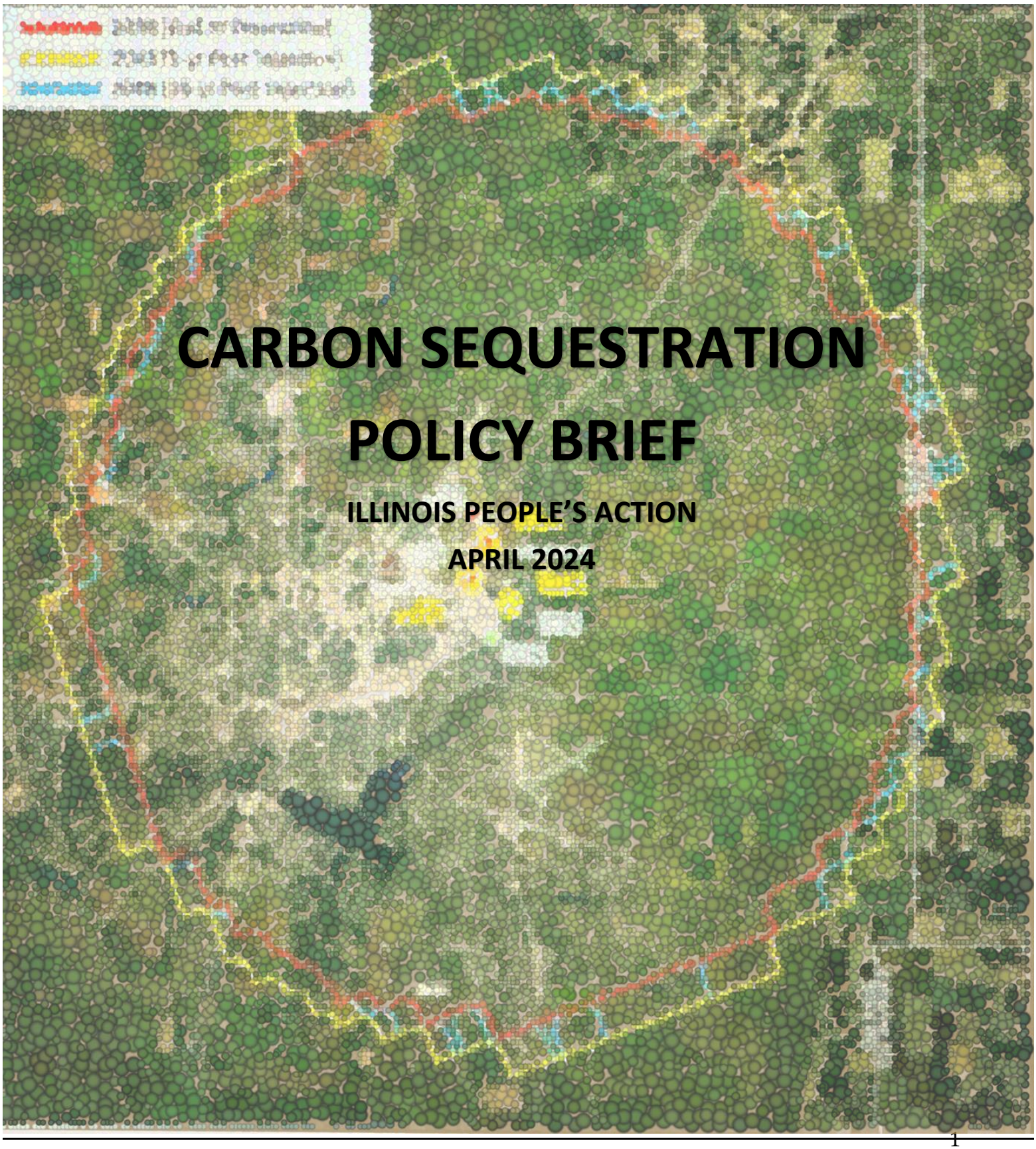

CARBON SEQUESTRATION POLICY BRIEF

ILLINOIS PEOPLE'S ACTION

APRIL 2024

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Executive Summary

Carbon Capture and Sequestration (CCS) is being championed by the fossil fuel industry as a solution to the climate crisis. To date, however, the industry has used most of the carbon capture in the United States to squeeze out the last bit of oil in wells, known as enhanced oil recovery (EOR).

Wolf Carbon Solutions, Navigator, One Earth and other CO2 companies are all vying to establish pipeline and sequestration projects in various parts of Illinois. Citizen intervention has kept Wolf, Navigator, and One Earth from being successfully approved for the time being, but the threat is still present, and other companies are joining the rush to CCS. One Earth could potentially reapply within the calendar year, and Wolf is likely doing the same. Navigator has withdrawn its pipeline application and does not plan to reapply, but it has kept its sequestration permit active with the USEPA. This brief will discuss the fundamentals of CCS, the risks posed to Illinois and the Midwest, and what Illinois People's Action (IPA) recommends for alternative solutions to the climate crisis.

Introduction

What is Carbon Capture and Sequestration (CCS)?

There are two types of carbon sequestration: biologic and geologic.[1] Biologic carbon sequestration involves carbon's 'natural' storage in sources like plants, soil, or the ocean. This is likely the type of sequestration you learned in school, discussing trees absorbing CO2 and is not the focus of this brief. Geological carbon sequestration[2] is a man-made process of capturing CO2 during industrial or manufacturing processes, compressing it, transporting it, and injecting it deep underground for storage. To date, most sequestration has been temporary so that it can be retrieved and used in the process of fracking for enhanced oil recovery. But, with the Federal Inflation Reduction Act tax credits (known as 45Q tax credits) increasing to $85 per metric ton for permanently stored CO2, a growing number of companies are entering the sequestration arena to make extreme profit at taxpayer expense.

[1] U.S. Geological Survey. (n.d.-b). *What's the difference between geologic and biologic carbon sequestration?* USGS.

[2] U.S. Geologic Service. (n.d.). *The concept of geologic carbon sequestration - USGS publications warehouse*. USGS.

Current State of Play in Illinois: Why here and why now?

Why Illinois?

Illinois is the national bullseye of the Carbon Capture and Sequestration debate. The state has been identified as having underground geology suitable for sequestration, and Illinois has the ONLY EPA-approved *and* operating CO2 sequestration project in the country to date.

In 2021, U.S. greenhouse gas emissions totaled **6,340 million metric tons (14.0 trillion pounds**) of carbon dioxide equivalents.[3] Worldwide, that number is a staggering 37 billion metric tons annually. With an ever-warming planet and fossil fuel corporations derailing a transition to clean, renewable energy, environmentalists and decision-makers are increasingly looking to lower atmospheric CO2. Corporations have been willing partners in this search for a technological fix as long as they can continue burning fossil fuels. CO2 sequestration became the focal point of agreement by this unholy alliance (which also involves institutes of higher education and organized labor).

Illinois is the unlucky winner in this "lottery" because of its underground rock formation.

Much of downstate Illinois has a geologic formation known as the Illinois Basin. The basin is rich in coal, oil, other minerals, and underground fresh water. According to geologists promoting carbon sequestration, it also contains underground structural formations that make it ideal for permanently storing waste carbon from industrial processes. The structural formation includes layers of porous rock, where the waste carbon would be pumped beneath a predominantly non-porous capstone that geologists purport would prevent the CO2 from migrating to the surface. As a result of the same geological history, vast underground freshwater lakes or aquifers were created.

Illinois' history of having the first operating CO2 sequestration permit.[4]

In 2009, Archer Daniels Midland Corporation (ADM) received $99 million to begin a pilot sequestration test project beneath its ethanol manufacturing facility in Decatur, Illinois. From 2009 to 2020, ADM received $281 million in federal tax dollars with a stated milestone of sequestering 1 million tons of CO2 in 3 years. The project went

[3] EPA. https://www.epa.gov/climate-indicators/climate-change-indicators-us-greenhouse-gas-emissions

[4] The EPA approved a Class VI sequestration well along the Indiana/Illinois border in January 2024. While the project has been approved, it is not yet operating.

online in 2016; by 2020, it had failed to reach its target by nearly half. During that same time, ADM's own Decatur plant increased its CO2 waste production from 4.2 million tons to 4.4 million tons. And yet the project was–and is–heralded as a success. This may be because other projects, like Future Gen (also in IL) and Petra Nova (Texas), failed in similar sequestration attempts; these projects have since shut down with monetary losses in the billions. The ADM project has a related community college program and extensive public relations.

