The American Coal Ash Association was established in 1968 as a trade organization devoted to recycling the materials created when we burn coal to generate electricity. Our members comprise the world’s foremost experts on coal ash (fly ash and bottom ash), and boiler slag, flue gas desulfurization gypsum or “synthetic” gypsum, and other “FGD” materials captured by emissions controls. While other organizations focus on disposal issues, ACAA’s mission is to advance the management and use of coal combustion products in ways that are: environmentally responsible; technically sound; commercially competitive; and supportive of a sustainable global community.
Coal Combustion Products – often referred to as “coal ash” – are solid materials produced when coal is burned to generate electricity. There are many good reasons to view coal ash as a resource, rather than a waste. Using it conserves natural resources and saves energy. In many cases, products made with coal ash perform better than products made without it.

As coal continues to be the largest energy source for electricity generation in the United States, significant volumes of coal ash are produced. Since 1968, the American Coal Ash Association has tracked the production and use of all types of coal ash. These surveys are intended to show broad utilization patterns and ACAA’s data have been accepted by industry and numerous government agencies as the best available metrics of beneficial use practices.

In 2014, coal ash utilization rebounded after a half decade of stalled growth. The volume of coal fly ash used in concrete production increased to 13.1 million tons in 2014, for the first time exceeding the 12.6 million ton utilization mark set in 2008. Increases in the use of synthetic gypsum produced by power plant emissions control equipment also helped to push the recycling rate for all types of coal combustion products to a record 48 percent.
Fly Ash

Fly ash is a powdery material that is captured by emissions control equipment before it can “fly” up the stack. Mostly comprised of silicas, aluminas and calcium compounds, fly ash has mechanical and chemical properties that make it a valuable ingredient in a wide range of concrete products. Roads, bridges, buildings, concrete blocks and other concrete products commonly contain fly ash.

Concrete made with coal fly ash is stronger and more durable than concrete made with cement alone. By reducing the amount of manufactured cement needed to produce concrete, fly ash accounts for more than 11 million tons of greenhouse gas emissions reductions each year.

Other major uses for fly ash include constructing structural fills and embankments, waste stabilization and solidification, mine reclamation, and use as raw feed in cement manufacturing.

Bottom Ash

Bottom ash is a heavier, granular material that is collected from the “bottom” of coal-fueled boilers. Bottom ash is often used as an aggregate, replacing sand and gravel. Bottom ash is often used as an ingredient in manufacturing concrete blocks.

Other major uses for bottom ash include constructing structural fills and embankments, mine reclamation, and use as raw feed in cement manufacturing.
Power plants equipped with flue gas desulphurization (“FGD”) emissions controls, also known as “scrubbers,” create byproducts that include synthetic gypsum. Although this material is not technically “ash” because it is not present in the coal, it is managed and regulated as a coal combustion product.

Scrubbers utilize high-calcium sorbents, such as lime or limestone, to absorb sulfur and other elements from flue gases. Depending on the scrubber configuration, the byproducts vary in consistency from wet sludge to dry powdered material.

Synthetic gypsum is used extensively in the manufacturing of wallboard. A rapidly growing use of synthetic gypsum is in agriculture, where it is used to improve soil conditions and prevent runoff of fertilizers and pesticides.

Other major uses for synthetic gypsum include waste stabilization, mine reclamation, and cement manufacturing.
Other Products and Uses

**Boiler Slag** – is a molten ash collected at the base of older generation boilers that is quenched with water and shatters into black, angular particles having a smooth, glassy appearance. Boiler slag is in high demand for beneficial use as blasting grit and roofing granules, but supplies are decreasing because of the retirement from service of older power plants that produce boiler slag.

**Cenospheres** – are harvested from fly ash and are comprised of microscopic hollow spheres. Cenospheres are strong and lightweight, making them useful as fillers in a wide variety of materials including concrete, paint, plastics and metal composites.

**FBC Ash** – is a category of ash from Fluidized Bed Combustion power plants. These plants reclaim waste coal for fuel and create an ash by-product that is most commonly used to reclaim abandoned surface mines and abate acid mine drainage. Ash from FBC power plants can also be used for waste and soil stabilization.

