



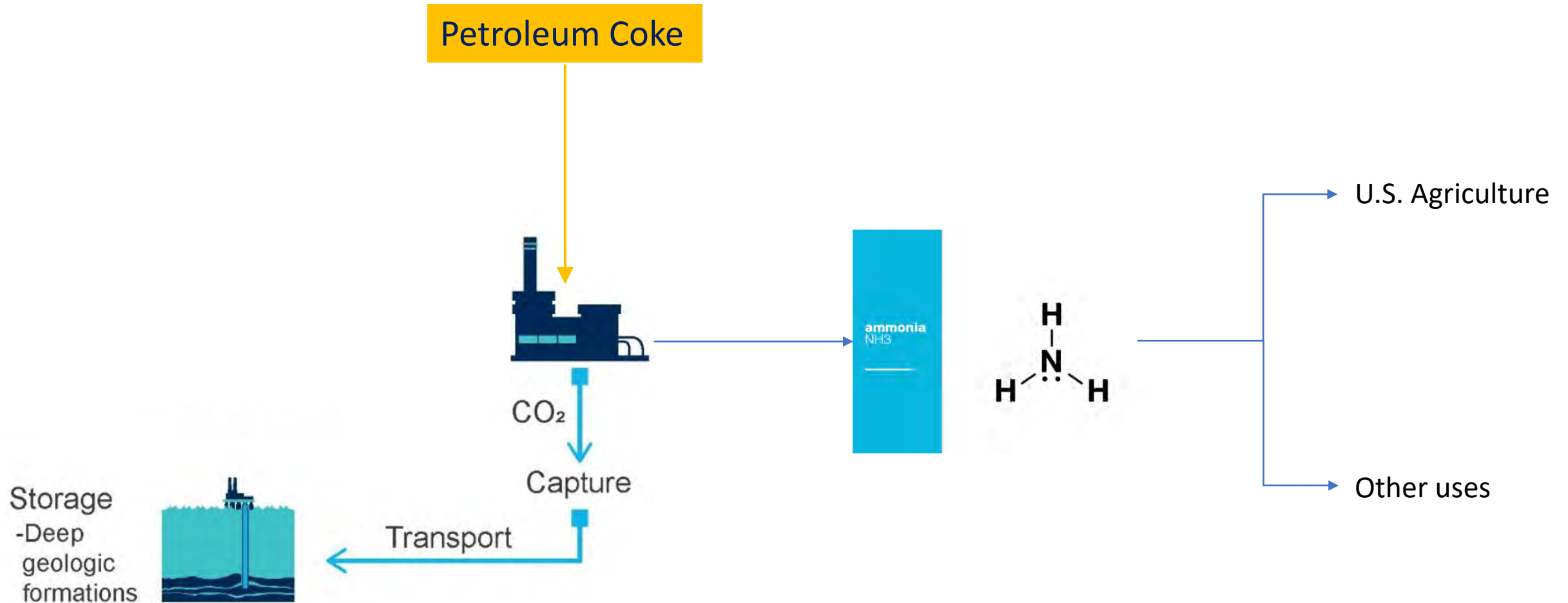
Wabash Valley Resources LLC

Wabash Hydrogen Energy Center

August 2023



Wabash Hydrogen and Blue Ammonia





Plant History

- The Wabash Gasifier began operating in 1995 as a power plant with higher efficiency and less air pollution compared to traditional coal power plants, utilizing new gasification technology.
- Site received visitors from around the world as a showcase for gasification technology
- Operated successfully as baseload power generator for 20 years
- Slated for demolition in 2016, due to the closure of the adjacent Duke Energy Wabash Station. This demolition was planned despite the Gasifier being capable of operating many more years
- Acquired by WVR in May 2016 with plans to modify the plant with capital upgrades to produce clean Ammonia fertilizer

Underground Injection of Fluids

Waste in our lives today..

Waste is an unavoidable byproduct of manufacturing processes that create the thousands of products we use each day. Products such as

- Steel
- Plastics
- Gasoline
- Pharmaceuticals
- Treated sewage by municipalities

and many others cannot be made without generating liquid and solid wastes. Generated wastes and waste treatment byproducts still require disposal.

History of the federal regulatory program..

Shortly after the creation of the U.S. Environmental Protection Agency (USEPA) in 1972, a federal underground injection control (UIC) program was created to increase groundwater protection when underground injection was used as a method of disposal.

This UIC program was established under the authority of the federal Safe Drinking Water Act (SDWA) of 1974.

It is estimated that about 24.4 billion barrels (bbl.), or 1.02 trillion gallons of produced waste, are generated each year in the United States. Of this total about 91.5 percent is injected underground for disposal.

Existing Active Injection wells in the U.S.

