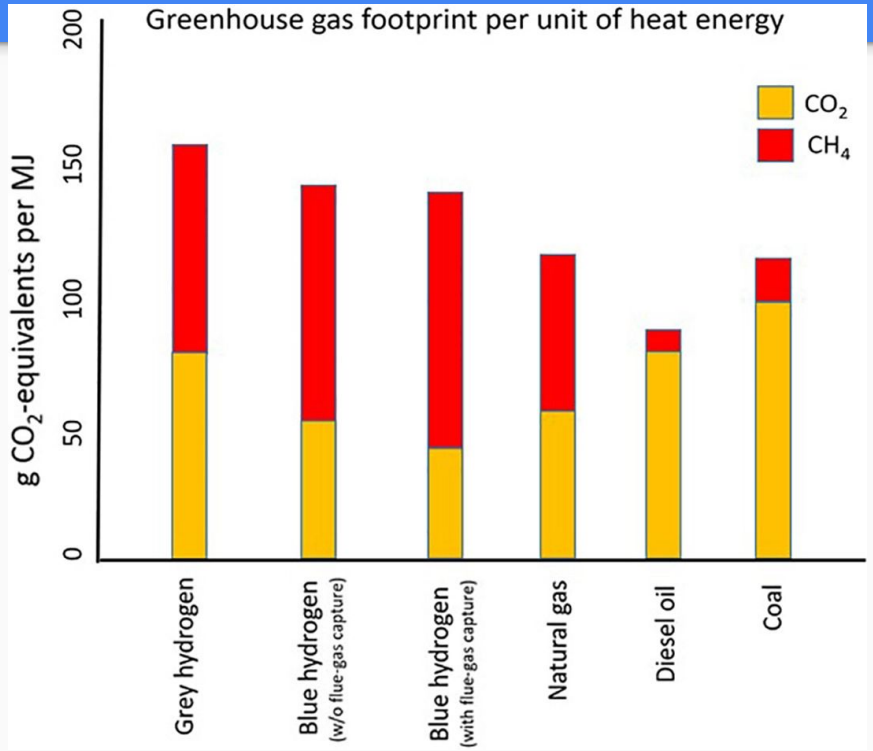
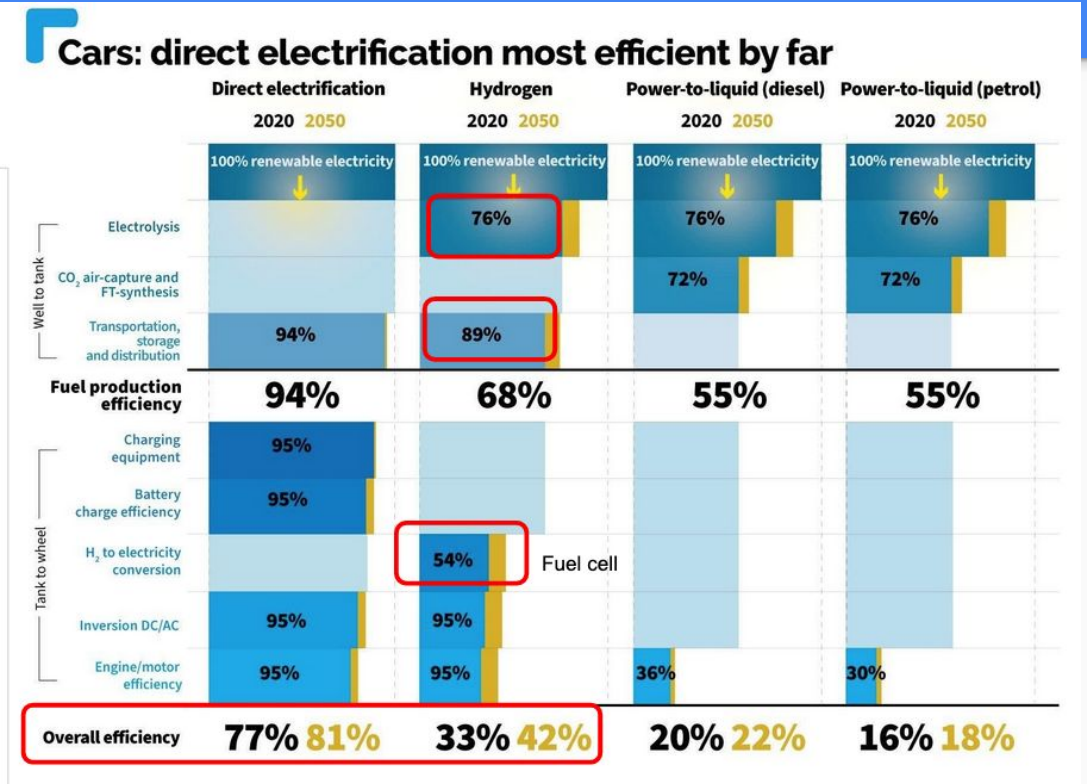


Image: Carbon dioxide emissions, including emissions from developing, processing, and transporting the fuels, are shown in orange. Carbon dioxide equivalent emissions of fugitive, unburned methane are shown in red.

