



CARBON GEOCAPTURE

COAL-ASSISTED CARBON CAPTURE AND STORAGE TECHNOLOGY



SUMMARY

Carbon GeoCapture (CGC) is a carbon capture and storage company that permanently buries carbon dioxide in unmineable coal seams through a safe, cost-effective, and scalable process. By revitalizing and refining a proven approach, we enable large-scale carbon sequestration at lower costs, helping industries and power producers meet their economic and environmental goals safely and efficiently. Coals act as a carbon filter, preferentially absorbing CO₂ and thereby greatly reducing the need and cost of cleaning up flue gas to the 99% purity required by conventional CCS. Our coal-assisted CCS technology meets growing baseload energy demand from data centers without sacrificing reliability or economic growth, ensuring our grid stays strong while simultaneously reducing CO₂ emissions. Unmineable coal seams are an abundant, proven, geologically stable option for permanent CO₂ storage. Coals provide a scalable, cost-effective solution. By using these existing natural formations, we ensure safe, scalable, cost effective, and permanent carbon removal.

BENEFITS

- Suitable for use anywhere in the world where coal occurs, commercially deployable at scale today.
- Burying CO₂ in unmineable coal seams poses lower geological and liability risk. These shallower, underpressurized, nanoporous formations securely store CO₂ for millennia.
- CO₂ sequestration monitored and controlled using proprietary patented in situ sensing technology.
- Our approach significantly reduces the CO₂ purity required for sequestration, eliminating the need for costly purification and compression of captured flue gas.
- By using existing coal beds, we reduce or eliminate the high transportation costs and project lead times required for conventional CCS. CGC's technique is 70% cheaper end-to-end than conventional CCS.
- Capable of use in US Class II or VI wells. Class II offers speed to market of months as opposed to years.
- Closed loop to preserve water and energy and protect aquifers; safe, easily monitored, and controlled.

KEY PROJECTS

- Developing our approach entailed more than 25 years of R&D and field work with \$40 million of investment.
- Worldwide applicability – we currently have a pipeline of commercially viable projects under development, in the US, Europe, Australia, Canada, and India.
- Black Hills Energy (BHE) and CGC have partnered to install a CCS operation for a coal-fired power plant at the Neil Simpson Complex in Gillette, Wyoming.
 - This ongoing pilot demonstration will confirm the modelled economics of the full-scale CCS system.
 - That demonstration began in September 2024 and will be completed in early 2026. At full scale, this project is expected to capture and sequester 3+ million metric tons of CO₂ annually from the coal-fired units at the Complex.

KEY DATA

TRL	8	Capture Rate Range (tpd)	1 - 200 (per injection well) To 50,000 (project)	Capture Efficiency (%)	90%+
Source CO ₂ Purity Range	4 - 100%	System Energy (GJ/tCO ₂)	~	Specific Regen. Energy (GJ/tCO ₂)	~
Number of Commercial Plants	0	Number of Pilot Plants	2	Modular (Y/N)	Yes
Target Industries	Power, cement, chemical, steel, natural gas processing, fuel, pulp/paper				

TECHNOLOGY DESCRIPTION

CGC's coal-assisted carbon capture and storage technology permanently buries carbon dioxide in unmineable coal seams through a safe and efficient process. Only sequestering carbon in coal can occur with a cost that allows us to help meet the world's climate goals. Those cost savings can accrue significantly over time, allowing us to do more with less. Burying carbon dioxide in coal, instead of in deep sandstones and salt domes, also poses a lower geological risk, as these shallower, lower pressure, nanoporous formations are underpressurized and therefore safer.

Coals act like carbon filters, preferentially absorbing and storing carbon dioxide at lower cost than storing it deep underground with conventional carbon capture and storage. Our approach repurposes existing oil and gas industry participants and creates new opportunities for workers and communities historically reliant on fossil fuels. This means good-paying jobs, stronger local economies, and a competitive edge for energy leadership. This lowers costs while providing high-quality jobs in the emerging carbon management sector, ensuring that the transition to a low-carbon economy is inclusive and economically viable.

Our coal-assisted CCS technology allows countries to meet growing energy demand from data centers without sacrificing reliability or economic growth, ensuring our grid stays strong while simultaneously reducing CO₂ emissions. Unmineable coal seams are an abundant, proven, geologically stable resource for permanent CO₂ storage. They provide a scalable, cost-effective solution. By using these existing natural formations, we ensure safe, permanent carbon removal.

To successfully bury CO₂ in unmineable coal seams at scale, CGC has developed a modern approach to avoid geological damage and ensure these formations are utilizing their full potential to store carbon dioxide. Commercializing this approach entailed more than 25 years of R&D and field work and \$40 million of investment. Currently, we have a pipeline of commercially viable projects under development, including in the US, Europe, Australia, Canada, and India.

CGC's unique process was designed to be resilient, flexible and modular to work with various carbon dioxide volumes, sources, capture technologies, power sources, and rock formation types. Our approach captures and stores carbon dioxide from a variety of emission sources, including power plants, and industries like chemicals, cement and paper, and can work with any variety of capture (membranes, amines, DAC technology) whereby CGC can store the captured carbon dioxide.

MONITORING AND SAFETY ATTRIBUTES

In partnership with our sister company, WellDog, our downhole systems have been used in hundreds of locations around the world over the last two decades to directly measure and monitor key geophysical and geochemical data in the subsurface.

Our unique proprietary downhole Raman and pressure sensors and database are based on decades of knowing how coal seams absorb CO₂, both in the field and in the lab. Our sensing systems operate on a 24/7 basis; therefore, any detection of any potential type of leak is identified in real time. These sensors take an agnostic approach to technology selection and deliver engineered fit-for-purpose subsurface monitoring solutions. These solutions take into consideration pressure sensor types, covering a variety of pressure ranges, that are available with different temperature ratings, and capable of either analogue or digital transmission of data.

WellDog has also pioneered a number of different gauge architectures and deployment methods that allow one or more gauges of the same or different type, to be installed in the same well, either on tubing, coil, and/or behind casing. This high degree of flexibility enables permanent downhole monitoring systems to be configured to exactly suit well and reservoir conditions, and data needs.

