BUILDING THE FUTURE 2020

Boosting innovation in the construction industry

Questions & Answers

Further questions? Please contact kiessling@bayfor.org

Keynote: Horizon Europe and Green Deal – opportunities for the building sector

Eleftherios Bourdakis // European Commission

Q **The technology examples given during the presentation mainly focus on the construction phase. How can this be transferred to the renovation sector, which is stated to be one of the key factors for CO_2 reduction in the building sector?**

A Depending on the technology, they might be able to be used both for new constructions and renovation of buildings (e.g. IoT, sensors, 3D scanning), there is no restriction that these technologies will be only used in new constructions. Of course, there are technologies that are easier to be deployed on a new construction site at first, e.g. robots and robotics arms, but this does not restrict us from publishing a call at a later stage of Horizon Europe where we request the use of robots/robotic arms on renovation projects.

Q **What does the term "systemic transformation towards climate neutrality" mean exactly? Is it possible to specify steps necessary for this transformation?**

A The term means that the ultimate goal is the climate neutrality by 2050 as expressed in the 2050 long-term strategy. From an R&I perspective, the three steps are roughly to develop all the necessary technologies by 2030, in the period 2030 – 2040 to have large scale demonstrators and from 2040 to 2050 full deployment.

Q **Will the implementation of BIPV technologies be mandatory or still optional in Future calls (Green Deal, Horizon Europe)?**

A In calls we do not seek for support for specific technologies, but for solutions to specific problems. It is up to the consortium to consider the ideal combination of technologies that will tackle the problem identified in each call for proposals.

Q **What do you expect to be the biggest challenges and hurdles during the transformation of the construction industry? How does this affect different trades and are there certain trades that transform more easily than others?**

A The biggest challenges are related to financing. Whether the owner or the tenant should pay for the renovation. Whether banks, funds, etc. are considering building renovation a viable/profitable investment. From a technical/engineering perspective, the challenge is to get out of their comfort zone. For example, ground source heat pumps have clearly demonstrated their benefits. Nevertheless, the increase in GSHP installations is still low. From a citizens' perspective the challenge is the lack of information on the multiple

benefits they are getting from a buildings renovation. Normally we associate a building renovation with energy efficiency and cost savings and not e.g. with health related issues caused by humidity, mold or stuffy indoor air.

Q **"The Building Sector causes 36 % of the EU's CO_2 emissions" - Which factors contribute to this number and where can the source of this number be found?**

A For these figures only the operation phase is taken into consideration, so not the embedded CO2 from materials e.g. cement and steel, or the decommissioning/demolition. The main factor contributing is the heating, cooling and domestic hot water equipment. These figures can be found at the EUROSTAT or DG ENER website.

The technology behind INNOVIP – innovations for buildings envelopes

Kenny Rottenbacher // va-Q-tec AG

Q **Is it possible to implement some kind of air exchange to cope with water vapor loads?**

A Vacuum insulation panels are a barrier to air and water vapor. If there should be an air exchange through the insulation layer, it has to be realized with intrusions, which are not insulated with VIP. This can lead to additional heat bridges.

Q **How can the boards be disposed? What is the energy demand for the production of the boards?**

A The high barrier envelope can be disposed like normal plastic waste. The silica core can be returned to the manufacturer and be re-used as core material.
The main part of the energy demand for VIP production is provided by pyrogenic silica. Here it is difficult to get clear information from the manufacturers. It is therefore hard to make an estimation on the total energy requirement for VIP production.

Q **Would it be of interest to replace the metalized cover of the multilayer polymer barrier surrounding the VIP by another high barrier coating (regarding sustainability issues etc.)?**

A Alternative envelope materials are always of interest. However, metallized multilayer polymer films turned out to offer the best cost/performance ratio until now.

Q **How does the fixation of design elements/ protection layers for the insulation (e.g. bricks, cavity-wall, curtain façade, plaster systems) work with VIPs?**

A VIPs can only be glued to surfaces. If there is some cover layer to be mechanically fixed with e.g. fasteners, a pattern has to be formed around the VIPs made from other materials. At these areas, mechanical fixation of cover layers is possible.
In the case of the Grand Tower, the VIPs were used as an inlay inside a frame system.

Q **What is the expected cost/performance rate of VIPs in the future?**

A The INNOVIP project demonstrated that it is possible to reduce the cost/performance rate up to 20%. Optimization of processes is necessary to bring this into to market. With further optimization of the production process, production costs can be reduced even further.

Recycling in the construction industry – the future is circular

Luis Hoffmann // Fraunhofer IVV

Q **In reality, how much PVC is reused (apart from a downcycling approach)?**

A This is highly dependent on the application that the PVC was used in previously. Windows, for example, are recycled quite often. Others, such as flooring, are hardly ever recycled at the moment.

Q **CreaSolv® Process: What happens to the removed plasticizers?**

A Plasticizers removed in the CreaSolv Process can no longer be used according to new regulations and therefore have to be disposed (usually incineration).

Q **CreaSolv® Process: Is it possible to separate the PVC from the polymers of the flooring adhesives during the process?**

A Yes, PVC can be separated from other polymers/adhesives in the process.

