Water, Energy, and Environmental Stewardship
A Changing Landscape

NEW MEXICO PRODUCED WATER CONSORTIUM
2023 ANNUAL MEETING
DECEMBER 13-14, 2023 – ALBUQUERQUE

Mike Hightower, Director

NM STATE
NEW MEXICO
PRODUCED WATER
RESEARCH CONSORTIUM

NM 2019 Produced Water Act

- In the Act, statutory and regulatory authority for the reuse of produced water was modified:
  - Reuse inside oil and gas sector is under the Oil Conservation Division (OCD)
  - **Reuse outside the oil and gas sector is under the NM Environment Department**
  - **Ownership is to the treater, but when discharged becomes a water of the state**
- The Act encourages produced water treatment and reuse to:
  - Reduce/stop fresh water use in the oil and gas sector
  - Create 'new water' supplies for the state
  - Support 'new water' for economic development
  - Assure public and environmental health and safety

] Water Stewardship
New Water for New Mexico

Consortium Research Priorities

"NMED's identified research questions:

- What contaminants are in produced water generated in NM?
- How can the produced water be treated to be safe?
- What changes are needed to our state water quality standards to protect water resources and human health? "

(NMED presentation to the Water and Natural Resources Interim Committee, 9/3/2020)

NM community and industry identified implementation questions:

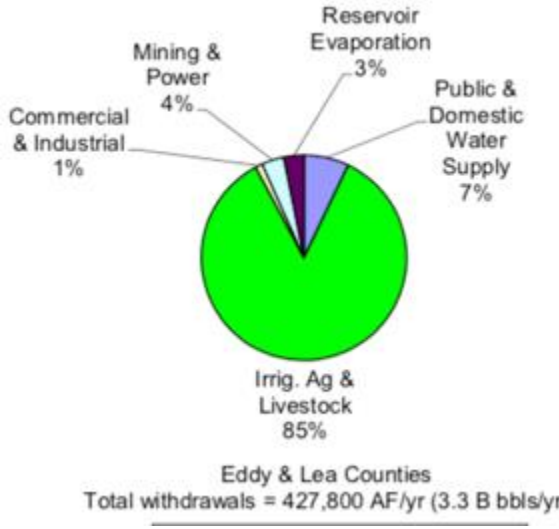
- How much water is available and where?
- What are the potential risks, costs, and benefits for various uses?

Focus: Techno-social-economic, safety and risk, and availability analysis work groups

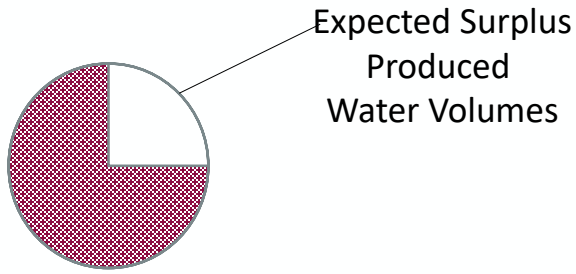
Produced Water Treatment and Reuse Questions - 2018

- Is treatment cost effective?
  - Consider O&G avoided costs
- How do you handle the concentrate?
  - 50-60% recovery/need solids disposal
- What about the energy transition
  - Will produced water be available?
- Is there enough produced water to be a local resource?
- Can you make it safe to use?
- Will the public accept it?
- **Can we afford not to do it?**

The Monte Kali potash mining salt mountain tourist attraction near Heringen, Germany.