Long Term Concerns

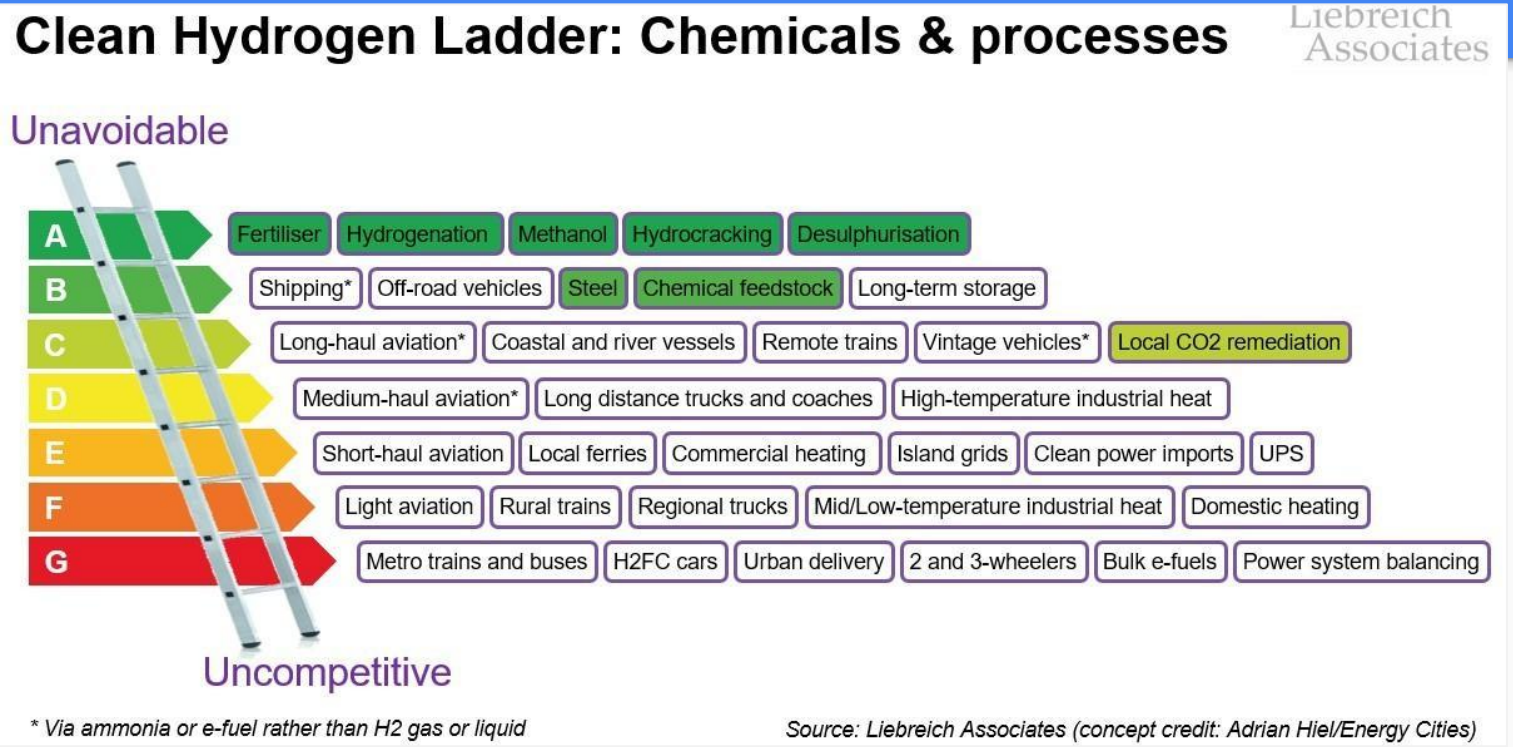
- The UK has a bid to utilize blue and green hydrogen for their energy sector shift
  - According to the UK's climate advisors from the Committee on Climate Change, blue hydrogen is fine if being used solely as a *bridge*, but should not be used beyond the 2030s or else the UK won't meet their climate targets
- Green hydrogen is more environmentally responsible and has more widespread support, however the water scarcity issue is something to consider
  - The water for green hydrogen needs to be pure water - either fresh water, or extremely well purified water

Efficiency of Hydrogen



- Hydrogen is ***not*** fuel. It is an energy carrier
- Hydrogen is not even half as efficient as electricity.
- H is the smallest, lightest element
  - High energy, low weight
- H_2 is a gas; high *volume*, low energy
  - New technology, in early development
  - Existing issues with efficiency and durability for fuel cells

Uses of Hydrogen



Can we use electricity powered by renewable energy?

