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Draft changes to greenhouse reporting methods

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Suggested changes to the National Greenhouse and Energy Reporting (NGER) (Measurement) Determination could affect the landfill industry. The Department of Climate Change and Energy Efficiency's (DCCEE) recently released response paper and exposure draft suggest an update to estimation Method 1 and Method 2 for solid waste disposal; and development of a method for the estimation of emissions from solid waste disposal using Method 4.

The NGER Act, NGER Regulations and NGER (Measurement) Determination 2008 were the result of comprehensive consultation with business and other stakeholders between May 2005 and June 2008. Since its implementation the DCCEE continues to work with industry on improvement of NGER estimation methods.

Under the Act, landfills which emit more than 25,000 tonnes of CO2 equivalent are required to monitor and report their emissions. Max Spedding from the Australian Landfill Owners Association (ALOA) said this probably relates to around 70 landfills, those which accept over 50,000 tonners of waste per year.

In August 2010 the DCCEE released a discussion paper for comment as part of a review of the NGER (Measurement) Determination 2008. The review aims to update the Determination in light of technical and methodological developments. Feedback from stakeholders was sought through a submission process between August and October 2010.

Under NGERS, available methods for the estimation of methane emissions from landfills include Method 1 and Methods 2 and 3.

Method 1 is derived from a first order decay model set out in the IPCC guidelines and used in the Australian national inventory. It requires data on the tonnages of waste delivered to the landfill over the lifetime of the landfill. Conversion of this activity data into methane generated at the site depends on a number of variables.

Default values may be adopted for these parameters in the calculation and include:
. The mix of waste types delivered to the landfill (which varies from state to state according to national inventory data);
. The organic carbon content of the waste types (DOC – which is waste type specific);
. The fraction of the carbon that degrades under anaerobic conditions (DOCf – 0.5);
. The rate of degradation (k – which is waste type and state-specific);
. The fraction of landfill gas that is methane (F – assumed to be 0.5).

Method 2 for solid waste disposal permits operators of landfills to make measurements of methane generation at their facility in order to determine a facility-specific estimate of the rate of decay, 'k', at the landfill. The facility-specific value of 'k' changes over time the profile of methane emissions but does not change the total amount of emissions from a site.

"Basically what it says is that they will change the individual decomposition figures for various waste types," said Spedding of the exposure draft.

The Department proposes to amend the DOCf values, as laid out in the discussion paper, in the Determination based on the values used in the 2008 Inventory with amendments taking effect in the 2011/12 reporting year.

For wood products, the national inventory reports a value of 0.23 to apply to all wood deposited in landfills in Australia; for the paper and cardboard waste mix it utilises a weighted average DOCf value of 0.49. For garden and park waste a DOCf value of 0.47 is used; and for the remaining waste categories in the inventory the IPCC default value of 0.5 has been retained.

This means the weighted average DOCf value for Australian landfills for waste deposited in 2008 is 0.52.

Also chair of the national landfill division of the Waste Management Association of Australia (WMAA), Spedding said the changes have been agreed with industry and are very welcome.

"While we're pleased with the changes we believe that they will help significantly in getting a better a national inventory figure for the government, there are still some outstanding issues related to Method 1…it's subject to ongoing discussions between industry and the department".

These discussions relate to DOCf figures for several minor waste types including rubber, plastics, nappies and leather.

"They are a small component, maybe two or three per cent of the waste stream, so they don't have a significant impact but there is still work to be done," said Spedding.

From the landfill owners' point of view, they are pleased that some progress has been made on Method 1 but insist it is not suitable for application to individual landfills with an error factor claimed of plus 30% to minus 200%.

"What it means is if we use Method 1 on an individual landfill basis we either get an inflated figure or we get an underestimated figure," said Spedding.

"The NGERS may form the basis of a carbon tax, ALOA's position is that it's totally inappropriate to use the first order decay method for individual and the government should not be…using this information to determine carbon liability for individual landfills."

Blue Environment Consulting undertook a qualitative assessment of the currently available direct measurement techniques for the DCCEE. The firm's director, Dr Joe Picken, said, "In relation to NGERS Method 1, the current model probably overestimates emissions on average. But that's as it should be – from a social perspective the cost of uncertainty should be borne wholly by the emitter who is, after all, in competition with waste management options that are able to offer higher levels of certainty in relation to their emissions."

However, he said there are some perverse incentives in the current NGERS approach. "For example, it provides no incentive to adopt techniques that have been shown to increase oxidation of methane prior to emission, and in some cases it sets a disincentive to increase the efficiency of methane collection."

"The government has a program of incremental improvement to the NGERS Method 1, and I reckon that's probably the best bet for now," said Dr Picken, "The next thing to look at would be the default 'k' values, which are set by the IPCC based on climate type and are a bit of a joke in the Australian context. Linking 'k' values with recorded rainfall, leachate recirculation or even landfill moisture content readings would be good, and could probably be done by comparing model results with methane collection rates".

Dr Picken said for any method to become useful in a regulatory setting the government would need to be comfortable with:
. the measurement technique generally
. the use of the technique on a particular occasion (taking into account operator competence, instrument calibration etc)
. the modelling used to extrapolate from the measurement to obtain an estimate of emissions from the whole site (since all measurement methods obtain only a sample in particular locations)
. the modelling used to extrapolate from the estimate of emissions from the whole site at that particular time to emissions over the whole year.

"There's uncertainty in relation to all four of these and no straightforward way of checking overall accuracy," he said, "Research is needed in which different methods are used simultaneously and the results compared".

There is currently no Method 4 option for landfills in the Determination. However, there is a commitment in the Technical Guidelines to work towards the inclusion of a method 4 framework for solid waste.

"In my opinion, the approach with the most potential for a NGERS Method 4 is surface concentration measurement. This involves trailing a portable measurement device over the landfill and extrapolating using a Gaussian model," said Dr Picken.

"It's conceptually simple, relatively cheap, doesn't need offsite measurement, isn't restricted to particular topographies, can cover the whole site and has a bit of history in the US".

The government said Method 4 approaches to the measurement of emissions from landfills remain in the experimental phase and that it will give further consideration to the development of a Method 4

framework in future iterations of the Determination.

The Government is inviting all interested parties to comment on the exposure draft, with submissions due on the Tuesday May 31, 2011.

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