Carbon Management Messaging Guide

Carbon management technologies—including the capture, transport, reuse, removal, and storage of carbon dioxide (CO_2)—are a few of the many necessary technologies needed to reduce the impacts of climate change. Carbon management will play an important and complementary role to other emission reduction strategies when decarbonizing the industry, energy, and transportation sectors.

Effectively communicating about carbon management requires sharing the benefits of the technologies and thoughtfully addressing the concerns. Use this resource to develop a strong communication strategy grounded in facts, collaboration, and co-benefits to build trust with your stakeholders. While different audiences will have different perspectives, questions and concerns about carbon management may fall into a few key categories. Some common issues are discussed below, with recommended talking points to help guide your engagement.

Key Categories:

- **Community priorities & credibility:** Lead with shared values like the desire for healthy communities and family-sustaining jobs, using information from trusted organizations and people.
- **It's a necessity:** Carbon capture and removal are necessary technologies we must use to prevent and remove CO_2 emissions.
- **Safety:** Acknowledge the risks of carbon management technologies and address safety concerns transparently.
- **Transitioning the energy system:** Explain the role of carbon management alongside other climate solutions, emphasizing that we need every tool.

Community priorities & credibility: Lead with shared values like the desire for healthy communities and family-sustaining jobs, using information from trusted organizations and people.

Carbon management creates and protects family-sustaining jobs.

- Addressing climate change and creating high-quality jobs can go hand in hand. Carbon management provides a critical pathway for creating and retaining the high-wage jobs base that families and communities depend upon while positioning our nation's industrial, energy, and manufacturing sectors for global leadership in achieving net-zero emissions by midcentury.
- Carbon management projects can create thousands of family-sustaining jobs in engineering, construction, and operation of facilities and pipelines, as well as in the research and development of new technologies.
- Rhodium Group found that carbon capture retrofit opportunities at industrial and electric power facilities across 21 states can potentially create 67,000 to 100,000 jobs on average per year over the next 15 years.[1] Nearly 20,000 additional jobs would be created annually over this period by building a regional and national network of CO_2 transport and storage infrastructure, recently enabled by the enactment of critical policy levers included in the Infrastructure Investment and Jobs Act.[2]

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Carbon management technologies can benefit communities across the country by improving air quality.

- In addition to reducing levels of CO_2 released into the atmosphere, carbon capture systems can reduce air pollution for millions of Americans in communities across the country. Carbon capture equipment retrofits on facilities in many instances may significantly reduce conventional pollutant emissions, including sulfur dioxide, nitrogen oxides, and particulate matter.[3]
- Criteria air pollutants, including the three emission types mentioned above, are found across the United States and can harm health, the environment, and property.[4] Carbon management technologies can play a pivotal role in addressing pollution in overburdened communities.
- As the United States prepares to deploy carbon management technologies at economywide scale, we must ensure that project benefits—including jobs, economic development, and air quality co-benefits—flow to the communities and workers that host and build these diverse projects.

Organizations around the world recognize the need for carbon management.

- The United Nations' Intergovernmental Panel on Climate Change (IPCC) is comprised of nearly 200 experts from UN member countries with the objective to provide scientific information to governments that informs climate policy.[5] The International Energy Agency (IEA) is an intergovernmental organization that provides policy recommendations, analysis and data on the global energy sector.[6] These organizations and their reports are widely referenced as highly trusted scientific bodies that provide a global outlook on the global challenge of climate change.
- The IPCC and the IEA have each conducted modeling to assess pathways to achieve 2050 climate goals. Both organizations' modeling has reaffirmed the essential role that economywide and dramatically accelerated commercial deployment of carbon management technologies must play in managing emissions from existing industrial facilities and power plants. Their analyses demonstrated the role carbon management projects can play in balancing emissions from energy and emissions-intensive sectors and removing legacy CO_2 emissions from the atmosphere.
- The IPCC's most recent report uses seven specific pathways that best summarize and highlight different economywide decarbonization strategies.[7] Only one excludes carbon capture and requires global energy demand to decrease by nearly 50 percent by midcentury.[8]
- The IEA estimates the global carbon management industry will need to capture or remove 1.2 gigatons of CO_2 per year between now and 2030 to reach net-zero emissions by 2050 and prevent the worst potential effects of climate change.[9] To reach this goal, we need to add carbon capture to at least 10 new industrial or power facilities per month.
- Even in scenarios that rely on high levels of renewable energy and electrification, the IPCC estimates that globally, carbon management technologies will be needed to capture a total of 2 gigatons of CO_2 in the industrial sector by 2030.[10] For comparison, the United States is responsible for approximately 15 percent of global emissions, at a sum of about 4.85 gigatons in 2020.[11] These scenarios consider that the typical commercial-scale carbon capture and storage facility would store 1 million metric tons of CO_2 per year. In the modeled scenarios, several thousands of carbon management facilities in industry, power, and direct air capture need to be deployed between now and 2030.