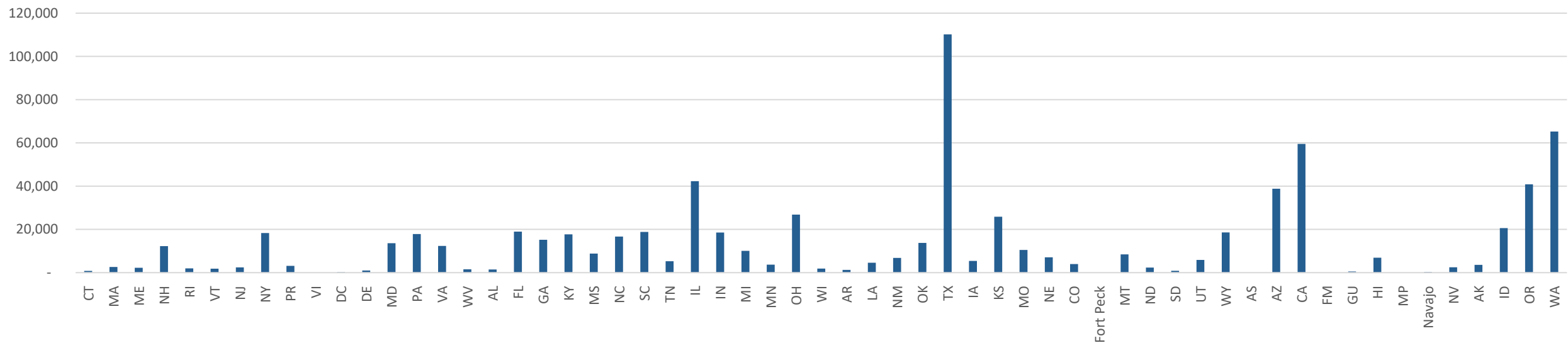
Well Class	Purpose	Active Wells
I	Injection of hazardous, non-hazardous, and municipal wastes below the lowermost USDW	830
II	Injection of fluids associated with the production of oil and natural gas resources for the purposes of disposal or enhanced oil and gas recovery	181,431
III	Injection of fluids for the extraction of minerals	28,327
IV	Injection of hazardous or radioactive wastes into or above a USDW (USEPA prohibited the use of Class IV wells in 1984)	122
V	Injection into wells not included in other well classes but generally used to inject non-hazardous waste	531,536

Source: https://www.epa.gov/sites/default/files/2020-04/documents/uic_fact_sheet.pdf

Inventory by each state

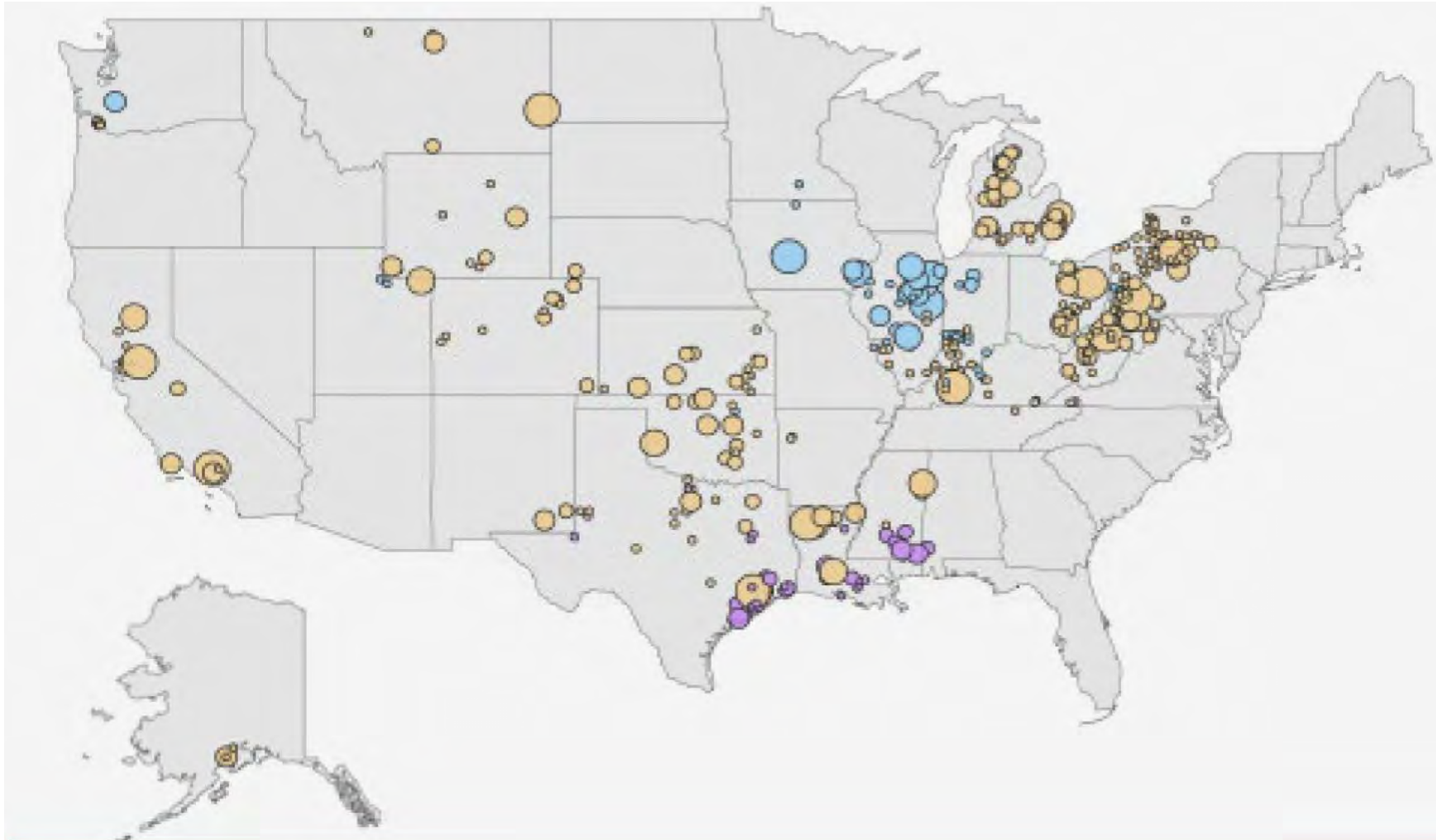
Indiana has close to 18,000 injection wells. Illinois has over 42,000 injection wells.

