

ARTICLE 1 – NATURE IN THE BALANCE CONTROLLING CARBON DIOXIDE EMISSIONS AND STILL PROVIDING AFFORDABLE ENERGY

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Affordable energy not only fuels our vehicles and electrical plants, it also fuels our economy and our quality of life. However, most of today's energy technologies release carbon dioxide (CO₂) to the environment. There is growing concern that CO₂ in the atmosphere might affect global climate and weather.

Humans release about 7 billion tons of carbon (26 billion tons of CO₂) to the atmosphere each year. The challenge is that the global population will increase by 1.5 billion in the next 15 years and the need for affordable energy will also increase, especially in developing nations. CO₂ from human sources may have to be controlled to reduce the risk of global warming.

CO₂ is a colorless, odorless gas. Whether we're aware of it or not, we come in contact with CO₂ every day: we exhale it, it makes our soft drinks fizz, and a small amount of CO₂ is naturally present in the atmosphere. Plants take in CO₂ for photosynthesis. After the plant dies and begins to decay, or burns, some of the carbon is returned to the atmosphere as CO₂. CO₂ is also part of the emissions from large stationary sources such as power plants, factories, cars, trucks, boats, airplanes, lawn mowers, and snowmobiles. Plowing, draining wetlands, and deforestation have also contributed

significant amounts of CO₂ to the atmosphere.

CO₂ is a greenhouse gas, as are water vapor and methane; they are important in the natural process known as the greenhouse effect. CO₂ and other gases in the atmosphere act like a blanket around the earth that traps heat and helps create the conditions that support life on Earth.

Over time, the level of CO₂ in the atmosphere has varied. The human contribution of CO₂ was very small and came largely from two practices: plowing and burning wood and dung for heat.

But by the mid-1800s, humans changed the way they used resources. The Industrial Revolution began, and better energy sources were needed to fuel trains and automobiles and provide energy to generate electricity. Humans turned from energy-poor fuels—wood and animal droppings—to energy-rich fossil fuels, including coal, oil, and natural gas. Fossil fuel use has increased dramatically in the industrialized world since 1850. During that same period, the level of CO₂ in the atmosphere increased by 25%, and the atmosphere warmed by about 1°F.

Because the majority of CO₂ from human activities comes from the use of fossil fuels, stabilizing CO₂ levels in the atmosphere

would mean making changes in the way we fuel our vehicles, heat our homes and businesses, power our industry, and generate electricity. At the most basic level, energy is essential, but it has to be affordable. In order to use our resources in a sensible way without damaging our planet, there needs to be a balance between energy and the environment.

The U.S. Department of Energy (DOE) has identified several strategies that can help stabilize the level of CO₂ in the atmosphere, including using less energy, improving the efficiency of systems that produce and use energy, increasing the use of energy sources that do not give off CO₂ (solar, wind, and nuclear power), and actively removing CO₂ from the atmosphere or preventing it from ever entering the atmosphere. The capture and long-term storage of CO₂ is called sequestration. Experts agree that we may need all of these strategies, including sequestration, to manage CO₂.

The University of North Dakota Energy & Environmental Research Center (EERC) is leading an international team to develop opportunities for CO₂ sequestration in the Great Plains. The Plains CO₂ Reduction (PCOR) Partnership is part of a DOE program looking at sequestration options in different regions.

Our region has many opportunities for sequestration. The PCOR Partnership, a

collaboration of more than 40 government, industry, and environmental groups from the United States and Canada, is currently characterizing CO₂ sources and sequestration opportunities in nine states (Iowa, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Wisconsin, and Wyoming) and three Canadian provinces (Alberta, Manitoba, and Saskatchewan).

The PCOR Partnership is tracking sources of CO₂, identifying sequestration opportunities, assessing technologies to monitor CO₂, and assessing regulatory needs for successful sequestration projects. The effort is funded by DOE's National Energy Technology Laboratory (NETL) in Morgantown, West Virginia, and partnership members.

To learn more, check out the Plains CO₂ Reduction Partnership Web site at www.undeerc.org/PCOR and tune in to Prairie Public Television on May 12, 2005, to watch "*Nature in the Balance: CO₂ Sequestration*" (check your local listings). The show provides a 30-minute introduction to CO₂ management with a focus on the North American heartland. The video introduces audiences to DOE NETL's seven Regional Carbon Sequestration Partnerships and describes their role in assessing opportunities for carbon sequestration across North America.



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Visit the PCOR Partnership Web site at www.undeerc.org/PCOR.

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