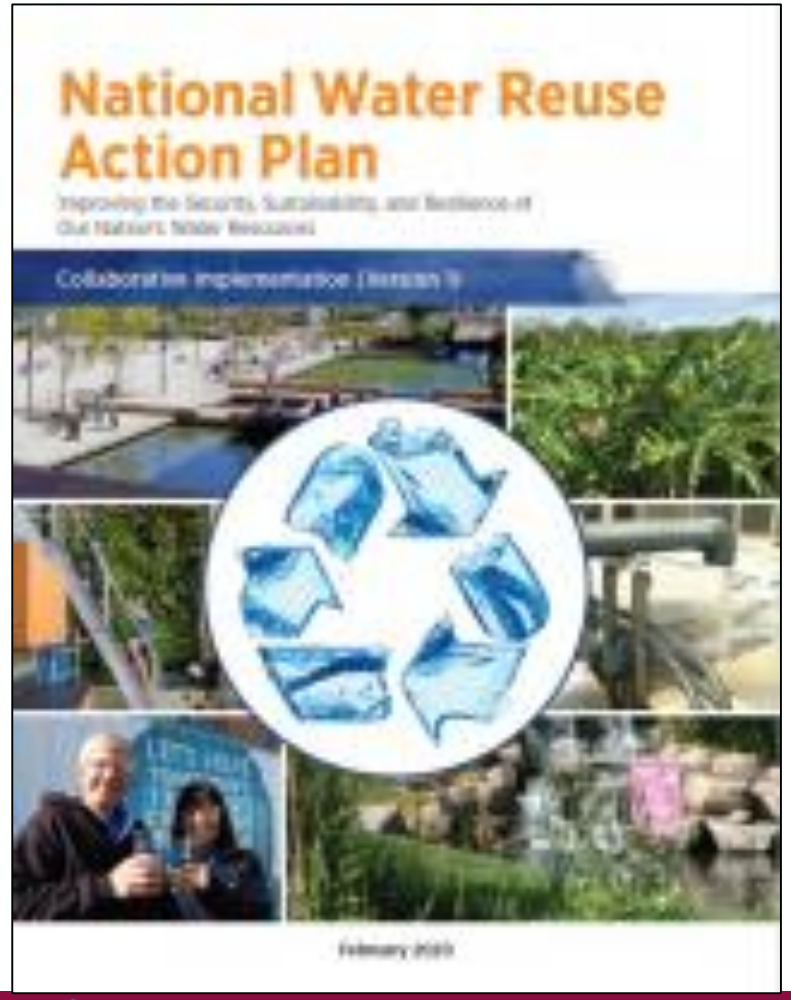


[Thomson 2020]

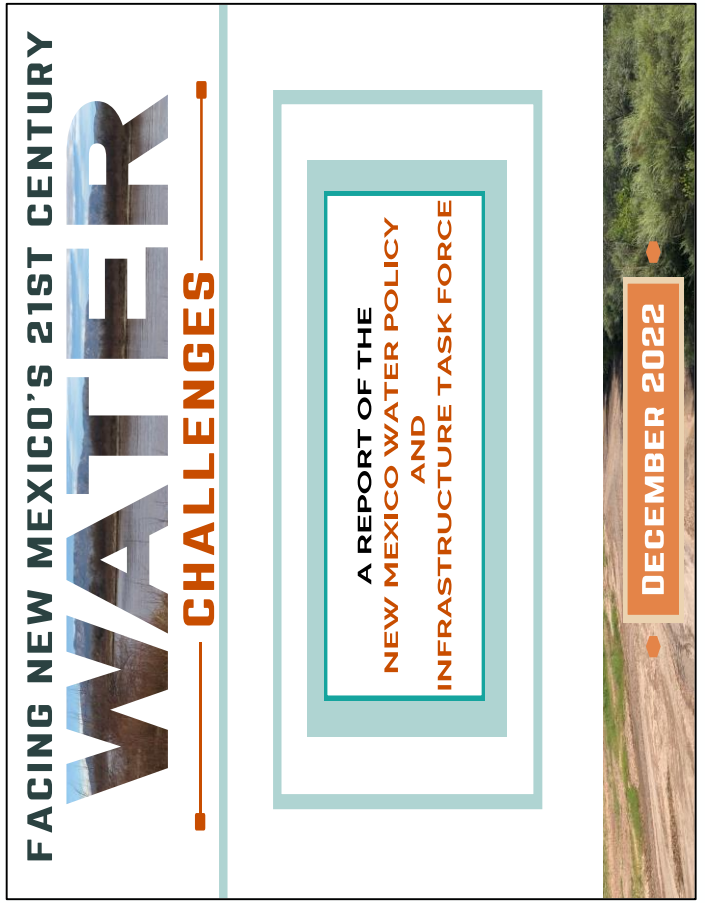


Surplus expected to be ~1 B bbls/yr (2-3 M bbls/day)

