REGIONAL CARBON CAPTURE DEPLOYMENT INITIATIVE

Indiana

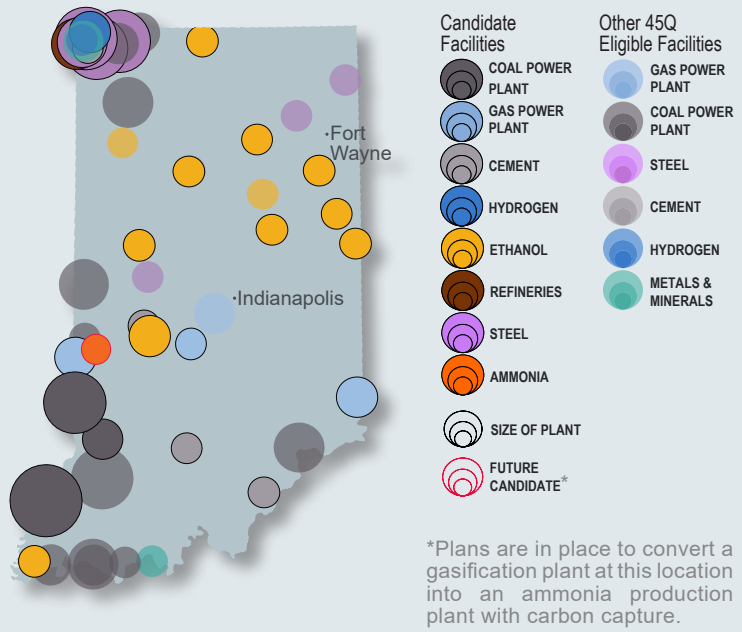
IMPLEMENTING CARBON CAPTURE AND STORAGE TECHNOLOGY

KEY TAKEAWAYS

- Indiana recently passed Senate Bill 442, which supports carbon capture as "a public use and service, in the public interest, and a benefit to the welfare and people of Indiana."
- As the eighth largest coal producer and second largest coal consumer, Indiana has the potential to capture over 12 million metric tons (MT) of CO_2 per year at coal facilities identified as likely near or medium candidates for capture.
- Indiana is the fifth largest ethanol producer and has the potential to capture over 3 million MT of CO_2 per year at the 13 ethanol facilities in the state that have been identified as potentially economically feasible candidates for capture and qualify for the 45Q federal tax credit.

Figure 1 (Right) : Indiana has many facilities large enough to qualify for the 45Q carbon capture tax credit, including power plants, ethanol 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 2019; EPA 2018.

SOURCES BY INDUSTRY & VOLUME



*Plans are in place to convert a gasification plant at this location into an ammonia production plant with carbon capture.

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
Gibson	Owensville	Coal Power Plant	16,332	6,400	$52
Mittal Steel USA	East Chicago	Steel	6,971	4,373	$55
Merom	Sullivan	Coal Power Plant	4,834	3,200	$54
13 Ethanol Plants	Multiple	Ethanol	3,449	3,066	$17 (Average)
Edwardsport	Edwardsport	Coal Power Plant	3,430	3,043	$55
Arcelormittal Burns Harbor	Burns Harbor	Steel	10,131	2,885	$57
US Steel Corp	Gary	Steel	9,215	2,621	$57
Lawrenceburg Energy	Lawrenceburg	Gas Power Plant	2,857	2,574	$53
Arcelormittal Indiana Harbor	East Chicago	Steel	4,684	2,571	$58
BP Business Unit 1	Whiting	Refineries	4,694	1,042	$48
BP Business Unit 2	Whiting	Gas Power Plant	4,694	955	$58
Lone Star Industries	Greencastle	Cement	1,056	952	$50
Praxair - Whiting	East Chicago	Hydrogen	1,610	900	$36
IPL Eagle Valley	Martinsville	Gas Power Plant	1,107	800	$59
Sugar Creek	West Terre Haute	Gas Power Plant	1,397	800	$59
Lehigh Cement	Speed	Cement	531	478	$58
Carmeuse Lime Buffington	Gary	Cement	873	462	$59
Lehigh Cement	Mitchell	Cement	626	318	$65

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 2019; EPA 2018.

LEGISLATIVE CONTEXT

The recently passed Senate Bill 442 (SB 442) supports the potential for carbon capture in Indiana as being "a public use and service, in the public interest, and a benefit to the welfare and people of Indiana". SSB 442 further lays the groundwork for deployment of carbon capture by providing a statement of support for the development of a $450 million pilot project at the West Terre Haute ammonia production facility. SB 442 also includes the opportunity to establish further studies on statewide carbon capture suitability and economic benefit analysis. The state's voluntary clean energy portfolio standard program, the Comprehensive Hoosier Option to Incentivize Cleaner Energy (CHOICE), also provides substantial room for growth in clean energy adoption, especially in the realm of carbon capture technology. In addition to action taken by the state, Duke Energy, Indiana's largest utility, is supporting carbon capture research and exploring opportunities to capture carbon at local coal-powered facilities. Given these recent developments, implementing carbon capture and storage in upcoming years at existing and new facilities to support the state's economy and environmental goals is crucial.

