

Making sense of greenhouse gas accounting

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Waste management is increasingly gaining the recognition that it deserves as a major contributor to mitigating climate change. But with at least four different methods of accounting for greenhouse gas (GHG) emissions currently in play, it is vitally important to ensure that all stakeholders are counting emissions accurately and transparently. A study released this week in a special issue of the journal *Waste Management & Research* published by SAGE describes methods currently used to quantify GHG emissions in waste management, and proposes a new framework that enables stakeholders to use consistently and transparently core emission data, which can then be implemented in any accounting procedure.

GHG [accounting](#) has become a major focus within waste management, but due to complex and overlapping methodologies, confusion can and does arise. Emmanuel Gentil and Thomas Christensen from the Technical University of Denmark in Kongens Lyngby, Denmark along with Emmanuelle Aoustin of Veolia Environnement, Paris, France analysed and compared the four main types of GHG accounting in waste management.

The authors have analysed that the four main accounting approaches are based on common technical data from waste technologies and plants. "But the different accounting procedure scopes lead to many ways of quantifying [emissions](#) which is confusing to the waste management industry and wider stakeholders," says Gentil. The different GHG accounting methods include or exclude upstream and downstream processes, depending on their scope. "This naturally leads to different

results, all likely to be fully justifiable," Gentil adds.

One accounting approach is provided by the Intergovernmental Panel on Climate Change (IPCC) guidance documents and focus on the direct operating GHG emissions of landfill and mass burn incinerators. At the corporate level, GHG accounting is part of the annual reporting on environmental issues and social responsibility. While the IPCC accounting is organised around large industrial sectors, the corporate accounting mechanism is focusing on organisational boundaries, using traditional financial accounting procedures. A further approach is life-cycle assessment (LCA), as an environmental basis for assessing waste management systems and technologies, which aims at including upstream, operating and downstream environmental effects. Finally, the carbon trading methodology, and more specifically, the clean development mechanism (CDM) methodology, were introduced to support cost-effective reduction in GHG emissions for specific projects, such as landfill gas recovery. This approach aims at assessing the saved emissions due to the project compared to emissions that would have occurred without the implementation of the project.

Due to limited data availability and the different scopes of each accounting model, GHG emissions calculations can lead to different results, which taken out of their context, could lead to erroneous decisions. The authors reinforce the importance of transparency in GHG accounting when it comes to waste type, waste composition, time period considered, GHGs included, global warming potential (GWP) assigned to the GHGs, carbon cycle within waste management, choice of system boundaries, interactions with energy and other industrial systems, and the use of generic emissions factors.

In order to enhance transparency and consistency, Gentil and colleagues propose a format called the upstream-operating-downstream framework (UOD). This framework is to report basic or core technology-related

data regarding GHG emissions. It shows a clear distinction between direct operating emissions from waste management technologies (e.g. landfill gas), indirect upstream (e.g. emissions from electricity use) and indirect downstream activities (e.g. recycling of scrap metals).

This framework may go some way to meeting one need identified in the International Solid Waste Association (ISWA) Waste & Climate White Paper, due for publication in December 2009. This paper calls for a method that would allow researchers to capture the complete scope of waste activities to yield better recognition of the sector's important GHG reduction and avoidance potential from downstream GHG savings.

"Efforts to improve the quantification and reporting should be continued in order to reduce the uncertainty of emission estimation at the various levels and to harmonize the approaches using common core set of emission data," according to the ISWA white paper. For many stakeholders, this harmonization will be a welcome and timely step towards more comprehensive GHG accounting in order to support better and more sustainable decision making processes.

More information: [Greenhouse gas](#) accounting and waste management by Emmanuel Gentil, Thomas H. Christensen and Emmanuelle Aoustin is published this week in a special issue of Waste Management & Research, published by SAGE. The article will be free for a limited period at wmr.sagepub.com/cgi/reprint/27/9/850

Read the editorial by Jens Aage Hansen on the importance of this special issue, also free online at wmr.sagepub.com/cgi/reprint/27/9/837

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