

Green Guide to Specification BRE Materials Industry Briefing Note 5: Energy

Purpose of this note

To develop accurate energy models for use in the Environmental Profiles Methodology and to clarify the Methodology in its application to the use of energy.

Background

LCA Models

The current methodology uses LCA models for electricity based on the UK national mix, and LCA models for uses of other fuels which are independent of location. The LCA models were developed by BRE based on data available for UK electricity production, and emissions models produced by NATCEN, and included emissions occurring during resource extraction, fuel refining, storage and distribution. However the models only covered those key emissions which were reported, omitting those for which no data was available.

Very detailed LCA models for electricity production have recently been published based on generation in 2000, and are available at a national and European level. These models have been produced on behalf of the Swiss Government, as part of the Ecolnvent database and cover all resource use and emissions to air, water and land, for all stages of the electricity system, from resource extraction through to distribution of electricity. LCA models for the use of fuels are also available from the Ecolnvent database and are at the same level of detail.

National or Regional Mix

The environmental impacts from the generation of electricity vary depending on what sources are used for generation. As different countries use different sources, so the national models can vary significantly in terms of impact. As materials and products are increasingly manufactured and sourced from across Europe, manufacturers can gain advantage or be disadvantaged through their location because of the electricity mix.

BRE feel that the use of national energy models will become an increasing barrier to trade and therefore feel that it is appropriate to use a European wide energy model within the Environmental Profiles Methodology for manufacturers located within Europe. For manufacturers located elsewhere, eg USA or Asia, energy models on a similar geographical basis will be used where possible.

Proposal

BRE propose to use the energy and electricity models provided in the Ecolnvent Database.

Fuels

- 1 LCA models will be based on the Ecolnvent Database (Swiss Government Funded programme for LCA). This is the latest available data source for the production and distribution of fuels.
- 2 Different profiles are available for various fuels (natural gas, coal, coke, light and heavy oil, wood etc) and for boilers or furnaces, and for different sizes (eg >100 kW) and different technologies (eg modulating/condensing boilers).
- 3 The LCA models include infrastructure (eg building of oil wells and refineries) and supply network (eg building and operation of pipelines) over the lifespan of fuel production.
- 4 The LCA models include all upstream extraction, production and distribution impacts for fuels etc.
- 5 As with the existing methodology, these LCA models can be adapted based on measured or monitored emissions for a specific factory.
- 6 Waste derived fuels – a separate briefing note on the treatment of waste within the Methodology is being produced. Where a manufacturer buys or is given a waste fuel, then the emissions from the use of waste fuels are all allocated to the fuel user. If the manufacturer is paid to take a waste fuel, then the emissions from the use of the fuel and the process are allocated between the waste producer and the manufacturer based on the income received by the manufacturer – for example if they receive 10% of their income from taking waste fuel, and 90% from selling product, then 10% of the process emissions (including waste fuel use) will be allocated back to the waste producer.
- 7 Biofuels – Fuels derived from agriculture or forestry (eg wood, biodiesel, etc) or from organic wastes such as paper or food waste, have sequestered their carbon within the last 100 years. Any emissions of carbon dioxide from these fuels will therefore be returning to the atmosphere without causing any net increase in carbon dioxide over this timescale. As with the existing methodology, emissions of Carbon Dioxide from these biofuels are therefore not considered within the updated Environmental Profiles methodology. Emissions of other global warming gases (eg methane) are however considered as they would result in a net increase in global warming over a 100 year timescale.
- 8 CHP – where CHP plants have been installed, these will also be assessed based on the operation of the particular plant.

Electricity

- 1 LCA models will be based on Ecolnvent Database (Swiss Government Funded programme for LCA). This is the latest available data source for the production and distribution of electricity*.
- 2 The models include impacts from infrastructure (eg building of power stations, wind farms, dams, and supply network (eg pylons and cables)) over lifespan of power production).
- 3 The models include all upstream extraction and production impacts for fuels etc.
- 4 BRE will move to using a European Model based on mix of Western and Central Europe, Nordic, UK and Eire models, based on electricity supplied in 2000. For factories located elsewhere in the world, BRE will try to source an electricity model at a similar geographical level (eg USA).

- 5 Different LCA models for High Voltage (direct supply to some major industries), Medium Voltage (most industry) and Low Voltage Supply (domestic and offices) will be used. Distribution losses increase as voltage lowers.
- 6 Where a company has invested in the construction of a specific power plant from which it takes the majority or all of the supply, then BRE will consider using a specific LCA model for that power plant rather than the European mix.
- 7 Renewable electricity – see note on renewables below.

Renewables

- 1 Biofuels – biomass, wood etc continue to be treated as the existing methodology, with emissions of carbon dioxide being ignored as they do not add to the net amount of carbon dioxide over a 100 year timescale.
- 2 Waste fuels – if an electricity generator buys or is given waste fuel, then all the emissions from that fuel are allocated to the electricity generator. If the generator is paid to take waste fuels, then the emissions from all generation are allocated to the product – electricity and the waste producer based on the income generated from each activity – for example if the generator makes 5% of their income from taking waste, and 95% of their income from selling electricity, then 5% of the impact of generation, including emissions from waste fuel, is allocated to the waste producer.
- 3 Green tariffs – for electricity purchased from true “green tariffs”, ie 100% wind generation, then profile will be based on 100% wind generation using EcoInvent data. Removal of green tariff electricity from the European mix has been ignored as it currently has no statistical significance on the results (only 1% of European electricity users use green tariffs). Tariffs which involve investment in the production of renewable electricity rather than the sourcing of renewable energy will not involve any change to the use of the European electricity model.
- 4 Onsite generation – if a manufacturer has invested in the generation of renewable electricity on site and uses the majority of supply, then the appropriate renewable electricity model will be used for that supply.

* BRE are still checking what allocation method was used by EcoInvent for the co-products of electricity production, namely pulverised fuel ash (PFA), furnace bottom ash (FBA) and flue gas desulphurisation gypsum. A preliminary study by BRE has shown that no significant alteration to the electricity profile is detectable if either allocation by value or system expansion is used.

Action: what we would like from you

We invite your response to our planned approach and welcome your opinion on the proposed update to the Methodology.

The deadline for response is 7 August 2005 and comment should be directed via the CPA-MAG for materials producers, or to greenguide@bre.co.uk. Specific questions on the above should be directed to:

Jane Anderson
01923 664396
andersonj@bre.co.uk