# REGIONAL<br/>CARBON<br/>CAPTUREIIIINOISIMPLEMENTING CARBON CAPTURE<br/>DEPLOYMENT<br/>INITIATIVEIMPLEMENTING CARBON CAPTURE<br/>AND STORAGE TECHNOLOGY

#### **KEY TAKEAWAYS**

- Twenty-one industrial and power facilities have been identified as potentially economically feasible candidates for carbon capture retrofits. These facilities have the combined potential to capture nearly 16.5 million MT of CO<sub>2</sub> emissions annually if retrofitted with carbon capture equipment.
- With a commercial scale carbon capture project at the Archer Daniels Midland site, Illinois has led the way in demonstrating the feasibility of carbon capture in the ethanol sector. There are 12 ethanol facilities in the state the qualify for the 45Q tax credit.
- Illinois has laid a foundation for advancing carbon capture by crafting legislation to incentivize carbon capture and having started to define liability during and after operation.

Figure 1: Illinois has many facilities large enough to qualify for the 45Q carbon capture tax credit, including coal and gas power plants, gas processing facilities, and petroleum refineries. Facilities identified by the Regional Carbon Capture Deployment Initiative as potential early candidates for capture retrofit based on emissions, equipment and estimated capture cost, are shown with outlines and darker colors. Details on these facilities are listed below.

Source: Great Plains Institute 2022; EPA 2020.

#### LEGISLATIVE CONTEXT

Carbon capture will be key to reducing emissions from the power and industrial sectors in order to meet clean energy goals such as the Climate and Equitable Jobs Act of 2021, which puts Illinois on the path to 100% clean energy by 2050. The act requires private coal and natural gas generating units to reach zero emissions by 2030 and 2045 respectively. In particular, the act creates the Nonprofit Electric Generation Task Force to explore carbon capture and sequestration options for the Prairie State coal powered facility.

#### SOURCES BY INDUSTRY & VOLUME



To drive further understanding of carbon capture, Public Act 102-0341, enacted in 2021, requires a study by the Prairie Research Institute to look at the potential for carbon management technologies as well as recommendations for policy and regulatory needs. The act also requires that, in developing the report, an advisory committee be created with members from various government agencies. Additionally, the Prairie Research Institute must conduct stakeholder engagement. The report is due by the end of 2022. Illinois is on the cusp of substantial emissions reductions through the deployment of carbon management technologies with the development of a robust legislative and regulatory framework.

The **Regional Carbon Capture Deployment Initiative** brings together state officials with diverse industry, NGO, labor, and other stakeholders to promote broad scale deployment of infrastructure for carbon mangement including capture, transportation, storage, or conversion for beneficial utilization of  $CO_2$  in the Western and Midwest regions of the country.

The Initiative is staffed by the Great Plains Institute (GPI), a nonpartisan, nonprofit working to transform the energy system to benefit the economy and environment. For more information on this effort, go to carboncaptureready.org or contact Matt Fry at mfry@gpisd.net.

Maps and graphics within this document are based on work by the Great Plains Institute (GPI) to help the Regional Carbon Capture Deployment Initiative identify facilities that qualify for the federal 45Q tax credit and are optimal near-term investment opportunities for carbon capture for each state. For more information, visit **carboncaptureready.org**.

#### **CAPTURE AND STORAGE POTENTIAL**

Illinois has already started to capitalize on the immense opportunities present for carbon capture in the ethanol sector. With numerous financial incentives for carbon capture technology from ethanol production, including the federal 45Q tax credit and California's low carbon fuel standard (LCFS), financial feasibility is at an all-time high for this sector. Given the relatively pure stream of CO<sub>2</sub> emitted during ethanol production, capture costs are lower compared to other sectors. Twelve ethanol facilities in the state are eligible for 45Q and have a combined capture capacity of over 5.2 million MT of CO<sub>2</sub> annually if retrofitted, with an average capture cost of \$16 per ton. This lower carbon fuel can then be sold into the California market. The Archer Daniels Midland (ADM) project in Decatur exemplifies the commercial-scale viability of carbon capture on an ethanol facility. The

REGIONAL CAPTURE OPPORTUNITIES

project successfully captured one million MT of CO<sub>2</sub> from ADM's corn processing plant and securely stored the carbon in the Mount Simon sandstone formation which spans western Illinois. Additionally, ADM is working on another storage project at the Decatur site. The Illinois Industrial Sources Carbon Capture and Storage Project has the potential to store up to 5.5 million MT of CO<sub>2</sub>. The project is currently permitted to run through 2022.

Crude oil refining represents another key sector of the Illinois economy, with the state ranking fourth in the nation in total capacity. All four refineries in Illinois qualify for the federal tax credit and have been identified as potentially economically feasible in the near term. With retrofits, these four facilities have the potential to capture an estimated 3.15 million MT of CO<sub>2</sub> per year.

## SALINE FORMITION POTENTIAL EOR FIELD PROPOSEID CO, PIPELINE See front for full legend

### Figure 2: Potential regional $CO_2$ sources and pipeline corridors for transportation to utilization and storage sites as modeled by the Regional Carbon Capture Deployment Initiative.

#### FACILITIES AND EMISSIONS BY INDUSTRY



MT: Million metric tons CO<sub>2</sub>

Figure 3: This bubble diagram visualizes the number of facilities and corresponding annual  $CO_2$  emissions for each industry in Illinois. The darker large bubbles are eligible for the 45Q carbon capture tax credit, while the faded bubbles are too small to be eligible. The total amount of  $CO_2$  emissions in Illinois is listed for each industry. Source: GPI 2022; EPA 2020.

Maps and graphics within this document are based on work by the Great Plains Institute (GPI) to help the Regional Carbon Capture Deployment Initiative identify facilities that qualify for the federal 45Q tax credit and are optimal near-term investment opportunities for carbon capture for each state. For more information, visit **carboncaptureready.org**.