

# Build Green

*Specifying coal combustion products promotes environmental sustainability, increases performance & creates opportunity.*

## with COAL COMBUSTION PRODUCTS

Coal combustion products (CCPs) are "environmentally preferred" materials offering significant technical and commercial advantages in architecture, engineering, construction, agriculture, manufacturing, and other industries.

The future possibilities inspire the imagination.

Coal-fueled power accounts for more than half the electricity produced in the United States. CCPs are created when coal is burned to generate electricity. They include fly ash, flue gas desulfurization materials, bottom ash and boiler slag. More than 124 million tons of CCPs were produced in the United States in 2006. About 43 percent (54 million tons) were used beneficially in a variety of commercial applications - a 13 percent increase since 2000. Tens of millions of tons are landfilled each year. With knowledge and mastery opportunities for CCP use will continue to gain momentum, realizing these materials' full potential in sustainable, exceptional performance for industry and society.



*Coal combustion products preserve land otherwise used for disposal;  
conserve natural resources as the need to extract virgin materials is eliminated;  
and reduce greenhouse gas production.*

Build Green  
visit [WWW.ACAA-USA.ORG](http://WWW.ACAA-USA.ORG)



## *Fly Ash: Sustainable, High Performance*

Fly ash is captured in electrostatic precipitators or baghouses from the exhaust of a boiler. The ash then collects in hoppers and is loaded into trucks.

Fly ash is most commonly used as a high-performance mineral admixture for portland cement or as raw feed for clinker in cement production. Cements blended with fly ash are becoming more common.

Fly ash has a variety of building material applications from grouts and masonry products to cellular concrete. Geotechnical uses include soil stabilization, road base, structural fills and embankments, and brown-field development. Fly ash also serves as filler in synthetic wood and plastic products, paints and metal castings.

Each ton of fly ash substituted for a ton of portland cement eliminates nearly one ton (.92) of carbon dioxide produced during cement production. This reduction equals two months of emissions from a car.

Also, the landfill space conserved equals 455 days of solid waste produced by the average American. Less machinery, less heavy equipment and less transport creates energy and greenhouse gas savings calculated exponentially. In fact, experts estimate that enough energy is saved to provide electricity to an average American home for 24 days! That's just one ton of fly ash in place of cement.

In addition, concrete with fly ash requires 2 to 10 percent less water than portland cement. In 2005 roughly

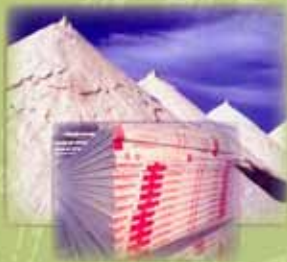


400 million cubic yards of concrete was poured. One estimate states that 200 million to 1 billion gallons of water can be saved annually by incorporating fly ash into concrete mix designs.

Fly ash typically creates a long-lasting, high-performance concrete. Fly ash modifies the chemistry of a concrete mix to increase strength and reduce permeability and chloride ingress, thus improving durability and freeze-thaw performance. A properly trained and experienced contractor can place concrete containing fly ash in most weather and temperature conditions encountered during regional construction seasons.

High volume fly ash concrete (up to 50 percent can be used in many applications), is particularly suitable for drilled caissons and piers and for mass pours such as mat slabs, foundations and bridge piers.

## *Flue Gas Desulfurization Materials*

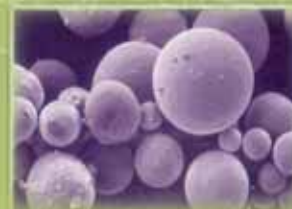


Flue gas desulfurization (FGD) materials are produced by chemical "scrubber" emission control systems. Residues vary, but the most common are FGD gypsum (or "synthetic" gypsum) and spray dryer absorbents. FGD gypsum is used in almost 30 percent of U.S. gypsum panel products. Other FGD materials are used in horticulture, landscaping and agriculture, as well as other applications.

## *Bottom Ash & Boiler Slag*



Bottom ash and boiler slag can be used as a raw feed for manufacturing portland cement clinker. They're also used in concrete masonry products and for geotechnical applications, such as structural fills and land reclamation. Boiler slag is used for roofing shingles and more.



As our society ages, many of our natural resources will become a memory. Recyclables will be the resource of necessity, not choice. Construction methods and practices will evolve from our throwaway society to one of sustainability. Our actions, research and creativity today is what will define our society in the future. Infrastructure projects designed to last over a 100 years will be the norm.



## *Resources*

**U.S. EPA: Coal Combustion Products Partnership**  
[www.epa.gov/epaoswer/osw/consolve/c2p2/](http://www.epa.gov/epaoswer/osw/consolve/c2p2/)

**U.S. Green Building Council: Leadership in Energy & Environmental Design**  
<http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

**Green Globes**  
<http://www.greenglobes.com/>

**ACAA - Advancing & Promoting Coal Combustion Products**  
[www.acaa-usa.org](http://www.acaa-usa.org)

