



Sharing responsibility along the supply chain to eliminate double and multiple-counting in life-cycle analysis of interconnected systems

What's the problem

The setting of organisational boundaries is time consuming. ISO 14044 compliance requires the inclusion of inputs that cumulatively contribute more than a defined amount to the total. A system boundary must be agreed on so that the inputs do not overlap with the inputs to another product or process. If the systems were to overlap then inputs would be counted twice and possibly multiple times. This can happen not only within an organisation but also in a supply chain. If everyone in a supply chain were to conduct a full upstream life cycle analysis then inputs in the supply chain could be counted many times over¹.

Allocating responsibility

The question is: who *should* count, and therefore take responsibility for, the inputs and therefore the effects of doing business.

Is it the producer? *If a gadget is made in China by an American company and exported and used by consumers from Stockholm to Sao Paulo, Brazil, should the Chinese government be held responsible for the carbon released in manufacturing it? (Wall Street Journal. N.Y. Nov 12, 2007. pg. A.2)*

If the Chinese government were to take *full responsibility* this would mean that the *producer* takes responsibility for all the effects of its production.

Is it the consumer? *As China's emissions rise, everyone is pointing the finger of blame at China ... The real responsibility for rising emissions should lie with the final consumers in Europe, North America and the rest of the world. (Wall Street Journal. N.Y. Nov 12, 2007. pg. A.2)*

Full consumer responsibility (the blame-the-buyer approach) means that the final consumer calculates her or his full upstream footprint, accounting for all emissions, land use etc embodied in the goods and services purchased and takes full responsibility for it.

Is it everyone's responsibility? *... emissions are embedded in goods that move around the world through trade - so if the U.S. imports iPods from China, Americans should share some responsibility for the pollution produced in making them (Wall Street Journal. N.Y. Nov 12, 2007. pg. A.2)*

Shared responsibility means that we acknowledge that we're all in this together, we're an integrated system, and we must all take our share of the good and the bad effects of doing business. We're all responsible for creating employment along the supply chain just as we're all responsible for creating greenhouse gas emissions along the supply chain. If we are all responsible then the question now is: how can the responsibility of an individual or an organisation be calculated consistently and fairly.

¹ The Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (WRI/WBCSD 2004) glossary says that double counting refers to the situation when "two or more reporting companies take ownership of the same emissions or reductions" (p. 97). Double or multiple counting occurs when there is overlap between the accounting boundaries of two or more entities. This situation is addressed in the Factors and Methods Workbook (Australian Greenhouse Office 2006), p. 2) for "consumption of **purchased electricity, steam or heat** produced by other organisations" through the definitions of a Scope 2 emissions category. Scopes 1 and 2 are "carefully defined to ensure that two or more organisations do not report the same emissions in the same scope". The ISA methodology (see Info Sheet 1) systematically addresses the issue of double counting. It eliminates double counting by systematically apportioning ownership of *all* embodied emissions along the supply chain. Thus it is not possible for two organisations to report the same emissions, and the need for carefully defining boundaries is eliminated.



Apportioning the effects of doing business along the supply chain – sharing responsibility

Apportioning emissions, or any other impact, along the supply chain has only recently been consistently and quantitatively conceptualised by ISA researchers. Allocating each impact – for example on a 50%-50% basis between the supplier and the recipient – removes double-counting and solves a decades-long problem in Life Cycle Analysis.

ISA's framework allocates a 50:50 split of all impacts, so that they cascade along the supply chain. This means that, for example, the portion of jobs (which could just as easily be greenhouse gas emissions) retained/accepted by your organisation is 50% of the on-site total² plus 50% of your allocation of the upstream impacts embodied in the goods and services that you purchase³. The other 50% gets passed on to your customers, pro-rated according to the amount of goods that each customer purchases.

Why is double counting un-desirable in carbon-accounting?

The notions of carbon neutrality and voluntary offsetting ascribe a value to emissions. If there is no formal system of monitoring and trading this value ownership is ill-defined. In a complex supply chain there is the possibility that emissions reductions can be claimed, and perhaps sold, multiple times, with no real additional outcome other than the original emissions reduction. Offset monitoring and accreditation schemes can go some way to reducing such practices, but full accounting is impossible without tradeable certificates being used. Clarity in offsets and carbon neutrality is most desirable for consumers, who are likely to bear the majority of the costs of reducing carbon emissions in supply chains. Clarity on double counting is therefore required for household (consumer) and business greenhouse accounting.

Further reading

Foran, B., M. Lenzen, et al. (2005). "Balancing Act: a triple bottom line analysis of the Australian economy." Sydney, CSIRO and the University of Sydney.

Foran, B., M. Lenzen, et al. (2005). Integrating sustainable chain management with triple bottom line reporting." *Ecological Economics* 52(2): 143-157

Gallego, B. and M. Lenzen (2005). "A consistent input-output formulation of shared consumer and producer responsibility." *Economic Systems Research* 17(4): 365-391

Hammerschlag, R. and W. Barbour (2003). "Life-cycle assessment and indirect emissions reductions: issues associated with ownership and trading." Seattle, Institute for Lifecycle Environmental Assessment.

Lenzen, M., J. Murray, et al. (2007). "Shared producer and consumer responsibility - theory and practice." *Ecological Economics* 61(1): 27-42.

² In the case of emissions this is the equivalent to the Scope 1 emissions category of the Factors and Methods Workbook (Australian Bureau of Statistics (2006). 2003-04 Household Expenditure Survey - Detailed Expenditure Items. Canberra, Australia, Australian Bureau of Statistics.)

³ In the case of embodied emissions these are proportionally allocated to producer and consumer at every intersection so that when the good or service is purchased by an entity it arrives with its own allocation of the emissions generated by every stage of its production and delivery. In the ISA framework *indirect emissions* covers the Scope 3 category of emissions identified in the Factors and Methods Workbook as well as the Scope 2 emissions caused by the consumption of purchased electricity, steam or heat produced elsewhere (Australian Greenhouse Office 2006). Furthermore, emissions occurring further upstream from Scope 3 are also accounted for.