HOW BUSINESS AND ACADEMIA CAN WORK TOGETHER TO PROMOTE SUSTAINABLE MATERIALS: A CASE STUDY FROM CZECH REPUBLIC

Ondřej ŠRÁMEK
Knauf Insulation, Czech Republic, ondrej.sramek@knaufinsulation.com

Julie HODKOVÁ
Faculty of Civil Engineering, CTU in Prague, Czech Republic, julie.hodkova@fsv.cvut.cz

Vladimír KOČÍ
The Institute of Chemical Technology, Prague, Czech Republic,vlad.koci@vscht.cz

Antonín LUPÍŠEK
Faculty of Civil Engineering, CTU in Prague, Czech Republic, antonin.lupisek@fsv.cvut.cz

Summary

The paper introduces the activities of the Czech Green Building Council's working group Sustainable Materials. The Working group actively promotes the need of environmentally friendly production of building materials not only to wide public, but also in close discussions with industry and the leading producers of innovative building products. The paper presents a survey of knowledge of the building sustainability assessment systems and sustainable materials in the market. The survey defines the environment in which the WG started to operate. It also identifies the gaps needed to be filled to bring a significant change to the construction market in the Czech Republic.

Keywords: sustainable material, building product, life cycle assessment, EPD

1 Introduction

The Czech Green Building Council (CZGBC) was established in the fall of 2009 as a trade association of leading companies in the field of sustainable buildings. Its inception was a logical answer to the obvious trend across Europe and the whole world. Today CZGBC has over one hundred members, ranging from small local companies or medium ones to large international corporations including developers, architects and designers, to consultants, construction companies or technology and building materials suppliers. CZGBC is also a member of the World Green Building Council.

The group of manufacturers and suppliers of building materials is relatively strongly represented in the Council and thus a working group Sustainable materials (WG) was created to investigate the situation on the Czech market and develop a strategy for further development in the sustainable construction materials field. From the initial debates it became very clearly apparent that the Group overwhelmingly agrees that the best way to avoid the risk of greenwashing and really track sustainability in building materials is based on life cycle assessment (LCA) as an objective scientific evidence-based method. Environmental Product Declarations (EPD) were then adopted as the best practice in

reporting product sustainability. This holistic approach offers an objective tool for application environmental and Sustainable strategies in practice.

2 Survey of the market for sustainable materials

The survey was conducted among the Council's members to show the global knowledge about sustainable materials issue. There was a relatively balanced mix of all professions represented in the sample (architects, designers, builders, manufacturers, developers, technical equipment suppliers), with slight over-representation of consultants. Out of total 86 respondents 20 % were small, 40 % medium and 40 % large companies. Regional scope was 19 % Czech Republic (CZE) only, 23 % in Central and Eastern Europe, 16 % in all of Europe and remaining 42 % of companies were global.

2.1 Knowledge of building rating tools

In the first section knowledge of building certification schemes, such as LEED, BREEAM, DGNB or SBToolCZ has been gauged. This was done on the assumption that these rating tools are fairly well known on the market already. The results were quite surprising, because material manufacturers displayed the worst knowledge than all other groups. While on average about one third of respondents said they know building rating tools very well and deal with them daily, only less than 8 % of material manufacturers said that.

In the next question respondents were asked whether materials are weighted sufficiently in the building rating tools. About half of the respondents said it's weighted sufficiently, about 20 % would like more weight to materials (the biggest part of those were the manufacturers themselves) and the rest did not have an opinion.

What was shocking, however, was the question What should be the weight of materials? All groups put very high figures, trumped by architects followed by builders, who wanted on average 42 % (or 34 %) weight in the total building assessment, while in reality we know different rating tools typically assign about 5–10 % in the total score. Interestingly, material manufacturers were the most modest here, at mere 20 %.

2.2 Knowledge of LCA/EPD

In the second part participants were asked about LCA and EPDs in a similar structure to the previous question on building rating tools. It turned out the knowledge in this area was significantly worse than in building rating tools, as the comparative chart below demonstrates. The proportion of confident users dropped from 34 % to 13 % and while for building rating tools the most common answer was "I know fairly well", for LCA it was "I heard something but need to learn more", see Figure 1.

In the last question respondents were asked to assess the importance of LCA today and in the future. 14 % thought it is already an important topic today and the remaining 86 % thought it was not yet as important, but believed it would become soon. Interestingly, nobody answered that LCA would be unimportant ("a bubble that will come and go").