Initially, the ADM facility was essentially a pilot project for demonstration purposes. Today's approaches capture only a minuscule amount of CO2 emitted, according to a recent study.[5] Averaged over the life of the 3-year project, ADM captured 0.0036% of the CO2 U.S. plants emit annually. Proposed projects, including new projects proposed by ADM, are substantially bigger (some 100x larger) and would operate at a significantly higher capacity than ADM's initial sequestration project. For example, One Earth is asking for three wells to be constructed,[6] while ADM's initial project has never operated more than one of its two wells at a time. It is noteworthy that as other projects have entered the turf, ADM is now requesting additional permits from the EPA that would allow for projects so large that the entire city of Decatur, IL, would be in the "area of review" (also known as the evacuation zone) for a single project. (see Appendix for aerial photograph). This specific project would have the largest Area of Review in the country.

There are currently 42 operational commercial CCS and CCUS projects across the world with the capacity to store 49 million metric tons of carbon dioxide annually, according to the Global CCS Institute, which tracks the industry. That is about 0.13% of the world's roughly 37 billion metric tons of annual energy and industry-related carbon dioxide emissions.[7] This means that, yearly, CO2 levels in the atmosphere would continue to grow at astounding levels. The ONLY sound approach is to move off fossil fuels and to renewable energy.

Reasons Illinoisans Don't Want to Be the Nation's Test Case

There are a multitude of reasons downstate Illinoisans do not want to be the nation's test case on Carbon Capture, Transport, and Storage:

1. We've tried and failed in the past.
2. Our desirable underground rock formation also houses sole drinking water sources for most Central Illinois residents.

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[5] Smith, S.M. et al. (2023). *The State of Carbon Dioxide Removal*. 1st Edition

[6] https://icc.illinois.gov/downloads/public/edocket/602132.PDF

[7] Douglas, Leah. (2023, November). *Explainer: Why Carbon Capture is No Easy Solution to Climate Change.* Reuters.

3. The history of CO2 transport elsewhere has demonstrated that it is a high-risk enterprise.
4. The history of sequestration has neither been long enough or predictable enough to guarantee safety in the near or distant future.
5. Insurance companies are already signaling their unwillingness to insure land and property on that land if it is part of a transport or sequestration project.

US-EPA gambled on CO2 a decade ago in Illinois and lost: An instructive lesson.

FutureGen, and subsequently FutureGen 2.0, were joint projects by EPA and the coal industry to create "clean coal," utility-scale coal-burning while capturing CO2. The nearly $2 billion project was ultimately scrapped due to cost overruns, inability to secure private sector financing, and risk mismanagement, including unresolved health and safety concerns and unproven technology.

The Biden Administration continues to buy into the CCS-as-climate-savior myth. There are currently 43 CCS projects with a total of 127 sequestration wells seeking EPA permits to sequester CO2 waste.[8] That number changes almost weekly. Seven of those projects- with 22 total wells (nearly 20% of the nation's total)- are in Illinois (the bulk of the Midwest projects). Since January 2022, three companies have sought permits in McLean County alone. Some of these projects involve multiple wells and bring CO2 waste from other states.

The Biden Administration's support of CCS is shocking when viewed in the context of a brief released by the White House Environmental Justice Advisory Council (WHEJAC) in late 2023. The brief lays out the threats of CCS to people and communities and summarizes that ***"Carbon sequestration is not a real solution.***[9]***"***

Water is Life: Illinoisans Don't Want to Risk Their Sole Source of Drinking Water.

One million Central Illinois residents get water from the Mahomet Aquifer, the state's largest sole-source aquifer. Most central Illinois municipalities tap into the aquifer for their water supplies, including Champaign/Urbana and Bloomington/ Normal, home to the University of Illinois and Illinois State University, the two largest universities in the state.

[8] https://www.epa.gov/uic/current-class-vi-projects-under-review-epa

[9] White House Environmental Justice Advisory Council. (2023, September 20). *WHEJAC recommendations on Climate Planning*.

Although proponents of CCS tout its safety, even the "successful" Decatur project has had unanticipated migration of underground CO2, causing ADM to have to modify their "Area of Review" (AOR), not once but twice. Using the exact same underground formation to sequester methane, People's Gas has had an unexplained and, to date, ongoing and unfixable leak of methane into the Eastern edge of the Mahomet.[10] [11]

Nearly all the Illinois CO2 sequestration projects under review by the Federal EPA propose storing CO2 waste below or adjacent to the Mahomet Aquifer or in watersheds that recharge the aquifer.

Follow the Money: The Political Forces Behind CO2 Sequestration and Pipelines

The law firm, Gibson Dunn, suggests that there may be an increase in tax credit claims over time for corporations engaged in CCS. In their brief, *The Inflation Reduction Act Includes Significant Benefit for the Carbon Capture Industry*, they explain that the federal Inflation Reduction Act of 2022 earmarked an estimated $2.4 billion for CCS during the five-year period from 2022-2026 and $30.3 billion from 2022 to 2032. Numerous energy corporations, large and small, are seeking these federal tax credits by quickly moving CO2 capture projects regardless of their experience or expertise.

The One Earth and Heartland Greenway Vervain sequestration proposals for McLean County have no prior permanent CO2 sequestration experience. These projects combined could receive up to $595 million in federal tax credits annually.[12] As neither corporation has significant tax liability due to size, these credits are marketable to third-party corporations for their own carbon reduction mandates without having to reduce their own carbon footprint, or for cash sale. Some of the largest buyers in the markets for carbon credits include Chevron, Shell, Aramco, Exxon Mobil, BP, PetroChina, Comcast, Apple, Hyundai, Volkswagen, Bank of America, Amazon, Walmart, and JP Morgan Chase. Given the federal tax credits at play, Heartland Greenway offered the McLean County government a no-strings-attached grant of $29

[10] Schneck, Mary. (2022, June 29). *Illinois AG, Peoples Gas settle lawsuit over 2016 leak that reached Mahomet Aquifer.* The News-Gazette.

[11] (2022, March 2). *Illinois Residents Sue Peoples Gas, Subsidiary of WEC, for Contaminating East Central Illinois' Major Source of Water, According to FeganScott Law Firm.* Business Wire.

[12] One Earth LLC, 420,000 tons CO2 initially with projected pipeline capacity of 4.5 million tons CO2. Heartland Greenway 2.5 million tons annually (source EPA permit applications). Federal tax credit of $85 per ton.

million over 30 years should the project proceed (reportedly not responded to by the County).[13]

Most Illinoisans involved in the fight against CO2 pipelines and storage resent their tax dollars being spent propping up private corporations to do something Illinois residents do not want in the first place. They also anticipate that they will be left "holding the bag" if and when there are accidents, their water is contaminated, or these ventures fail in other ways.

Pitting Jobs and Partisan Preferences Over the Lives of Impacted People

A primary supporter of the Illinois Democratic party, the AFL-CIO Illinois strongly supports CO2 capture with the promise of union jobs. Eligibility of 45Q tax credits requires prevailing wage and apprenticeship requirements. Major CO2 pipeline corporations have identified union labor as one of the reasons pipelines and sequestration sites should be pursued. Navigator turned out organized labor to public meetings throughout its proposed Illinois 250-mile project. ADM/Wolf packed predominantly white male union members into a Southside Peoria event where nearly 14,000 Black and Brown families reside, most of whom were opposed to the pipeline for health and safety reasons. The message to local residents was that a handful of labor jobs were worth more than residents' own safety and welfare.