If so, is electricity more efficient, less costly?

Escalante Project

- Tri-State/Escalante Generating Station closed at the end of 2020
- Terminated 107 jobs at the plant, many more at coal/natural gas mines
- Goal is to begin operations as hydrogen plant in 2025
- Project will cost $425 million
  - TallGrass Energy - 75%, August 9th
  - Tri-State selling Escalante to Wiley Rhodes (eH2 Power)
- Estimated 115-145 new jobs

SCIENCE OF HYDROGEN PRODUCTION

$2CH_4 + 3O_2 \rightarrow 2H_2 + 2CO_2 + 2H_20$

OXIDATION OF METHANE USING PURE OXYGEN YIELDS CARBON DIOXIDE AND HYDROGEN

- Escalante claims they will store CO2 in the ground
- There is no guarantee for zero CO2 leakage
- **Plan to start operations before CCS is ready at Escalante - though this will prove to be extremely difficult to get permitting for**

Hydrogen Hub - Guiding Principles

- New Mexico must put in place a comprehensive, durable, and enforceable climate policy framework as a predicate to assessing the propriety of integrating hydrogen into our energy transition
- Equity and justice must shape and underpin hydrogen decisions
- Hydrogen must not divert attention and resources away from our transition to a renewable energy future
- New Mexico must address the serious risk that fossil gas hydrogen may jeopardize climate progress and cause negative environmental, public health, and community impacts

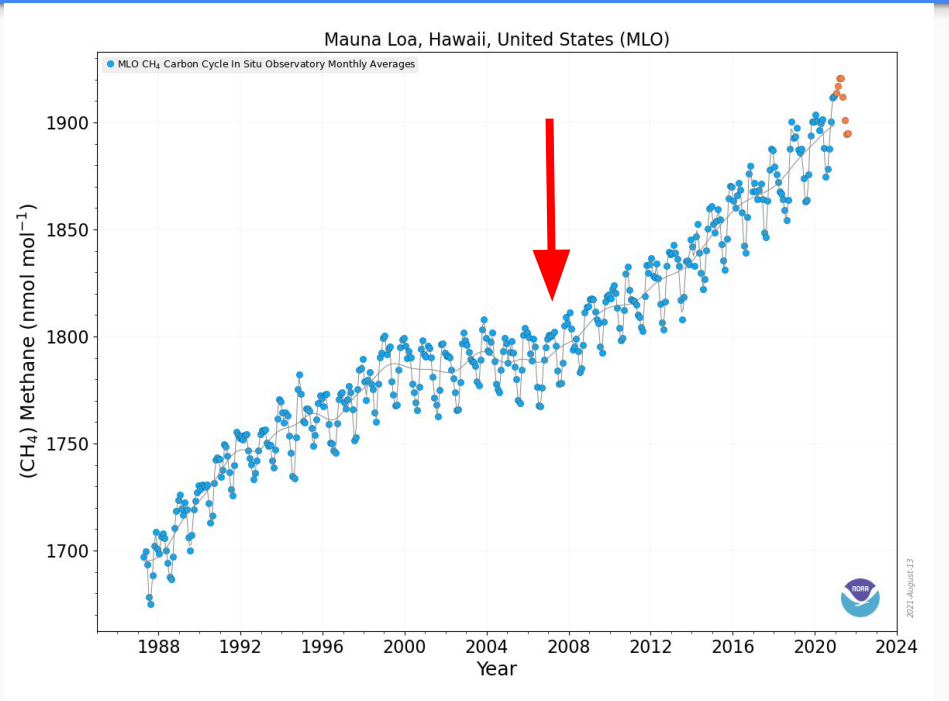
Carbon Capture & Sequestration

- Legislation: SB 208 (2009) → Pore space title/interest
- Blue Hydrogen is dependent on CCS to be “emission free”
  - Does not address upstream emissions of transportation and extraction of natural gas
- Economically unsound
  - Electricity generated not able to be sold at a profit, given market prices and costs of operation
  - Market for hydrogen fuel is unclear, as both prices and market venues are in development
  - Current business model appears to be highly dependent on 45Q sequestration tax credits
- Science has shown that CCS is not a solution for climate change
  - Escape rates
  - CCS = “fixing” fossil fuels. ETA = transitioning away from fossil fuels.
  - Enhances oil and gas industry. 80% of CCS business model helps to pump more oil.
  - CCS requires transportation, injecting, and storing of CO2
    - Health, environmental, safety risks for disproportionately affected communities

