TWO CASES OF MISLEADING ENVIRONMENTAL DECLARATIONS DUE TO SYSTEM BOUNDARY CHOICES

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Abstract

Environmental Product Declarations (EPDs) on electricity and nitrogen fertiliser are used to illustrate how a declaration or labelling[1] based on data from the current supply chain can be misleading when the production capacity in the supply chain is constrained. Three ways of avoiding such misleading declarations are suggested.

Introduction: The cause of deception

As a specific application of environmental data from the product chain (life cycle data), there is some ambiguity in the way Environmental Product Declarations (EPDs) are viewed by the public and by experts in the field of labelling and declarations. On the one hand, EPDs are seen as declarations of the past environmental impact that the declared product has had up till the point of purchase, and sometimes including the expected use and disposal phases, but not specifically intended to indicate the expected environmental consequences of buying the declared product, in parallel to a declaration of contents, which does not indicate the expected composition of tomorrows product. On the other hand, EPDs are seen as a means for the customer to influence the environmental impacts of the purchased products, which exactly places a requirement on the EPD that it reflects the expected environmental consequences of buying the declared product compared to not buying it.

These two views on EPDs are not necessarily in conflict, since in some cases the environmental impacts from buying an additional unit of a product may be expected to be identical to the past environmental impacts caused by a unit of the same product. Intuitively, this expectation appears justified, since one would expect that buying an additional unit of the declared product would lead to an equivalent increase in production of this product by its immediate supplier, and in the long term an increase in the production capacity in the current supply chain. In many cases this may in fact be the case, and a declaration based on data from the current supply chain can then be regarded as both useful for the customer and beneficial for the environment.

However, two conditions must be fulfilled for the expectation to be true, namely:

- that the production capacity in the supply chain is unconstrained, and
- that the market is not declining

In so far as these two conditions are not fulfilled, the inclusion of data from the current supply chain into the EPD may be seen as deceptive, as they may mislead the customer as to what are the actual consequences of the purchase. The following cases will illustrate the need for requiring the two conditions to be fulfilled before including data from the current supply chain into EPDs. Also, possible ways of avoiding misleading declarations are discussed in the following.

Constraints on production capacity: The case of electricity

In Europe, some sources of electricity, notably hydro power and nuclear power, are subject to either physical or political constraints on their capacity. This implies that the production capacity cannot increase as a result of an increase in demand. An EPD based on current data for these sources of electricity will therefore obviously be an attribution of past environmental impacts rather than a reflection of the consequences of an additional demand. Therefore, such an EPD should be issued with an appropriate warning that it should not be applied in a comparison with EPDs of other sources of electricity in the context of a purchase decision aiming at choosing the electricity source leading to the lowest environmental impact.

In spite of this, EPDs of hydro power are presented to the public without such warnings, in a way that could lead the customer to think that they reflect the environmental consequences of buying the declared electricity. One such example is the EPD of hydro power electricity from the Lule river (SEMC 1999), which is published without any warnings on the limitations of its applicability, and even on a web-site (last visited 2001-08-15), where you can find statements such as: "Environmentally sound procurement is probably one of the most important applications of EPD" and similar statements. Although not explicitly placed as an information for purchase decisions, e.g. in the context of increasing a customers purchase of "green electricity", the way the declarations are presented to the audience lead me to conclude that this use of the declarations is intentional on behalf of the certifying body and/or the enterprise, but even if it is unintentional, this does not change the fact that it is misleading to present the declarations without a specific warning that they should not be used for comparisons with other equivalent products.

That there are other options available is demonstrated by the Swiss naturemade-star label. This label explicitly demands that the additional income from the premium on the labelled electricity is used to increase the environmentally friendly electricity production from renewable sources and to improve the environmental performance of the existing power plants (http://www.naturemade.org/d/zertifizierung). Specifically for hydropower, the label requires (according to Frischknecht 2001) that the additional revenues, about 0.03 EUR per kWh, from selling labelled electricity, are used for (percentages from one specific utility, as example only):

- additional distribution and marketing for labelled electricity, directly & through local utilities (31%),
- a promotional model (Fˆrdermodel), implying that per kWh naturemade-star hydro power, 0.025 kWh new naturemade-star renewable electricity (wind, biomass, photovoltaics) must be sold (47%),
- ecological improvements at the power plant (22%).

This implies that the naturemade-star hydro power is part of a larger scheme of increasing production capacity for renewable electricity, thus avoiding the criticism of misleading labelling.

Besides physical and political constraints as in the above electricity example, constraints may also be found in relation to co-products (see Weidema et al. 1999, Weidema 2001), and the use of allocation procedures (as opposed to system expansion) may therefore lead to similar misleading results as the ones shown in the above case. In fact, capacity constraints on specific raw materials or technologies are such a widespread feature in most supply chains, that the two conditions stated in the introduction are seldom fulfilled for all parts of a product chain. This means that in most cases where EPDs are based exclusively on data from the current supply chain, there is a risk that the declarations may be misleading.

Declining markets: The case of nitrogen fertiliser

In Europe, the market for ammonia is declining, mainly due to political constraints on the use of nitrogen fertiliser for environmental reasons (EFMA s.d.). The variations in environmental effects of ammonia production may be illustrated by the differences in energy consumption per ton of ammonia between a modern combined plant in Western Europe, at 29 GJ/ton (EFMA 2000), and an old plant in Eastern Europe producing at 48 GJ/ton (Patyk & Reinhardt 1997).

Considering an EPD on a nitrogen fertiliser produced on the basis of supplies from the modern plant, the inclusion of environmental data from this immediate supplier would not reflect the environmental consequences of buying the declared product. Since the market is declining, no new capacity is being installed, and the purchase of the declared product therefore does not lead to increase in production capacity for this environmentally preferable product, but rather to postponing the decommissioning of an old plant with poor environmental performance. In fact, the declining market may be seen as a special kind of the constraints on increases in production capacity that we encountered in the electricity example.

Thus, to bring the declaration in accordance with reality, i.e. to reflect the consequences of the purchase of additional nitrogen fertiliser, the EPD would have to include the environmental data for the old Eastern European plants that would actually be affected by the purchase decision.

To avoid this situation, there is another option for the producer of nitrogen fertiliser: To bring the reality in accordance with the declaration. This could be done by creating a separate market for “green” ammonia, i.e. ammonia from modern plants with low energy consumption, etc. If the producer of nitrogen fertiliser placed a requirement on the ammonia supplier(s) to increase the production capacity in proportion to the sale of declared ammonia (somewhat in parallel to the promotional model described above for electricity), the consequences would be that decommissioning of old plants in Eastern Europe would be speeded up, and the declared ammonia would now really be produced on a modern plant, the data for which could then be safely used in the EPD.

Conclusion: How to avoid misleading EPDs

In conclusion, there are three ways to avoid the problem of misleading EPDs due to system boundary choices:

- Issue the declaration with a warning: The EPDs can be issued with a warning that they should not be used for comparisons with other equivalent products. However, this would then not provide any decision support to the customers.
- Bring the declaration in accordance with reality: The EPDs can be produced under the application of system boundaries that reflect the consequences of the purchase decision, i.e. market-based modelling.
- Bring reality in accordance with the declaration: The constraints on production capacity can be overcome, e.g. by creating a separate market for the environmentally preferable products, or by a promotional model (as illustrated by naturemade-star), so that the immediate supplier providing the data for the EPD also becomes the supplier affected by the purchase decision.

References

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