Colleges and universities are also getting into the game, often funded by money from the fossil fuel industry. "Six fossil fuel companies funneled more than $700 million in research funding to 27 universities in the US from 2010 to 2020, according to a new study…. Such funding at universities that conduct climate research can shift not just research agendas but also policy in the direction of climate solutions the industry prefers, the report's authors argue."[14]

The **Prairie Research Institute (PRI) at the University of Illinois** is a prime educational and technical supporter and stakeholder of CCS development. Created and funded by the state of Illinois, the Institute has become the public face of CCS promotion. It also leads the "CarbonSAFE Illinois Storage Corridor" project, supported by millions of dollars in federal funds. PRI apparently had a significant hand, if not actually drafting, in the One Earth permit to the EPA. The Institute has embraced the

[13] Hardman, C. (2023, October 25). *McLean County plans more public testimony before deciding carbon capture zoning*. WGLT.

[14] Westervelt, Amy. *Fossil Fuel Companies Donated $700 million to U.S. universities over 10 years.* The Guardian. 2023.

One Earth sequestration application, providing technical expertise and community propaganda while claiming they are not involved in policymaking or advocacy.

Richland Community College in Decatur, IL (site of ADM's CO2 demonstration project) is supported by US-DOE and ADM in the creation of the nation's first federally funded National Sequestration Education Center as well as the nation's first Associate of Science degree in CCS.

Current State of Play of CCS Corporations in Central Illinois

Multiple companies are applying for U.S. EPA Class VI Injection well permits to sequester CO2 waste in Central Illinois. Of the 25 Class VI well permits currently under review in the Midwest (Zone 5) by the EPA, 22 applications are in Central IL, many under the Mahomet Aquifer or in watersheds that recharge the aquifer. Some companies have multiple well applications in multiple counties, sometimes under local names. For example, Heartland Greenway has six wells under review in Christian County, 3 in McLean & Logan Counties, and 2 in DeWitt County. While both Wolf and Navigator have withdrawn their respective pipeline applications from the Illinois Commerce Commission, their Class VI Injection Well permit applications with the Federal EPA are continuing through the review process. This indicates that they either plan to come back in themselves or offer sequestration sites to other companies looking to ship CO2 waste here.

One Earth Sequestration LLC: A Case Study for Problematic Practices

An EPA Class VI well permit is required before construction of a CO2 well in Illinois. Despite this requirement, some companies are attempting to short-circuit processes that might otherwise offer protections to the public. For example, One Earth requested a "Special Use permit"[15] from McLean County to sequester CO2 from its Ford County ethanol refinery based in Gibson City prior to being approved by the EPA. During the Special Use hearing process, they testified that they were sailing through the EPA review process and were on track to obtaining a permit. But calls to the EPA revealed that the application was still preliminary, where documentation of required paperwork was being check-listed. The actual application had not even begun its review.

With public notice limited to a single legal notice in the local newspaper, Illinois People's Action organized the community, turning out community members and impacted residents week after week, to testify against One Earth. Over the course of six hearings, hundreds of community members attended, providing a dozen hours of

[15] Eggert, T. (2023, October 27). *One earth energy proposes CO2 Pipeline Project*. Farm Week Now.

testimony and cross-examination. Some landowners testified that while seeking land-lease agreements, One Earth had falsely informed individuals that their neighbors had signed land-lease agreements when this hadn't happened. These types of nefarious practices are being reported across the country.

Repeatedly during the weeks of public hearings, One Earth guaranteed the sequestered CO2 would stay safely where it was injected "forever." As noted above, the ADM project didn't go online until 2016, and its injected CO2 has already moved beyond the original area of review twice. Based on the ADM project alone, it is substantially too short to make sweeping statements about this technology's safety and efficacy. Other so-called "success" stories are yielding similar concerns. The Norwegian North Sea Sleipner sequestration project struggled when CO2 unexpectedly migrated upwards from the original underground storage site, and the Snohvit project's storage capacity was reduced from the promised 18 years down to 2.[16] [17] Sequestration is anything but an exact science and the very short time of its operation has resulted in one failed project after another.

At times, One Earth's "Expert Witness" testimony was misleading. For example, Nick Malkewicz, President of Projeo Corporation, a corporation working with One Earth, stated they were a "group of technical experts…working to leverage the near century of experience gained in that field." But their expertise was in oil and gas, not CO2. The federal Pipeline and Hazardous Materials Safety Administration (PHMSA) publicly states that CO2 transport is very different from oil and gas, and current oil and gas policies, practices and regulations are inadequate for the transport of CO2.

Tristan Brown, Acting Director of PHMSA, met with Illinois People's Action staff in Washington D.C. in June of 2023 and stated that PHMSA recommends new CCS pipeline projects wait until the current PHMSA safety study is complete and the new recommendations are released to the public before proceeding with CO2 pipeline construction. Community members echoed this during the One Earth Hearings.

The One Earth hearings resulted in the McLean County Board[18] voting unanimously to reject the ONE Earth application with one abstention. The Board is comprised of 10 Democrats and 10 Republicans demonstrating that both grassroots and local elected officials' opposition to CCS cuts across political party lines. This current victory is monumental, with the defeat in McLean County being the first time a CO2

[16] Williamson, Rachel. (2023, June 16). *Problems At Two CCS Success Stories Cast Fresh Doubt on the Technology.* Renew Economy: Clean Energy News and Analysis.

[17] Goodall, Christopher. (2021, July 30). *The struggles to make CCS work*. Carbon Commentary.

[18] Steinbacher, M. (2023, December 15). *McLean County Board denies special-use permit for CO2 Wells proposed for Saybrook Area*. WGLT.

sequestration permit was stopped through grassroots community organizing and citizen input. The fight against CCS, however, is far from over. McLean County Board Member Lea Cline noted that One Earth can resubmit their application after a year or, if they can show new evidence before that time, "the director of building and zoning can waive this requirement."

People are Under Threat by CCS Pipelines and Sequestration

Disaster in Satartia, Mississippi

CO2 pipeline bursts can destroy communities, and they have done just that in the past. Satartia, Mississippi, is a recent[19] and tragic[20] example of the devastation these pipelines can wreak. On February 22, 2020, a carbon pipeline ruptured one mile from Satartia, MS, requiring the hospitalization of 45 people and the evacuation of another 200. Residents in Satartia are still coping with negative health impacts in the aftermath, with many reporting increased difficulty breathing or requiring inhalers when not previously needed.

Rescue in accidents like Satartia poses unique challenges to Emergency Responders. Internal combustion engines–like people–require oxygen to operate. When a CO2 pipeline bursts, the CO2 replaces oxygen at ground level, asphyxiating people and animals and greatly hindering evacuation or assistance efforts in low-lying areas where the gas pools. While there have been debates about the best kind of "modeling" to use to determine where a CO2 eruption might likely travel or "pool," in the case of Satartia, there wasn't any model that indicated Satartia, which was a mile from the pipeline, would be at risk.

And while Satartia was incredibly lucky to avoid deaths in the immediate aftermath due to the sparse population of the area, a Central Illinois pipeline rupture could easily result in a mass-casualty event. Peoria's south side has about 14,000 residents, making a successful emergency response (no fatalities) during a pipeline rupture likely impossible. And, as mentioned previously, the new application by ADM to expand its sequestration projects places the ENTIRE city of Decatur in the "Area of Review", also known as the evacuation zone.

[19] Zegart, D. (2021, September 17). *The Gassing of Satartia*. HuffPost.

[20] Simon, J. (2023, September 25). *The U.S. is expanding CO2 pipelines. One poisoned town wants you to know its story*. NPR.