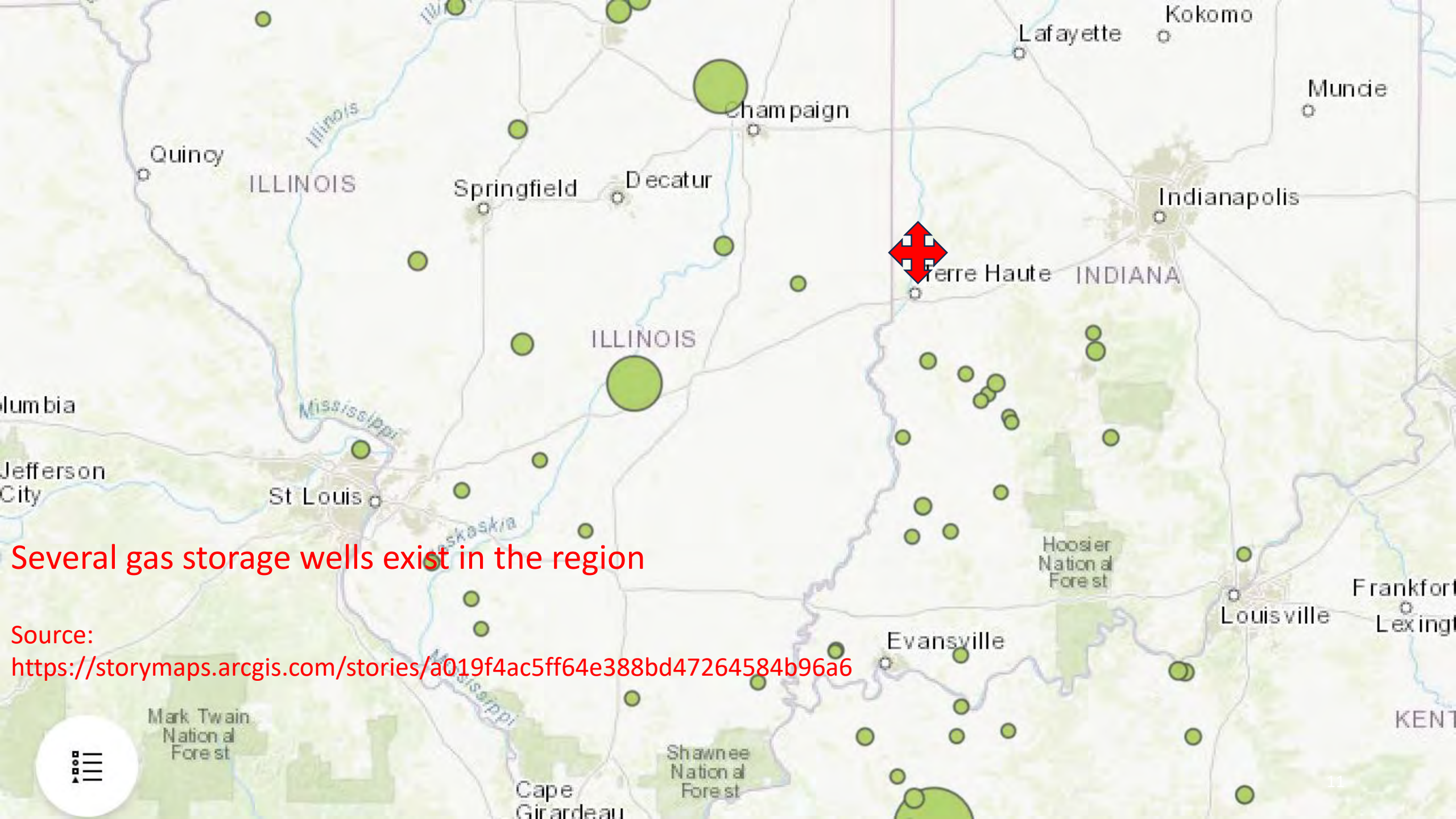
In the US, there are over 145,000 active and idled CO₂ wells for EOR purposes.