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It's a necessity: Carbon capture and removal are necessary technologies we must use to prevent and remove CO_2 emissions.

Carbon management is particularly critical for the industrial sector.

- The industrial sector contributes roughly 30 percent of all US greenhouse gas emissions on an end-use basis.[12] There are industries, such as steel and cement, that have significant carbon emissions resulting from the chemistry of the production process itself, regardless of energy inputs. This means that even if we switch to 100% renewable energy for fuel sources, the production of materials like steel and cement would still produce large quantities of CO_2.
- Steel, cement, plastics, and other materials with emissions-intensive manufacturing processes are essential to the everyday lives of humans across the planet. These are some of the basic materials used in construction projects, including the build-out of renewable energy projects and the new infrastructure needed for the energy transition. Rather than continue to release emissions created when manufacturing these crucial products, carbon capture equipment can prevent them from entering the atmosphere.

Climate action is incomplete without addressing legacy emissions through carbon removal solutions and technology, such as direct air capture. As we run out of time to reach 2030 decarbonization goals, these solutions become more important.

- We have had over a century in which existing carbon emissions have accumulated in the atmosphere since the Industrial Revolution. Carbon removal is the only ready-to-deploy technological method to take existing emissions out of the air.
- Carbon capture and removal technologies are both necessary in viable climate mitigation strategies to stop new emissions entering the atmosphere while pulling down the existing stores already contributing to planet warming.

Safety: Acknowledge the risks of carbon management technologies and address safety concerns transparently.

Carbon management practices are proven and safe, but individuals' concerns are valid and should be addressed.

- Carbon management has been around for decades, but many individuals are hearing about it for the first time. It's right for people to have questions about the technology's safety and regulatory safeguards, and these questions should be acknowledged and thoughtfully addressed. While every type of energy infrastructure has inherent risks, carbon management is relatively safe, and has an excellent track record.

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- Carbon management technologies have a long track record.[13] The United States has over 50 years of commercial experience safely capturing, transporting, reusing, and storing CO_2 at large scale. Today in the United States, there are 14 commercial-scale facilities with the capacity to capture and store approximately 20 million metric tons of CO_2 per year, representing nearly half of the global deployment of the technology to date.
- The longest operating CO_2 storage facility—the Sleipner carbon capture and storage project operating off shore Norway in the North Sea—has successfully and permanently stored more than 1 million metric tons of CO_2 per year since storage operations began in 1996.[14]

Carbon storage is regulated and safe.

- CO_2 storage is a well-understood process that has been utilized for decades with an excellent safety record and very low potential for leaks occurring from the process when properly carried out.
- CO_2 is injected and safely and permanently stored deep underground in rock formations below a confining layer of impermeable rock. Storage occurs about one mile (1600 meters) below the earth's surface, far beneath underground sources of drinking water.
- Once injection is complete, the well is sealed to ensure stored CO_2 remains in the formation where it was injected. Testing and monitoring continue for at least 50 years unless the owner demonstrates to the US Environmental Protection Agency or state authority that the plugged well poses no threat to drinking water.
- Carbon management project operators must complete thorough research and meet stringent regulations before regulators will consider granting them permits for underground injection of CO_2.[15] Before potential storage sites can move forward, they must provide highly detailed models to federal or state regulators that demonstrate safe and permanent storage of CO_2 and ensure the pipelines around sites are continually monitored. This process is secure and well-understood.

