



**Ash Development  
Association of Australia**

# Ash Development Association of Australia

## Annual Membership Survey Results

**January - December 2013**

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# Membership Survey Results: 2013

The beneficial use of coal combustion products (CCPs) during 2013 resulted in 5.7 million tonnes or 52% being effectively utilised, resulting in the conservation of energy, finite natural resources, the reduction of greenhouse gas emissions and recovery of mineral by-product resources that would otherwise be placed into long term storage.

The survey results for CCP production and categorised end uses for the period January to December 2013 are shown in Table 1. From the 12.3 million tonnes of all CCPs produced some 52% of were effectively utilised<sup>1</sup> within various civil and construction applications throughout Australasia. This compares well, given the uncertainty during 2013 with the withdrawal Carbon Tax impost, wide ranging environmental reforms and government privatisation agenda during 2013. The previous periods of 2001, 2011, 2010, 2009 and 2008 with effective utilisation being 42%, 48%, 41%, 34% and 31% respectively.

Annual members and non-members were surveyed for CCPs generated, stored and sold during the reported period which provides results for the calendar year, January to December 2013. Information provided by members<sup>2</sup> and non-members<sup>3</sup> was collated, compared with other data sources for verification purposes and then combined into a set of national results. The import and export of CCPs was included, however sources and destinations are not identified.

## Discussion of results

Total CCP generation for the period has again fallen from 12.8 million tonnes to 12.3 million tonnes, a reduction of almost 0.5 million tonnes. This trend has continued since 2008 with total CCP production of 14.7 million tonnes.

The major contributing factors are partly related to; closure/retirement of older coal fired power stations, the short-term closure of units to undertake earlier than planned maintenance, plant unplanned maintenance/repairs and selective shut down of units due to based load demand issues. The net result during 2013 is partly a function of the continuation of short-term interruptions within the supply chain for cement and concrete users, again highlighting the limited and highly centralised processing and distribution capacity across selected power station sites.

The principle utilisation end uses continue to be attributable to graded materials used in cement and concrete, structural/civil applications and mining applications such as mine site remediation, with significant growth on in Category 2 and 3 sales for ungraded materials. Ongoing regulatory reform by the Association continues focusing on new end use market opportunities for ungraded applications.

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<sup>1</sup> “Effective utilisation” is the sale or utilisation of recoverable mineral resources into a value added construction application that provides both commercial returns [revenue] return on investment or an economic profit [avoided expense], and use is consistent with the criteria of ecologically sustainable development (EDS) principles.

<sup>2</sup> <http://www.adaa.asn.au/membership.htm>.

<sup>3</sup> MacGen and Bluewater Power stations.

The use of CCPs such as fly ash can further significantly contribute to further reducing the carbon footprint of the cement and concrete sector<sup>4</sup>, but only where additional processing capacity can meet demand, coupled with supply chain inventory capacity and exploitation of large volumes of stored materials within ash dams to buffer the supply chain.

Demand for fine and coarse aggregate use in structural/civil applications continues to be closely tied to consumption or growth in future development of infrastructure in both urban and regional Australia – estimated to be in excess of 160 million tonnes annually. Extractive resources are generally widespread and remain in adequate supply nationally, however shortages in important large scale markets (Sydney, Melbourne and Brisbane) are occurring. These are mainly attributed to unsuitable geology, conflicting or incompatible land uses and environmental problems caused by high rates of urban expansion.

Natural sand and gravel resources are also being depleted leading to opportunities for substitution by ungraded CCPs. There has been a considerable increase in interest from extractive industries to supplement natural sand and gravel resources with recovered resources such as CCPs, which is an area of considerable focus within the Association with the Cooperative Research Centre for Low Carbon Living research projects.

## Key results

The survey results include all generators<sup>5</sup>, marketers<sup>6</sup> and users for the total production and resulting sales by each end use. Where required, data was supplemented with importation data and other secondary data<sup>7</sup> sources for accuracy purposes.

- Approximately 12.3 Mt (million tonnes) of CCPs were produced within Australasia. On a per capita basis, this equates to about 520 kg/person.
- Some 5.7 Mt or 52% of CCPs produced have been effectively utilised in various value-added products or to some beneficial end over the period. On a per capita basis, this equates to about 248 kg/person recycled or reused.
- Approximately 1.7 Mt or 66% of effectively utilised coal ash was used in high value-added applications such as cementitious binders, concrete manufacture or mineral fillers.
- About 0.84 Mt or 34% of effectively utilised coal ash was used in non-cementitious applications such as flowable fills, structural fills, road bases, coarse/fine aggregates and mine site remediation.
- Some 2.4 Mt or 19% was used in projects offering some beneficial use (e.g. onsite remediation, local haul roads etc.). These uses typically generate no economic return, that is, cost avoidance or recovery only.
- Surplus CCPs of 8.3 Mt are typically placed into onsite storage ponds awaiting some future opportunity for economic reuse.
- More than 37 Mt of CCPs [fly ash] have been used in cementitious applications or concrete manufacture from 1975 to 2013 [38 years].

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<sup>4</sup> Heidrich, C., I. Hinczak, et al. (2005). Case study: CCP's potential to lower Greenhouse Gas emissions for Australia. World of Coal Ash 2005, Lexington, Kentucky, USA, American Coal Ash Association & University of Kentucky.

<sup>5</sup> Generator – means a company who generates coal powered electricity, produces CCPs as a by-product and has been admitted as a member. CCPs can be supplied to processors, consumers or value adders.

