ISA/CenSA Information Sheet 20

Calculating Scope 3 GHG Emissions Using Optimum Hybrid Analysis (OHA)

Introduction

This information sheet outlines three methods for the calculation of Scope 3 emissions. These three methods can be used in combination to provide the highest degree of *comprehensiveness* and *specificity* in calculating the Scope 3 emissions from any business activity. The terms *comprehensiveness* and *specificity* are used rather than *accuracy* to express the attention to both **completeness** and **detail**. *Accuracy* is often mistaken for *precision* and can be misleading. The best approach approach for estimating the emissions involved with a particular business activity is likely to be a combination of methods that together provide the most complete coverage and the highest level of detail and specificity. However for each business activity the weighting of methods within the combination is likely to be different.

The three methods are:

- Environmentally Extended Input-Output Analysis (EEIOA) offering complete coverage but not including process or specific supplier data;
- Process (life-cycle) Analysis (PA) using existing databases, providing detailed (but secondary) information on GHG emissions by process; and
- Primary Data Collection (PDC), providing original and specific information to the organization and its supply chain.

Environmentally Extended Input-Output Analysis (EEIOA) is the method of allocating GHG emissions associated with upstream production processes to groups of finished products using inter-industry economic transactions. Like following the flow of money from production to consumption, EEIOA yields the flow of environmental footprints along supply and production chains. As each step adds an environmental burden, the result is a life-cycle inventory of impacts of production and consumption, e.g. carbon footprints of companies. The main data sources are sectoral economic National Accounts and Environmental Accounts produced by national statistical offices. The crucial advantage of EEIOA is the comprehensive coverage of all supply chain emissions according to sector averages, though it does not include detailed data for each process employed by the organization[1].

[1] For more information on input-output analysis see ISA Information sheets: 2, 3, 13, 16, 17 and particularly 18. See also Murray, J. & Wood, R. (Eds) (2010). *A Sustainability Practitioner's Guide to Input-Output Analysis*. CommonGround: Illinois (http://onsustainability.com/2010/06/18/the-sustainability-practitioner's-guide-to-input-output-analysis/).

Process Analysis (PA) is a quantitative approach to assess a product's impact on the environment throughout its life by mapping and evaluating salient processes. It mostly uses secondary data from existing life cycle inventories and is usually employed in Life Cycle Assessment (LCA) studies. PA-LCA attempts to quantify the environmental impacts arising from all stages of a product life cycle from 'cradle to grave', including impacts associated with materials extraction, product manufacture and assembly, distribution, use, recycling, and disposal. LCA applications are governed by the ISO 14040 series of standards. The advantage of PA is its detail and specificity to the actual physical processes involved with supply and production chains. However, the necessity of setting boundaries for the analysis often leads to significant truncation errors[2].

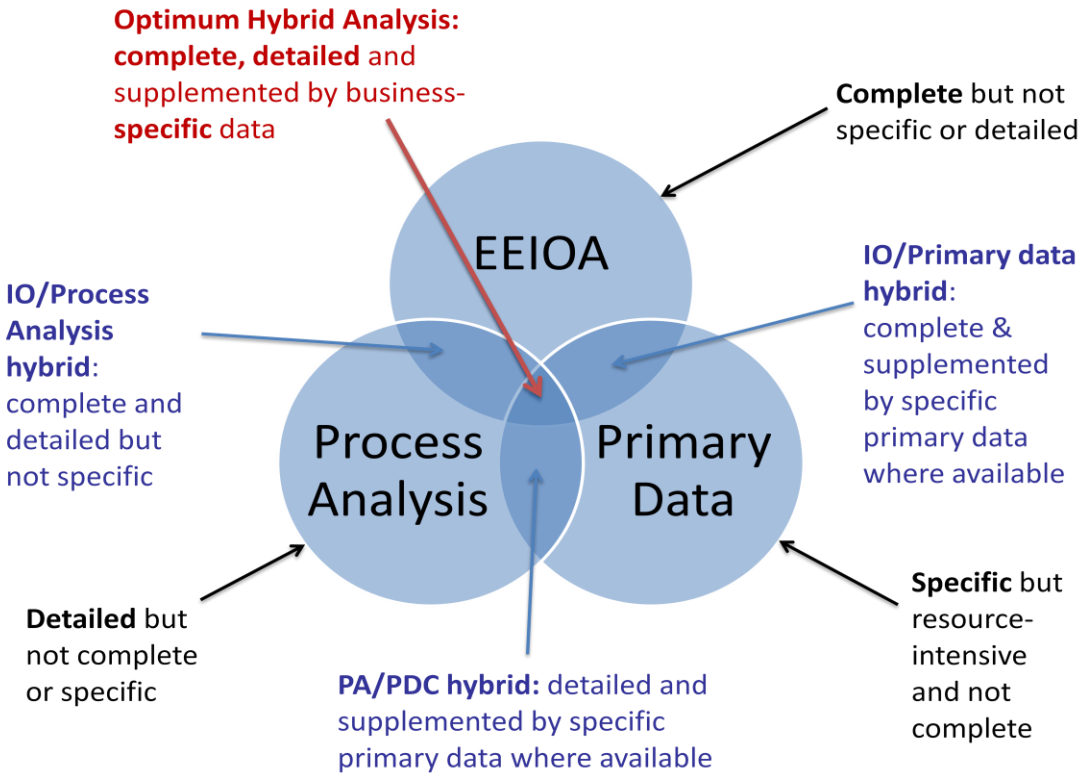
Primary Data Collection (PDC) involves the gathering of original and specific information by surveying, reviewing, monitoring, measuring, analyzing, investigating or inspecting energy use and emissions of the organization and its suppliers. Whilst this is the most precise and specific method, it is also the one that requires most time and resources and can never ensure complete coverage, for both practical and theoretical reasons. PDC requires the employment of one (EEIOA) or both of the other two methods to be complete.