Source: <https://www.epa.gov/uic/uic-injection-well-inventory>

Underground Gas Storage in the United States





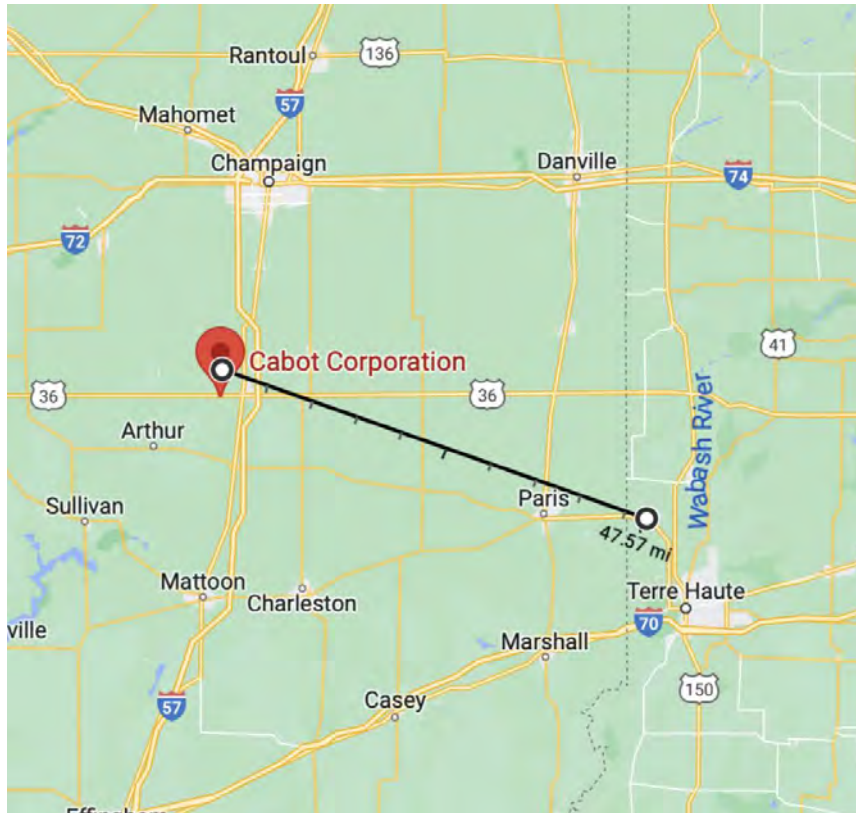
Several gas storage wells exist in the region

Source:

<https://storymaps.arcgis.com/stories/a019f4ac5ff64e388bd47264584b96a6>

Example of a facility with significant injection profile..

Tuscola, IL chemical waste disposal wells (~50mi WNW)