Carbon transport is regulated and safe.

- CO_2 pipelines have operated safely in the United States for over 50 years. Currently, 50 operating pipelines span over 5,000 miles, with individual pipelines safely transporting millions of metric tons of CO_2 annually over hundreds of miles and across entire regions of the country.[16] CO_2 pipelines are a safe, energy efficient and lower emissions way to transport CO_2 to appropriate sites for geologic storage.
- Like most gases, exposure to CO_2 at high concentrations can be dangerous, but operators are required to constantly monitor pipelines and injection sites for any potential leaks. Operators also must have an emergency plan in place to immediately address a potential leak.
- When incidents occur, industry must be held accountable through the established failure investigation, subsequent public reporting and citation process established by the US Pipeline and Hazardous Materials Safety Administration (PHMSA), the US Department of Transportation agency charged with overseeing CO_2 pipeline safety. PHMSA completes a thorough investigation into incidents and has issued fines for millions of dollars in penalties to violators.

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- The CO_2 pipeline safety record indicates that these pipelines can be operated at the highest safety standards. In PHMSA's current regulations, all newly constructed CO_2 pipelines must include automatic shut-off valves, contributing to faster shut down times.[17] Faster shut down times will help improve safety by allowing faster access for emergency first responders who respond to fires and injuries.[18]

Transitioning the energy system: Explain the role of carbon management alongside other climate solutions, emphasizing that we need every tool.

Carbon management is one of the many necessary tools needed to reduce the impacts of climate change. It will play an important and complementary role to other emission reduction strategies when decarbonizing the industry, energy, and transportation sectors.

- Carbon management, which is ready to be deployed now, provides an effective bridging solution while our economy transitions away from fossil fuels.
- Fossil fuels will be around for a while. While the IEA predicts that future demand for fossil fuels will taper off, they forecast that global oil demand will rise by 6 percent between 2022 and 2028 to reach 105.7 million barrels per day, supported by robust demand from the petrochemical and aviation sectors. The agency also predicts that burgeoning petrochemical demand and strong consumption growth in emerging and developing economies will more than offset a contraction in advanced economies.[19]
- Economic demand and other outside factors are perpetuating the use of fossil fuels, as both the United States and other countries are still opening new fossil-powered energy plants. Given this reality, it is essential that we have ways to capture and offset these emissions, rather than let them go unabated and add to the significant stores of carbon emissions that have accumulated in our atmosphere since the Industrial Revolution.
- The power sector was responsible for approximately a quarter of US greenhouse gases in 2022, and natural gas is projected to dominate these emissions in the near-future.[20] Natural gas power will be in the energy mix for decades. Even in aggressive renewable scenarios, which show significant deployment of renewable resources in the next decade, we'll need firm, dispatchable power, which can be provided by carbon capture at natural gas power facilities.[21]

Carbon management opens pathways to reuse captured carbon in widely used products that require CO_2 in the manufacturing process, such as building materials and fuels.

- Carbon reuse can provide an important and valuable component to building the carbon management marketplace. Increasingly, carbon reuse is seen as an important complement to large-scale carbon storage, as it provides value-added markets and carbon reuse opportunities for carbon capture operations while also creating long-term, circular supply chains.

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- The National Academy of Sciences has estimated that globally, reuse pathways could use up to 1 gigaton of captured CO_2 per year. This growing carbon-to-value market could be worth an estimated $800 billion annually by 2030.[22]
- Carbon reuse allows us to utilize the carbon stores we've either already emitted into the atmosphere or otherwise would release if they weren't captured by carbon capture systems. In other words, it's a "recycling" option to convert CO_2 emissions into valuable products, effectively displacing the use of fossil-based products that would increase planet warming.

Please contact carbonactionalliance@gpisd.net with your questions and feedback.

Carbon Action Alliance

Endnotes

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