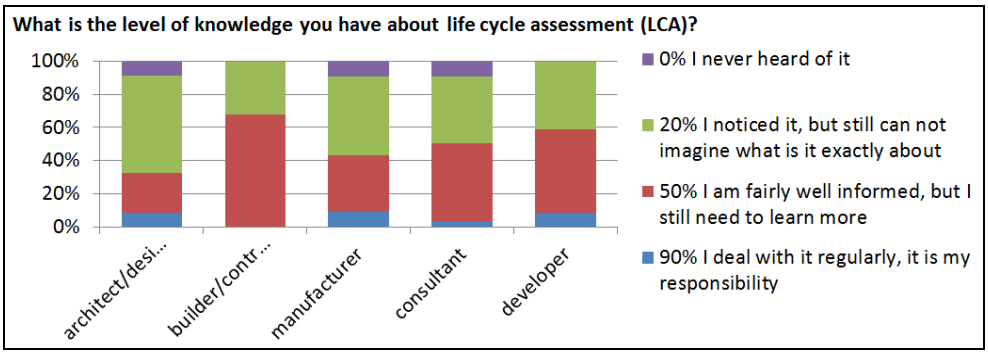

Fig. 1 *Knowledge of LCA/EPD of the survey participants*

3 Visit the manufacturing plants

There are several manufacturers in the WG that are working on EPDs of their products. The WG thus organized four field trips to four different production plants where modern construction products are produced and LCA is currently realized. The selected production plants represented a good mix of different construction product types: thermal mineral insulation, burnt clay bricks, flat glass and portland cement.

Mineral insulation plant visited is located in Krupka, CZE. It belongs to Knauf Insulation. The plant producing flat glass belongs to AGC Flat Glass and is operated in Teplice, CZE. The company is currently cooperating on LCA of flat glass production. AGC Glass also uses the Cradle-to-Cradle certification as an alternative to EPD. The plant producing burnt bricks is a part of Heluz Corporation in Hevlín, CZE. The fourth technology plant visited was portland cement plant in Radotín, CZE.

4 Make environmental data available

The building sector in other European countries began to look for environmental parameters of construction products much earlier than the Czech Republic. Their need was answered by the development of several databases of LCA data. However, such databases are usually created in national context – in most cases they include data about products sold on the national markets or contain only generic data for building materials. These data are not always representative for the Czech conditions, mostly because of the different energy mix and technologies used. Therefore, as the Czech building sector starts to care more about environmental parameters of construction products, the need for a Czech database, which would provide representative data of real products actually used in Czech buildings, became apparent.

Such a database was prepared by the Faculty of Civil Engineering of the Czech Technical University in Prague as a part of project Envimat. In the future, the database should contain only EPDs of building products of the Czech market. However, the database was not the only goal of the project Envimat. Another important goal was to provide information about LCA, EPD and impacts of the building materials on the environment and to allow the designers, developers, students and building certification assessors to model complete building structures and compare alternatives (with the same chosen functional unit) according to their environmental profiles. This comparison can then lead to a choice of the most environmentally friendly construction.

Envimat is linked to SBToolCZ, which is the Czech certification system for sustainability of buildings. That is why the next step of the project will be to create an interface for environmental assessment of the whole buildings.

Another major obstacle to spreading LCAs and EPDs more was the absence of the Czech EPD program operator, which would cover this issue and spread it among the construction sector stakeholders. Czech companies had to use services of EPD operators in other countries, which was often prohibitively expensive. As a result, the Center for Environmental Declarations (CENDEC) was established in March 2012 as the EPD operator for the Czech Republic. CENDEC comprises experts in LCA and EPD, experts from universities, certification bodies, manufacturers, unions and industry associations. The aim of the association is to operate EPDs in the Czech Republic and expand the use of the concept of life cycles in the evaluation of the impacts of human activities.

5 Conclusion

The survey revealed not much is happening yet in the area of sustainable materials and LCA. The level of understanding is fairly basic. However, expectations are that in the future it will become very important. In mature markets a move toward more sustainable materials is a clear trend that is likely to come to the Czech Republic sooner or later as well. Also knowing the exponential growth the building rating tools witnessed in the last couple of years, it can be safely assumed LCA will become more important, especially as various rating tools start acknowledging LCAs more.

Unfortunately, at the moment there are still very few EPDs available for the building products in the Czech market – although most of the members of the CZGBC WG try to remedy that. This obviously makes it difficult for the market to move faster forward toward using more sustainable materials. One of the main reasons remains poor knowledge of the LCA and EPDs in the construction sector.

Like many other Eastern European markets, The Czech market is still very immature in terms of sustainability of materials. But the situation in Green Buildings was very similar just a few years ago and yet, we witness an exponential boom today.

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References

[1] *FCE CTU in Prague. První český katalog stavebních produktů a dopadů jejich výroby na životní prostředí – Envimat.* Envimat.cz. [Online] 2010. [Citace: 30. 1. 2013.] http://envimat.cz/.

[2] Ecoinvent. Ecoinvent database. [Online] [Citace: 1. 11 2012.] http://ecoinvent.ch.

[3] CENDEC. Centrum environmentálních prohlášení CENDEC. CENDEC. [Online] 2013. [Citace: 30. 1. 2013.] http://www.cendec.cz/.