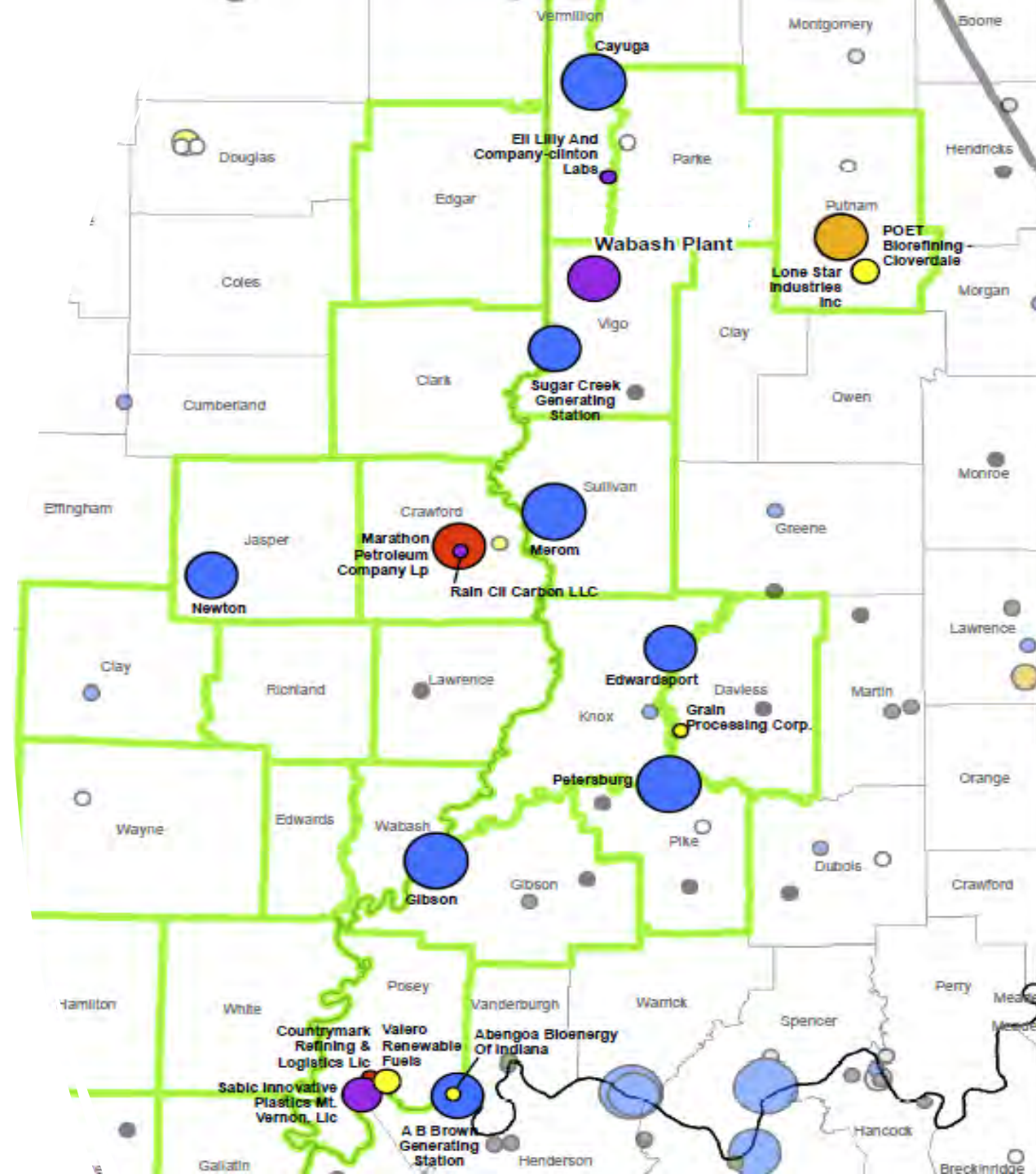


Since 1970, injected **18 billion Gal** of liquid into the same formation through Cabot-Tuscola #2 well

Equivalent to injecting more than **50 million metric tons of CO₂**

Still injecting equivalent to **60,000 ton per month of CO₂**

Significant CO₂ sources in
our region.



Underground storage related incidents

Decade	Incidents	Injuries	Fatalities
1950 - 1959	2	0	0
1960 -1969	10	7	4
1970 - 1979	15	3	0
1980 - 1989	7	0	0
1990 - 1999	18	5	0
2000 - 2009	9	0	0

Source: <https://www.energyinfrastructure.org/-/media/energyinfrastructure/images/ng-storage/underground-natural-gas-storage-jitf-whi.pdf>

Comments by the leading organization on groundwater protection..

The Groundwater protection council (GWPC) believes that based on the long history of demonstrated effective operations, the underground injection program is one of the safest and most environmentally protective programs in the United States.

Source: https://www.gwpc.org/wp-content/uploads/2022/12/UIC_Guide_June_2021_Update1.pdf

