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UNIVERSITY OF  
**NORTH DAKOTA**



Critical Challenges. Practical Solutions.



Energy & Environmental Research Center (EERC)

# PRAIRIE HORIZON CARBON MANAGEMENT HUB

U.S. Department of Energy  
National Energy Technology Laboratory  
2024 Carbon Management Research Project Review Meeting  
DE-FE0032371  
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# PROJECT PARTNERS



U.S. DEPARTMENT OF  
**ENERGY**



NATIONAL  
ENERGY  
TECHNOLOGY  
LABORATORY

## Project Partners

- Prairie Horizons Energy Solutions
- North Dakota Renewable Energy Program
- University of North Dakota Nistler College of Business & Public Administration
- U.S. Department of Energy

# MAJOR PROJECT OBJECTIVES



- Provide technical assistance and engagement for a prospective large-scale CO<sub>2</sub> storage hub.
- Emphasize community outreach and public engagement activities that will support better understanding of the social landscape of the region in which the storage hub would be developed.

# PROJECT GOAL AND BENEFIT TO THE PROGRAM

## Project Goal

To advance public acceptance to benefit and accelerate commercial carbon capture, utilization, and storage (CCUS) deployment.

## Program Benefits

This project will support FECM's goals by:

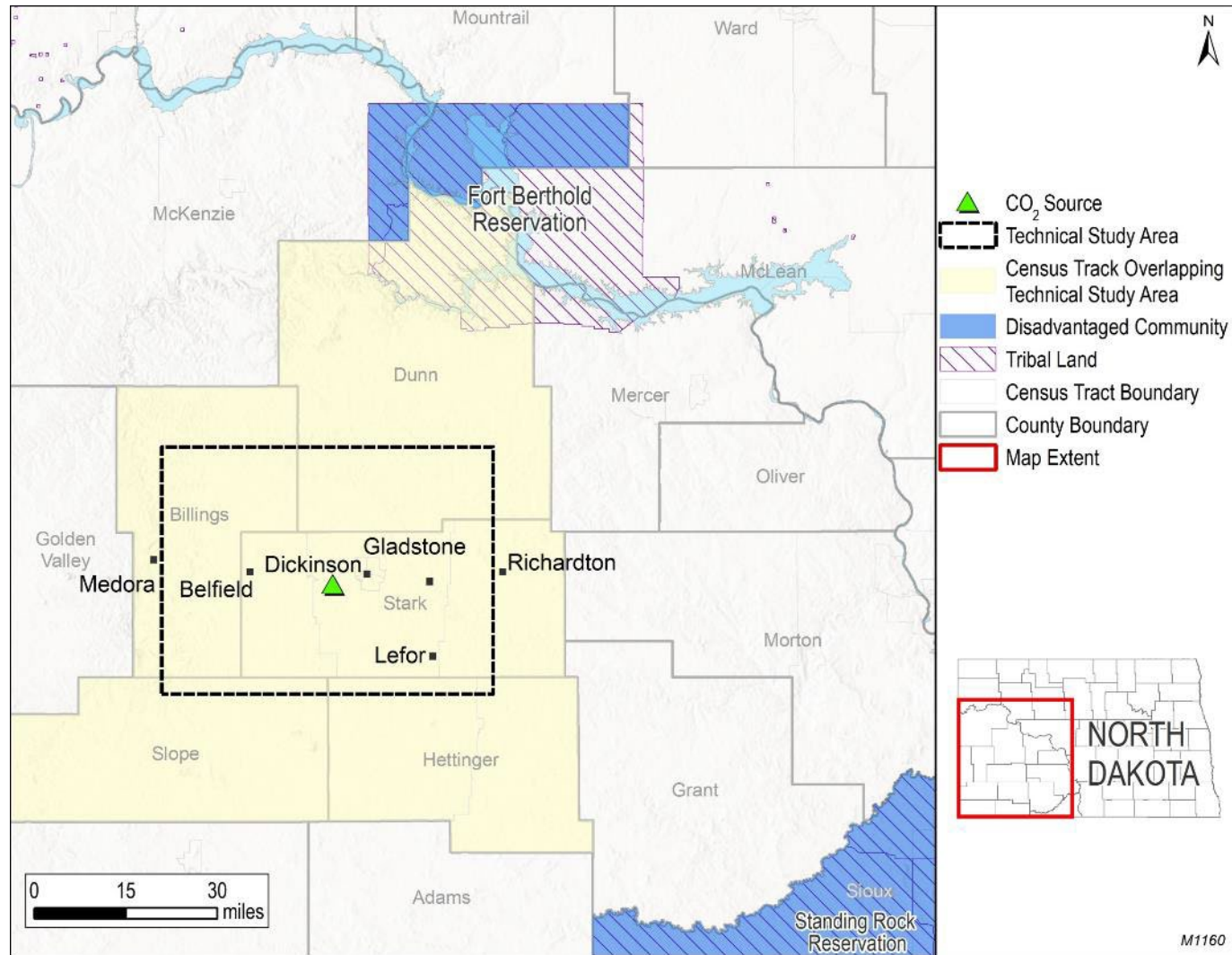
- 1) Addressing key technical challenges.
- 2) Facilitating data collection, sharing, and analysis.
- 3) Evaluating regional infrastructure.
- 4) Promoting regional technology transfer.
- 5) Public engagement and support.