National and Regional Water Agencies Recognize the Role of Non-traditional Resources in Water Stewardship



- Current EPA and NM Water Policy is focused on use of ***non-traditional water resources***
- 'New Water' is a major new policy in NM
  - " The need to augment supply regionally, through such tools as brackish groundwater desalination, wastewater reuse, and <u>treated or recycled produced water</u>."



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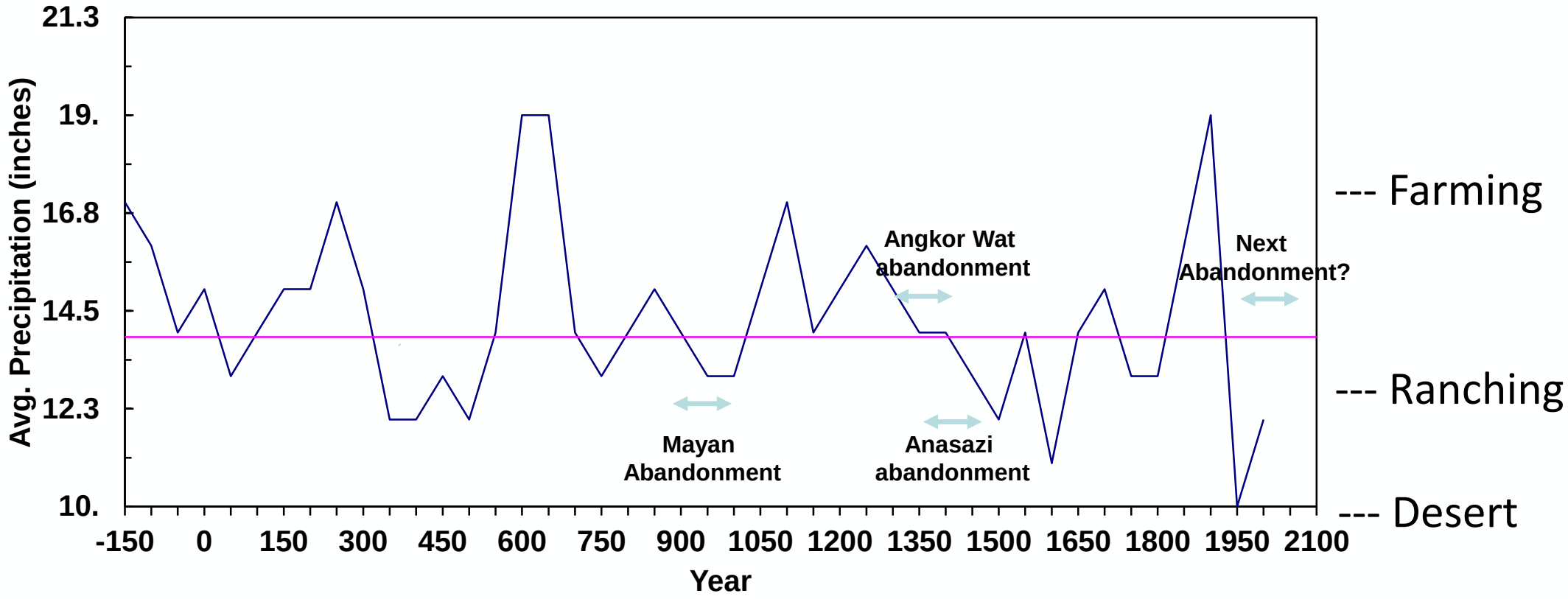
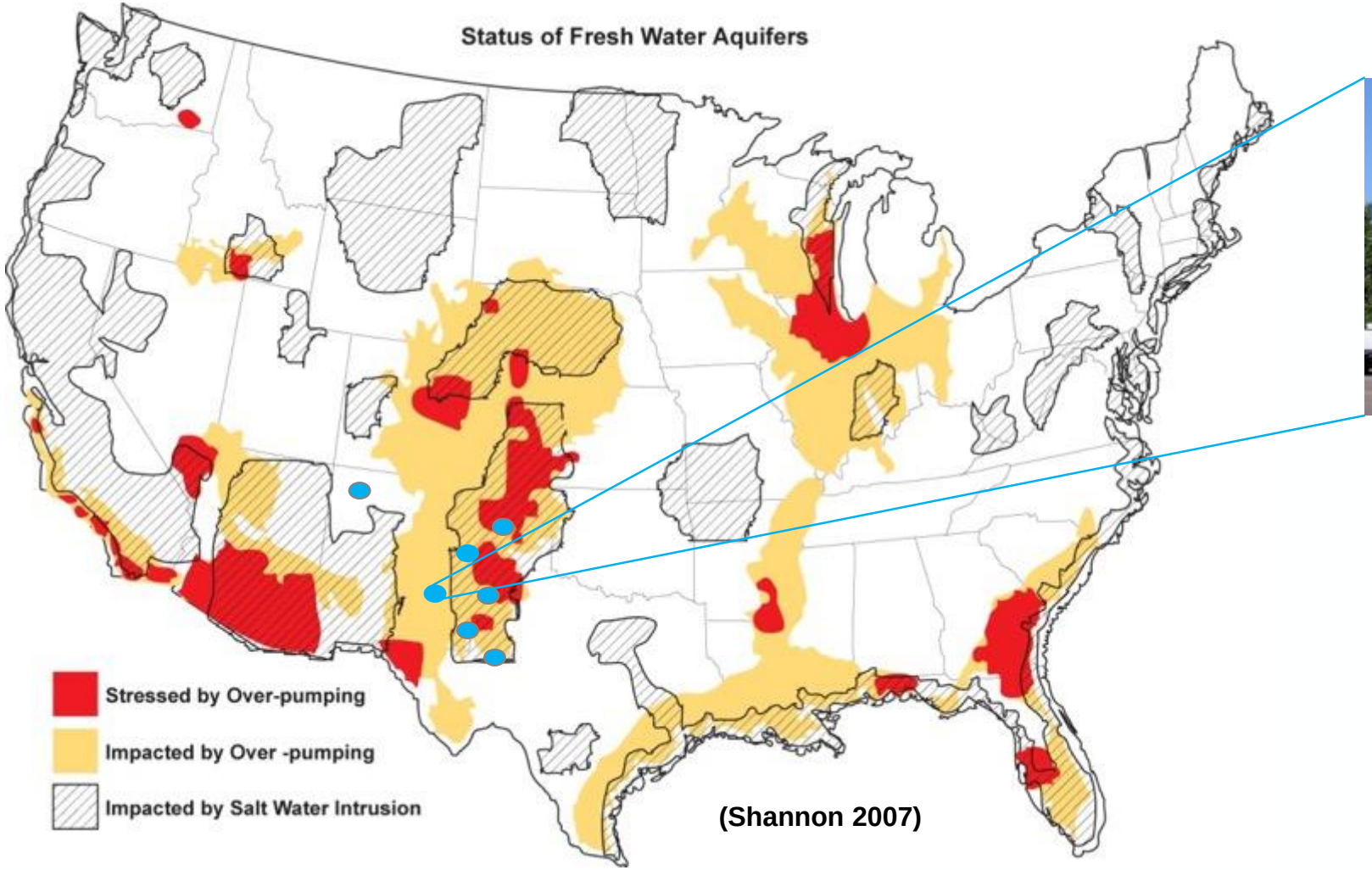
Mid-latitude Rainfall History and Social and Ecological Impacts



Univ. of Arizona – Tree Ring Lab – 50 year averages

The southern U.S. and the mid-latitudes are in the 130th year of a 300 year arid cycle

Why Is Water Stewardship Important in the SW?