REGIONAL CAPTURE OPPORTUNITIES

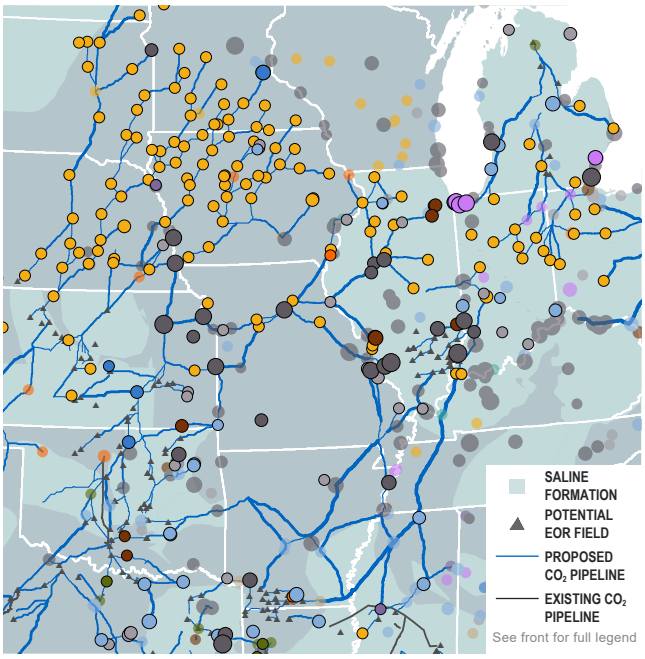


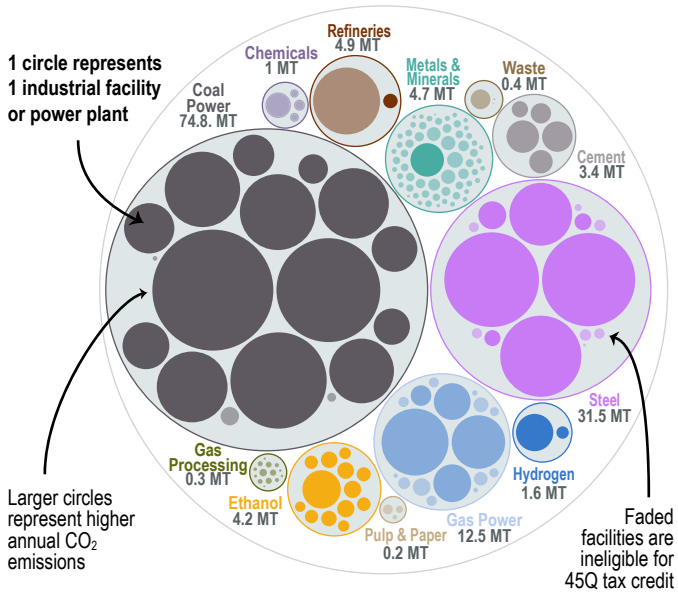
Figure 2: Potential regional CO_2 sources and pipeline corridors for transportation to utilization and storage sites as modeled by the Regional Carbon Capture Deployment Initiative.

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**.

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 Indiana. 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 Indiana is listed for each industry.
Source: GPI 2019; EPA 2018.

CAPTURE AND STORAGE POTENTIAL

The Illinois Basin is the largest saline aquifer in the Midwest region. Taking up most of Illinois and spanning into Indiana and Kentucky, the Illinois Basin features an extensive fleet of coal-fired power plants, presenting the opportunity for nearby storage from facilities with carbon capture in Indiana. The Mt. Simon Sandstone formation, located within the Illinois Basin and most of Indiana, holds a potential storage capacity between 20 to 35 billion metric tons of CO_2. Given the amount of CO_2 emitted from nearby sources, the entirety of Mt. Simon Sandstone formation holds hundreds of years of storage potential. Currently, Wabash Valley Resources is planning a carbon capture project at an ammonia facility in West Terre Haute, IN, and sequestering carbon in the Mt. Simon Sandstone formation. The project has recently received an investment from the Oil & Gas Climate Initiative's Climate Investments LLP and is planning to capture and permanently store 1.5 to 1.75 million tons of CO_2 per year. By creating a nearly zero-carbon ammonia product, additional industries such as agriculture, will benefit significantly.

In addition to the Wabash project, Indiana has many additional emissions sources with economically feasible potential for carbon capture technology. Indiana is the eighth largest coal producer and second in coal consumption in the nation. Three coal-power plants have been highlighted as potentially financially feasible units for carbon capture with a total capture target of over 12 million MT of CO_2 per year. Additionally, Indiana is the fifth largest producer of ethanol in the nation, making around 1.2 billion gallons per year. All thirteen ethanol facilities in Indiana qualify for the 45Q federal tax credit and have been identified as potentially economically feasible candidates for capture.

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**.