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GEOLOGIC CARBON SEQUESTRATION

What is geologic carbon sequestration?

Carbon dioxide capture and geologic carbon sequestration is achieved by chemically capturing carbon dioxide at a power plant or other source before it is emitted to the atmosphere. The captured CO_2 is compressed and transported to an appropriate site to be injected and stored, or "sequestered," in geological formations below impermeable caprock for thousands of years.

What types of underground sites can be used?

Three types of geological formations are sought: unmineable coal seams, depleted oil and gas reservoirs, and deep saline reservoirs, which have the most potential according to the DOE.

Is geologic carbon sequestration safe?

The natural accumulation of CO_2 underground and industry's use of CO_2 for Enhanced Oil Recovery suggest that geologic sequestration can be safe if carefully planned and executed. Leakage of injected CO_2 through rock fractures or abandoned wells and its return to the surface would be counter-productive and needs further study. Some of the environmental concerns related to shale gas development apply to CO_2 sequestration. The risk of earthquake inducement needs careful consideration.

How much can be stored?

Near one New York power station, one saline reservoir has a storage volume adequate for ~10 years of CO_2 production in a 5-square-mile area. Annually, the nation produces 6000 million metric tons of CO_2, compared to DOE's estimated total geologic storage resource of 3600 billion metric tons CO_2. Big questions are what fraction of that storage resource the injected CO_2 can reach, and at what price.

Are there existing geologic sequestration sites?

Internationally, there are several. Nationally, the DOE sponsored 9 development tests. Under the Northeast Regional Greenhouse Gas Initiative, 10 northeastern and mid-Atlantic states plan to cap and reduce CO_2 emissions by 10 percent by 2018.

How does H.R. 2454, American Clean Energy and Security Act of 2009, address geologic sequestration?

The bill directs the Administrator of the Environmental Protection Agency to develop regulations and a process to permit geologic sequestration. Industry organizations are authorized to establish a carbon storage research corporation to accelerate commercial availability of capture and storage technologies.

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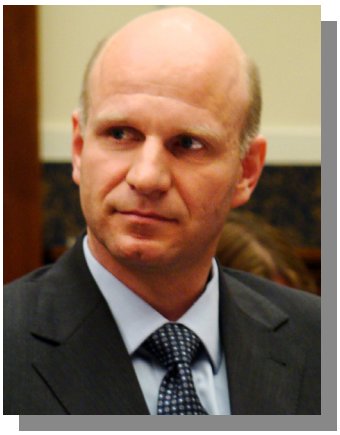
BIOCHAR



What is biochar?

Biochar uses an ancient technique of plowing charred plants – such as farm waste -- into the ground to revive the soil and trap greenhouse gases for hundreds or thousands of years. When plants are heated, using a process called pyrolysis, the carbon dioxide they had absorbed while growing is stored in the soil and the greenhouse gas is removed from the atmosphere.

How much carbon can biochar store?

Biochar has the potential to sequester .2-1 billion tons of carbon annually – as much as 10 percent of global carbon emissions.

Is biochar currently used?

The underlying technology is already developed and applicable globally but biochar is not actively produced or added to soils to any appreciable extent. Additional research, development, and demonstration projects are needed to optimize development and to evaluate the economic costs and benefits of large-scale deployment. If biochar is to become commercially viable, carbon-trading mechanisms will need to accept soil carbon sequestration as an appropriate method to reduce carbon levels in the atmosphere.

Is biochar economically viable?

Depending on the plant material used, biochar can be cost effective. Materials that would otherwise be disposed of – such as yard waste and livestock manure, have the highest potential for economic profitability.

Aside from reducing greenhouse gases, are there other benefits to biochar?

When biochar is applied to degraded soils, crop performance and fertilizer use efficiency improves and surface and groundwater pollution is reduced.

Does H.R. 2454, the climate change bill that passed the House last summer, recognize biochar?

The bill does not specifically mention biochar. However, the legislation requires the Environmental Protection Agency to develop regulations for a cap and trade system that could potentially use biochar sequestration to reduce greenhouse gas emissions. The bill calls for a study of technologies available, including biological sequestration, to reduce greenhouse gases.

Is biochar a substitute to curbing greenhouse gas emissions?

Biochar is not a substitute to reducing greenhouse gas emissions but it may be an important tool in our arsenal to combat climate change.

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