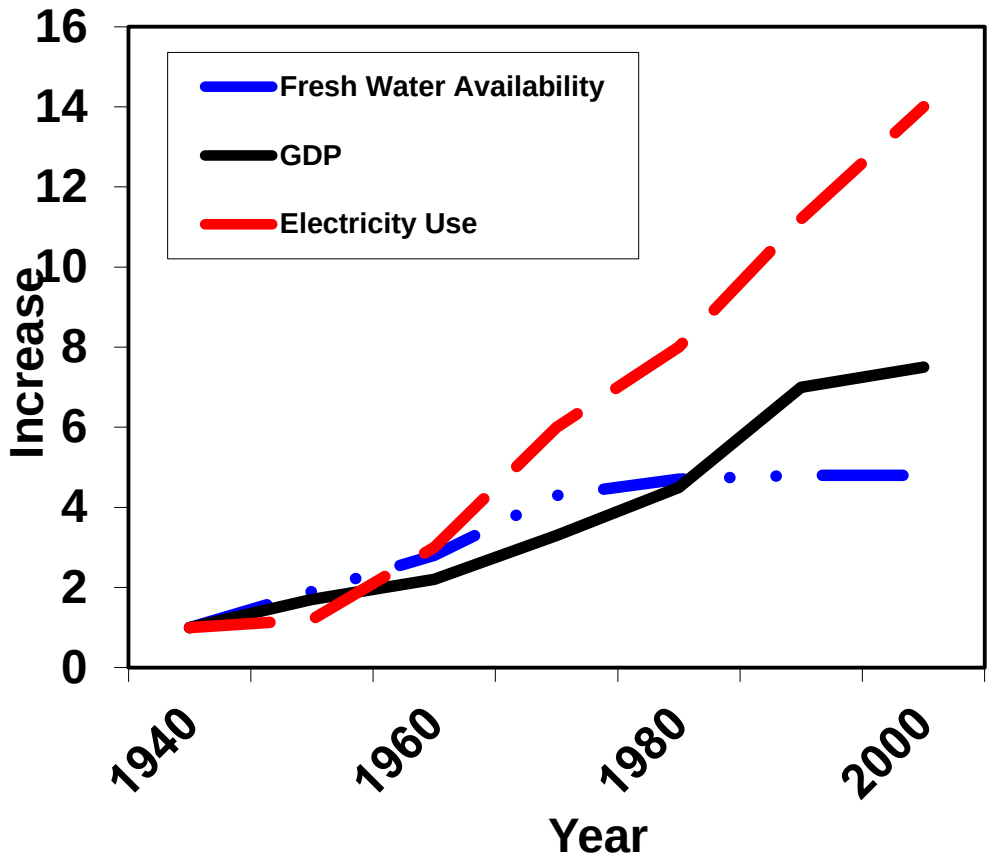
(Shannon 2007)

Hope, New Mexico 88540,
1920 population – 2100
20 sq. miles of orchards
2020 Population - 100

Due to loss of aquifer recharge from Penasco River

Cedarville, Milensands, etc.

Water Supply Growth is a Primary Economic Growth Driver



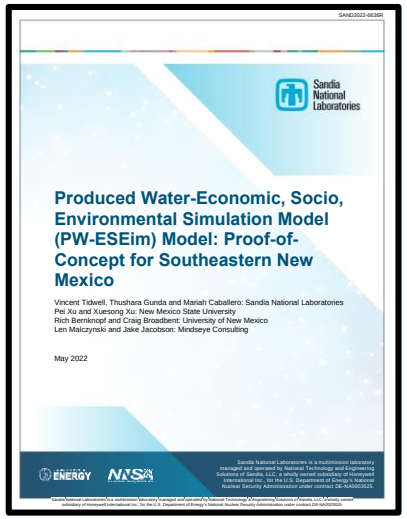
US GDP Growth vs Energy and Water Growth

- NM is 49th in fresh water availability

	AZ	NM
Water supply:	7 M acft/yr	2 M acft/yr
GDP:	$300 B/yr	$100 B/yr
Ag use:	~72%	~75%
M&I use:	~28%	~25%
Population:	7 M	2 M

"Water promises to be to the 21st century what oil was to the 20th century: the precious commodity that determines the wealth of nations."