Transportation of fluids via pipeline

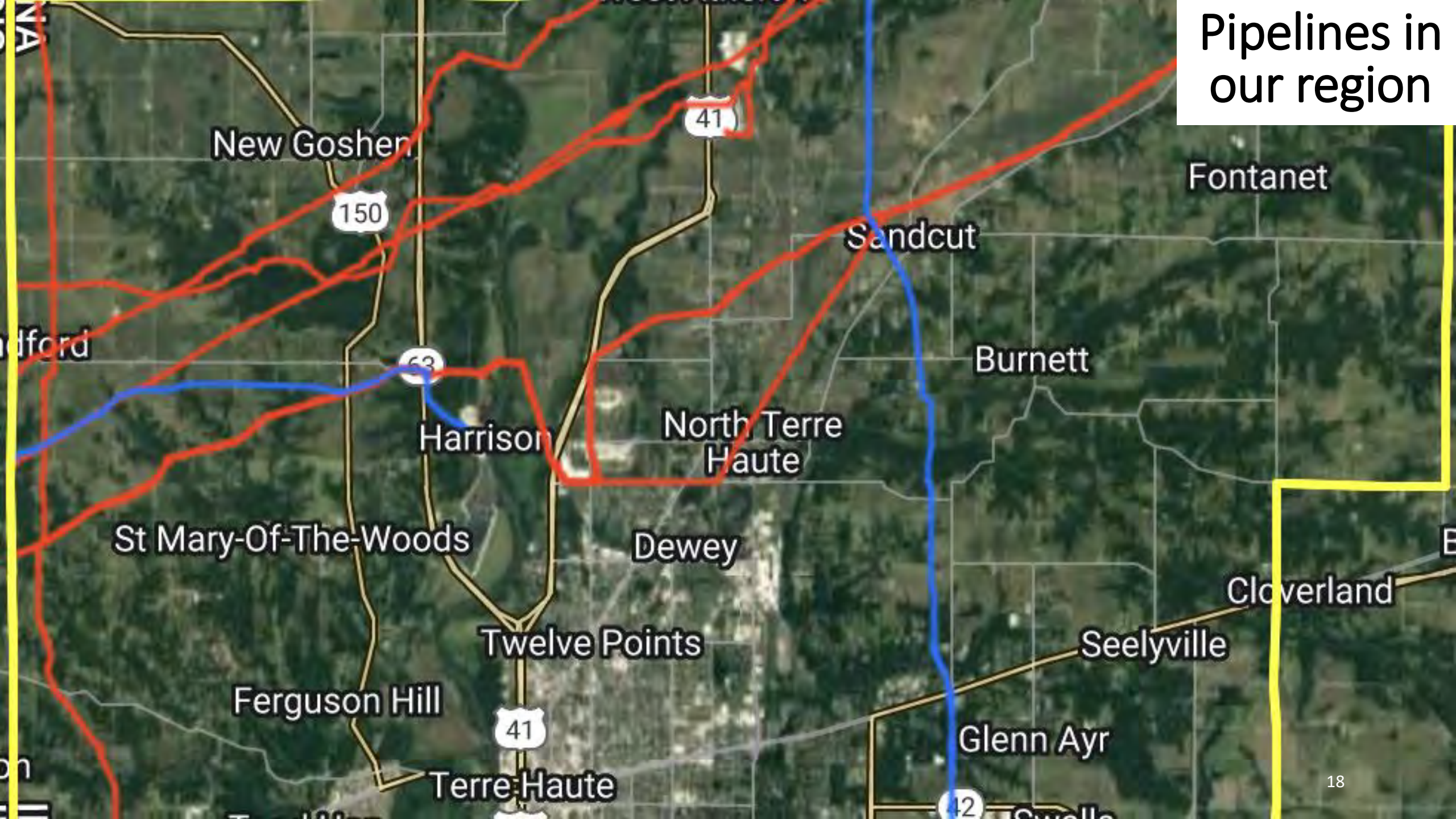
Pipelines in the United States

United States has more than **2.6 million miles** of pipelines that safely deliver trillions of cubic feet of natural gas and hundreds of billions of tons of liquid petroleum products each year.

They are essential: the volumes of energy products they move are well beyond the capacity of other forms of transportation.

Source: <https://www.phmsa.dot.gov/faqs/general-pipeline-faqs>

Pipelines in our region



CO₂ Pipeline Incident

Incident. In February 2020, Yazoo County MS had an incident related to CO₂ pipeline burst.

Pipeline Specifications. The pipeline is a 77 miles of 24-inch diameter pipeline (WVR proposed pipeline is 11 miles and 8-inch, which is 90% smaller in volume).

Sent to Hospital: Forty-five people were taken to the hospital

Fatalities: None

Injuries: None

Evacuations: None

Source. <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-05/Failure%20Investigation%20Report%20-%20Denbury%20Gulf%20Coast%20Pipeline.pdf>

Safety protocol followed at the incident

7:06 p.m. – Denbury’s 24-inch pipeline ruptured.