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# STUDY AREA



M1160

# OBJECTIVES

## 1) Addressing technical and nontechnical challenges by investigating:

- Pore space competition.
- Legacy well integrity.
- CO<sub>2</sub> pipeline rights-of-way.
- Site-readiness factors and more.

## 2) Outreach and engagement

- Public education and engagement.
- Engaging state and federal government.

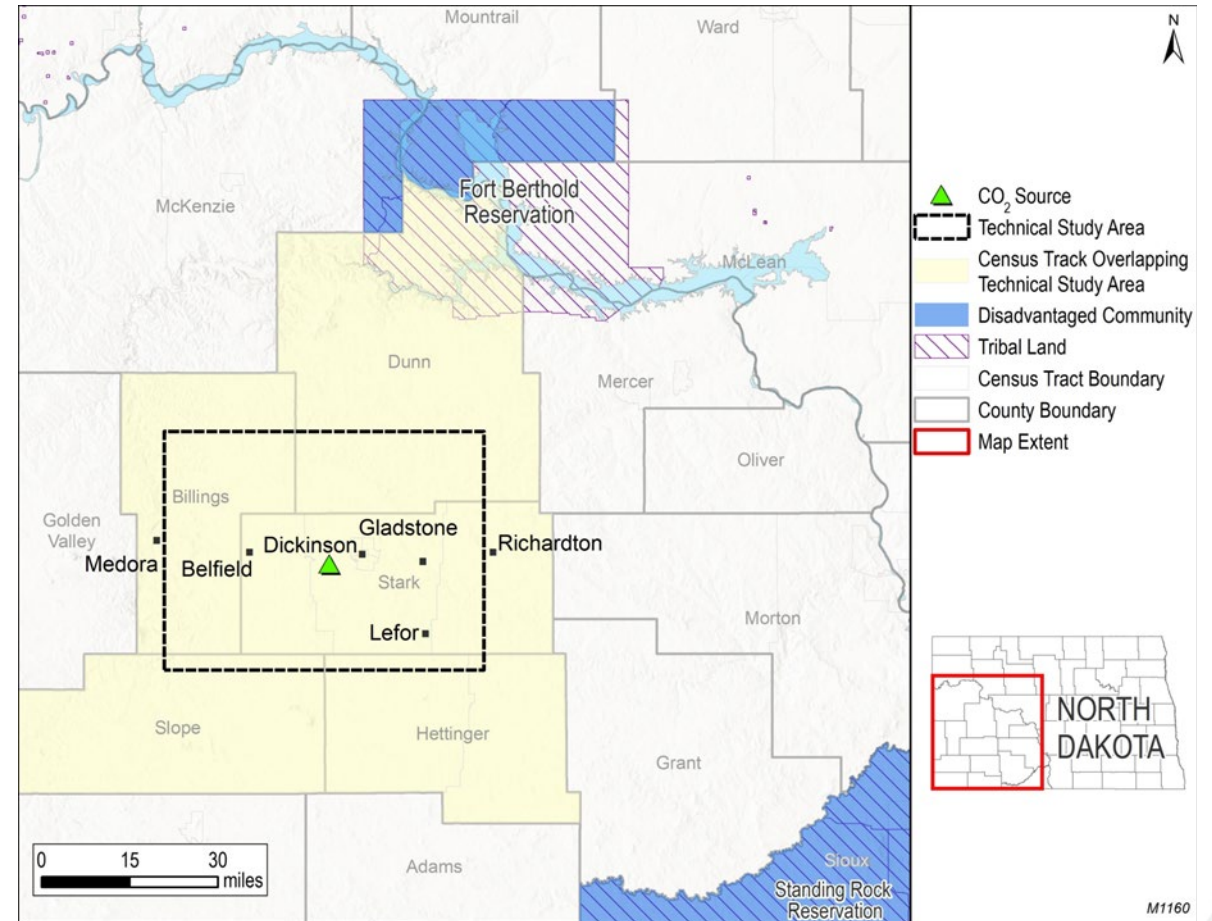
## 3) Carbon Hub Advisory Team (CHAT)