Health Impacts of CO2

Carbon dioxide is in the air we breathe every day. It also a biproduct of human metabolism; we inhale oxygen and exhale CO2.[21] It occurs naturally in the atmosphere in small amounts (about 0.04%). But that small amount has increased by 50%[22] (from 280 parts per million over the course of the last 10,000 years to 421 parts per million in May 2021)[23]. Human activities are responsible for the increase.[24] [25]

The direct effects of increasing CO2 concentrations in the atmosphere include rising temperatures, ocean acidification, and increased fertilization on plants and crops.[26] However, there are potential human health impacts as well, with CO2 increases likely leading to long-term health impacts in the general population.[27] The adverse health outcomes associated with chronic CO2 exposure include systemic inflammation, bone demineralization, kidney calcification, chronic, low-grade respiratory acidosis, behavioral changes, and physiological stress. [ibid]

Short-term exposure to CO2 can be life-threatening. The following chart is provided by the Environmental Protection Agency on Acute Health Effects of High Concentrations of Carbon Dioxide.

[21] Carbon Dioxide 101. National Energy Technology Laboratory.
[22] Carbon dioxide now more than 50% higher than pre-industrial levels | National Oceanic and Atmospheric Administration". www.noaa.gov. 3 June 2022.
[23] Etheridge, D.M.; L.P. Steele; R.L. Langenfelds; R.J. Francey; J.-M. Barnola; V.I. Morgan (1996). "Natural and anthropogenic changes in atmospheric CO_2 over the last 1000 years from air in Antarctic ice and firn". *Journal of Geophysical Research*.
[24] Eggleton, Tony (2013). A Short Introduction to Climate Change. Cambridge University Press. p. 52.
[25] The NOAA Annual Greenhouse Gas Index (AGGI) – An Introduction". NOAA Global Monitoring Laboratory/Earth System Research Laboratories. Archived from the original on 27 November 2020.
[26] Wikipedia. Carbon Dioxide in the Earth's Atmosphere.
[27] Jacobson, TA, Jasdeep, SK., Hernke, M.T., Baun, R.K., Meyer, K.C., Funk, W.E. "Direct Human Health Risks of Increase Atmospheric Carbon Dioxide." Nature Sustainability. www.nature.com/natsustain.

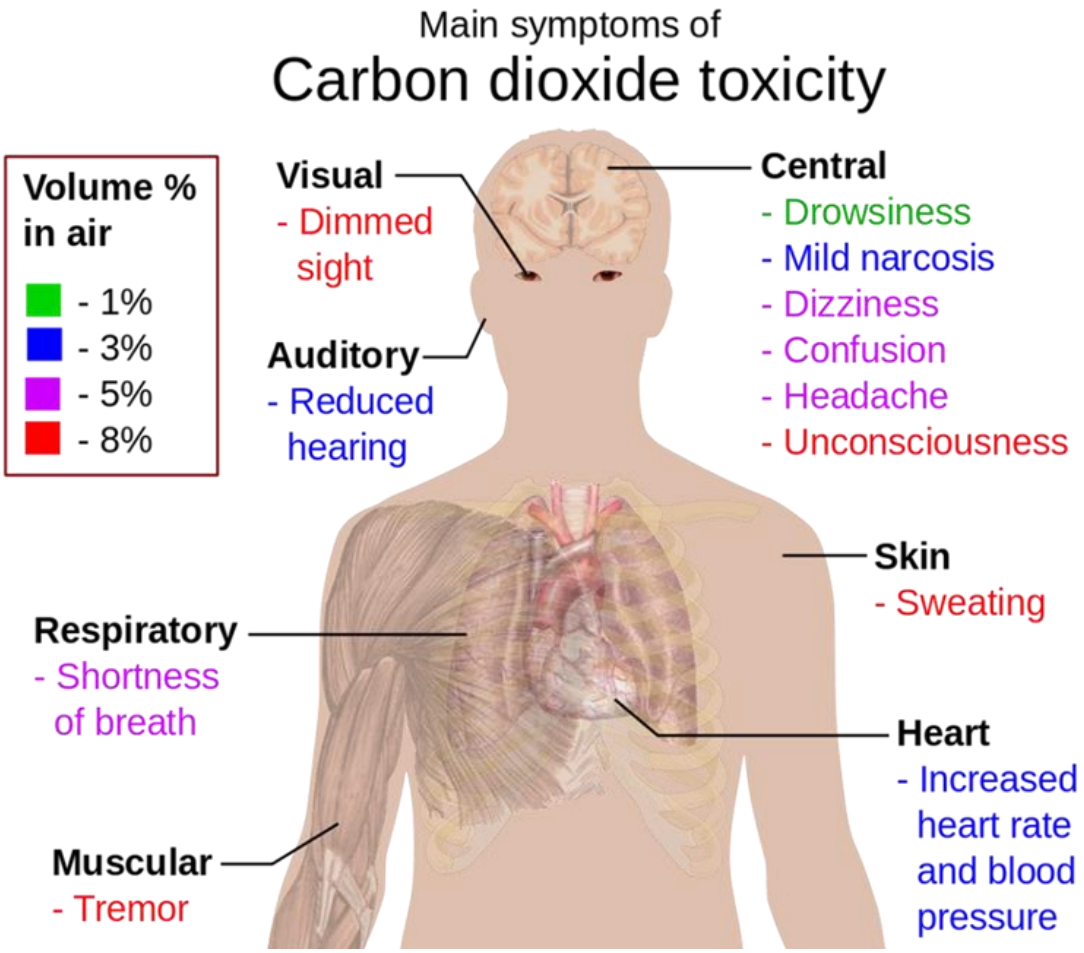
Table B-1. Acute Health Effects of High Concentrations of Carbon Dioxide

Carbon Dioxide Concentration (Percent)	Time	Effects
17 - 30	Within 1 minute	Loss of controlled and purposeful activity, unconsciousness, convulsions, coma, death
>10 – 15	1 minute to several minutes	Dizziness, drowsiness, severe muscle twitching, unconsciousness
7 – 10	Few minutes 1.5 minutes to 1 hour	Unconsciousness, near unconsciousness Headache, increased heart rate, shortness of breath, dizziness, sweating, rapid breathing
6	1 – 2 minutes ≤16 minutes Several hours	Hearing and visual disturbances Headache, dyspnea Tremors
4 – 5	Within a few minutes	Headache, dizziness, increased blood pressure, uncomfortable dyspnea
3	1 hour	Mild headache, sweating, and dyspnea at rest
2	Several hours	Headache, dyspnea upon mild exertion

CO2 can cause dizziness, disorientation, breathing problems and other debilitating health impacts. The USDA states that at 3% concentration, CO2 can lead to moderate respiratory stimulation, increased heart rate and blood pressure. A 4% concentration is cited as being "Immediately Dangerous to Life of Health." CO2 hypoxia can also lead to decreased mental capacity, making it difficult for impacted individuals to make decisions (such as the decision to evacuate).[28] The following chart provides physiological tolerance times for CO2 exposure by concentration levels. Health effects can continue even after the individual is removed from high exposure. Residents from Satartia, MS still report adverse health outcomes after the pipeline rupture occurred in February, 2020.[29]

[28] https://www.fsis.usda.gov/sites/default/files/media_file/2020-08/Carbon-Dioxide.pdf

[29] As reported by impacted survivors of Satartia at a public meeting in Central IL, 2023.



Concentration of CO2 by Percent of total air volume	Concentration of CO2 by Parts per Million (PPM)	Maximum Exposure
0.5%	**5,000 ppm**	**indefinite**
1.0%	**10,000 ppm**	**indefinite**
1.5%	**15,000 ppm**	**480**
2.0%	**20,000 ppm**	**60**
3.0%	**30,000 ppm**	**20**
4.0%	**40,000 ppm**	**10**
5.0%	**50,000 ppm**	**7**
6.0%	**60,000 ppm**	**5**
7.0%	**70,000 ppm**	**Less than 3**

Source: Compressed Gas Association.

If a pipeline bursts, concentration in the air of the surrounding areas is dependent on variables such as the size of the pipe, the topography of the land, and the direction and speed of the wind. The general guideline for determining setbacks from pipelines involves "modeling" using all these variables. But no modeling is perfect and, as stated previously, in the case of Satartia, NO models indicated that Satartia would ever be at risk.

