

Carbon Capture and Sequestration by Iowa Ethanol Plants

Public Comments Prepared by

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With 42 ethanol refineries¹ capable of producing four and a half billion gallons annually, including over 30 million gallons of annual cellulosic ethanol production capacity, and 11 biodiesel facilities with the capacity to produce over 400 million gallons annually, Iowa is the nation's premier renewable fuels producer. Iowa is also the largest U.S. producer of ethanol feedstocks such as corn starch, corn kernel fiber, and corn stover; and biodiesel feedstocks such as soybean oil, distillers corn oil, and animal fats. Therefore, the Iowa Renewable Fuels Association (IRFA) is uniquely suited to comment on the importance and impact of allowing Iowa biofuels producers to fully participate in the current energy transition toward low carbon energy sources.

There are times throughout history when old technology gave way to new: bronze to iron, the horse to the automobile, leaded gasoline to E10. And there are times when technologies competed to be the new technological leader: VHS vs. Betamax (Beta), for example. You may know someone who still passionately believes that Beta was the better technology, but history records that VHS became the standard for video recording for a time, and those clinging to their Beta machines were left behind.

The members of the Iowa Renewable Fuels Association believe we have entered such a time for powering our transportation sector. This change will not occur overnight; but make no mistake, there will be winners and losers. Further, it is not just the future of "ethanol" that is at stake, but specifically the future of *Iowa* ethanol. Areas or states that handcuff their industries from being on the cutting edge of technological evolution will see those industries left behind, with investments stranded, jobs lost, and income eliminated. You may still believe in Beta, but the marketplace moved on.

Much is at stake for Iowa. "As Iowa agriculture goes, so goes the whole Iowa economy" is not just a cliché. It's also not an overstatement to say that for the last 20 years "how the Iowa ethanol industry went, so went Iowa agriculture."

Over 60 percent of Iowa's nation-leading corn crop goes to an ethanol plant to be processed into high-octane, low-cost fuel, corn oil, high-protein animal feed (known as distillers grains) and other high-value, low-carbon co-products.

¹ Forty-one of the 42 ethanol plants are currently operating. One is idle. A 43rd ethanol plant is currently under construction.

In 2021, the economic activity from ethanol production that reverberated throughout the Iowa economy:

- Accounted for over \$5 billion of Iowa GDP;
- Generated \$2.6 billion of income for Iowa households (much was farm income); and
- Supported nearly 46,000 jobs throughout the entire Iowa economy.²

If Iowa stands still while other states innovate, much – if not most – of that economic activity could cease to exist. If Iowa’s nation-leading ethanol capacity of 4.5 billion gallons per year is left to idle and rust, our corn will simply flow out of the state with no added value. Ask any farmer near an ethanol plant where they get the best price for corn. Iowa farmers used to receive less, sometimes much less, than the “price” of corn listed on the Chicago Board of Trade. Ethanol largely reversed that weak local basis. These positive benefits of ethanol production in Iowa are not guaranteed. They can and will be lost if Iowa fails to remain technologically competitive in a world focused on rapid decarbonization.

The technological transformation confronting Iowa’s ethanol producers today is the worldwide move toward low carbon sources of energy. Within Iowa, there are undoubtedly many different opinions on this topic. We suspect that’s equally true among the private thoughts of IRFA’s board. However, the IRFA Board is united in believing that embracing the move to low carbon ethanol is vital to our future success and maybe even to our survival. We do not intend to stand idly by like those in the 1980s clinging to Beta tapes while the marketplace bought VHS.

Individuals, private companies, municipalities, states, countries, and international standards bodies are demanding low carbon energy. California, the largest fuel market in the US, has a Low Carbon Fuel Standard. Canada, the number one export market for US ethanol, has a low carbon energy standard. Many other states either have or are in the political process of enacting policies similar to California. Most of our largest export opportunities – Brazil, Japan, EU, Great Britain, India, and many others, have carbon metrics that must be met. Iowa need not fear these policies. Iowa has the capability to produce the world’s most affordable low-carbon fuel. We simply must turn that capability into a reality.

IRFA is not asking anyone to “agree” with these low carbon policies. We are asking that Iowa allow a fair and equitable path forward for our members to make the innovative investments necessary to have access to these vital markets. This decision will have enormous impacts on farm income and Iowa’s economic growth for decades to come.

As ethanol producers work to lower their Carbon Intensity (CI) scores, there are many options available – from improvements in farm practices to plant production efficiencies. All of these are being pursued. However, the single biggest step an ethanol plant can take to reduce CI is to disrupt the normal biogenic carbon cycle by capturing the CO2 created during fermentation and sequestering it in an approved manner. This one change reduces a typical ethanol plant’s CI score by roughly 50 percent.

² <https://iowarfa.org/economicimpactstudy>

In other words, carbon capture and sequestration moves a typical ethanol plant half-way to being carbon neutral. When combined with other potential improvements at the farm and plant level, we expect to be able to produce carbon-negative energy in the next 10 to 15 years. That is a goal that wind and solar – while also part of the overall clean energy solution – can never meet.

To understand this, it might be helpful to remind folks that a kernel of corn is the most perfect “battery” yet created. It is compact, energy dense, and easy to transport and store. While it is “charged” by solar energy, unlike a solar panel, when the corn plant absorbs the sun, it also sucks in CO₂. Through photosynthesis, the corn plant converts that sunlight and CO₂ into oxygen for us to breathe and kernels packed with energy.

When the ethanol plant processes the corn and ferments the starch from the kernels into ethanol, CO₂ is produced. While some ethanol plants currently capture CO₂ for food and industrial purposes, that market is not large enough for all plants to participate. Most ethanol plants currently vent the CO₂ back into the atmosphere from which the corn plant gathered it in the first place. This is called a biogenic cycle because it’s a “closed loop” – there is not net, new CO₂ entering the atmosphere as there is when fossil fuels are burned.

However, carbon capture and sequestration will allow ethanol plants to disrupt this cycle. Instead of venting the biogenic CO₂, we can capture it and put it back underground where it was for millions of years before being released during the combustion of fossil fuels. In other words, through the “magic” of a corn plant (combined with ethanol production and carbon capture), it is possible to not only reduce carbon emissions, but to reverse them.

The benefits of carbon capture are already being realized by ethanol producers in other states. Some plants are fortunate enough to sit on top of the geological formations needed to sequester carbon and are doing it today in neighboring states. This is a proven technology. Other states are rapidly facilitating the ability for their ethanol producers to gather and transport CO₂ to areas where it can be sequestered. If Iowa fails to provide a fair and equitable path forward, we risk turning our ethanol plants into the Beta tapes of the past. The importance of this technology is clear when one considers that today 34 of Iowa’s 41 operating ethanol plants have publicly committed to the carbon capture and sequestration projects pending before the Iowa Utilities Board. Beta and VHS are behind us. DVDs are giving way to streaming. Technology markets will not wait. Iowa should not hold back the next evolution of low-carbon biofuel production.

IRFA is made up largely of farmer-owned ethanol plants. We fully understand the deep connection for the land Iowa farmers feel and the emotions at play whenever technological change is occurring. We also know that the success of Iowa’s agricultural sector has always been tied to innovation and meeting the needs of the marketplace. IRFA members are proud to have helped add significant value to the Iowa economy over the last two decades, and we want to enhance that impact in the future. We do not want to see Iowa lose its number one value-added ag opportunity. While change is never an easy process, IRFA urges the Iowa Utilities Board and all Iowans to work together to find a path forward for carbon capture and sequestration.