**New Uses on Horizon**

New beneficial uses for coal ash are continually under development. Researchers and ash marketers are currently focusing heavily on the potential for reclaiming ash that has already been disposed for potential beneficial use. There is also renewed interest in the potential for extracting strategic rare earth minerals from ash for use in electronics manufacturing.
### 2014 Coal Combustion Product (CCP) Production & Use Survey Report

#### Beneficial Utilization versus Production Totals (Short Tons)

<table>
<thead>
<tr>
<th>CCP Categories</th>
<th>Fly Ash</th>
<th>Bottom Ash</th>
<th>Boiler Slag</th>
<th>FGD Gypsum</th>
<th>FGD Material Wet Scrubbers</th>
<th>FGD Material Dry Scrubbers</th>
<th>FGD Other</th>
<th>FBC Ash</th>
<th>CCP Production / Utilization Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CCPs Produced by Category</td>
<td>50,422,234</td>
<td>12,478,709</td>
<td>2,694,056</td>
<td>34,123,820</td>
<td>12,596,231</td>
<td>1,255,775</td>
<td>344,551</td>
<td>15,768,766</td>
<td>129,684,142</td>
</tr>
<tr>
<td>Total CCPs Used by Category</td>
<td>23,181,723</td>
<td>6,063,028</td>
<td>1,706,621</td>
<td>16,750,930</td>
<td>1,163,434</td>
<td>275,999</td>
<td>0</td>
<td>13,285,766</td>
<td>62,427,561</td>
</tr>
</tbody>
</table>

1. Concrete/Concrete Products /Grout | 13,126,930 | 609,558 | 0 | 423,613 | 0 | 0 | 0 | 0 | 14,160,100 |
2. Blended Cement/ Feed for Clinker | 3,391,272 | 1,197,398 | 0 | 1,308,208 | 120,509 | 0 | 0 | 0 | 6,017,388 |
3. Flowable Fill | 84,734 | 2,672 | 0 | 0 | 0 | 0 | 0 | 0 | 87,406 |
4. Structural Fills/Embancments | 2,805,515 | 1,928,492 | 51,659 | 1,586,234 | 311,183 | 0 | 0 | 0 | 6,683,084 |
5. Road Base/Sub-base | 365,868 | 306,936 | 12,992 | 0 | 0 | 0 | 0 | 0 | 685,796 |
6. Soil Modification/Stabilization | 176,112 | 720,791 | 0 | 0 | 0 | 0 | 0 | 0 | 896,903 |
7. Mineral Filler in Asphalt | 68,707 | 9,758 | 0 | 5,197 | 0 | 0 | 0 | 0 | 83,662 |
8. Snow and Ice Control | 0 | 736,397 | 101,359 | 0 | 0 | 0 | 0 | 0 | 837,756 |
9. Blasting Grit/Roofing Granules | 0 | 127,114 | 1,530,853 | 0 | 0 | 0 | 0 | 0 | 1,657,968 |
10. Mining Applications | 1,392,935 | 41,330 | 0 | 11,221,836 | 0 | 0 | 0 | 0 | 13,151,161 |
11. Gypsum Panel Products | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16,206,855 |
12. Waste Stabilization/Solidification | 279,323 | 475 | 0 | 16,390 | 0 | 0 | 0 | 0 | 134,605 |
13. Agriculture | 62 | 10 | 0 | 1,332,708 | 0 | 0 | 0 | 0 | 1,332,791 |
14. Aggregate | 0 | 181,107 | 0 | 0 | 0 | 0 | 0 | 0 | 181,107 |
15. Oil/Gas Field Services | 512,100 | 4,708 | 0 | 0 | 0 | 0 | 0 | 0 | 516,801 |
16. Miscellaneous/Other | 978,165 | 206,039 | 0 | 43,384 | 153,498 | 0 | 0 | 0 | 1,381,086 |

#### Summary Utilization to Production Rate

<table>
<thead>
<tr>
<th>CCP Categories</th>
<th>Fly Ash</th>
<th>Bottom Ash</th>
<th>Boiler Slag</th>
<th>FGD Gypsum</th>
<th>FGD Material Wet Scrubbers</th>
<th>FGD Material Dry Scrubbers</th>
<th>FGD Other</th>
<th>FBC Ash</th>
<th>CCP Utilization Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total by CCP Type/Application</td>
<td>23,181,723</td>
<td>6,063,028</td>
<td>1,706,621</td>
<td>16,750,930</td>
<td>1,163,434</td>
<td>275,999</td>
<td>0</td>
<td>13,285,766</td>
<td>62,427,561</td>
</tr>
<tr>
<td>Category Use to Production Rate (%)</td>
<td>46%</td>
<td>49%</td>
<td>63%</td>
<td>49%</td>
<td>9%</td>
<td>22%</td>
<td>0%</td>
<td>84%</td>
<td>48%</td>
</tr>
</tbody>
</table>

#### Notes:
These are estimates for entire U.S. utility and IPP sectors calculated by dividing the survey respondents data by the portion of the overall industries coal burn they represent, as reported in the July 2015 EIA Electric Power Monthly (58%).