- Technical advisory team to help with technical challenges.



# COMMUNITY BENEFITS PROGRAM (CBP) OVERVIEW

- Provide technical assistance and engagement activities to a prospective large-scale carbon management storage hub with a strong emphasis on:
  - Public engagement activities.
  - Energy and environmental justice analysis.
  - Social science research.







# ENGAGEMENT

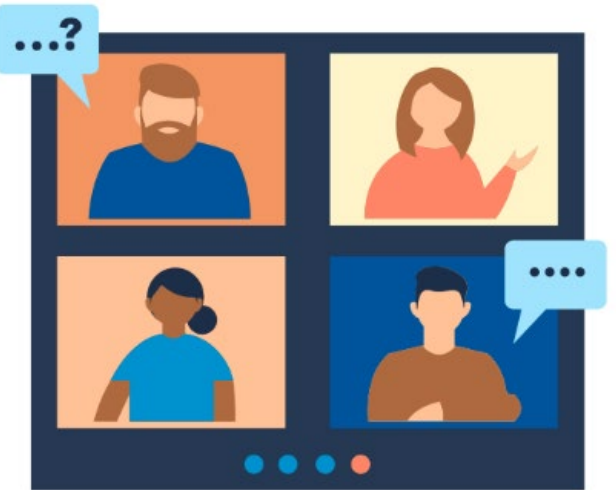
**Landowner Meetings**

- Gladstone, ND

**Fact Sheet**

- CO<sub>2</sub> Pipeline Safety

Coming in 2025:



**Virtual Listening Session(s)**

- Disadvantaged Community

**Public Opinion Survey**

- Every Door Direct Mail Invitation
- Online Survey Instrument

**What to Know about Pipeline Safety**  
ENSURING THE SAFETY OF CO<sub>2</sub> PIPELINES

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CO<sub>2</sub> has been safely transported via pipeline since the 1970s. The United States has over 5000 miles of CO<sub>2</sub> pipelines, primarily supporting enhanced oil recovery projects. As the nation focuses on reducing carbon emissions, demand will rise for permanent CO<sub>2</sub> storage solutions and lower carbon intensity oil production, necessitating a significant expansion of pipeline infrastructure. Ensuring the safety and reliability of these pipelines is crucial as we move toward a more sustainable future.

**LEADING THE WAY IN SAFE TRANSPORT**  
The United States has almost 230,000 miles of pipelines for oil and petroleum products and another 3 million miles of natural gas pipelines. When it comes to transporting CO<sub>2</sub>, pipelines have consistently demonstrated the highest safety standards compared to trucks and trains. With significantly lower incident rates, the controlled environment of pipeline systems, along with their regular maintenance and monitoring, makes pipelines a reliable option for CO<sub>2</sub> transportation. There are about 50 pipelines across the United States, transporting about 66 million tonnes of CO<sub>2</sub> per year, which is equivalent to about 54 million gallons of CO<sub>2</sub>, each day.