Fortune Magazine, May 15, 2000



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Water Supply Access - Social and Economic Impacts by 2030

Today one in five people live in areas of water stress.

This is expected to rise to two in three.

Demand for water is set to outstrip supply by 40%.

Business as usual water management will put at risk $63trillion or 1.5 times today's entire global economy.

Water will have more rapid and unavoidable consequences for some businesses than carbon

Goldman Sachs

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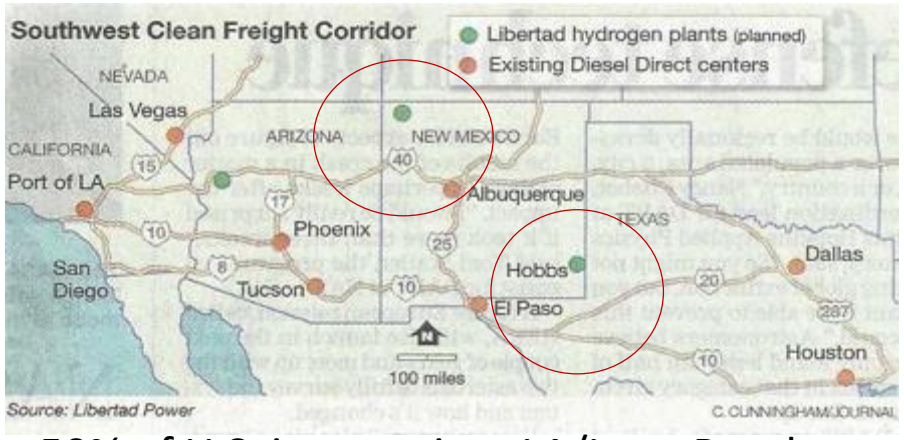
Capital

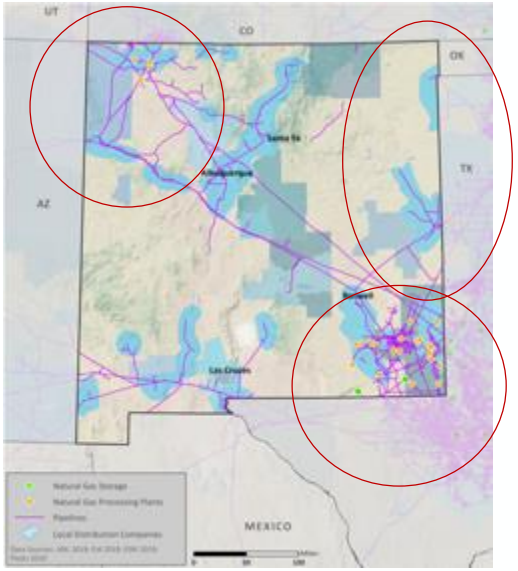
CDP

Energy Transition Options for NM Using Saline Water



50% of U.S. imports into LA/Long Beach

2 of 3 gas pipelines to CA



Intersection of all 3 US Energy Grids

Lowest levelized cost of wind and solar

The Roosevelt Project (Hydrogen Hubs)

A New Deal for Employment, Energy and Environment

- Blue and Green Hydrogen – transportation fuel, heating, electric grid reliability
- Use existing infrastructure
  - Pipelines, CO2 sequestration, SWD, gas infrastructure infrastructure in place

Energy Surety Drivers

- World Economic Forum warnings
- Need to address energy security, reliability, resilience, cost, and safety
- Resources immediately available in the western U.S.