In summary, the recovery and reuse of CCPs provides positive and significant environmental impacts, including resource conservation and in this case, the reduction of Greenhouse Gas emissions from the processing of virgin resources, resulting in the reduction of almost 1.3 million tonnes of greenhouse gases.

The following table provides more detail for individual category sales of CCPs for the 2013 calendar year.

Ash Development Association of Australia Inc  
July 2014

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<sup>6</sup> Marketers (Value adder) – means a company who processes, mixes, blends, or otherwise incorporates CCPs to produce products for supply to consumers or other value adders. [A value adder typically incorporates owned intellectual property].

<sup>7</sup> Company annual reports and other published data sources.

## Ash Development Association of Australia

### 2013 Membership Survey - CCP Production & Use Survey

SECTION A. Fuel or Coal Used	Tonnes Consumed	Avg % Ash Content	Ash (Auto-Calc)	Ash (Manual-Calc)											
A1: Bituminous (Black Coal)	43,448,465	23.48%	10,200,890												
A2: Sub-bituminous	5,825,167	7.55%	439,707												
A3: Lignite (Brown Coal)	56,100,529	2.90%	1,628,061												
Total Coal Burned (Auto-calc)	105,374,161	11.64%	12,268,657												
SECTION B. CCPs Beneficial Use Calculations (Tonnes)	Fly Ash	Furnace Bottom Ash	Cenospheres	Combined 2013	Combined 2012	Combined 2011	Combined 2010	Combined 2009	Combined 2008						
B1. Total Produced (Jan-Dec)	10,869,269	1,387,298	7,828	12,264,395	12,797,331	13,680,219	14,076,233	13,755,682	14,638,323						
B2. Total not used [Stored]	7,436,528	832,063	7,828	8,276,419	9,755,479	9,421,266	10,365,700	9,053,178	12,246,852						
Total Production Used (Auto-Calc)	3,432,741	555,234	0	3,987,975	3,041,852	4,258,953	3,710,533	4,702,504	2,391,471						
B3. Amounts removed or diverted from storage	2,255,142	110,142	0	2,365,284	19%	2,343,291	2,368,626	2,101,983	2,037,200						
Total of All Used (Auto-Calc)*	5,687,883	665,376	0	6,353,259	52%	5,385,143	42%	6,627,579	48%	5,812,516	41%	4,702,504	34%	4,584,096	31%
SECTION C. CCP Use (Tonnes)	Fly Ash	Furnace Bottom Ash	Cenospheres	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)						
C1. Cement/Concrete Products /Grout	1,554,135	91,000	2,182	1,647,317	1,893,613	2,029,563	1,889,991	1,571,495	1,757,379						
C1. Cement/ Raw Feed for Clinker	10,000	0	0	10,000	0	61,174	0	0	0						
C1. Mineral Fillers	0	0	25,000	25,000	10,000	35,879	0	0	30,000						
Category 1	1,564,135	91,000	27,182	1,682,317	66%	1,903,613	79%	2,126,616	73%	1,889,991	77%	1,571,495	71%	1,787,379	79%
C2. Flowable Fill CLSM	0	0	0	0	0	180,715	35,000	22,180	215,000						
C2. Structural Fills/Embankments	106,108	29,705	0	135,813	123,108	95,515	103,505	12,820	227,821						
C2. Road Base/Sub-base	93,384	136,231	0	229,615	115,300	295,899	320,334	476,360	0						
C2. Soil Modification/Stabilization	31,000	0	0	31,000	41,000	0	11,725	10,936	30,000						
C2. Mineral Filler in Asphalt	0	0	0	0	0	0	8,787	8,787	7,209						
C2. Agriculture	0	1,259	0	1,259	600	600	0	0	0						
C2. Aggregate	0	181,000	0	181,000	123,000	20,000	5,708	708	0						
Category 2	230,492	348,195	0	578,687	23%	403,008	17%	592,729	20%	485,059	20%	531,791	24%	480,030	21%
C3. Mining Applications (e.g. Backfill)	153,615	13,364	0	166,979	81,000	166,775	83,000	107,500	275						
C3. Waste Stabilization/Solidification	106,500	0	0	106,500	34,500	15,913	6,446	6,443	8,991						
C3. Miscellaneous/Other	1,500	0	0	1,500	2,000	0	1,500	0	0						
Category 3	261,615	13,364	0	274,979	11%	117,500	5%	182,688	6%	90,946	4%	113,943	5%	9,266	0.4%
Total Use (C1, C2, C3)*(Auto-calc)	2,056,242	452,559	27,182	2,535,983	2,424,121	2,902,033	2,465,996	2,217,229	2,276,675						
SECTION D. Summary Results	Fly Ash	Furnace Bottom Ash	Cenospheres	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)	Combined (Auto-Calc)						
7. Total of All Sold (Auto-Calc)*	2,056,242	452,559	27,182	2,535,983	2,424,121	2,184,018	2,184,018	2,217,229	2,276,675						
6. Total of All Beneficially Used (Auto-Calc)*	5,687,883	665,376	0	6,353,259	5,385,143	6,627,579	5,812,516	4,254,429	4,469,300						

**Table 1 - 2013 CCP Sales and Production Survey<sup>8</sup>**

<sup>8</sup> Data presented in this table is aggregated based on member and non-member responses. Where appropriate for non-members, estimates are given based on published public reports. Coverage of data represents all coal fired power stations.