

Coal Combustion Products: Beneficial Use - Simply Recycling by Another Name



Many people pride themselves on their efforts to recycle paper, glass, cans, cardboard and other leftovers from the consumer marketplace. Reduce, reuse and recycle are strategies employed widely in the United States to help cut down on the need for landfills and conserve limited resources. Many public regulators use the terms "beneficial use" when referring to recycling activities.



Reduced Utilization of Virgin Materials

Coal fly ash has many of the chemical properties of portland cement. It includes constituents such as silica, alumina, iron and other oxides. These characteristics allow fly ash to replace portland cement in concrete products or to be used in the production of bricks. Ash typically needs no processing and can be delivered from the power plants directly to the ready mix producer.

Companies that burn coal to produce electricity and steam have pride in their efforts to recycle as well. Over the years they have found a variety of ways to put the byproducts from burning coal to productive, beneficial uses. The amount of coal combustion products (CCPs) put to beneficial use has increased steadily and now constitutes about 43 percent of all CCPs produced.

The Environmental Protection Agency has partnered with industry and other federal agencies in an effort to promote the reuse of coal ash. The Coal Combustion Products Partnership (C²P²) recognizes that the recycling and reuse of coal ash has a number of environmental benefits, including reduced land disposal, reduced utilization of virgin resources, and reduced greenhouse gases. A few of the leading beneficial uses are described below. This has been a win for the companies, their neighbors and the environment.

Reduced Land Disposal



In the same way that households conserve landfill space by recycling, America is able to reduce the need for additional landfills by recycling coal ash. For each ton

recycled, space equivalent to 455 days worth of solid waste is saved in a landfill. Coal ash can be beneficially used in ways that avoid the need for comparable virgin materials. Coal ash is used safely and often at a lower cost than competing products. Since 2000, more than 360 million tons of CCPs have been recycled.

Bottom ash, the heavier particles that remain after combustion, is similar in form and composition to fine aggregates like sand and gravel. Bottom ash can be used in concrete blocks, shingles, asphalt, flowable fill and bricks. This means that the natural materials – sand and fine aggregates – can be saved for other uses. This extends the service life of current virgin sources and delays the need to find new sources.

Green building emphasizes the use of "recycled content" as part of the components of many structures. The Green Building Initiative (GBI) and U.S. Green Building Council (USGBC) both encourage using fly ash in concrete or products that contain recycled materials. Federal and state procurement guidelines also support the use of fly ash and other recycled material in government funded projects. In fact, concrete containing coal ash was used in the construction of the Ariel Rios building, EPA's headquarters in Washington D.C. (below).



...see reverse.

For more information please visit: www.coalashfacts.org

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Reduction in Greenhouse Gases

Using coal ash as a substitute for virgin materials reduces the emissions of greenhouse gases. Energy is consumed and carbon dioxide is released during the production of portland cement. However, by using recycled coal ash in place of portland cement these carbon dioxide emissions are avoided. Each ton of coal ash used in this manner saves the equivalent to two months emissions from a typical automobile. The energy saved by using coal ash is equal to 24 days electricity consumption of an average home. Incidentally, concrete made with coal ash requires at least 10 percent less water to produce a long lasting product.

Energy Savings and Life Cycle Impacts of One Ton of Fly Ash in Concrete¹

Metric Measurement	Amount
Energy Savings in dollars.....	\$129.10
Water savings	376.3 liters or 99.4 gallons
Avoided total CO ₂ equivalent green house gases..... (ave.)	718,000 grams or apx. 0.80 tons per ton of portland cement
Passenger cars not driven for a year	0.2
Avoided gasoline consumption	310 liters or 82 gallons
Avoided oil consumption	1.7 barrels or 53.5 gallons

¹ June 3, 2008 EPA Report to Congress (EPA530-R-08-007) Study on Increasing the Usage of Recovered Mineral Components in Federally Funded Projects Involving Procurement of Cement or Concrete to Address the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for User.

Engineering & Environmental Standards Apply

Projects that use coal ash, such as highway construction, land and mine reclamation, and structural fills are engineered to meet specific design requirements. National transportation and construction codes and standards and state specifications require coal ash to meet certain criteria to be acceptable for these uses. State regulators are often required to review and approve a project that uses recycled materials (including coal ash) to ensure there is no negative impact to the environment or potential health concern.



Ash Recycling makes \$ense!



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