The "standard" currently used in the field based on test studies indicates that above-ground plumes can be expected to move 4 miles/hour in the direction with a prevailing wind. That translates into 15 minutes per mile. In general, the further someone is from the site of a pipeline rupture or explosion, the greater time one has to evacuate, and the more dispersed the concentration becomes. But in many cases, it is difficult to make those exact calculations, especially when CO2 companies are less than transparent with their documents.

It is important for the public to understand that the industry has, to date, avoided sharing important health and safety data. In every case reviewed to date by the authors of this brief, large portions of information included in company applications have been redacted. In some cases, at the county level, ALL information has been redacted. The following is a chart from Navigator's proposed pipeline through Illinois. (Note: Navigator has withdrawn their application for a pipeline permit due to sustained and robust public organizing and opposition.)

Navigator Pipeline Plume Study
Number of Feet From Pipeline by CO2 PPM
ICC Docket 23-0161

CO2 ppm → / Pipeline Diameter ↓	105,000 PPM	63,000 PPM	40,000 PPM	30,000 PPM
8"	417'	[redacted]	1855'	2753'
16"	[redacted]	[redacted]	[redacted]	3644'
20"	1029'	[redacted]	2920'	4250'

Note: The blacked-out areas in this chart were redacted by Navigator. Using the data from the Navigator Pipeline Plume Study chart (on page 15) and the data from the previous charts and illustrations on pages 13 and 14, you can see why Navigator wouldn't want the public to have this information.

Using Navigator's data, individuals would be overcome by CO2 in a matter of minutes. In all likelihood, they would be overcome before any warning was issued or any evacuation procedures could be initiated.

Concentration of CO2 (by % and ppm)→ Pipeline Diameter ↓	**10%+ (105,000 ppm)**	**6+% (63,000 ppm)**	**4% (40,000 ppm)**	**3% (30,000 ppm)**
8"	**417'- 1 minute**		**1855'- 5 minutes**	**2753'- 7.5 minutes**
16"				
20"	**1029'- 3 minutes**		**2920'- 7.5 minutes**	**4250'- 12 minutes**

Please note that, to date, no company applying for a CCS permit in Illinois has presented any plan that would notify the public or provide means of egress that would enable the nearby populations to survive a pipeline blowout in anything close to what the industry is asking for. Most of the setbacks (distance required from a pipeline or wellhead to a residence, school, etc.) requested by companies have been less than 1500 feet. In some cases, they have been as little as 300 feet. A blowout at that distance would be a death sentence.

Lack of Regulatory Oversight

Oversight of Carbon Capture and Storage in the United States is split among numerous entities. The EPA protects drinking water and Environmental Justice communities. It has the power and responsibility to approve or deny Class VI CO2 injection wells. The Pipeline and Hazardous Materials Administration (PHMSA) which falls under the federal Department of Transportation, sets and enforces policy and standards for pipelines nationally. The Army Corps of Engineers determines pipeline routes over and under waterways. In Illinois, the Illinois Commerce Commission approves or denies pipeline routes, and County Boards have the power over zoning within their counties. With so many entities involved in the process, it is easy for

important regulatory requirements and monitoring to be missed or for the "buck" to be passed.

An alarming example of this occurred on January 19, 2023, when the EPA stated that an ERRP *(Emergency Response and Remediation Plan)"is not required to cover the training and capability of local responders…The ERRP supplements facility health and safety plans required by other local, state, or federal regulatory requirements."*[30] But, as noted in local testimony, local responders don't know enough about the various CCS threats to provide that training or to ensure that the appropriate equipment would be available in the event of an accident.

In direct testimony before the Illinois Commerce Commission on CO2 pipeline permits, local county government EMS officials identified the absolute need for, but inability to afford, new emergency equipment (electric vehicles that can operate without combustion) and EMS training. These issues are particularly acute in Illinois's rural communities which rely on volunteer EMS departments.

Specific CO2 emergency response planning by individual Illinois counties does not exist. In direct testimony by One Earth Sequestration before the McLean County Zoning Board of Appeals, company representatives were unable to explain their Emergency Response Plan (a plan to have a plan) nor willing to commit to funding for EMS training or equipment. This became a main reason for the County Board's denial of One Earth's request for a special use permit. Safety issues were also cited by Illinois Commerce Commission staff who subsequently recommended denial of a pipeline permit.

Class VI CO2 permit applications describe an Area of Review (AOR) which is the underground area of increased risks to USDWs due to injection activities.[31] As per publicly available documents in each EPA Class VI permit reviewed, populations would have to be evacuated in case of serious or major accident. This includes numerous public schools within Central Illinois sequestration proposals. And as mentioned previously, the entire City of Decatur is in the AOR for ADM's new proposal. That includes 8,260 public school students in 23 public schools, an additional 1,431 students in 8 private schools, plus the entire student population of both Millikin University and Richland Community College.

As of this writing, in case of an accident, no company has submitted written plans that would adequately address the evacuation needs of the school children. One Earth has

[30] U.S. EPA Region 5. Underground Injection Control. Class VI Underground Injection Permits. Attachment #5. https://yosemite.epa.gov

[31] Bacon, D.H., Demirkanli, D.I., White, S.K., *Probabilistic Risk-based Area of Review (AoR) Determination for a Deep-Saline Carbon Storage Site.* Pacific Northwest National Laboratory, P.O. Box 999, Richland, WA 99352

no evacuation plans for them at all. And the EPA has, to date, proved unwilling to address the issue.

CCS as a distraction from real climate solutions

Some industries have no other choice but to use fossil fuels. The Iron & Steel and Cement industries[32] require some form of fossil fuels because other energy sources do not generate enough heat for the necessary manufacturing processes. However, the widespread implementation of sequestration for CO2 waste encourages the continued use and expansion of fossil fuel use by industries that could transition to clean, renewable energy. Fossil fuel use has never and will never be green. By lifting a technology that continues to make coal, oil, and gas profitable, the fossil fuel industry will remain economically viable. But we are trading current profits for fossil fuel companies with future health, safety and drinking water losses for future generations. Some industry representatives estimate that it takes ~10,000 years for sequestered CO2 to become 90% inert.[33] It is unrealistic and unethical to expect future generations to continue monitoring these reserves which will provide absolutely no benefit to them.

Policy Considerations with Recommendations

Policy Consideration #1: Illinois People's Action (IPA) supports policies that move us from greenhouse gas-producing utilities and technologies to clean, renewable energy. As an Illinois Clean Jobs Coalition member, IPA helped author and fight for the passage of the Climate and Equitable Jobs Act of 2021. In preparation for writing the legislation, the Coalition held over 100 listening sessions in every senate district across the state to hear what ordinary people wanted in a clean energy future. IPA held 10 of those sessions. Our theory of change is that ordinary people, especially those most impacted by issues, must have a seat at the table where decisions are being made that may affect their lives. This is critical when the decisions being made stand to turn entire communities into sacrifice zones.

Recommendation #1: Governmental decision-making bodies must enact broad and robust community participation processes in decision making.

Policy Consideration #2: Human health and drinking water preservation are primary concerns for IPA members. Protection of sole-source aquifers, like the Mahomet Aquifer, should be of utmost regulatory concern to the EPA and local governments in decision-making. Class VI well permits should not be permitted under

[32] World Bank Group. (2016, August 31). *A greener path to competitiveness: Policies for climate action in industries and products*. World Bank.

[33] View Appendix Figure 2

any of those aquifers or their recharge areas. Sequestration is too new and too under-researched for the health and safety of people and the environment to be put at risk. When even the industry admits it will take 10,000 years for 90% of sequestered CO2 to become inert,[34] no CO2 company should be allowed to sequester CO2 beneath sole source aquifers or their recharge areas.

Recommendation #2: Prohibit Class VI well permits under sole source drinking water aquifers and their recharge areas.

