

## REGIONAL ROUNDTABLE: DIRECT AIR CAPTURE IN WYOMING

### MAY 24, 2023

### KEY TAKEAWAYS

**Note:** Key takeaways represent statements made in the roundtable discussion and do not necessarily reflect C2ES positions or opinion.

#### Direct Air Capture (DAC) Technology Development and Deployment

- DAC has potential in regions across the country, but Wyoming has some key advantages that can make the state a leader in the industry. These advantages include Class VI primacy, availability of low-carbon energy resources, the existing energy IQ among the state’s workforce, and its existing pipeline network and ongoing efforts on the WY Pipeline Corridor Initiative. Additionally, the state’s geologic storage capacity is a key resource, in the same way its mineral resources are and have been leveraged for decades.
- Wyoming has already been developing carbon dioxide storage projects across the state, giving the state a head start for industry growth.
- Climate benefits of the technology aside, the economic opportunity for Wyoming workers and communities in deploying local DAC projects is sufficient motivation for the state to invest in attracting DAC developers.
- Manufacturing for low-carbon technologies like DAC is an economic opportunity for Wyoming. The state could build local facilities to manufacture necessary DAC components (e.g., air contactors, sorbents/solvents, pumps, compressors, heat exchangers).
- The recent enhancements to the 45Q tax credit for carbon capture and storage have served as a spark to help ignite the industry in Wyoming.
- A key challenge for the DAC industry is the lack of tangible projects to date—developers must complete DAC demonstration projects in short order to build confidence in the technology and the industry’s potential.
- More broadly, a major challenge to the deployment of carbon management at scale is the infrastructure needed to transport captured carbon dioxide. Wyoming has a robust pipeline network in place already for the transport of fossil fuels, but significant additional investment will be needed to transport captured carbon dioxide, such as retrofitting these existing pipelines to accommodate carbon dioxide or building new pipelines along existing rights of way.
- There is an opportunity for tribes to deploy DAC on reservations and benefit economically from these technologies, leaning into the strengths of their skilled energy workforce and access to conducive geology for storage. Tribes must be included from the beginning in the development of carbon capture, transport, and sequestration to bring revenue, economic benefit, and inclusion in the development of their resources.
- When deploying carbon management technologies, in addition to carbon dioxide reductions, developers should consider lifecycle greenhouse gas emissions, not just carbon dioxide emissions. This should include the energy powering these technologies to demonstrate overall negative emissions and be eligible for carbon credits.
- Protecting Wyoming’s communities, wildlife, and natural landscape requires smart siting of new DAC and energy projects, including building on or adjacent to previously disturbed industrial land. Mitigating siting impacts is essential to reduce risk to the natural landscape and wildlife, as well as to

developers—impact mitigation can accelerate permitting, reduce conflict, and reduce monitoring requirements for projects.

### **Community engagement and consultation**

- Transparency and authentic engagement with communities are essential for building trust between project developers and the communities that can host DAC projects. This includes sharing information about potential impacts, benefits, and risks of these projects.
- Education and outreach around DAC can be most impactful by focusing on creating economic opportunities, reducing climate impacts, creating good-paying jobs, and supporting local communities.
- Wyoming communities' prioritization of conservation is a basis for building common ground among stakeholders and can help unify them in support of projects that protect the environment; conversely, conservation concerns may motivate communities to oppose projects and should therefore be addressed transparently from the start.
- Policymakers and developers must be prepared to justify to residents why Wyoming should be the storage location for other states' carbon to build political support for deployment.
- The success or failure of the DAC industry will depend on the ability of developers to authentically engage and invest in communities even before the projects are built, support the current and future workforce, and share the economic benefits with the residents of Wyoming.
- For smaller businesses, 50-50 federal cost-share requirements for community engagement measures—an area where they have less existing expertise to draw on—can be prohibitive. Exceptions (e.g., moving the cost-share to 80-20) could provide relief for these smaller businesses and better enable them to leverage federal resources.