High-quality organizational Scope 3 accounting involves combining the three methods to various degrees depending on the *comprehensiveness* and *specificity* to be achieved.

The characteristics of the three methods and the benefits of combining them are depicted in Figure 1.

[2] For more information on, and examples of use of, life cycle inventories in combination with input-output analysis see Murray, J. & Wood, R. (Eds) (2010). *A Sustainability Practitioner's Guide to Input-Output Analysis*. CommonGround: Illinois.

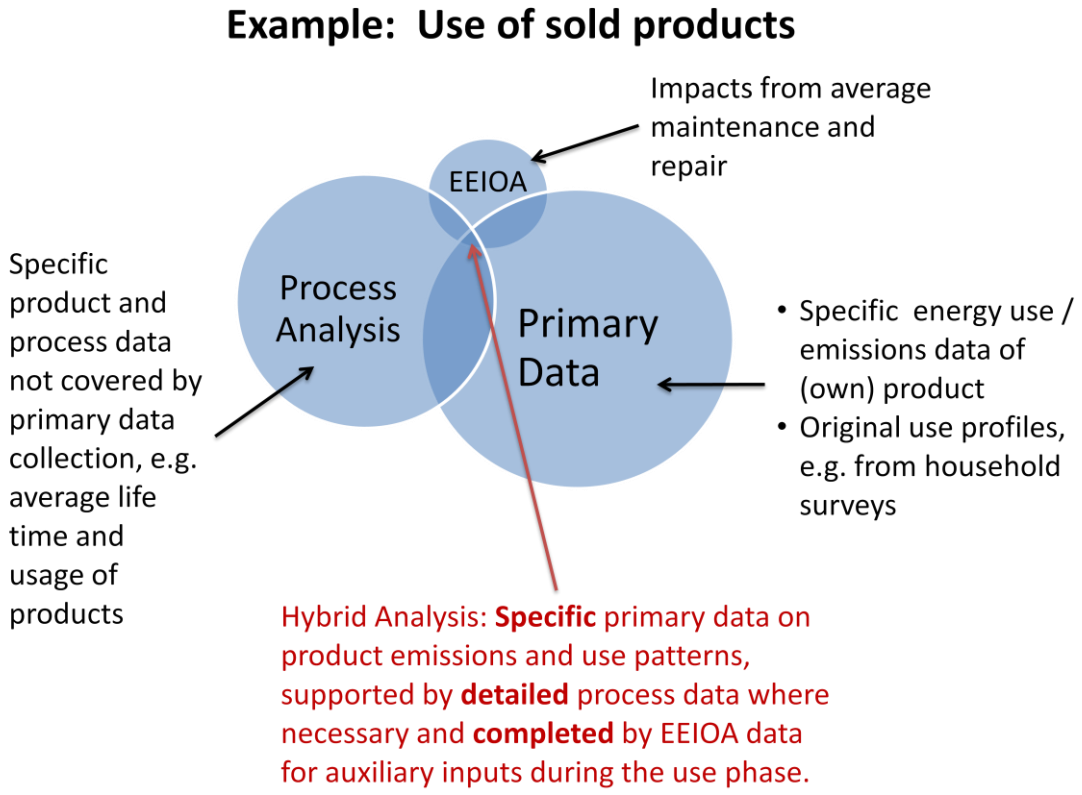
Figure 1: Three methods working in combination to provide the optimum hybrid analysis.



A combination of EEIOA, PA and PDC is referred to as **Optimum Hybrid Analysis**. It aims to combine the specificity of primary and secondary process data with the comprehensiveness of input-output analysis. There are several possibilities for this combination, but in all cases specific data on individual processes – most preferably primary data – are connected with data from an input-output model.

The optimum combination of methods taking into account availability of data and tools as well as cost and required expertise will mean that a different weighting will be given to each method according to the particular analysis to be undertaken (example Figure 2).

Figure 2: Three methods adjusted to show optimum combination for calculating Scope 3 emissions from use of sold products.



Data Sources and Tools

Some LCI emissions data from EEIOA and PA are freely available, e.g. from Defra[3] or www.eiolca.net or PA-LCI data from the European ILCD/ELCD database. Similarly, some tools are also freely available, although most Scope 3/LCA tools are proprietary. A comprehensive database is the Environment Tools directory on www.environmenttools.co.uk.

[3] DEFRA (2009) Guidance on how to measure and report your greenhouse gas emissions. September 2009. UK Department for Environment, Food and Rural Affairs, London. http://www.defra.gov.uk/environment/business/reporting/index.htm.