Policy Consideration #3: IPA is fighting with farmers and landowners who risk losing their land through eminent domain enactment or due to insurance coverage denial. Eminent domain,[35] in simple terms, is the ability of the local or federal government to take ownership of private land for public usage while providing compensation to landowners. Eminent domain is usually imposed when something is determined to be needed for the public good. In the case of CCS, none of it is in the public good. The only entities expected to benefit from CCS are companies engaged in the process and the landowners or municipalities/counties who have been offered large buy-out packages. While One Earth and Wolf claim they are not planning to invoke eminent domain rights, they could potentially change their approach, especially in the face of intense public resistance.[36] Equally concerning is the relatively new practice of insurance companies informing landowners that the insurance company will revoke their coverage if CO2 pipelines run through their property or their property is located over a sequestration well.[37] If this practice continues, entire communities could be denied insurance coverage and both the land and property on that land would essentially become worthless.

Recommendation #3: Prohibit Eminent Domain for the development of CCS.

Policy Consideration #4: IPA supports policies and practices at the local, state, and national levels that take into account the lifecycle of industrial practices and the negative impacts they may have in the long term. And we prioritize policies that lead with racial equity, as Communities of Color have long experienced pollution and the effects of the growing climate crisis first and worst.

When energy-related decisions are being considered, Illinois People's Action has a simple 2-point test that we have used in hearings and meetings with local, state and federal decision-makers. We ask:

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[34] See chart in Appendix based on Navigator's data

[35] U.S. Department of Housing and Urban Development. (n.d.). *Eminent domain | hud.gov / U.S. Department of Housing and Urban …* U.S. Department of Housing and Urban Development.

[36] Strong, J. (2023a, April 8). *Wolf proceeds with voluntary pipeline approach despite neighbors' growing blockade*. Iowa Capital Dispatch.

[37] Brumleve, Will. Save Our Illinois Land Files Testimony Opposing Proposed CO2 Pipeline. Ford County Chronicle. March 4, 2024.

1. Will this policy/practice support the buildout of Renewable Energy prioritizing solar and wind and do it in a racially equitable way? We want a YES for this question for any energy-related policy/practice to move forward.
2. Would any portion of this project prolong fossil fuel use, invest in fossil fuel infrastructure, promote new uses for fossil fuels, or allow for disproportionate life cycle impacts on health, safety or environmental justice communities. If any portion of this question is a yes, it must be stopped in its tracks.

Recommendation #4: Require life cycle analysis of all energy-related projects/practices, and use a process similar to IPA's two-point test at the beginning of each decision.

Policy Consideration #5: There is currently (April 2024) a CO2 pipeline moratorium bill in the Illinois General Assembly. Although citizen involvement has been successful (up until this point) in preventing CCS applications from being approved, residents and concerned parties should not carry the full burden for prevention.
While we believe Illinois can (and should) demonstrate its commitment to the health and safety of its residents, and to environmental protections by banning CCS altogether, a moratorium will buy time. A statewide moratorium would also set a precedent for other states dealing with similar CCS applications. Local governments should follow suit by adopting moratorium ordinances and denying permits for CO2 sequestration using their zoning powers. With Illinois being the center of the Midwestern CCS fight, we must present a strong front against companies seeking to harm our communities and environment. Moratorium ordinances and consistent denial of sequestration permits would be excellent steps towards doing so.
Recommendation #5: Enact Bans or Moratoriums on CCS.

Policy Consideration #6: As of this writing (April 2024), there is also a CO2 regulatory bill in the General Assembly: **SB2421, the Carbon Dioxide Transport and Storage Act.** This is the Illinois Clean Job Coalition's (ICJC) comprehensive CCS bill, sponsored by Representative Ann Williams and Senator Laura Fine. The bill includes necessary regulations to protect our health, safety, and water from carbon capture, transport via CO2 pipelines, and carbon sequestration. We need the bill passed intact. As members of both the Illinois Clean Jobs Coalition and the Illinois Coalition to Stop CO2 Pipelines and Sequestration, we encourage individuals attending IPA and the Coalition trainings to demand a moratorium until the PHMSA safety study is complete, recommendations are released, AND the state regulatory bill is passed intact. (If the regulatory bill is watered down during political negotiations, we reserve the right to withdraw our support.) Landowners and citizens have been actively

fighting against potential ownership encroachments by pipeline companies, and collective action has been successful.[38]

Recommendation #6: If a Regulatory Framework is considered with regard to CCS, demand that it prioritizes the health, safety and rights of people and planet. Do not support any bill that compromises health, safety and rights.

Policy Consideration #7: Study after study shows that solar and wind are more cost-effective than their non-renewable counterparts[39] and it appears that those costs will keep decreasing. Wind costs[40] have reportedly dropped 72% since 2009. Solar prices have also dropped 54% since 2013. While solar and wind aren't perfect due to the need for rare earth elements, a broken wind turbine or solar panel are unlikely to result in a mass casualty event, nor will they threaten sole source drinking water supplies in perpetuity for residents.

Authentic renewable energy sources need to be built by a workforce prioritizing people and communities who have been left out of every previous energy revolution. Residents should have a say in how and where projects are located and should be direct beneficiaries of the power produced and profits obtained. Projects should train and hire locally. Ordinary Illinoisans demanded this in the 100+ listening sessions leading to the writing and passing of the Climate and Equitable Jobs Act in 2021.

Illinois is ideally situated for solar panels and wind turbines, with both being plentiful in the area. Renewable energy investments have also helped diversify and grow the Illinois economy and job market. From wind turbine land lease payments[41] alone, the state of Illinois paid out more than 47 million dollars to residents, boosting the economy and supporting rural communities. The state also generated over 57 million dollars in local and state taxes. The wind industry has brought close to 10,000 new jobs to the state, helping build out the renewable job economy in record time. The Illinois solar industry is growing as well,[42] with 5,520 solar jobs reported in 2023. That said, some of the practices of corporate wind and farms are nearly as nefarious as the practice of corporate oil, gas, nuclear and CO2. While we need a buildout of truly clean and renewable energy, it must be done with transparency, community buy-in AND community benefit. Too many energy projects of all kinds are built without any consideration of residents who live near those projects.

Recommendation #7: Support the Equitable Buildout of Solar and Wind.

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[38] Loeb, V. (2023, November 6). *How Midwest landowners helped to derail one of the biggest CO2 pipelines ever proposed*. Inside Climate News.

[39] International Renewable Energy Agency. (2023, August 1). *Renewable power generation costs in 2022*. IRENA.

[40] Fritz, H., & Thorud, D. (2023, February 2). *Clean energy is a great investment for Illinois*. Clean Grid Alliance.

[41] American Clean Power. (n.d.). *Wind Energy in Illinois*. American Clean Power.

[42] Illinois Solar Energy Association. (n.d.). *Illinois Solar Industry Data*. Illinois Solar Energy Association.

Conclusion

Carbon capture and storage is extremely expensive, unproven, and exceptionally risky. Some industry representatives estimate that it takes ~10,000 years for sequestered CO2 to become 90% inert.[43] It is unrealistic and unethical to expect future generations to continue monitoring these reserves, which will have long since played out any positive effect on climate.

CCS technologies prop up the fossil fuel industry and carbon-intensive industrial activity, prolonging pollution and other environmental injustices. Framing CCS as a climate solution is dangerously misleading because, in practice, the outcome of CCS rarely involves climate mitigation and more often boosts oil production. At the end of the day, the false hope for CCS distracts from the urgent task of transitioning away from an extractive, fossil-fuel-based energy system while simultaneously threatening the health and safety of residents and drinking water supplies. Instead of channeling billions of dollars each year into the CCS industry, governments and key decision-makers should focus on proven, economical, and safe climate solutions that can lead to equitable change.

The state of Illinois must: 1) enact a state-wide Moratorium against pipelines while PHMSA is engaged in rulemaking, and 2) pass the proposed Carbon Capture, Transport, and Sequestration regulatory legislation intact. 3) require strong public participation in the CCS decision-making processes at all levels of government (local, state and federal).

Citizen involvement is a cornerstone of American Democracy that must be protected. Corporations with financial motives should not be afforded a louder voice than Illinoisans who will have to live with potential consequences.