### **Geologic Sequestration**

- Maximizing access to geologic sequestration will require cooperation between state and federal agencies, including intrastate cooperation, as geology does not adhere to state boundaries.
- Developers must coordinate across all levels of government to ensure access rights are consistent, so projects can be operated in a timely uniform manner.
- Wyoming's state revenue is heavily tied to the severance tax on mineral extraction, but to date no such framework currently exists for carbon injection. A tax framework on pore space utilization could fill this gap.
- Federal legislation would accelerate carbon storage activities. There is no framework or guidance to assist federal agencies with regulation and permitting of carbon dioxide sequestration. Congress should pass legislation that provides clear guidance to make the development and permitting of carbon dioxide projects more certain and efficient.
- Wyoming can learn from other surrounding states with varying policies and regulations regarding geologic sequestration.
  - For example, Wyoming requires 80 percent unitization (i.e., 80 percent of pore space owners must agree to a project before it can move forward), which can give outsized power to small numbers of opponents; other states' unitization requirements (e.g., Montana, North Dakota) are 60 percent.

### **Energy**

- Wyoming's existing energy generation is ready to serve the large power demand of new DAC facilities, but the challenge is to meet this need with low-carbon or carbon-free generation. Companies investing in DAC deployment will only do so if the technology is carbon negative, i.e. not emitting more carbon than it can draw from the atmosphere. Utilities could utilize nuclear power, combine existing generation with CCS to reduce its carbon emissions, and deploy new renewables to meet this power need.

- DAC will be a massive driver of clean energy demand, and access to these resources is the most crucial constraint to scaling DAC in Wyoming and nationally. High uncertainty in Wyoming with respect to the development of energy required to power facilities constrains their ability to scale, but also presents an opportunity for utilities to benefit by responding to this market signal by delivering clean energy at scale.
- Decarbonizing the power sector in Wyoming, which exports more than two-thirds of what it produces, can help boost the state's economy and maintain or even grow demand into the future from other states like California, Washington, and Oregon for Wyoming power.
- Reducing emissions from Wyoming's power sector will require holistic integrated energy solutions to ensure the reliability of the power supply, as well as to meet the energy needs for DAC projects.
- Given the amount of clean power required to operate DAC, current DAC project developers often also play the role of energy developers. The challenges to bringing new grid-integrated energy generation resources online and building the transmission needed to deliver power to users means DAC and other energy intensive low-carbon projects may need to rely on local micro-grids to bring power online in a timely manner.
- On average, 80 percent of the energy consumed by DAC projects is heat, and 20 percent is electricity. Decarbonizing heat is extremely challenging, and heat generation must be co-located with the DAC facility because it is virtually impossible to transport heat over long distances (unlike electricity). To be economical, both electricity and heat must be available 24/7.
- Geothermal energy could offer a possible solution, especially if collocated with geologic sequestration sites.
- Energy storage is key to supporting the integration of significant volumes of new renewables into both thermal and electricity generation systems.

## Workforce

- Wyoming has been losing good jobs for decades—matching capabilities to emerging opportunities is key, and DAC aligns with Wyoming's existing skills/capacities and natural resources.
- Recently, employment for power plant operations technicians in Wyoming has fallen at a faster rate than in the rest of the country, creating a need for jobs requiring similar skillsets at comparable salaries. DAC projects may offer similar employment opportunities to power plants and could present an opportunity for workers to leverage their existing knowledge and skills.
- Many existing professions for Wyoming workers are also in demand in the low-carbon energy and carbon management sectors, including engineers, technicians, accountants, researchers, and regulatory professionals.
- To keep Wyoming jobs competitive, and to attract new workers to the industry while retaining existing talent, employers can provide workers with non-wage support including benefits, job safety, and the ability to retire with dignity. Wyoming can help keep workers in-state by enabling/encouraging these conditions.
- Access to transportation, housing, and childcare is another element supporting workers' ability to come to work. Especially for projects that may be located far away from populated areas, housing access is a major constraint on the ability of the Wyoming workforce to grow and support growing industries.
- Existing federal tax credits include significant multipliers for prevailing wage and apprenticeships, meaning projects that meet these workforce requirements can maximize the economic benefit of the tax credit. A key benefit to workers of participating in apprenticeship programs is increased safety.
- The workforce skills of the future are being developed today in K-12 schools. To compete for workers, future employers should support skills development in schools while demonstrating the opportunities for employment upon graduation.