

Communicating monetary values of environmental impacts – case studies related to ISO DIS 14008

Bengt Steen¹, Klas Hallberg², Per Hanarp³, Jacob Lindberg⁴, Ellen Riise⁵, Mia Romare^{3,4}, Tomas Rydberg⁴, Anna Wikström¹,

¹Chalmers University, Gothenburg, Sweden

²AkzoNobel, Gothenburg, Sweden

³Volvo Group

⁴IVL, Swedish Environmental Research Institute, Gothenburg, Sweden

⁵Essity, Gothenburg, Sweden

E-mail contact: bengt.steen@chalmers.se

1. Introduction

Monetary valuation of environmental impacts from human activities is a way of understanding and communicating its societal significance. However, monetary values are easy to accept without knowing the many ways they can be determined and the many perspectives they may represent. ISO TC 207/SC1 has set up a working group to develop a framework standard on monetary valuation of environmental impacts and related aspects (=emissions and use of resources) to increase transparency and its use in environmental management. The standard contains requirements and recommendation on how to document and report information (metadata) about what a monetary value represents and how it is developed.

2. Materials and methods

As a part of the Swedish contribution to the ISO working group, three case studies was made to find out which metadata that had the greatest influence on the ranking of alternatives. The cases represented three choices of ways to produce energyware, one between natural gas and waste wood, one between vehicles using different fuels, and one between different ways for sludge treatment and energy recovery.

We have used the EPS 2015dx method [1] to value emissions and resources and a national Swedish “Price database” used for cost benefit studies [2]. In using these methods we have tried to follow the standard’s requirements and recommendations on documentation and reporting. We have also proposed a relational database format to allow an easy access to the documentation.

3. Results and discussion

The total monetary value of the environmental impacts from natural gas and using the two different valuation methods are shown in figure 1.

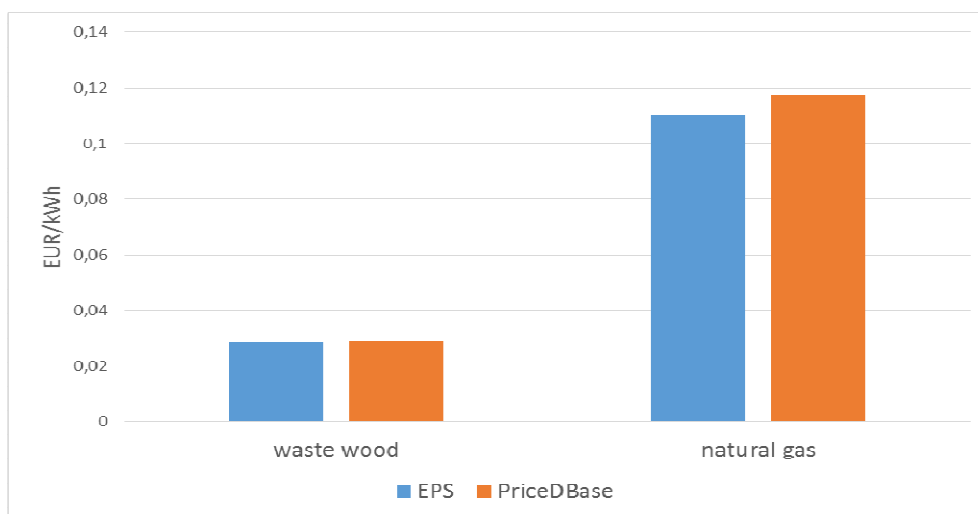


Figure 1: Monetary values of environmental impacts of energy production alternatives

Even if the aggregated monetary values for the two valuation methods are almost the same, they differ with respect to what contributes most. When using the Swedish price database, the aggregated monetary value

is almost entirely due to the social cost of carbon dioxide, which is determined as an average value for short term impacts published in literature. The EPS value is to 42% related to carbon dioxide, which has a lower value and 51% to the resource value of natural gas. The rest is due to other resources.