County and city governments must also use their power to deny CO2 sequestration zoning permits. Local municipalities are the center stage of the CCS fight, and elected officials must actively prevent dangerous projects from making their homes in our communities. **One sacrifice zone is too many.** Making aggressive, sweeping actions against CCS shows a commitment to citizens and the state we call home.

IPA posits that, when done well, renewable energy can be a strong investment in our economy and our planet. The worsening climate crisis requires rapid investment in true renewables, growth of clean energy job training and employment, and implementation of clean energy projects with community buy-in and benefits. False

[43] View Appendix

solutions like sequestration will tie up valuable time and resources in avenues that will not fix the climate crisis. In fact, it will make the crisis worse.

Addendum to the Brief

Two noteworthy events have happened since initial publishing of this brief:

1. Carbon Capture and Storage Legislation was passed in the Illinois General Assembly and signed into law by the Governor.
2. ADM experienced leaks in their CCS wells.

CCS Legislation

Three Carbon Capture and Storage (CCS) Bills were introduced during the Spring 2024 session of the Illinois General Assembly: a moratorium bill and a strong regulatory bill (both introduced by the Illinois Clean Jobs Coalition), and a permissive industry bill. The Governor's office convened the authors of all three bills and informed them that there would only be one bill. That bill would be negotiated between Industry, Labor, and Environmentalists with the Governor's office mediating. The final bill, SB 1289, passed through the General Assembly on May 26, 2024 and the Safe CCS Act was signed into law by the Governor at ADM in Decatur on July 22, 2024. As mentioned in the brief, ADM has the only operating permanent storage CCS wells in the country and is a major proponent of CCS. ADM and British Petroleum (BP) were the negotiators for the industry bill.

While there were some good elements in the bill, critical protections for both people and water were missing and Illinois People's Action did not support the bill for these reasons:

1. There was no ban preventing drilling through–or storing under–the Mahomet Aquifer or its recharge areas.
2. There was no ban on CCS operations in Environmental Justice Communities.
3. The bill required no setbacks beyond the current Oil and Gas Act requirements (which are 200 feet).
4. Safety Planning is left up to the CCS Company with local input.

No Ban Under the Mahomet. The Mahomet Aquifer, the only sole-source aquifer in Illinois, requires stringent and thorough regulatory safeguards and one of those safeguards would be banning CCS operations through and under the Aquifer and its recharge areas. Post-injection-site monitoring is only required for 30 years, a number at odds with scientific data. It takes 10,000 years for sequestered CO2 to become 90% inert (See Appendix Figure 2). 10,000 years of movement with only 30 years of well-monitoring could spell disaster for the safety of Illinoisans living over a plume or even over the larger Area of Review (which is sometimes referred to as "the Evacuation Zone").

No Ban through Environmental Justice Communities. The bill neglected strong environmental justice protections. Originally, a specific clause regarding particulate matter was celebrated for protecting EJ communities. On closer

analysis, however, the operator is only required to reduce particulate matter at the sequestration site and, even then, can make a hardship claim allowing them to demonstrate their reduction efforts in alternate ways. There are also no reduction requirements for the entire lifecycle of the operation.

Inadequate Setbacks. The particulate matter clause is not the only piece posing a threat to EJ localities. The lack of proper setbacks puts vulnerable communities at risk for mass casualty events. The current setbacks, as per the bill, are the same as oil and gas regulations: 200 feet away from an occupied dwelling. CO2 plumes are estimated to travel at 4 miles per hour. At 200 feet, the breath you took at the time of the explosion might be your last. In a 2023 meeting with Tristan Brown, Acting Director of the Pipeline and Hazardous Materials Safety Administration, PHMSA staff acknowledged there will be mass casualty events if the industry proceeds using oil and gas standards.

Safety Planning. IPA continues to be concerned that the legislation leaves the development and execution of emergency response plans up to the owner/operator and the owner/operator's agreement with local responders. This is especially alarming as many rural EMS services are staffed with volunteers who may have no experience in a carbon dioxide emergency event. Emergency plans submitted to date have been insufficient to protect residents within these danger zones.

ADM CCS Project has leaks and failed to follow its own safety planning.[44]
In early October 2024, ADM announced that it was temporarily pausing injections at one of its CCS injection wells in Decatur. The company reported that it had a "possible leak" and had reported it to the EPA. The EPA alleges that ADM violated the Safe Drinking Water Act when injected fluid migrated into an unauthorized zone roughly 5,000 feet deep. A graphic provided by ADM is included in the Appendix of this Brief (Figure 3). The graphic demonstrates that the Eu Claire shale, which was declared impermeable by ADM, did not stop the upward migration of CO2. Subsequent news stories indicate that ADM knew it had problems as early as 2022 but failed to report those to the EPA and the public, both of which are required actions.

IPA remains in the fight. Members are organizing to pass legislation that would ban sequestration in the Mahomet Sole Source Aquifer Project Review Area which includes the aquifer and its recharge areas. (See Appendix, Figure 4.) We continue to educate and organize our communities, and to build power and momentum toward this goal by encouraging municipalities and counties to pass resolutions encouraging the Illinois General Assembly to pass this legislation.

[44] https://www.wandtv.com/news/adm-pauses-carbon-injections-after-possible-new-leak/article_0cf94f14-80d9-11ef-b78a-9391bd1b4f63.html

Appendix

Figure 1: Area of Review of proposed new ADM project (submitted as part of their application for additional Class VI wells.) Note that the entire city of Decatur, population 70,000) is in the Area of Review.

