

TEST BEDS FOR DEVELOPING A CIRCULAR ECONOMY RELATED TO THE WOOD BUILDING INDUSTRY

Test beds are often seen as a vehicle to develop something new and innovative. With that in mind partners in the project Circular Economy – A Game Changer for the Wood Building Industry, an Interreg, Botnia-Atlantica project, participated in meetings and visited seven different Circular Economy (CE)-initiatives/test beds in the Netherlands and Denmark.

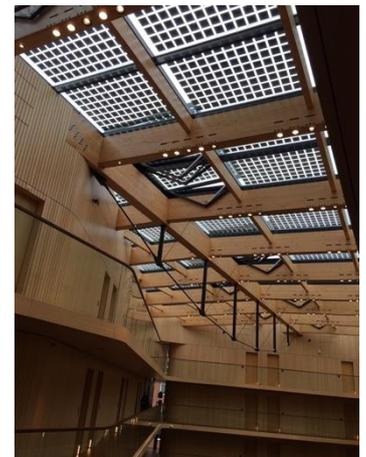
The first visited project consists really of a number of construction projects, labs and studios related to circular economy in Buiksloterham, Amsterdam, (please see photo to the right, “A map of the area of Buiksloterham”, located to the northwest of the city center of Amsterdam). A first reflection, that struck most of the



participants was the enthusiasm among the people involved in the various projects. And, the willingness to engage into, share knowledge and develop the ideas included in the various projects. Engagement proved to be a recurrent feature also in the coming projects. The active participation and high degree of involvement created a sense of importance and thrill to the projects.



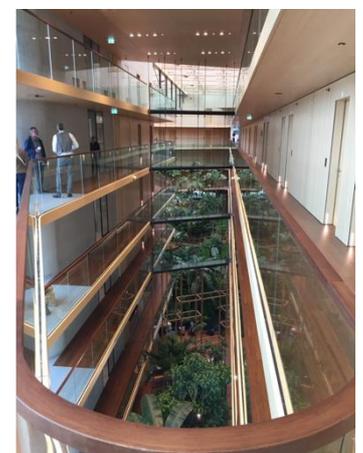
The second project was a brand-new hotel, inaugurated in the summer of 2018, built primarily in wood with a clear focus on sustainability, located on an island in the river IJ, at the center of Amsterdam. The hotel was not only built primarily in wood it also included a number of other sustainable features, for example, adapted ventilation and a roof covered with photovoltaic system (see photo to the right, ceiling in the hotel, from beneath and the open space in the center of the hotel). One insight from this project was importance of planning before the start of the project. All projects need to be planned but implementing new technology needs more careful planning.



At Delft University of Technology, the Netherlands, we visited both the GreenVillage, (see photo below to the left). It is striking how many types of different types of test beds, labs, living labs, green labs, etc there are. Most of them with the purpose to demonstrate and test a certain function, product, etc. Sustainability work, at for example some these labs, can sometimes (often) be perceived as quite reactive. Authorities and / or customers, clients, etc. make demands. Or the market changes, and players will start controlling production,



etc. to keep up. A more appealing perspective would be to participate in a more pro-active work. It means leading the development and showing the way. This roadmap could then provide the basis for how regulations, etc. should or could develop. Considerable amounts of research funds have gone to test beds. It is about demonstrating new concepts based on new technology. The new technology may be known but not tested. It is, of course, commendable and must



continue, but rarely new knowledge and new innovations are created from a this type of test bed. What is often lacking are "innovation-beds". It could be a platform, maybe physical, in shape or perhaps in the form of a cluster of partners who, with common forces, identify missing pieces, that need to be developed. A Think Tank or something more forward looking could fill such a function.

While in Delft and close to the Green Village, we visited the T.N.O. (cf RISE, Rise Institutes of Sweden, in Sweden). Once again, it was impressive how they welcomed us and let us take part of their projects, research and findings. Alternatively expressed, there was a clear willingness to share knowledge and experience.

At Groningen, also the Netherlands, we visited the Energy Barn (photo below to the left), a space for testing



materials, and the EnTranCe area, including a number of small test sites for example a site for testing the Pyrolysis technique, thermal decomposition of mixed plastic fractions (photo to the right). This site has also a sister site with additional related activities and projects, some related to the more maritime theme in the province of Friesland, on the islands north of Groningen.



In Skive, Denmark, we studied building cooperation platforms to develop and implement circular economy at a local level, more specifically the Circularity City Project and the 5 business models (below to the right) that they had successfully employed to different degree, those are: (i) circular supply – to replace virgin raw materials with materials that are renewable or bio-degradable, (ii) through resource recovery – recover discarded products or by-products to recycle or upcycle the materials, (iii) through life extension – to extend the life cycle of a product, or parts of a product, while preserving the original function, (iv) with the help of sharing platforms – to increase the use of a products through new models for sharing, accessibility, and ownership, and (v) by product as service – to optimize productivity of a resources or product while maintaining ownership of the product. A learning point from this visit was the need for different models and combinations of models.



In the vicinity of Skive centre another lab was introduced to us. This lab, the GreenLab (see below, fields being filled with large scale test beds) – a full-scale business park and platform for integrated energy, intelligent grid and sustainable production. It is an ambitious project and certainly integrated with its surrounding, including projects related to analytics, ai, iot, green products, energy storage etc. This visit proved the importance and need of scaling up project, letting professionals interact in real scenarios.



The final, the seventh, project was very much different compared to the above-mentioned projects, a renovation project, Fabers fabrikker, in Ryslinge Denmark. The hallmark of this project is the modular system implemented in a building heritage, transforming an old factory into affordable housing and all the concerns that need to be addressed, cultural, technical, economical, etc.

Individual members of the group also visited other specific projects related to their specific interests in the project, for example (i) Upcycle Studios in the Örestad South district of Copenhagen, where 75 percent of the windows are re-used windows from previous buildings, (ii) The Resource Rows, in Copenhagen, built with amongst else re-used bricks, cut out in modules and stacked upon each other forming interesting patterns on the façade. The building is also constructed of recycled wood-based material from the Copenhagen Metro construction.



Thus, the above study visits brought along a number of insights for example, the effect of engagement, (excessive) need of planning, one model or solution is seldom enough and often requiring a combination of different solutions that need to work together, be realistic, acknowledge the difficulties and the different dimensions of projects and test beds.

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