According to the U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA), from 2010 to June 2024, 76 incidents were reported and documented on CO<sub>2</sub> pipelines and related facilities. These incidents resulted in zero fatalities. During this period, 68% of incidents were small releases (unintentional release of 50 barrels/2100 gallons or less) that were quickly identified and addressed. The successful containment of small incidents is in part due to the stringent design specifications, robust monitoring and safety systems by pipeline operators, and detailed operational and response plans required by federal regulations for constructing and operating CO<sub>2</sub> pipelines. Furthermore, federal rules are being refined for new CO<sub>2</sub> pipelines as part of an ongoing update.

**+467% EMISSIONS** **OVER 4000 TRUCKS** **OR** **OVER 13 TRAINS EACH A MILE LONG** **+42% EMISSIONS**

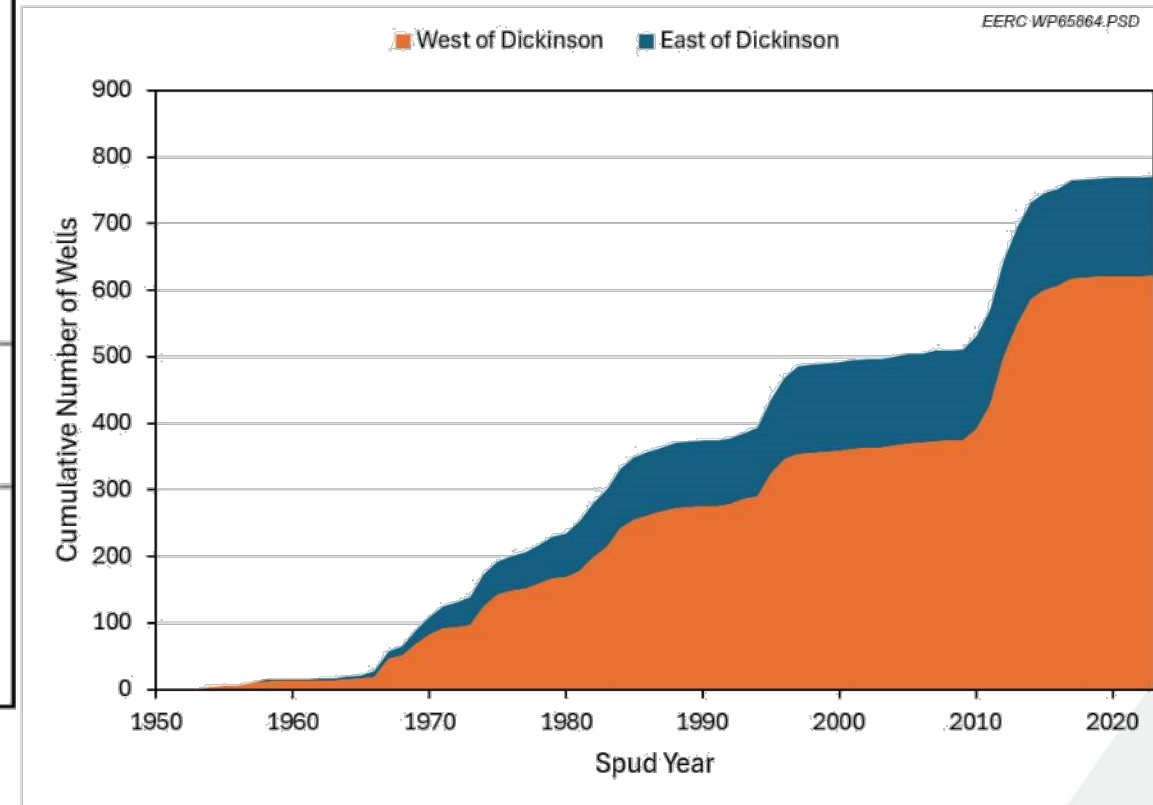
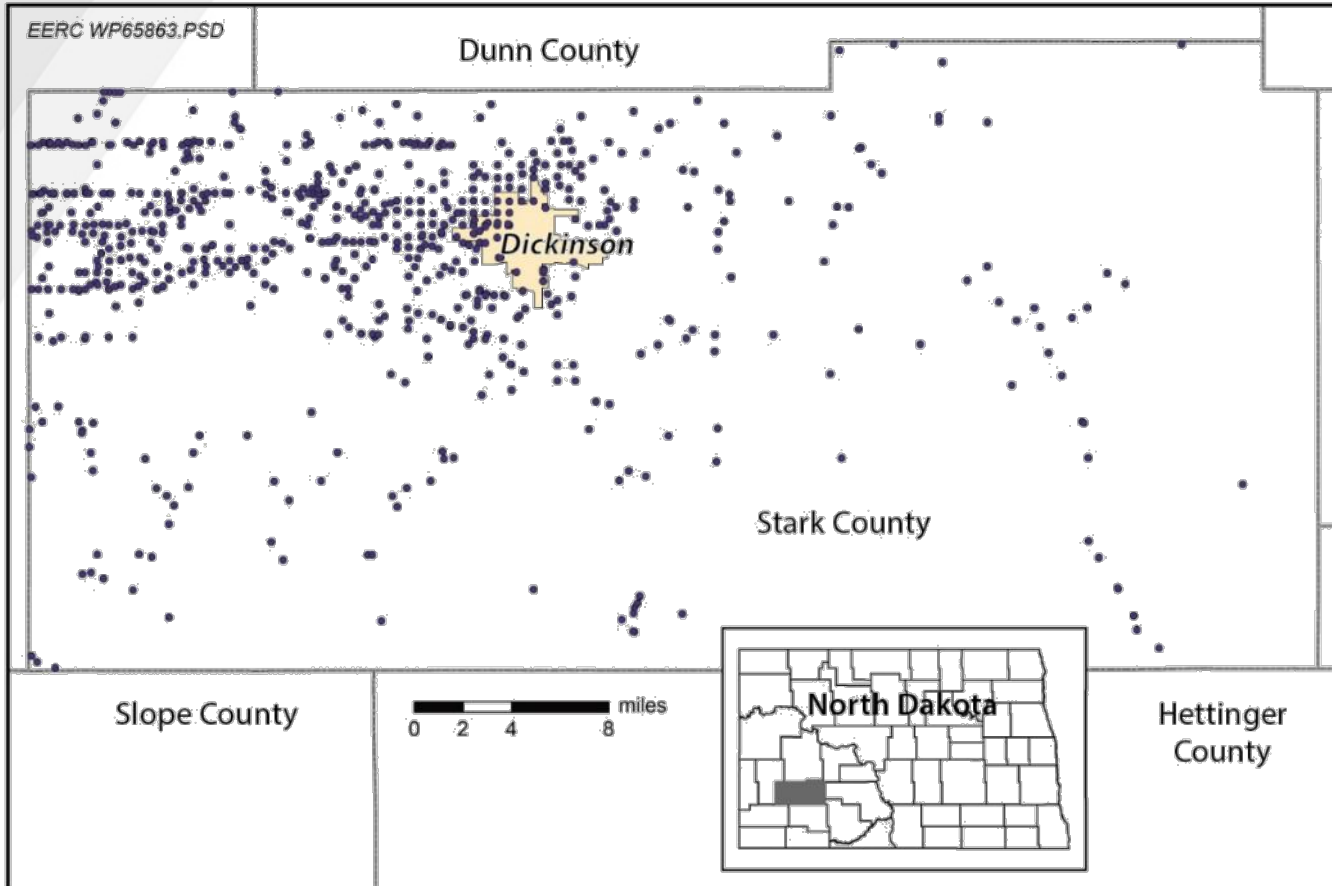
**NEEDED TO CARRY THE SAME VOLUME DELIVERED BY ONE LARGE PIPELINE ON A SINGLE DAY**

