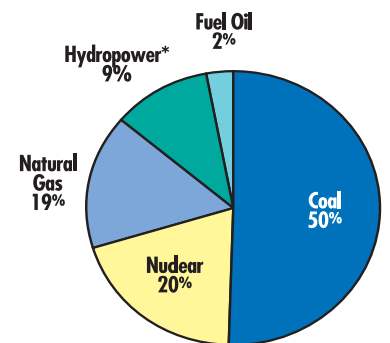


## Clean Coal Technology

**“Effective technology policies will allow coal to reach its full potential, meet required environmental standards, and ensure that the United States utilizes its most abundant and reliable energy resource.”**

*– United States Energy Association<sup>1</sup>*

- Coal accounts for approximately one-third of the United States’ primary energy production. It is an abundant, domestic energy resource, with estimated recoverable reserves totaling 275 billion short tons, or a 250-year supply at current rates of use.
- Today coal represents approximately 23 percent of total U.S. energy consumption. Coal is used primarily to generate electricity. In fact, 50 percent of the nation’s electricity is generated from coal. Coal-based power plants are expected to remain the key source of electricity through 2025.<sup>2</sup>
- Between 1970 and 2001, U.S. electric companies increased the amount of electricity generated from coal by 170 percent. During that same time, electricity from coal became increasingly clean. In fact, the rate of emissions (measured by the pounds of emissions per thousand kilowatt-hours generated by coal) from electricity from coal dropped significantly — sulfur dioxide (SO<sub>2</sub>) dropped 77 percent and nitrogen oxides (NO<sub>x</sub>) dropped 60 percent.



### Current Electricity Generation Mix

\*Other renewable sources (geothermal, biomass, solar, and wind) represent 2% of the generation mix.  
2002 preliminary data.

The Clean Coal Technology (CCT) Program is an innovative partnership, jointly funded by the U.S. Department of Energy (DOE) and industry, which is designed to demonstrate and move to market innovative and effective methods to reduce the environmental impact of using coal to generate electricity.

**\$3.5 Billion: Industry Contribution**

**\$1.8 Billion: U.S. Department of Energy Contribution**

**\$5.3 Billion: Total Cost**

*(Source: U.S. Department of Energy)*

<sup>1</sup> United States Energy Association, *Toward a National Energy Strategy*, February 2001.

<sup>2</sup> Energy Information Administration, *Annual Energy Outlook 2003*, DOE/EIA-0383 (2003), January 2003.

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- The CCT Program has resulted in selection of 38 projects in 18 states since 1986. These projects include technologies that control SO<sub>2</sub> and NO<sub>x</sub> emissions, process coal for clean fuels, and advance electric power generation. By law, industry must fund at least 50 percent of each project, but has actually provided two-thirds of funding to date.
- DOE estimates the benefits to American consumers from the CCT Program's scrubber technologies at \$50 billion through 2005; and another \$25 billion for NO<sub>x</sub> control. These technologies are reducing the cost of pollution control at coal-based generating facilities.
- Tangible advances from the CCT Program include advanced pollution controls that have helped utilities comply with more stringent Clean Air Act requirements. These technologies include:
  - Flue Gas Desulfurization Systems (Scrubbers) that remove SO<sub>2</sub> from flue gas by injecting lime or limestone and water slurry to remove the sulfur. More than 400 of these state-of-the-art systems have been commercially deployed.
  - Low-Nitrogen Oxide Burners that reduce NO<sub>x</sub> by lowering flame temperatures in boilers. Low-NO<sub>x</sub> burners are now used or are being installed on 75 percent of U.S. coal-based power plants.
- The CCT Program also has developed a new generation of advanced coal-based power systems that represent a quantum leap forward in efficiency and environmental performance. These systems provide fuel efficiencies 30 to 40 percent higher than a conventional coal-based power plant. They include:
  - Fluidized-Bed Combustors and Integrated Gasification Combined Cycle units. Some 170 fluidized-bed combustion units are operating in the U.S., and more than 400 operate worldwide. Plants with the IGCC technology are now operating in Tampa, FL, and Terre Haute, IN; as much as 95 to 99 percent of the sulfur and nitrogen impurities in the coal gas can be removed from the IGCC technology. Plans have recently been announced to build a 1,500-megawatt plant in Alabama.
- Improved operating efficiencies of new power generation technologies from the CCT Program are generally in the 30- to 40-percent range (compared with 33 to 35 percent for conventional coal-based plants), resulting in a nearly equal reduction in carbon dioxide (CO<sub>2</sub>) emissions according to DOE.<sup>3</sup>
- DOE and private industry currently are researching and testing carbon sequestration technologies that, coupled with higher-efficiency power plants, offer great potential for achieving significant reductions in CO<sub>2</sub> at relatively low costs.

<sup>3</sup> U.S. Department of Energy Fossil Energy Techline, May 8, 2000.

## Award Winning Clean Coal Projects

	<b>LOW-NO<sub>x</sub> BURNERS</b>
✓	1997 Air & Waste Management Association Award
✓	1994 R&D 100 Award
	<b>PURE AIR ADVANCED SCRUBBER</b>
✓	1993 Powerplant of the Year Award — Power Magazine
	<b>CT-121 FLUE GAS SCRUBBER</b>
✓	1994 Powerplant of the Year Award — Power Magazine
✓	1994 Air & Waste Management Association Award (Georgia)
✓	1993 Environmental Award - Chamber of Commerce (Georgia)
	<b>TIDD FLUIDIZED BED PLANT</b>
✓	1992 NERO Energy Efficiency Award
✓	1991 Powerplant of the Year Award — Power Magazine
	<b>TAMPA ELECTRIC CLEAN COAL PLANT</b>
✓	1997 Powerplant of the Year Award — Power Magazine
✓	1993 Ecological Society of America Award
✓	1991 Florida Audobon Society Award
	<b>WABASH RIVER REPOWERING PROJECT</b>
✓	1996 Powerplant of the Year Award — Power Magazine

Engineering Awards  
Environmental Awards

*Source U.S. Department of Energy*

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