Introduction

Building sector: increasing need to take into account, on a life cycle basis, the environmental impacts of its products. In France: environmental and sanitary statements (“Fiches de Déclarations Environnementales et Sanitaires” (FDE&S)). Environmental part: LCA Knauf Insulation, a glass wool producer for the French market, evaluate the environmental impact of its processes in view of FDE&S realization.

Model (GaBi 5): specific adjustable parameters for assessing the life cycles of all Knauf Insulation products ➔ FDE&S creation or eco-conception.

The process

Raw material extraction (wool)

Natural gas

Electricity

Oxygen

The model

Production Lannemezan ➔ Transport Lannemezan ➔ Application ➔ End of Life ➔ Transport Visé ➔ Production Visé ➔ Production

Life Cycle steps for the FDE&S

2 factories: Liège province (Belgium) and Midi-Pyrénées region (France) working on similar processes

1. Raw materials (recycled glass (cullet), sand, limestone and soda ash, as well as recycled off-cuts from the production process, borax and sodium carbonate) are weighed, mixed and sent to a furnace (1350°C combination of two heating techniques: oxy-combustion and electricity).

2. Forming: the melted mass is fiberized and the binder is added. Special binder with ECOSE Technology (based on plant starch) is used. The wool mattress is then formed and for some products, a glass veil is added on one or both sides.

3. Curing oven: The mattress goes through a natural gas oven at 250°C in order to cure the binder.

4. The curing oven is cut and packed.

The results

1. FDE&S
2. Better understanding of environmental impact through its life-cycle
3. Eco-conception

2: Possibility to use different methodologies and/or impacts categories

Most relevant impacts categories for a standard product for pitched roof application (share of plant A is higher).

2: Other possibilities: going in more details and examining each process or each plan individually or determining which process has the highest impact in a particular category.

Global Warning Potential (GWP – 100 years with CML2001 - Nov. 2010) of a standard product for pitched roof application. Base case (left) – only renewable electricity (wind power) at plant B.

Global Warning Potential (GWP – 100 years with CML2001 - Nov. 2010) of a standard product for pitched roof application. Base case (left) – only renewable electricity (wind power) at plant B (right). Measured in two ways:

- Plant B only (left): the use of wind electricity instead of the country mix partially reduces the GWP. But, the GWP is mostly related to the natural gas combustion and stays high.
- Product made in both plants (right) (share of plant A is higher), the GWP is smaller (plant A uses proportionally less natural gas). Nevertheless, the use of wind electricity in plant B reduces the GWP (even if its production share is smaller, plant B has higher GWP).

Conclusions and perspectives

The proposed model examines the entire life cycle of all glass wool products produced by Knauf Insulation in both plants. From this model, FDE&S, for communication and building design purpose and eco-conception to lower environmental impacts, can be developed. In fact, it allows to show the environmental impacts for the most relevant categories of process modifications such as change in energy supply.