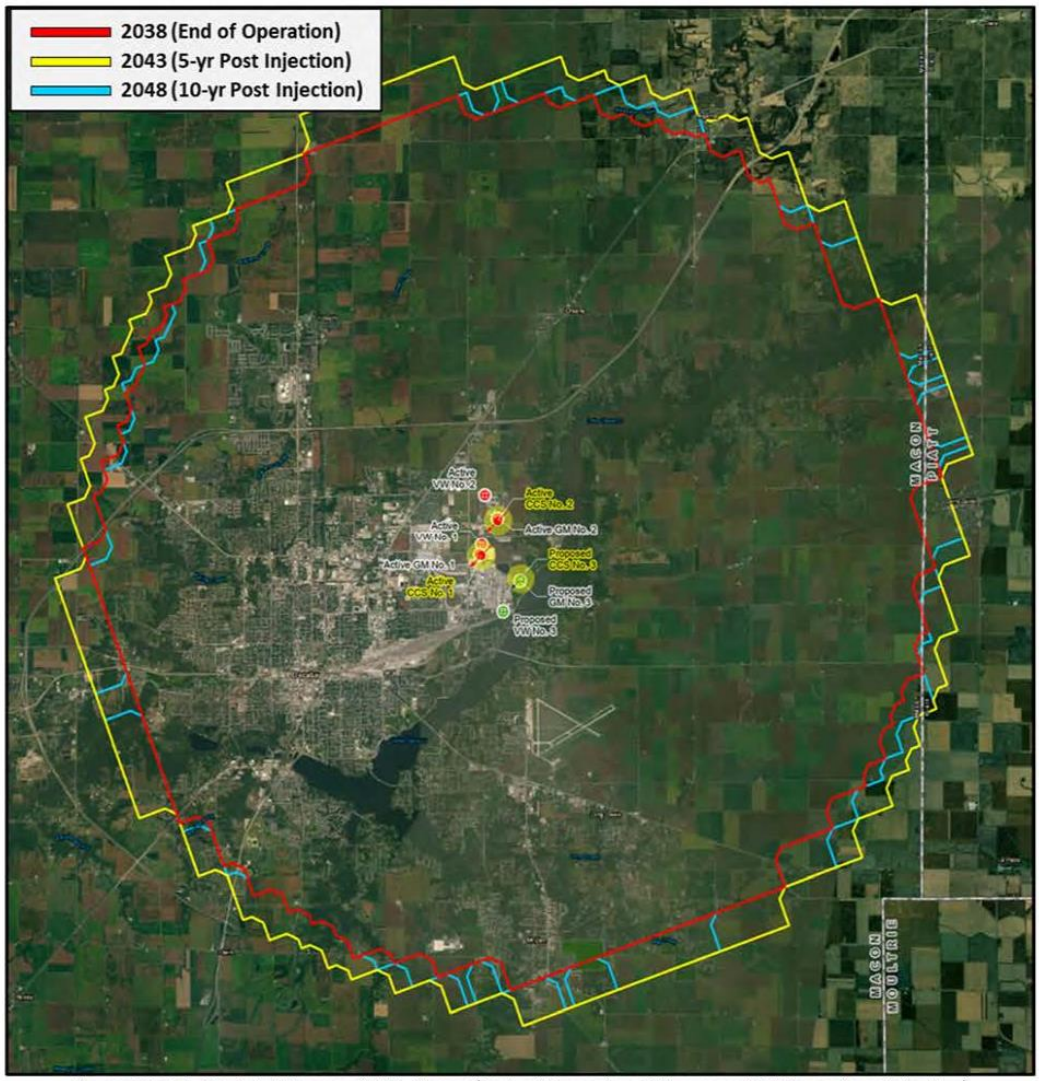


Figure 11.1-1. Modeled Extent of CO_2 Plume (End of Operation, 5-Years and 10-Years Post-Injection)

Figure 2:

Figure 3: Graphic provided by ADM showing the location of the breach of CO2 from its intended containment in the Mt. Simon formation, through the Eau Claire Shale (the primary rock layer purported to be "impermeable" and intended to stop upward migration of sequestered CO2).

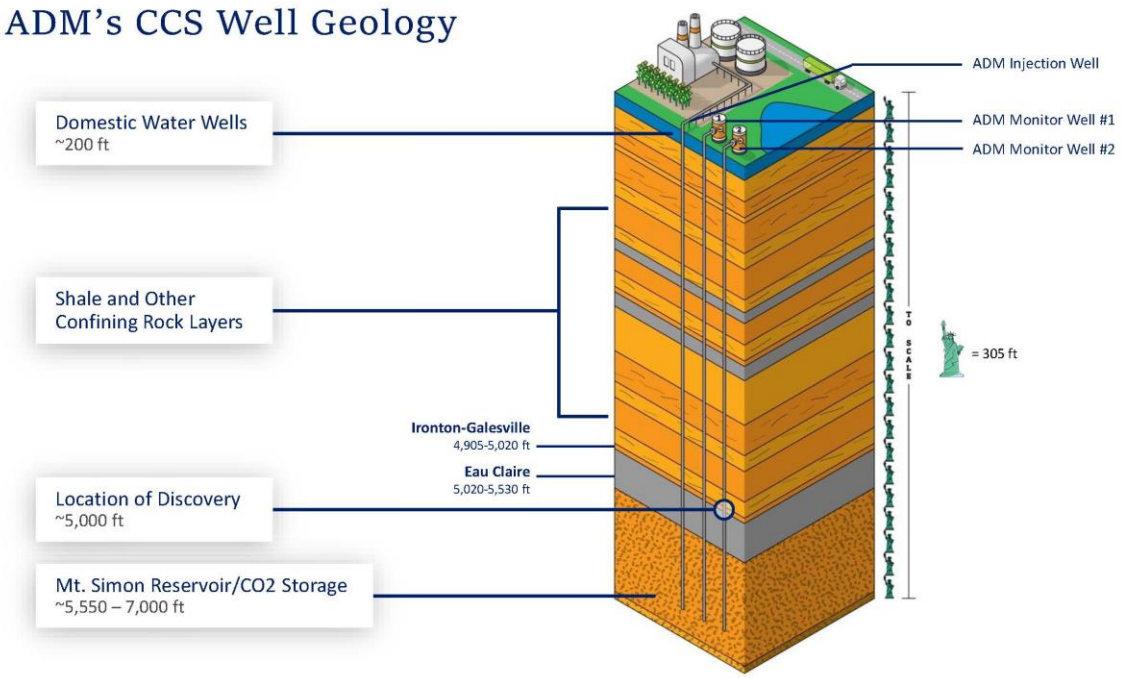
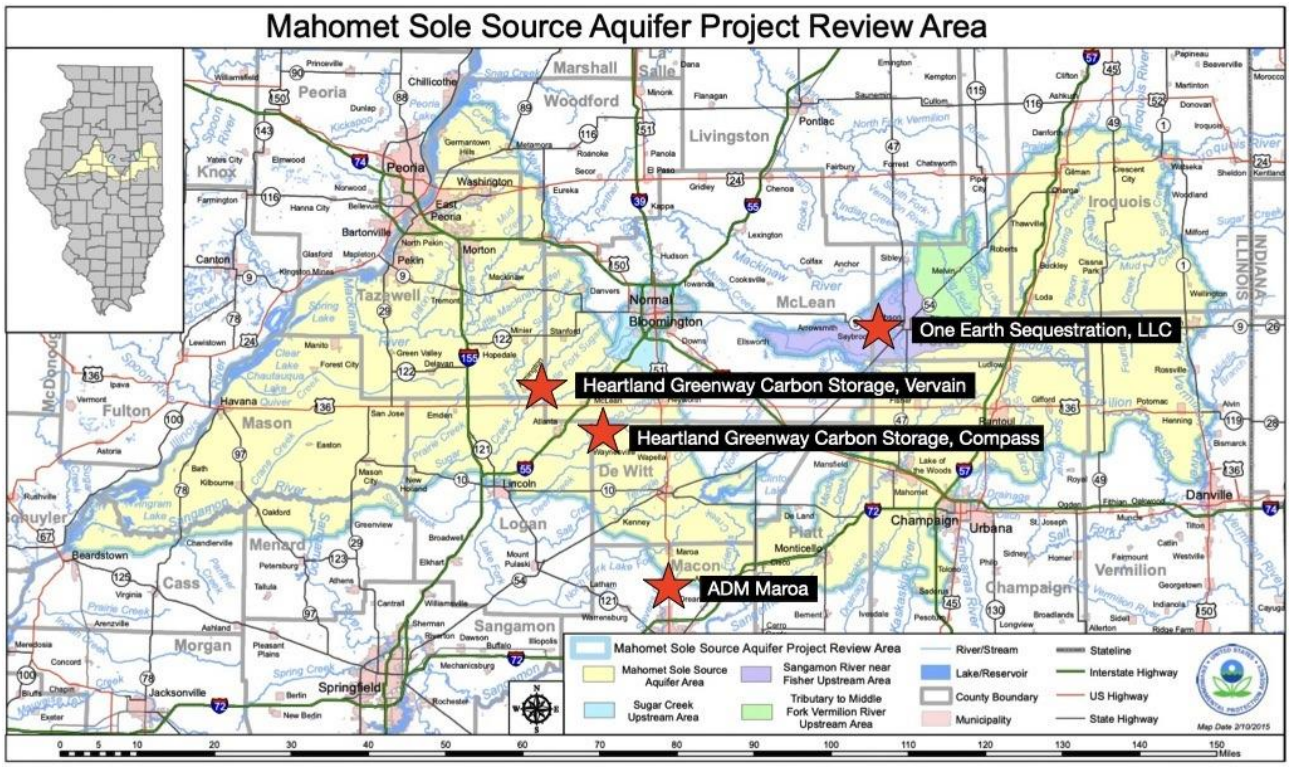


Figure 4:
Map of Mahomet Sole Source Aquifer Project Review Area (blue outline)



About Illinois People's Action

Illinois People's Action (IPA) is multi-issue, faith and community-based organization active across downstate Illinois. Its mission is to empower everyday people to become full partners in decision-making processes on justice issues that affect them. Headquartered in Bloomington, Illinois, the organization has active membership in Bloomington-Normal, Peoria, Pekin, Galesburg, Galena, Decatur, Danville, Champaign-Urbana and across rural Illinois. IPA is a 501c3 non-profit organization formed in 1996.

IPA is a member of People's Action Institute national organizing network, the Illinois Clean Jobs Coalition and the Coalition Against CO2 Pipelines.

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