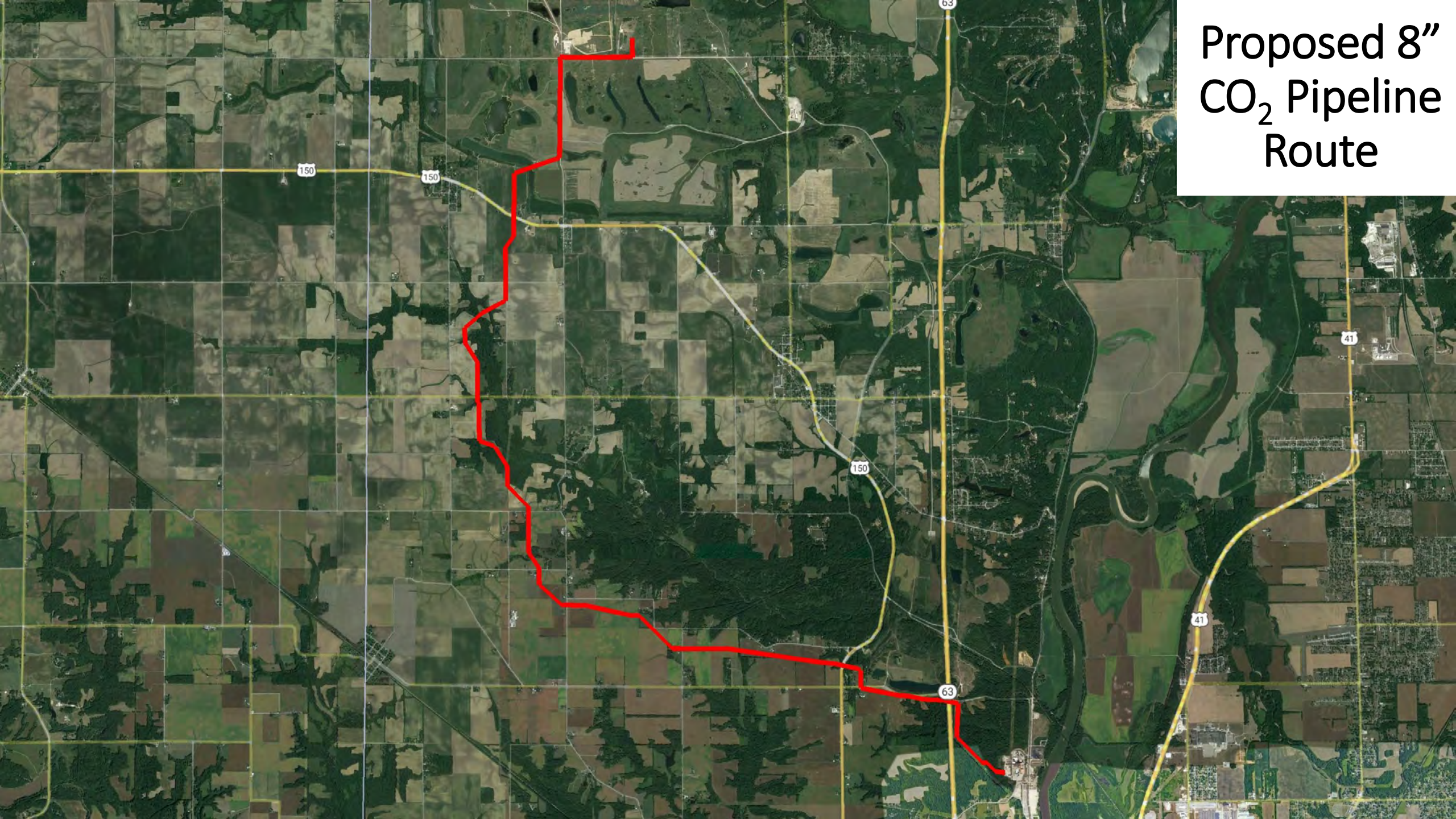
7:07 p.m. – Denbury’s control room was alerted by its supervisory control and data acquisition (SCADA) system of a pressure drop.

7:14 p.m. – Denbury control room remotely closed three MLBVs (one MLBV at Tinsley Station, which is upstream of the rupture site, and two MLBVs at Satartia and Redwood, which are downstream of the rupture).

7:15 p.m. – Denbury control room received SCADA confirmation that the MLBVs were closed.

Significant finding: Local emergency responders **were not informed** by Denbury Resources of the rupture of the CO₂ pipeline.

Proposed 8" CO₂ Pipeline Route



Community Benefits

Environmental and Social Justice Attributes..

