Carbon Capture, Utilization and Storage: Energy Innovation

Center Forward Basics
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Overview

Carbon capture, utilization, and storage (CCUS) is a process that captures carbon dioxide (CO_2) emissions from sources such as coal-fired power plants and either reuses or stores it so it will not enter the atmosphere. This approach to utilizing CO_2 in the energy sector is important because it both protects the environment and enhances energy security.

Utilization

The utilization of carbon dioxide involves capturing of CO_2 from various fuel combustions and industrial processes and then transporting the CO_2 through a pipeline. Once transported, it will be reused as a resource to create valuable products or services. Often, the CO_2 will be converted into products such as methanol, biofuel, and other hydrocarbons for use as alternative and renewable sources of energy.

Storage

The alternative option is to permanently store the carbon dioxide underground in a few different forms of geological formations. Storage of CO_2 involves the injection of captured CO_2 from various sources into deep underground geological reservoirs of rock, including deep saline aquifers, depleted oil, and gas reservoirs. These reservoirs prevent the release of CO_2 beyond the storage complex. For example, appropriately selected geological storage sites will safely store injected CO_2 permanently, which is defined as more than one thousand years. Storing CO_2 can also lead to enhanced energy production and improves national energy security. This is because the storage can provide a long-term dependable source of CO_2.

One important method to store CO_2 is known as Enhanced Oil Recovery (EOR). EOR is when the captured CO_2 is injected into depleted oil fields and various oil formations to increase the amount of oil extracted by the wells. In the United States, there are more than 130 CO_2-EOR projects. Therefore, the overall implementation of CCUS can provide a long-term dependable source of CO_2 for EOR in the future. It is important because it enables increased energy production and bolsters national energy security.

The Importance of CCUS

Around the world, there are currently 37 plants being built or already in operation to both utilize and store CO_2. Once all the plants are in operation, the projects will be able to capture 40 million tons of carbon dioxide annually. CCUS is also important because it supports the continued use and development of fossil fuels, while also meeting current goals to reduce CO_2 emissions. Not only does CCUS facilitate cleaner production of energy from reliable energy sources, but it also allows for the United States to continue to use existing natural resources such as

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Center Forward brings together members of Congress, not-for profits, academic experts, trade associations, corporations and unions to find common ground. Our mission: to give centrist allies the information they need to craft common sense solutions, and provide those allies the support they need to turn those ideas into results.

In order to meet our challenges we need to put aside the partisan bickering that has gridlocked Washington and come together to find common sense solutions.

For more information, please visit www.center-forward.org

Key Facts

- The United States is currently a world leader in utilizing and storing CO_2.
- Storage Projects Worldwide:
  - As of 2017, there are 21 carbon capture projects operating around the world. There are 22 more in development.
- Carbon capture can achieve 14 percent of the global greenhouse gas emissions reductions needed by 2050 and is viewed as the only practical way to achieve deep decarbonisation in the industrial sector.
- In February 2018, the FUTURE Act, which reforms and extends a federal tax credit to boost carbon capture,

coal, oil, and natural gas.

Conclusion

Carbon, capture utilization and storage is a solution that will decarbonize the power sector and significantly reduce emissions from coal and gas powered generation. It also decreases emissions across important industrial processes such as steel, cement and chemical manufacturing. In the future, CCUS technologies will play an important role in meeting energy and climate goals, enhancing energy security, and increasing the world's energy independence. Current goals outlined in the Paris Climate Agreement to stay below 2 degrees Celsius will require carbon capture to reduce CO_2 emissions. These goals will likely be met if CCUS technologies and strategies are implemented.

was signed into law. It also allows the use of the tax credit for the capture of carbon monoxide from industrial facilities, direct air capture of CO_2, and the conversion of the captured carbon into useful products.

Links to Other Resources

- American Institute of Chemical Engineers - What is CCUS?
- Carbon Brief - Clear on Climate
- Center for Climate and Energy Solutions - Carbon Capture
- Clean Energy Ministerial - Carbon Capture, Utilization, and Storage (CCUS) Initiation
- International Energy Agency - Carbon Capture, Utilization & Storage
- U.S. Department of Energy - Carbon Capture, Utilization & Storage
- U.S. Department of Energy - Enhanced Oil Recovery
- U.S. Energy Information Administration - Energy-related CO2 emissions from natural gas surpass coal as fuel use patterns change