Case study: CCP's lowering Greenhouse Gas emissions for Australia

Craig Heidrich[1], Dr Ihor Hinczak[2], Bridget Ryan[3]

[1]Ash Development Association of Australia, PO BOX 1194, Wollongong, NSW 2500, Australia, e:adaa@adaa.asn.au w:www.adaa.asn.au, [2]Cementech Pty Ltd PO BOX 362, Liverpool NSW 2170, e:ihorh@ozemail.com.au p: (02) 9823-9761. [3]Energy Supply Association of Australia, GPO Box 1823Q Melbourne Vic 3001, e:bridget.ryan@esaa.com.au p: (03) 9670-0188

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Abstract

Under the Kyoto Accounting rules, Australia's National Greenhouse Gas Inventory Report emissions for 2002 was 550.1 Mt carbon dioxide equivalent (CO_2-e) being a net increase of 1.3% on the 1990 levels. This increase is largely attributed to the stationary energy, transport and industrial process sectors, offset with reductions from reduced land clearing.

For the construction sector significant opportunities exist via re-using mineral resources like coal combustion products such as fly ash used in cement and concrete manufacture. In Australia, the manufacture of one tonne of cement results in the emission of approximately 0.79 tonne of CO_2-e or annually 6.1 Mt of CO_2-e emitted for total cement sales.

Using data collected from member companies, life cycle analysis was conducted to demonstrate the reduced embodied energy and CO_2-e signature for one cubic meter of concrete containing 30% fly ash of the binder. From the resultant data a simple CO_2-e estimator was developed to assist architects and designers in understanding and constructing eco friendly structures.

For the construction of a domestic dwelling (four bedroom home) using approximately 130m^3 of 25 MPa concrete containing binder ratios of 70% Portland cement and 30% fly ash, the total savings in CO_2-e emissions was 13.04 tonnes, or equivalent to emissions from a four-cylinder car for 4.35 years.

The paper will briefly discuss Australia's current National Greenhouse Gas Inventory Report in the context of how increased coal combustion product re-use in the construction sector can further lower greenhouse gas emissions.

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