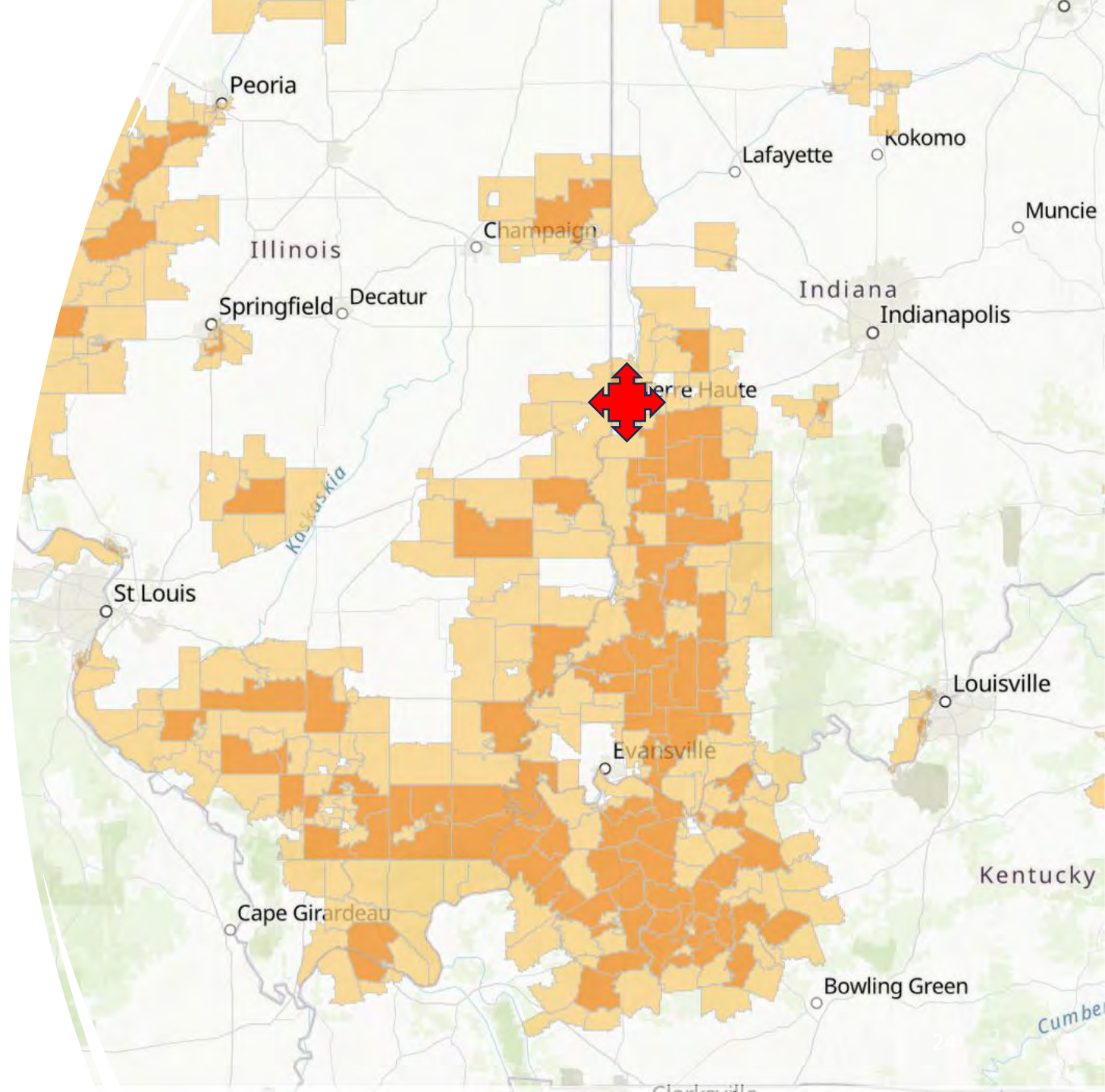
Department	Status	Notes
Industrial Waste	<input checked="" type="checkbox"/>	By maximizing waste from fossil energy as feedstock, the project aims to reduce the waste produced by human activities.
Environmental Justice	<input checked="" type="checkbox"/>	Refinery waste is dumped in low-income communities or exported to countries with lax environmental regulation. The uncontrolled incineration of such waste spews many harmful materials in the atmosphere. Wabash project shall reduce such incineration.
Revival of a coal community	<input checked="" type="checkbox"/>	When the Wabash Coal power plant was shuttered, over 600 jobs were lost. The hydrogen project is located on the same site. The project plans to re-hire as many of those who lost their jobs with salaries that are higher by at least 25%.

Revival of a coal closure community..

At its peak, the Duke Energy station employed 225 people, though about 600 coal mining jobs were lost indirectly as a result of the plant's closure.

With a total of **\$1 Billion investment**, this is one of the most significant investments in our community.

For each job we create, there is 8 indirect jobs created in the community, with total of over 1,100 jobs!



Community Benefits and Engagement

HISTORY OF ENGAGEMENT

WVR has a **30-year history** of partnering with the unionized skilled craft professionals of the Central Wabash Valley Building and Construction Trades Council and its union-signatory contractors.

COMMITMENTS TO ORGANIZED LABOR, WORK TRAINING, AND DIVERSITY

- WVR and the Building Trades have committed to building the project under the **National Maintenance Agreement (NMA)**, a national collective bargaining agreement.
- WVR will work with the Indiana Plan for Equal Employment, one of the **nation's oldest Apprenticeship Readiness Programs (ARP)**, to create a diverse workforce pipeline to opportunities with Building Trades apprenticeships and work at WVR.
- WVR is in discussions with Greater Terre Haute NAACP regarding joint outreach to **high school CTE programs and recruitment for the ARP**.



THANK YOU
