



FOSSIL ENERGY RESEARCH BENEFITS

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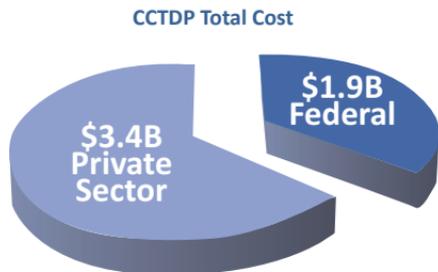
Clean Coal Technology Demonstration Program

The Office of Fossil Energy's (FE) **Clean Coal Technology Demonstration Program** (1986-1993) laid the foundation for effective technologies now in use that have helped significantly lower emissions of sulfur dioxide (SO_2), nitrogen oxides (NO_x) and airborne particulates (PM_{10}).

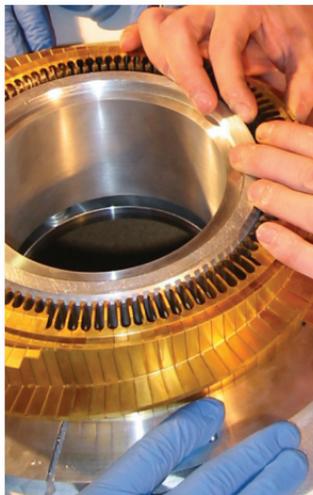
The program forged cost-sharing partnerships between the U.S. Department of Energy, industry, universities and technology suppliers and users.

The **U.S. General Accounting Office** said the program demonstrated "how the government and the private sector can work effectively together to develop and demonstrate new technologies."

75 percent of domestic coal-fired power plants include technology with roots in FE's Clean Coal Technology Demonstration Program.

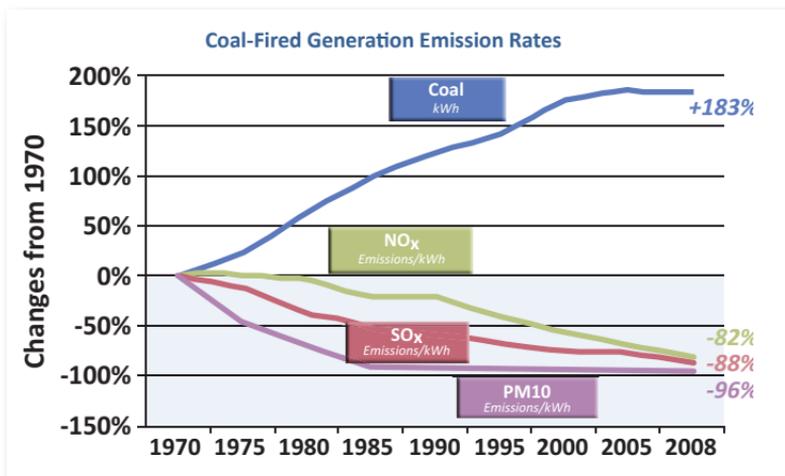


While the cost-sharing requirement for the program was a 50/50 split, the private sector provided about two-thirds of CCTDP dollars.



Program Benefits

- ✓ **33** successfully completed demonstration projects.
- ✓ Some **20 innovative technologies** developed; 15 resulted in marketplace sales of a demonstrated clean coal technology.
- ✓ Contributed to **significant SO_2 , NO_x reductions**, U.S. air quality improvement.
- ✓ Benefits from emissions reductions attributable to FE Clean Coal Program, 2000–2020 = **37 million tons** and **\$9 billion for SO_2** ; **16 million tons** and **\$16 billion for NO_x** (Source: Management Information Systems, Inc., 2009).



Source: Southern Company

Technologies from the FE Coal R&D program, combined with other factors, have helped to dramatically reduce potentially harmful emissions, even as coal use for electricity generation has risen substantially.

Key Technologies Demonstrated and Commercialized by the FE Clean Coal Technology Demonstration Program

- Low NO_x Burners** Reduce NO_x levels from coal combustion by 40–60 percent at relatively low cost; have or will soon be installed on 93 percent of U.S. coal-fired power plants.
- Selective Catalytic Reduction** Up to 95 percent NO_x reduction; costs have been halved since 1980s; SCR and selective non-catalytic reduction systems installed on about 50 percent of U.S. coal fleet.
- Flue Gas Desulfurization** Installed, permitted, or under construction at about two-thirds of existing coal fleet.; 95 percent or more reduction of SO₂ in flue gases.
- Fluidized Bed Combustion** Competitive efficiencies, low NO_x and SO₂ levels; more than 600 large boilers with total installed thermal capacity of more than 70,000 MW have been built worldwide.
- Integrated Gasification Combined Cycle** Inherently lower emissions of SO₂, NO_x, mercury; evolving technology in early stages; over 1,400 MW coal-based IGCC operating worldwide and additional 3,000 MW (net) under development in the United States.



U.S. Department of Energy

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