REGIONAL CARBON CAPTURE DEPLOYMENT INITIATIVE

Iowa

IMPLEMENTING CARBON CAPTURE AND STORAGE TECHNOLOGY

KEY TAKEAWAYS

- There are 56 power and industrial facilities in Iowa that are eligible for the federal 45Q tax credit.
- Iowa is the nation's leader in ethanol production, and 41 of the state's ethanol facilities have the combined potential to capture roughly 12.9 million metric tons of CO_2 per year if retrofitted with carbon capture technologies.
- Governor Reynolds recently created a Carbon Sequestration Task Force that will focus on the economic development opportunities around carbon sequestration within the state.

SOURCES BY INDUSTRY & VOLUME

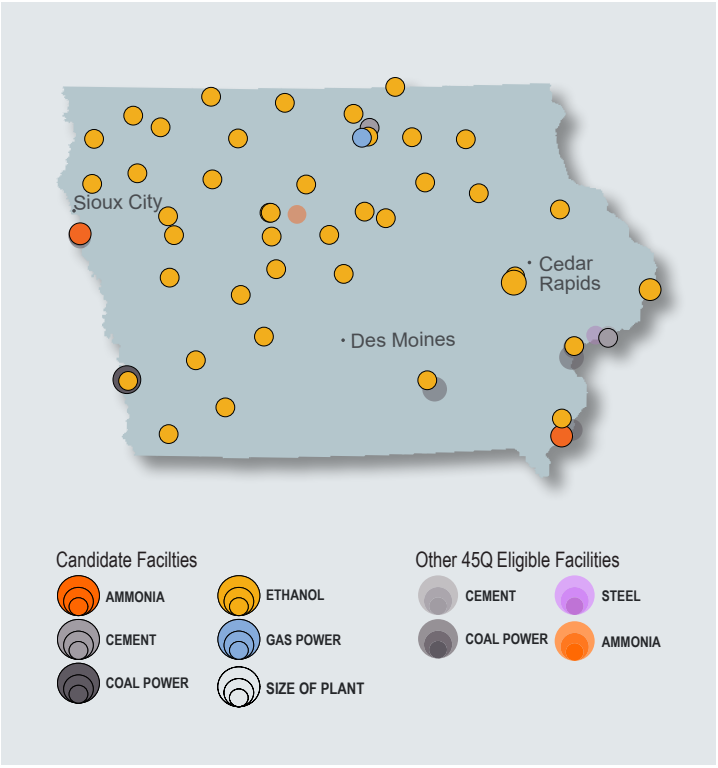


Figure 1 (Rght): Iowa has several facilities large enough to qualify for the 45Q carbon capture tax credit, including ethanol, cement, and power plants. Facilities identified by the Regional Carbon Capture Deployment Initiative as potential early candidates for capture retrofit based on emissions, equipment, and estimated capture cost, are shown with outlines and darker colors. Details on these facilities are listed in the table below.
Source: Great Plains Institute 2021; EPA 2021.

POTENTIAL CANDIDATE FACILITIES FOR CAPTURE WITH ANNUAL EMISSIONS

Facility Name	Location	Industry	Total Facility CO_2 Emissions thousand tons	CO_2 Captured Target thousand tons	Estimated Capture Cost $/ton
41 Ethanol Facilities	Multiple	Ethanol	23,689	12,915	$14 to $41
Walter Scott Jr. Energy Center	Council Bluffs	Coal Power	7,973	3,200	$54
Emery Station	Clear Lake	Gas Power	1,049	800	$59
Davenport Plant	Buffalo	Cement	785	709	$50
Lehigh Cement	Mason City	Cement	405	361	$57
CF Industries Port Neal Nitrogen	Sergeant Bluff	Ammonia	2,432	151	$19
Iowa Fertilizer Company	Wever	Ammonia	1,705	104	$21

Table 1: The Regional Carbon Capture Deployment Initiative estimated theoretical facility capture costs based on published capture equipment costs, facility-specific operational patterns, existing equipment and level of emissions. Most states have a large number of facilities eligible for 45Q. Of those facilities, the above table lists likely economically feasible candidates based on estimated capture cost. This list is not meant to be definitive. Commercial decisions by participating companies, and policy and regulatory decisions by state governments, will ultimately determine if a project is feasible for carbon capture. Captured Emissions refers to the amount of carbon dioxide that can be expected to be captured at a facility considering relevant technological and economic constraints. Source: GPI 2021; EPA 2021.

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 capture, CO_2 pipelines, enhanced oil recovery (EOR), other forms of geologic storage, and 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 Patrice Lahlum at **plahlum@gpisd.net**.

LEGISLATIVE CONTEXT

Iowa recognizes the opportunity for economic development and emissions reductions that carbon capture technologies can provide. At the recommendation of the Governor's Economic Recovery Advisory Board, Governor Kim Reynolds recently signed an Executive Order creating a Carbon Sequestration Task Force. The task force will focus on the economic opportunities for carbon sequestration strategies across several industries, including agriculture, natural resources, energy, and transportation. The task force's goals are to review the current state of research, advise how best to capitalize on the economic opportunities, and identify the role of state government in carbon markets. With the new task force, recent carbon management project announcements, and the federal 45Q tax credit, Iowa is primed to create legislation and guidance to streamline carbon capture deployment.