A more clear difference is found when comparing different fuel alternatives for light weight trucks (figure2).

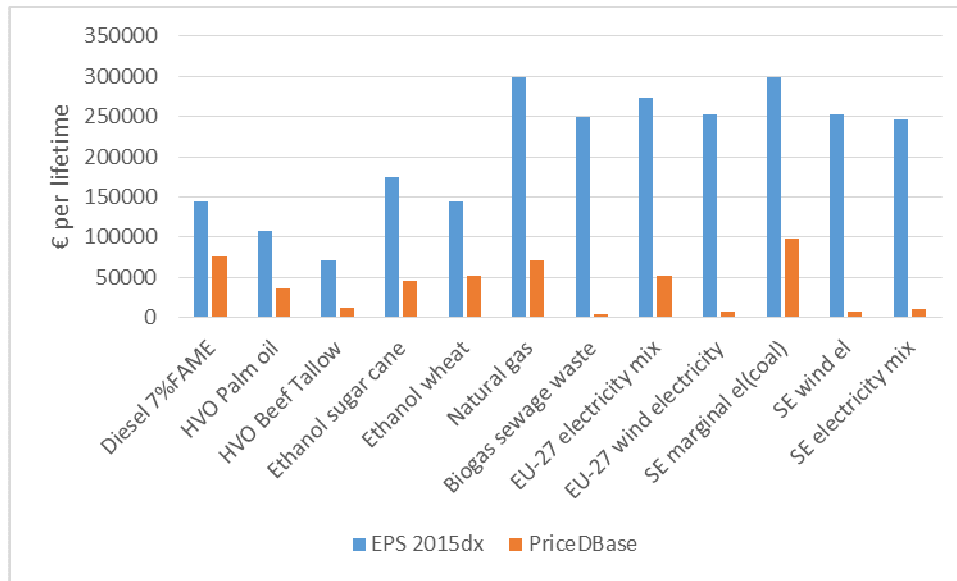


Figure 2 Aggregated lifetime environmental damage cost in € for light weight trucks

When ranking alternatives, the EPS 2015dx method gives the HVO beef tallow oil diesel the best rank, while the price data base gives the biogas from sewage waste alternative the best rank. The main reason is the different system boundaries, i.e. the price data base does not include values of abiotic resources, which are needed for the catalyst in the biogas case.

However system boundaries are not easily described. We propose to use a relational database format for this. Its basic principles are shown in figure 3. The information should be as required and recommended in the coming ISO 14008 standard.

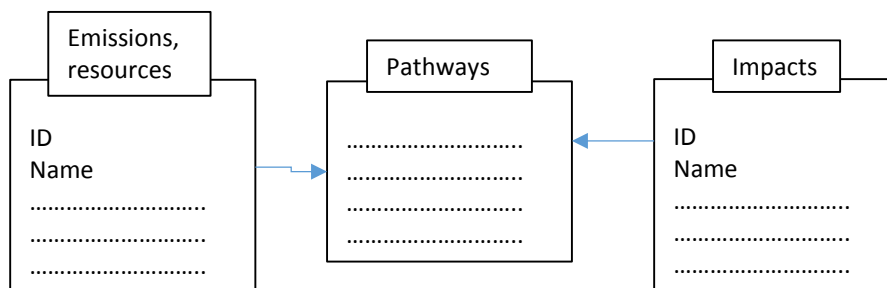


Figure 3 Proposed structure of a relational database for monetary values of environmental impacts

4. Conclusions

The primary cause for different monetary values of environmental impacts from human activities is different system boundaries for activities, impacts and affected people. Many published values lack in transparency and documentation of system boundaries. A relational database will allow better communication of monetary values of environmental impacts.

5. References

[1] Steen, B. Journal of Sustainable Development; Vol. 9, No. 6; 2016
 [2] prisdatabas. The Swedish Environmental protection agency. <http://www.naturvardsverket.se> (in Swedish).

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