

DEPARTMENT OF ENERGY'S PROGRAM ON THE RECLAMATION OF MINE LANDS FOR CARBON SEQUESTRATION AND OTHER ANCILLARY BENEFITS¹

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Increasing concentrations of CO₂ and other greenhouse gases in the Earth's atmosphere have the potential to enhance the natural greenhouse effect, which may result in climatic changes. The main contributor to the increased atmospheric CO₂ level is fossil fuel combustion. Consequently, an important component of the United States Department of Energy's (DOE) research and development program is dedicated to avoiding a detrimental increase in the CO₂ concentration in the atmosphere by developing technologies to capture and sequester CO₂. An option being researched is to enhance natural sinks for CO₂, such as terrestrial ecosystems, which can potentially increase the carbon stored in these systems. Enhancing such natural sinks could make a significant contribution to long term CO₂ management strategies. Of particular interest are sites that have been surfaced mined for coal. Surface mining for coal not only results in the release of millions of ton of carbon from subsequent power generation at power plants burning the coal, it also releases carbon that was stored in the form of above ground biomass and in soils. Lands that were previously forested are routinely converted to pasture after mining and not managed for agricultural productivity. Therefore, carbon storage on these lands is minimal. Over 1.6 million acres of documented abandoned mine lands exist in the United States today. With proper management, these lands have the potential to sequester several million of tons of carbon each year in the form of grasses, trees, and soil organic matter in soils.

The DOE Carbon sequestration program is working to meet the current Administration's goals for climate change to reduce the greenhouse gas intensity of the United States by 18% by the year 2012. Sequestration of carbon in terrestrial sinks promises to play a major role in meeting this goal since technologies for increasing carbon in these systems is well understood

Additional Key Words: Reforestation, carbon sequestration, carbon measurement, project selection tools.

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Carbon sequestration requires a new look at the old problem of mine land reclamation and could influence how these lands are treated. Carbon will become not only a product that mining companies remove from these lands in the form of coal, but also replace in the form of natural vegetation. Obviously, the price of carbon may not drive whether a site is mined. Future commodity markets are being developed today that will trade carbon credits to offset greenhouse gas emissions from the energy industry. These markets will demand that project plans be developed that include methods to measure, monitor and verify that these carbon credits are valid.

The Department of Energy (DOE) National Energy Technology Laboratory (NETL) program for Carbon Sequestration has partnered with several universities, non-government organizations, industry, and national laboratories to identify promising approaches to terrestrial carbon sequestration on mine lands. The projects focus on a variety of topics including: the demonstration and measurement of carbon sequestered on mine lands via reforestation incorporating various soil amendments and best management practices; improved technologies for the measurement of soil carbon; remote sensing applications to measure above ground carbon in forests; development of terrestrial carbon sequestration project management tools; economic analyses of carbon sequestration via reforestation of mined lands; and assessing the ancillary benefits of carbon sequestration on mine lands. This presentation will focus on DOE's program to assess and demonstrate the potential of using mine lands for carbon sequestration projects that will offset anthropogenic greenhouse gas emissions.