Hydrogen Development Resource Needs and New Mexico Opportunities

Mike Hightower – Program Director
New Mexico Produced Water Research Consortium
New Mexico State University

- Blue Hydrogen – steam reforming of natural gas (methane)

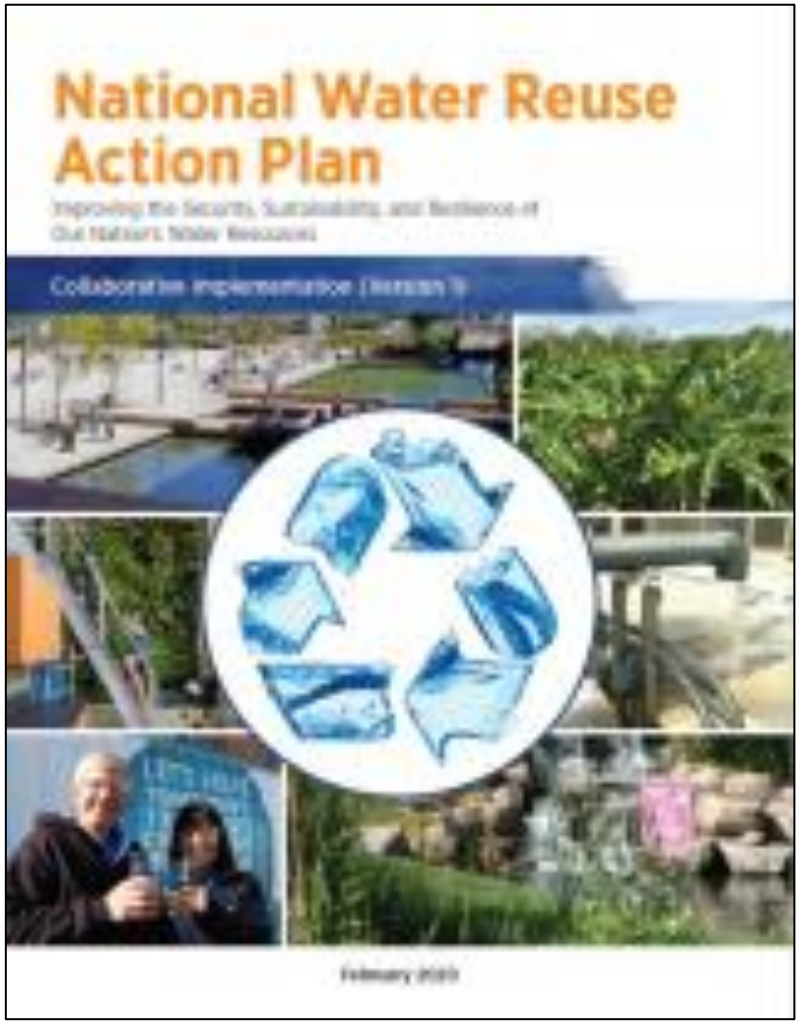
Natural gas		Water		Natural gas		Hydrogen		From the water
CH_4	+	$2H_2O$	+	heat	→	$4H_2$	+ CO_2	+ salt concentrate

- Green Hydrogen – electrolysis (electrical disassociation) of water

Water		electric power		Hydrogen		From the water
$2H_2O$	+	electricity	→	$2H_2$	+ O_2	+ gases and salt concentrate

Water is a big deal in hydrogen production!
What about the use of non-fresh water for hydrogen production in NM?

EPA National Water Reuse Action Plan – 2020



- Focus is on the fit-for-purpose treatment and reuse of waste water
- Five major focus areas:
  - Thermo-electric cooling water (brackish)
  - Agricultural waste water (brackish)
  - Municipal waste water (brackish, organics)
  - Produced water (saline, organics)
  - Storm water (debris, silt, chemicals)
- Definitely salinity reduction interests
- EPA has asked NMPWRC to lead research efforts for the treatment and reuse of produced water

What is the availability of non-fresh or brackish waters in New Mexico?