CAPTURE AND STORAGE POTENTIAL

There are 56 facilities in Iowa that are eligible for the 45Q tax credit across power and industrial sectors. Forty-six of these facilities have been identified as potentially economically feasible near-term retrofit opportunities. These 47 facilities could capture an estimated 18 million metric tons (MT) of CO_2 emissions per year through carbon capture retrofits.

Much of Iowa's potential comes from its notable ethanol sector. According to the US Energy Information Administration, in 2020, the state represented an estimated 26% of the nation's ethanol nameplate capacity, producing over 4,500 gallons per year. All but one of the state's 42 ethanol facilities are eligible for the federal 45Q tax credit and have been identified as potentially economically feasible near-term candidate facilities. With carbon capture retrofits, these 41 facilities would have the combined potential to capture over 12.9 million MT of CO_2 per year. Ethanol plants emit a relatively pure stream of CO_2, making it easier and cheaper to capture carbon emissions compared to other power and industrial sectors. Two of the state's ammonia facilities are also potentially economically feasible near-term retrofit candidates with low estimated capture costs of around $18 per ton of CO_2. This capture cost is well below the current level of the 45Q tax credit of $35 per ton for utilization and $50 per ton for saline storage.

REGIONAL CAPTURE OPPORTUNITIES

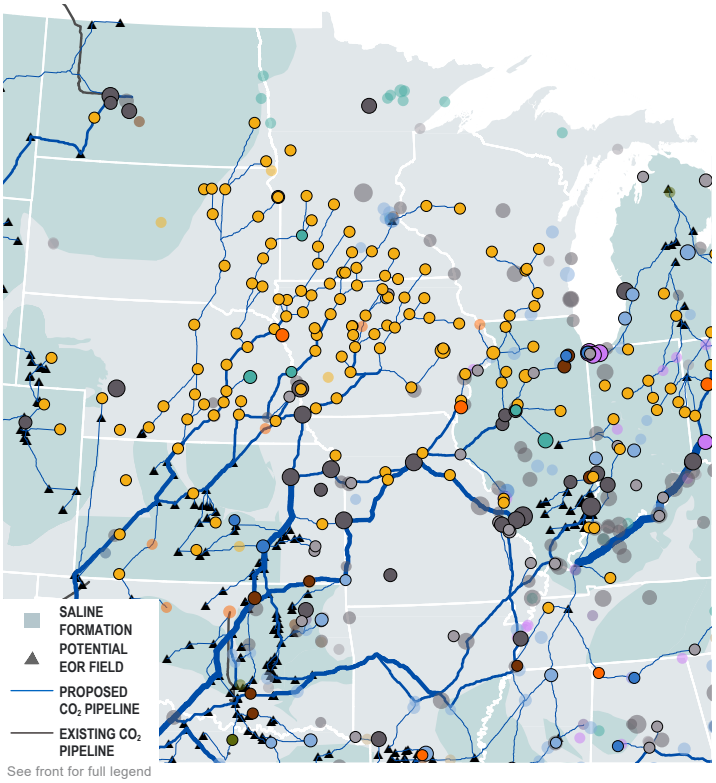
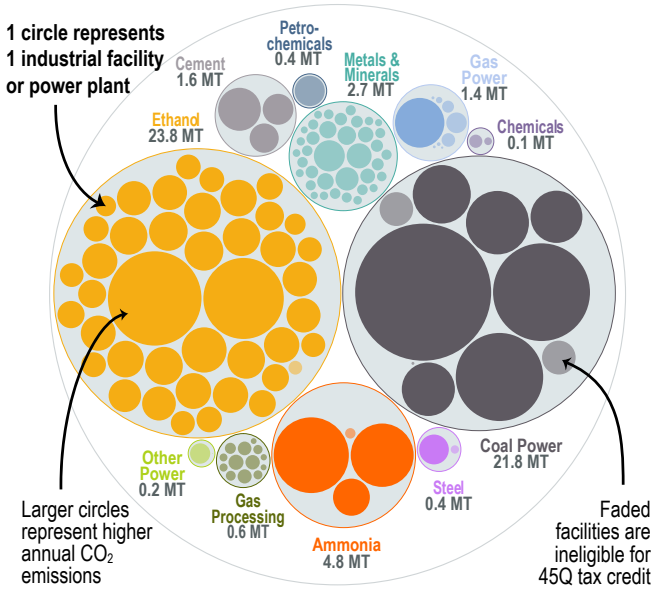


Figure 2: Potential regional CO_2 sources and pipeline corridors for transportation to utilization and storage sites as modeled by the Regional Carbon Capture Deployment Initiative.

FACILITIES AND EMISSIONS BY INDUSTRY



MT: Million metric tons CO_2

Figure 3: This bubble diagram visualizes the number of facilities and corresponding annual CO_2 emissions for each industry in Iowa. 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 Iowa is listed for each industry.
Source: GPI 2021; EPA 2021.

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**.