Methane Concerns

NATURAL GAS = METHANE

- Methane emissions are one of our primary concerns for climate change mitigation
- Using H_2 is 20% more harmful than burning methane
- Methane emissions from drilling from natural gas drilling are underreported



Takeaway Message

- In a vacuum hydrogen has great potential as a non GHG emitting fuel source
- HOWEVER, the current fuel cycle for the production of blue hydrogen essentially rules it out as a short term solution for reducing emissions because of the high reliance on the input of natural gas, the production of which results in tremendous GHG emissions
- Focusing time and resources on the development of hydrogen production may come at the expense of clean energy and fuel resources that are more proven and cost effective

Center for Civic Policy is a c3 advocacy organization focused on fostering broad, inclusive civic engagement among our state's diverse, underrepresented communities through policy work, voter engagement, and issue education campaigns.

NM Civic Engagement Table is convened by CCP and is comprised of over 40 non-profit organizations that work on the following issues:

- democracy reform
- tax and budget reform
- workers' rights
- immigrant rights
- environmental & climate justice

The New Mexico Civic Engagement Table

Center for Civic Policy
America Votes New Mexico
ACLU of NM
Albuquerque Interfaith (AI)
Bold Futures
Center for Civic Policy (CCP)
CHI St. Joseph's Children
Common Cause NM (CCNM)
Community Action Agency of Southern NM (CAA)
Conservation Voters NM Education Fund (CVNMEF)
Drug Policy Alliance
El Centro (EC)
Empowerment Congress of Dona Ana County
Equality NM
Forward Together (FT)
Friends of the Organ Mountains-Desert Peaks (OMDP)
Health Action New Mexico (HANM)
La Semilla Food Center
Marguerite Casey Foundation
NAVA Education Project
Ngage New Mexico
NM Asian Family Center
NM CAFé (CAFé/Faith in Action)
NM Donor Table
NM Public Interest Rights Group (NMPIRG)
NM Thrives
NM Voices for Children (NMVC)
NM Wild
NM Wildlife Federation
Organizers in the Land of Enchantment (OLÉ)
Partnership for Community Action (PCA)
Planned Parenthood
Policy Solutions Institute Education Fund
ProgressNow NM
Sierra Club - Rio Grande Chapter
Somos Un Pueblo Unido
The Wilderness Society
UWD - NM Dream Team
Working Families Party

Climate Policy: *Equity and Economic Development*

- Power 4 New Mexico
- DWS Study
- Equity Principles
- Sustainable Economy Task Force

Power 4 New Mexico

A coalition of conservation groups and cross-issue base-building organizations leading organizing in rural communities to advance a clean energy and workforce development strategy for NM.

Somos Un Pueblo Unido

CENTER for CIVIC POLICY

NAVA
NATIVE AMERICAN VOTERS ALLIANCE
EDUCATION PROJECT

OLÉ

NM CAFé

NM CAFé

cvnm
CONSERVATION VOTERS NEW MEXICO

Power 4 New Mexico's Goals

- **Engage** the most impacted communities in the debate around renewable energy and the preservation of our environment
- **Build** a robust infrastructure to reach, engage, and activate the public to provide direct opportunities to become a stakeholder in New Mexico's transition to a renewable energy economy.
- **Create** an avenue for the public to become involved in the innovation of our state's economy by embracing and being part of the energy evolution and economic diversification that is happening right now.

Power4NM

Policy, Communications, Organizing

- NMDWS Study
- Sustainable Economy Task Force
- Energy Transition Act
- Ongoing Organizing

Energy Transition Act and Power4NM

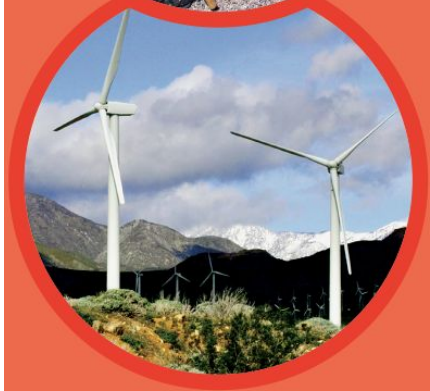
Power4 NM was part of the broader coalition of groups that successfully passed the Energy Transition Act (ETA). The ETA established a 100% coal-free by 2040 energy production standard for the state.