NM STATE NEW MEXICO PRODUCED WATER RESEARCH CONSORTIUM

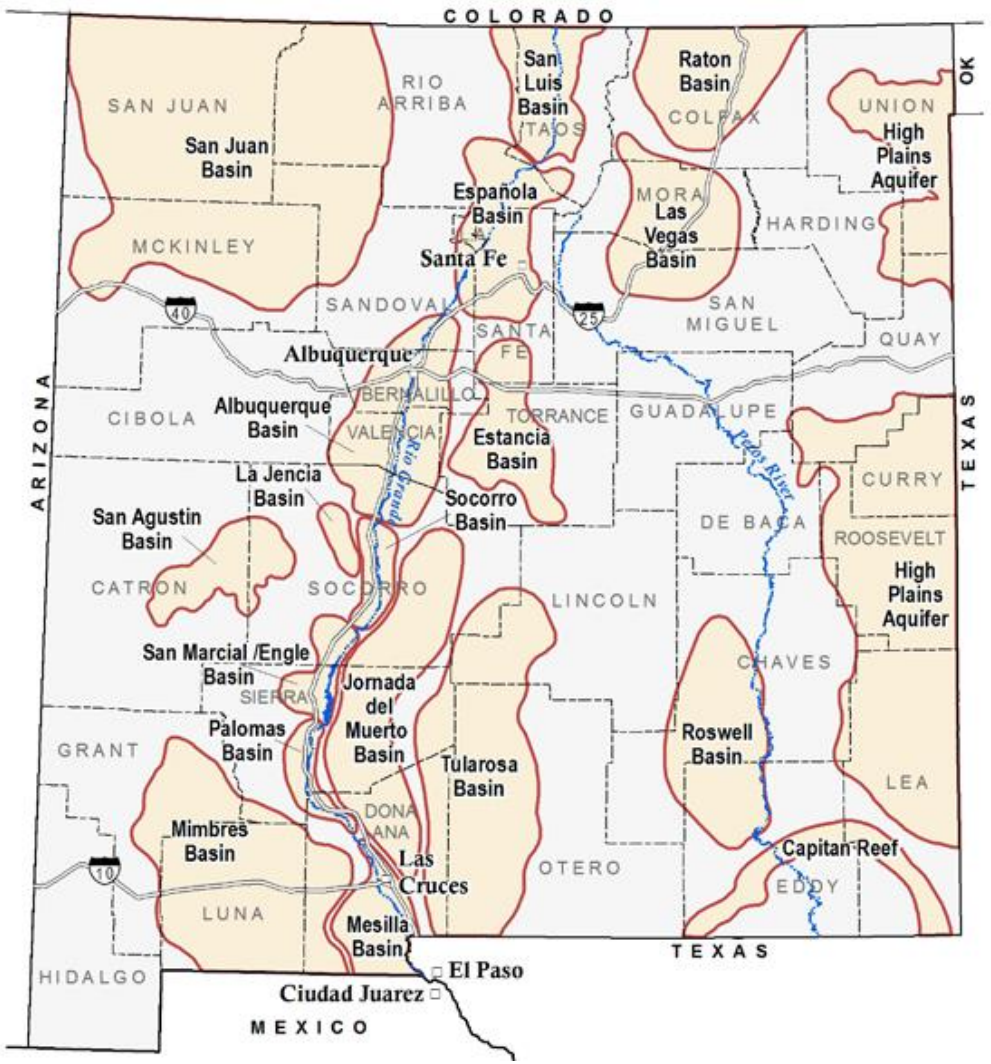
New Mexico Produced Water

- New Mexico is estimated to generate > 4 million barrels of produced water per day - much is disposed through deep well injection
- 100 – 150 MGD or up to 150,000 ac ft per year of water available (3 ABQ's)
- Treatment and reuse is an avoided cost for oil and gas companies – therefore potentially low cost to the user
- 20% of NM produced water comes from the San Juan Basin, but it is generally easier to treat

What about other non-fresh or brackish water resources in New Mexico?

New Mexico Brackish Water

- New Mexico is estimated to have 15 billion acre feet of brackish ground water:
  - 2 billion acre feet easily and economically treated for municipal use, and 2 billion acre feet for industrial use,
  - 1000 year supply of water at 2018 consumption levels,
  - All fresh water basins have zones of brackish water.



Lots of synergies between brackish water and oil and gas operations for hydrogen development in NM

Overview of Fresh and Brackish Water Quality in New Mexico. *New Mexico Bureau of Geology and Mineral Resources, OFR-583, New Mexico Tech, Socorro, NM, June 2016.*