

Achieving A Sustainable Eco-Friendly Future: Reducing U.S. and Global Carbon Emissions Through Technology and Partnerships

Climate Change is probably one of the most talked about issues worldwide today. It is clear that the current state of the environment is a major concern and the lack of a single solution and clear path to resolving the issue is an extreme concern for many people. Whatever a person believes on this issue, everyone agrees it isn't a good thing to put any pollutants into the atmosphere and that we need to find a solution. People are willing to make changes and sacrifices to make our environment better for the future generations.

Certainly, Carbon Dioxide levels are going up, and most of it comes from energy use. In the U.S., about 82 percent of the Carbon Dioxide comes from energy generation. In Japan, the industrial and energy sectors account for 50 percent of the green house gas emissions. It is common knowledge that we are consuming more and more energy. Although much of the publicity and a significant effort has focused on making "cleaner" automobiles, even if every car were replaced it would only make a slight impact on the emission issue.

The U.S. is trying to reduce emissions by approaching the problem several different ways. Overall, the Federal government spends \$5 Billion (570 Billion Yen) in science and technology to facilitate the technology development and demonstration. Virtually every government agency has programs to assist in reducing greenhouse gases. Near, mid-, and long term solutions are being developed. The Department of Energy is encouraging a reduction in energy consumption through improved power plant efficiencies as well as conservation. In parallel, technologies to capture and store Carbon Dioxide, and developing and using alternative fuels are being improved. To do this, a continuous flow of research innovations is required, which the U.S. will develop and demonstrate. The current annual budget for these programs is \$2.7 Billion (308 Billion Yen).

The ultimate solution is a low cost, zero emissions system, which we call "Future Gen." This is a \$1 Billion (114 Billion Yen), multi-national program over 10 years. This system is a coal-based power plant system that optimizes all the byproduct steams and technologies and results in virtually no emissions. Coal is processed in an Integrated Gasified combined cycle system to produce electricity. The Hydrogen by-product can be used directly or converted to a liquid. This could supply both power plants and transportation systems. The Carbon Dioxide is captured and either stored or can be used to enhance oil production. Currently many oil producers purchase Carbon Dioxide for this purpose.

The key to this happening is the development and demonstration of several technologies including fuel cells, sequestration, gasification with cleanup sequestration, optimized advanced turbines, and hydrogen production. All of these technologies are currently being developed and it is planned for them to be integrated in stages, beginning in 2012.

In the meantime, work is being conducted to clean up our existing power plants through affordable environmental control technologies. Many of these are available today but are not good enough to eliminate all the emissions. Two of the best ways to reduce emissions is to improve the efficiency of the power plant technology as well as use a clean fuel to start with. Gas-fueled power plants have about half of the emissions of coal-fueled power plants. In addition, the state-of-the-art coal-based power plants have demonstrated about a 25 percent reduction in Carbon Dioxide just because of their higher efficiencies. Our goal for 2020 is to improve the technology to reduce the emissions by 40 percent.

Before Carbon Dioxide gas can be sequestered from power plants and other sources, it must be captured as a relatively pure gas. After that, ways to use or store the Carbon Dioxide must be developed.

There are many challenges to ensuring the abundant, inexpensive energy and a clean environment for future generations. These include reducing emissions, land use, safety, security, and the development of a skilled workforce. Today, our countries recognize that energy and environment issues do not stop at a country's borders, but are global issues. Our countries can no longer work independently but must partner with other countries to jointly resolve these issues for future generations. New fuel sources, such as methane hydrates, have been identified in both the U.S. and Japan and could provide clean energy as well as energy independence. From this meeting, it is obvious that Japan feels strongly about this issue and is taking a global lead in bringing all the countries together and working towards reducing Carbon emissions. Although each of the panelists had different approaches to an ecologically friendly environment, everyone focused on a sustainable eco-friendly future. Just as it will take all countries participating in reducing the greenhouse gas emissions, it will take everyone participating in less polluting lifestyles and improved eco-agriculture processes. In addition, the environment and the economy will benefit from emissions trading which is expected to become common in the near future.