CRITICAL CHALLENGES | PRACTICAL SOLUTIONS

**YOUR OPINION MATTERS**

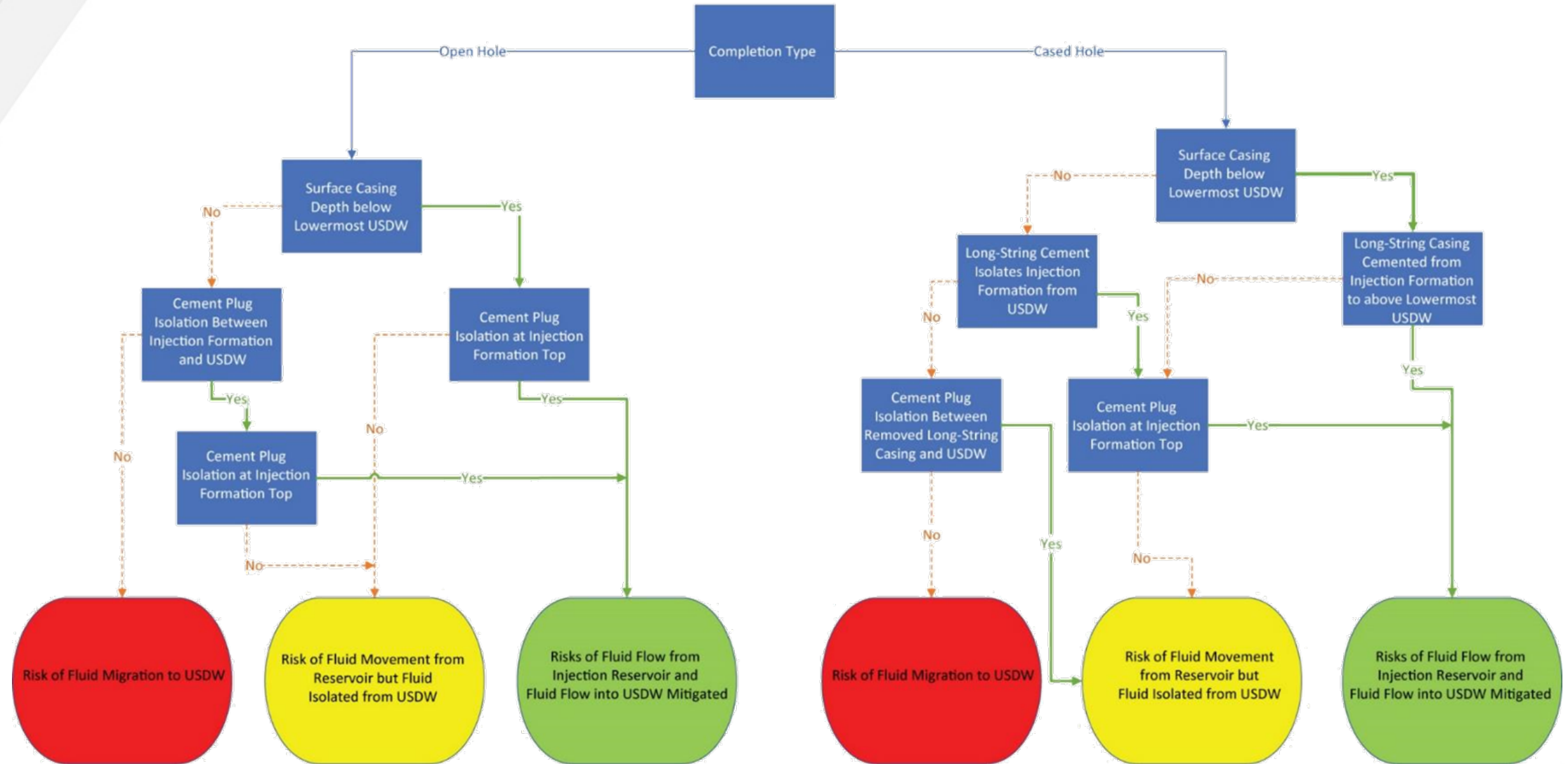
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# LEGACY WELLBORE INTEGRITY EVALUATION

