



**Ash Development
Association of Australia**

Ash Development Association of Australia

Annual Membership Survey Results

January - December 2012

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Membership Survey Results: 2012

The beneficial use of coal combustion products (CCPs) consolidated during 2012 with 5.4 million tonnes 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 2012 are shown in Table 1. From the 12.8 million tonnes of all CCPs produced some 42% of were effectively utilised¹ within various civil and construction applications throughout Australasia. This compares well, given the implementation of Carbon Tax and wide ranging environmental reforms during 2012, with the previous periods of 2011, 2010, 2009 and 2008 with effective utilisation being 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 2012. Information provided by members² and non-members³ 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 fallen from 13.6 million tonnes to 12.8 million tonnes, a reduction of almost 1.0 million tonnes. The major contributing factors are related to; closure/retirement of Swanbank Power Station, short term shutdown of units at Flinders Power (SA) and Eraring Energy (NSW) and shutdown of two (2) operating units at Tarong Power Station (QLD). The net result during 2012 was short term interruptions within the supply chain for cement and concrete users, which highlighted the limited and highly centralised processing and distribution capacity across selected sites.

The principle utilisation end uses continue to be attributable to cement and concrete, structural/civil applications and mining applications such as mine site remediation. Ongoing regulatory reform by the Association is focused on new end use market opportunities. For the traditional cement and concrete sectors, the Australian Government's introduction of a Carbon Tax⁴ on July 1 2012 now places an economic cost on carbon emissions for cement and concrete manufacture. The use of CCPs such as fly ash may significantly contribute to further reducing the carbon footprint of concrete⁵, but only where processing capacity can meet demand.

¹ "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.

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

³ MacGen and Bluewater Power stations.

⁴ <http://www.climatechange.gov.au/government/clean-energy-future/legislation.aspx>

⁵ 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.

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 at 150 million tonnes annually. Extractive resources are generally widespread and remain in adequate supply nationally, however shortages in important large scale markets 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 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. An area of considerable focus within the Association.

Key results

The survey results include all generators⁶, marketers⁷ and users for the total production and resulting sales by each end use. Where required, data was supplemented with importation data and other secondary data⁸ sources for accuracy purposes.

- Approximately 12.8 Mt (million tonnes) of CCPs were produced within Australasia. On a per capita basis, this equates to about 580 kg/person.
- Some 5.4 Mt or 42% 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 250 kg/person recycled or reused.
- Approximately 1.9 Mt or 79% of effectively utilised coal ash was used in high value-added applications such as cementitious binders, concrete manufacture or mineral fillers.
- About 0.52 Mt or 22% 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 2.34 Mt or 18% 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 9.8 Mt are typically placed into onsite storage ponds awaiting some future opportunity for economic reuse.
- More than 35 Mt of CCPs [fly ash] have been used in cementitious applications or concrete manufacture from 1975 to 2012 [37 years].

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

⁶ 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.

⁷ 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].

⁸ Company annual reports and other published data sources.

emissions from the processing of virgin resources, resulting in the reduction of almost 1.5 million tonnes of greenhouse gases or \$35 million of carbon tax offset⁹.

The following table provides more detail for individual category sales of CCPs for the 2012 calendar year.

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⁹ Calculation based on full cost exposure @ \$23/ tonne of CO₂-e.

Ash Development Association of Australia

2012 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)					46,942,358	22.68%	10,647,992							
A2: Sub-bituminous					4,775,050	6.53%	311,675							
A3: Lignite (Brown Coal)					57,409,967	3.19%	1,830,424							
Total Coal Burned (Auto-calc)					109,127,375	11.72%	12,790,091							
SECTION B. CCPs Beneficial Use Calculations (Tonnes)					Fly Ash	Furnace Bottom Ash	Cenospheres	Combined 2012	Combined 2011	Combined 2010	Combined 2009	Combined 2008		
B1. Total Produced (Jan-Dec)					11,391,946	1,394,818	10,567	12,797,331	13,680,219	14,076,233	13,755,682	14,638,323		
B2. Total not used [Stored]					8,698,587	1,048,365	8,526	9,755,479	9,421,266	10,365,700	9,053,178	12,246,852		
Total Production Used (Auto-Calc)					2,693,359	346,453	2,041	3,041,852	4,258,953	3,710,533	4,702,504	2,391,471		
B3. Amounts removed or diverted from storage					2,252,430	90,861	0	2,343,291	2,368,626	2,101,983	2,037,200	2,192,625		
Total of All Used (Auto-Calc)*					4,945,789	437,314	2,041	5,385,143	6,627,579	5,812,516	4,702,504	4,584,096		
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)		
C1. Cement/Concrete Products /Grout					1,841,247	50,184	2,182	1,893,613	2,029,563	1,889,991	1,571,495	1,757,379		
C1. Cement/ Raw Feed for Clinker					0	0	0	0	61,174	0	0	0		
C1. Mineral Fillers					10,000	0	0	10,000	35,879	0	0	30,000		
Category 1					1,851,247	50,184	2,182	1,903,613	2,126,616	1,889,991	1,571,495	1,787,379		
C2. Flowable Fill CLSM					0	0	0	0	180,715	35,000	22,180	215,000		
C2. Structural Fills/Embankments					106,108	17,000	0	123,108	95,515	103,505	12,820	227,821		
C2. Road Base/Sub-base					113,300	2,000	0	115,300	295,899	320,334	476,360	0		
C2. Soil Modification/Stabilization					41,000	0	0	41,000	0	11,725	10,936	30,000		
C2. Mineral Filler in Asphalt					0	0	0	0	0	8,787	8,787	7,209		
C2. Agriculture					0	600	0	600	600	0	0	0		
C2. Aggregate					0	123,000	0	123,000	20,000	5,708	708	0		
Category 2					260,408	142,600	0	403,008	592,729	485,059	531,791	480,030		
C3. Mining Applications (e.g. Backfill)					62,000	19,000	0	81,000	166,775	83,000	107,500	275		
C3. Waste Stabilization/Solidification					34,500	0	0	34,500	15,913	6,446	6,443	8,991		
C3. Miscellaneous/Other					0	2,000	0	2,000	0	2,000	0	0		
Category 3					96,500	21,000	0	117,500	182,688	91,446	113,943	9,266		
Total Use (C1, C2, C3)*(Auto-calc)					2,208,155	213,784	2,182	2,424,121	2,902,033	2,466,496	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)		
7. Total of All Sold (Auto-Calc)*					2,208,155	213,784	2,182	2,424,121	2,426,303	2,426,303	2,217,229	2,276,675		
6. Total of All Beneficially Used (Auto-Calc)*					4,945,789	437,314	2,041	5,385,143	6,627,579	5,812,516	4,254,429	4,469,300		

Table 1 - 2012 CCP Sales and Production Survey¹⁰

¹⁰ 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.