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HOW FRANCE'S BOURGOGNE DISTRICT HAS FOSTERED THE DEVELOPMENT OF LIFE-CYCLE OPTIMIZED BUILDINGS INVOLVING ALL STAKEHOLDERS

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ABSTRACT

Bourgogne district have been working for 5 years to bring LCA into general practice in the building field. They began in 2009 to conduct a substantive work which fitted with current needs at that time: a database of environmental impacts of generic building products for French market. The second step of the project was for Bourgogne district to discuss the method with stakeholders. The outcomes of discussion indicate the need to enter a third step (under way) aiming at improving the database. All data are implemented into e-LICCO, a LCA software used by building professionals. This experience shows how a political decision maker, Bourgogne district, succeeds in fostering the development of life-cycle optimized buildings involving stakeholders in the process.

INTRODUCTION

The Construction sector represents about 40% of the total energy consumed in Europe and has a great potential for improvement. Indeed, energy efficiency strategies can reduce a building's energy consumption by 50% to 70% and buildings can be used to raise the share of renewable energy (Zervos, Lins, & Muth, 2010). In addition, the built environment uses 50% of the materials taken from the Earth's crust. The construction and demolition stages are the source of 25% of all waste generated in Europe.

In light of this, Bourgogne district always tried to contribute to the challenge of reducing environmental impacts of building industry, trying to always be one step forward regulation. In 2008 the building team in Bourgogne district launched a call for projects for very low energy buildings (Marie, 2008). In particular, the call included the requirement for building owners to take care about embodied energy of their building. This call constitutes the first step of Bourgogne district into life cycle thinking. They thus state that there were no independent, complete and liable databases of building materials impacts available on the market. Indeed, reliability of French INIES database (Meur, & Ruzin, 2008), which gather EPDs of building products manufacturers, rely on manufacturers' good faith (only 30% of EPD are reviewed) and other available data are not valid for French context. From then on, the Building department of the district, led by Dominique Marie, has worked at the

elaboration of an environmental database to allow performing reliable LCA during building conception.

METHOD

Conduct a substantive work which fits with actual needs
The 2008 call for projects for very low energy buildings gather up more than 100 building owners, so the year after Bourgogne district chose Cycleco, a Life Cycle Assessment company, to assist them throughout the issue of embodied energy. During two years, Cycleco developed an ecoinvent-based database of embodied energy of building materials and products. The requirements were to make a complete and well documented database of generic products, i.e. independent from manufacturers. Cycleco build up a first version including 220 items and went beyond project terms and developed of prototype of a LCA web application to go with the database.

Discuss the project with stakeholders
In 2011, interest for embodied energy growing, Bourgogne districts consolidated a steering committee of political decision makers, as people belonging to ADEME (French Environment and Energy Management Agency) and other districts in France, for them to give their recommendations about the tool being developed. On the supervision of the steering committee, Cycleco established a Product Category Rules (PCR)-like for LCA of buildings and completed a first version of the web application called e-LICCO (Sié, & Payet, 2012). At that time Regional Delegation of ADEME in Bourgogne decided to be involved and to support the project. Meanwhile, Cycleco keep on working on the database adding 300 new items, and improving the software. Furthermore, building professionals began to use e-LICCO, mainly in the framework of calls for projects lead by districts in France.

Improve what have been done
In 2012 Bourgogne district decided to involve building professionals in the development of the next version of e-LICCO database. Two architects' and three building engineers' teams have been working along with Cycleco since the beginning of last year on the development of an improved version of the database which allows, once implemented into e-LICCO, starting eco-design at the early stages of a building project. It involved in particular aggregation of data to build environmental impact of constructive systems (wall, floors…) and ratios for technical systems and utilities. In addition, constructive system's cost ranges are estimated and displayed to help designer through conception process. The second version of the software will be available in January 2014.

RESULTS

As a result, around 40 building projects have been life cycle assessed with e-LICCO so far.

Building professionals use it:

- to assess grey energy and carbon footprint
- to know environmental burden of construction or renovation in relation to operation (see figure 1)
- to compare variants

- to study eco-design routes

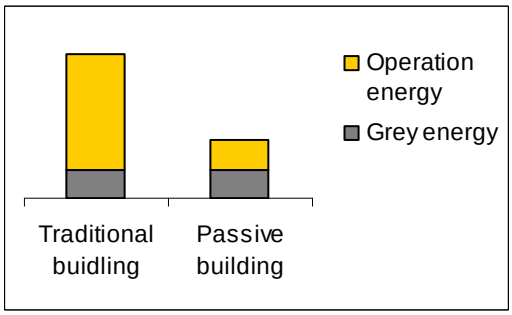

Figure 1. Example of results provided by e-LICCO: comparison of grey impacts and building's operation impacts

Bourgogne district and its partners hope to foster use of LCA for building design with the next version of e-LICCO to be launched in January 2014 and currently under beta test. Using this new version, projects developers can easily and quickly (less than 3 hours) achieve a reliable LCA of their building at the planning stage of their project. They get costs information as a help to design while performing assessment. In addition, ILCD Midpoint impact categories have been added to the set of indicators already in place.

CONCLUSIONS AND PERSPECTIVES

Bourgogne district experience shows how a political decision maker succeeds in fostering the development of life-cycle optimized buildings involving all stakeholders in the process.

Management board of e-LICCO, consisting of of Bourgogne district, Regional Delegation of ADEME in Bourgogne and Cycleco, is currently thinking about actions plan for next years to attract always more and more users and, as a consequence, to get more and more Life Cycle Optimized buildings. This plan includes tasks as: involvement of manufacturers in database elaboration, communication and marketing around the tool, to become closer to environmental certification/labialization schemes, the study BIM (Building Information Model) compatibility…

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