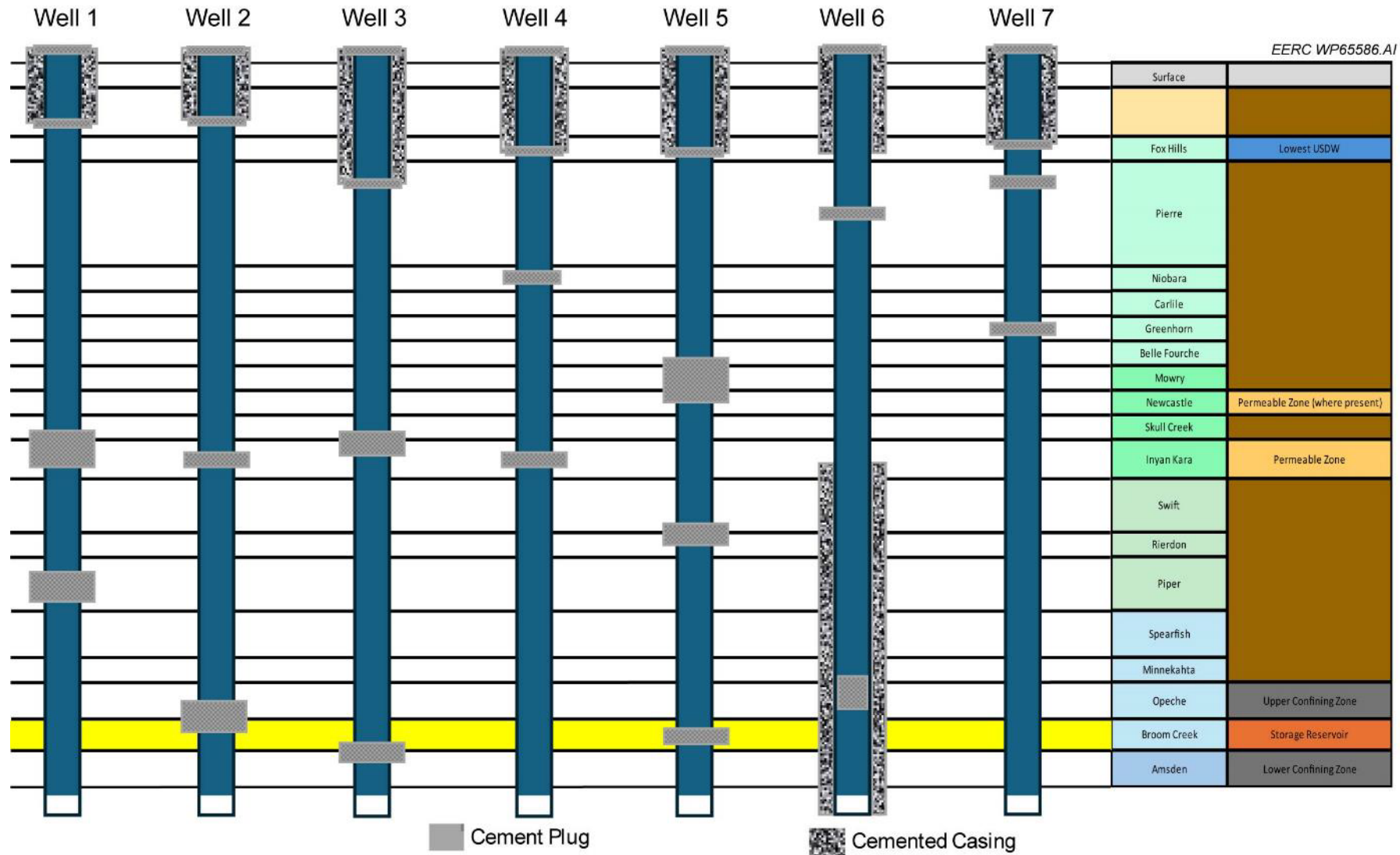


# STOPLIGHT SYSTEM

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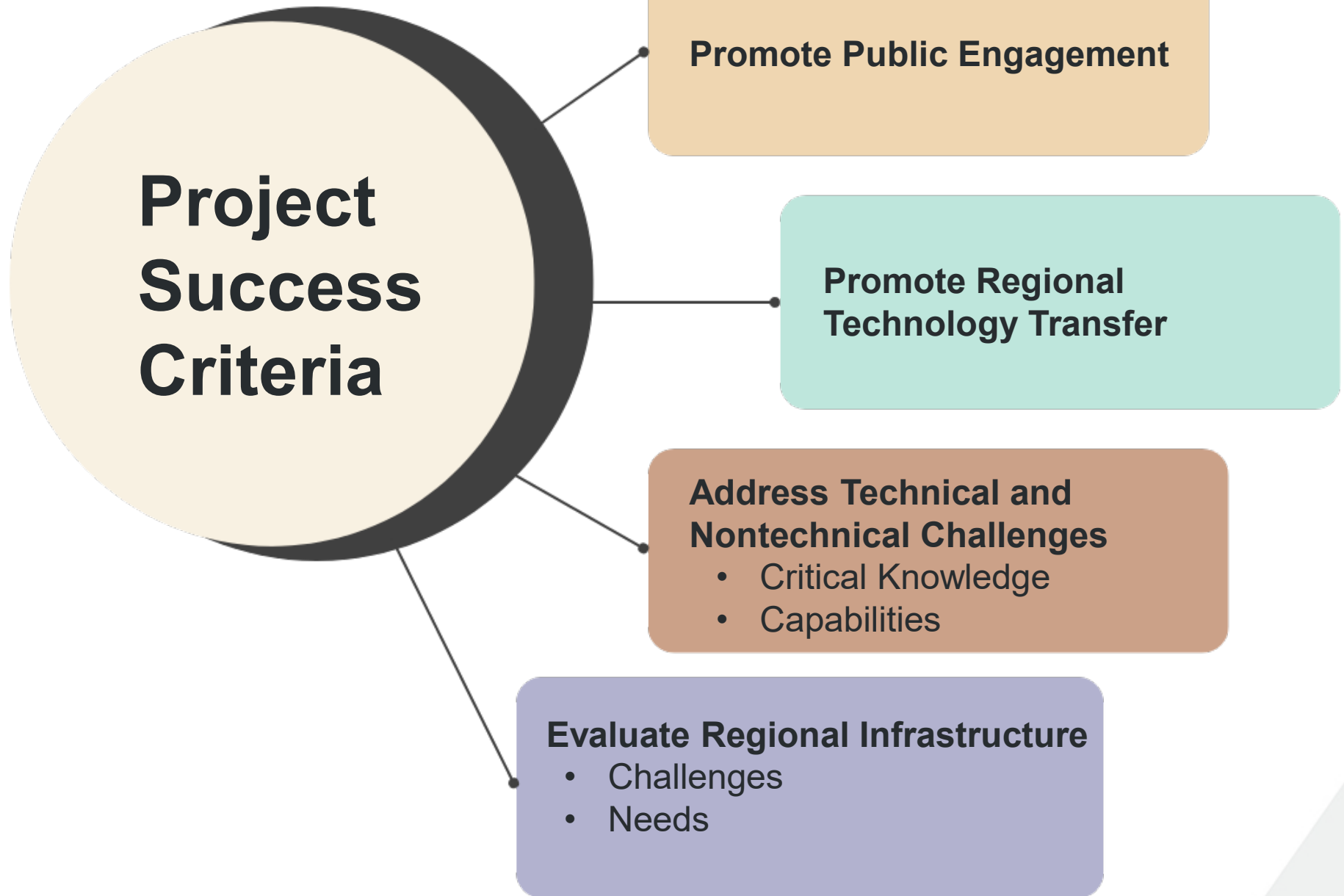


# CEMENT-PLUGGING CONFIGURATIONS





**Ultimately,  
this project  
will be  
considered  
successful if  
it can...**



# NEXT STEPS

- Investigate pipeline rights-of-way (report due September 2024).
- Investigate pore space resource competition (report due November 2024).
- Hold the first CHAT meeting (November 2024).



**Catalyze** meaningful investment in innovative energy technology.

**Diversify** North Dakota's economy.

**Leverage** North Dakota's vast resources.

**Reduce** the carbon intensity of the state's economy.



**SUMMARY**





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A wide-angle photograph of a university campus at sunset. The sun is low on the horizon, casting a warm glow over the scene. In the foreground, there are large trees with yellowing leaves. In the background, there are several large, multi-story brick buildings, some with white accents, and a parking lot filled with cars. The sky is a mix of orange, yellow, and blue.

**THANK YOU**

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