- Power4 NM was instrumental in getting workforce/economic development language into the bill to ensure jobs and economic benefits for New Mexico workers in the emerging clean energy sector.
- NM DWS Study....

NM Department of Workforce Solutions
Clean Energy Workforce Development Study

Budget allocation of $200,000 and a mandate to NMDWS to conduct a study to develop a workforce and economic development **roadmap** to integrate underrepresented communities into the clean energy economy. ***Sponsored by Rep. Angelica Rubio***

Study was conducted by UNM Center for Social Policy with heavy input from Power4NM.



Clean Energy Workforce Development Goals

Identify opportunities and barriers in the transition to a clean energy economy in low-income and rural communities.

Develop recommendations that address the expected demand for increased career and technical education, job training and workforce development needed to prepare industries, workers, and communities to take full advantage of emerging clean energy jobs.

Identify and prioritize disadvantaged communities to prepare for economic development opportunities in a sustainable and clean energy economy.

Overview of Study

The Study:

- ❏ Reached: 1,864 New Mexicans
- ❏ Power4NM: 64 participants in four focus groups
- ❏ Online Survey: 1754 New Mexicans
- ❏ Higher Ed: 20 administrators and faculty, representing 13 higher education institutions including Tribal, two-year, and four-year colleges and universities
- ❏ Industry: Various staff from construction and renewable energy industry

Findings: Our research identified that New Mexico's potential for clean or green energy production is among the nation's best, due largely to our natural solar and wind resources. We also found that the transition to clean energy will definitely create jobs in construction, installation, wind turbine maintenance and other professions. These jobs pay comparatively high wages and are projected to be accessible to a wide spectrum of New Mexico residents, including those without advanced educations and who live in the state's rural areas. Our research suggests many reasons to be optimistic about the future. - **Dr. Gabe Sanchez, UNM Center for Social Policy**

- ❏ A majority of New Mexican's surveyed support diversifying the states economy away from oil and gas industry
- ❏ A majority of New Mexican's surveyed do not support subsidizing the oil and gas industry during its bust cycle

Concerns of Community Regarding Access to Clean Energy Jobs

- That all of the jobs that come from clean energy will go to people who live in Albuquerque and Santa Fe without equal access to New Mexicans who live in rural areas – 72%

- That all of the jobs that come from clean energy will go to people with advanced education without many jobs for New Mexicans who only have a high school education – 76%

- That all of the training opportunities to be competitive for jobs in clean energy will only be available in the urban areas of the state, making it challenging for those who live in the rural areas to acquire training – 74%
- That small businesses that rely on the mining of fossil fuels will suffer when that industry is phased out - 60%

Study Key Findings

- Coordinating committee of select state departments i.e. EMNRD, NMDWS, NMEDD, IAD, PED
- Renewable energy jobs should be expanded beyond Wind and Solar. They should include areas like outdoor recreation and land reclamation.
- Current and future training programs that receive state funds must be MultiLingual
- Community Workforce Agreements in place for renewable projects over a certain size
- Prioritization of Minority and Women Owned Businesses in renewable projects
- Locate new training programs in tribal and rural areas
- Remove or prohibit the requirement of drug testing as requirement of state funded renewable energy jobs
- Start an Office of Just Transition
- Step up Regional Advisory Committees for JT (Some of these exist in a different forms related to the ETA)
- Project Labor Agreements required for all new renewable projects over a certain size
- Place pre-apprenticeship programs in each county

Equity Principles and Climate and Energy Policy

Economic Development

The Sustainable Economy Task Force: *Creating a road map to an economy in which all New Mexicans thrive and our air, land, and water are protected.*

SB112 - AN ACT

RELATING TO ECONOMIC DEVELOPMENT; CREATING THE SUSTAINABLE ECONOMY TASK FORCE; **REQUIRING THAT THE SUSTAINABLE ECONOMY TASK FORCE DEVELOP A STRATEGIC PLAN TO TRANSITION THE STATE ECONOMY AWAY FROM RELIANCE ON NATURAL RESOURCE EXTRACTION**; PROVIDING DUTIES; REQUIRING THAT DEPARTMENT SECRETARIES OF STATE AGENCIES COMPLY WITH THE STRATEGIC PLAN; MAKING AN APPROPRIATION.

Ongoing Organizing and Advocacy

Sammi Kao

Conservation Voters NM

Climate & Energy Advocate

samantha@cvnm.org

James Povijua

Center for Civic Policy

Policy Director

(312) 307-4402

James@civicpolicy.com

Joseph Hernandez

NAVA EP

Diné Energy Organizer

joseph@navaeducationproject.org