Q **Creasolv Process: What is the quality and colour of the PVC resulting from the process?**

A The product quality is dependent on the quality. Since the polymer chains are not chemically modified within the process, similar product qualities to the material used for flooring production can be expected. The removal of colors is limited. Thus the color is also dependent on the input material's color.

Q **How would you rate the perspective of thermosets in complex materials with respect to a recycling approach?**

A Thermosets are in general more difficult to recycle than thermoplastic polymers.

Q **Is this the existing process for EPS recycling? (https://www.youtube.com/watch?v=M1RV1wJ-tDE)**

A The linked video describes the CreaSolv® Process (a solvent-based process). There are however also existing mechanical processes for EPS recycling, however in those processes, the cleaning potential is limited and flame-retardants cannot be separated from the material.

Q **Can VIPs be up-cycled or is only down-cycling possible?**

A Partially down-cycling, partially recycling, no up-cycling.

Common challenges and threats of data uncertainty for innovation projects – synergies in the AMANAC cluster

Dr Shahab Resalati // Oxford Brookes University

Q **How are the costs of disposal including dismantling of the insulation taken into account in an LCA? What share of the overall life cycle cost do they approximately account for?**

A When it comes to system boundary definition in Life Cycle Analyses in construction generally, there are five main stages that are considered. Product stages, construction process stage, use stage, end of life stage and if applicable reuse, recycling and recovery stages. The end of life stage includes deconstruction, demolition, transport, waste processing and disposal. These stages are included in any comprehensive LCA/LCC if the system boundary definition covers the end of life stages. The overall cost share of disposal can be different project to project and can vary significantly so not possible to pin down exact numbers here.

Q **Are LCAs made for specific products only ore are there also exemplary LCAs for certain product groups, e.g. concrete or timber structures in general, available?**

A Yes, there are numerous databases such as GaBi, Ecoinvent etc that cover the majority of the existing raw and processed materials. These are also comprehensively studied in books and research papers available.

Netzwerk innovatier Massivbau (NIM) presents: Start-Up Pitches – Start-ups from the construction industry show ground-breaking concepts

Rüdiger Busch // Bayern Innovativ GmbH

Fabian Hoppe // HOREICH

Jonas Lerchenmüller // Kewazo

Q **HOREICH: Which kind of sensors (load, temperature etc.) does your company have experience with?**

A Solutions for load cell, cracks, and especially humidity which enters buildings (sensor invented by HOREICH). The advantage of the HOREICH system is that it can use sensors from different manufacturers and connect them to their universal platform and HOREICH cloud where the data is visualized.

Q **Kewazo: In general, what is an appropriate business model to attract construction contractors?**

A KEWAZO is entering the market with a sales-based approach. In 2020 we plan to sell five systems, in 2021 up to 25. Since we are also bringing data analytics to the scaffolding industry, we offer this specific service on a SaaS subscription basis. Later, when we also have developed a robotic system that allows horizontal and vertical movements, we want to offer a full-care package “Robot as a Service” that includes data analytics, but also maintaining and care services.

New highly insulating mineral products for the construction market – Outcome of the European project Wall-ACE

Dr Jürgen Frick // MPA Universty of Stuttgart

Q **Do the filled bricks developed during the Wall-ACE project also have high compressive strength?**

A The compressive strength is not lower compared to other high insulating bricks, but the insulating performance is better.

Q **How is the Aerogel product developed during the Wall-ACE project different from Aerogel Insulation Plasters already available on the market?**

A The product will be more cost-effective (around 20 to 30%) compared with market products.

Q **What is the current price range of Aerogels on the market compared to the products developed during the Wall-ACE project?**

A The aerogels are comparable to market available products.

Q **Was the thermal conductivity of the products also measured at higher temperatures? What is the thermal stability of the products under air or inert gas?**

A The thermal conductivity rises with temperature, as other aerogel products do. After drying the products are stable at higher temperatures.

Q **What is the method to apply the Aerogels developed during the Wall-ACE project? Can they by sprayed?**

A Outdoor render: Machine spraying out of silos is recommended, which avoid dust production. One key technology is the avoiding of de-mixing within silos. Up to 4 cm could be sprayed at one step. It is re-workable after around 2 hours. Therefore, several layers per day (around 12 cm) could be sprayed.
Indoor plaster: It is machine sprayable as well. Comparable thicknesses could be sprayed.
Insulating finish and patching filler: Designed for application by hand.

Open Innovation Test Bed “LightCoce” – Project Overview and Brick Pilot Line at THN

Prof. Krcmar // Technische Hochschule Nürnberg

Q **How are bricks filled with geo-polymers recycles?**

A This is generally not a problem as both the bricks and the geo-polymers are inorganic and can be burned.

BayFOR Services

Dr. Daniel Kießling – Bavarian Research Alliance

Q **Does the Bavarian Research Alliance only work with universities or also with small private companies?**

A BayFOR offers a whole range of services, from basic information, to individual consulting up to hands-on support during your Grant application and preparation. Usually, we are able to offer these services free of charge under one condition: You need to be open to add a Bavarian stakeholder to your consortium. This stakeholder has to be either a Bavarian SME and/or university and/or university of applied science. Of course, we also support you identifying the most suitable candidates from our large pool of contacts in Bavaria.