SMARTER HABITAT

PRESS INFORMATION

SMARTER HABITAT & University Göttingen:
Symposium „The Future of Building“
Bio-based, sustainable building materials in focus

Munich / Göttingen, March 2023.

Sustainable building in harmony with ecological, economic and social-humanitarian responsibility was the central topic at the symposium "The Future of Building", which was held on February 27th in cooperation of the Munich-based start-up Smarter Habitat and the Büsgen Institute of the Georg August University of Göttingen. The presentations and the panel discussion both highlighted how new approaches are able to accelerate the paradigm shift towards sustainable, CO_2-neutral building of the future. The speakers and all participants agreed, that science, industry and politics must cooperate closely with readiness to support innovations with investments in order to bring about this transformation as quickly as possible.

"Today we are talking about solutions that can significantly change building in the future." This is how Dr. Ines Marbach, environmental scientist and expert moderator for sustainability, welcomed the numerous guests to the symposium and thus set a positive basic tenor for the event right from the start, which was also available as a live stream on YouTube.

Numerous participants of the symposium "The future of building" appeared in the lecture hall of the Büsgen Institute of the University of Göttingen

"We can think buildings differently and we can think building differently!"

The opening speech by Martin Prösler, co-founder of the German Sustainable Building Council (DGNB) and owner of the Proesler Kommunikation agency, which has long been focusing thematically on this field, was both a wake-up call and an appeal. Under the heading "Popcorn – Making Sense and Confidence," his keynote address called on all those involved in the building industry turnaround to move forward together, with a clear objective focused on sustainability and full of confidence.

The momentum for change is currently strong and a lot is happening: The construction industry, which in the past was considered to be rather slow to innovate, has developed rapidly in recent years. There is great interest here to replace conventional building materials with bio-based ones. Here, he cited the example of several start-up projects (greening of steep roofs, building bridges from flax, or using rice waste for insulating material) that have triggered a powerful thrust in this field.

But also entrepreneurs like Datty Ruth, founder of Smarter Habitat, are also needed, who, with courage and a willingness to take risks, want to implement their future-oriented product ideas by means of novel business models. It requires science, which has been researching many sustainable solutions for the building sector for years now with most valuable findings. And last but not least, this change requires a new, confident way of thinking, coupled with openness to innovation and readiness for investment and "the awareness, that together we can make a difference!"

Keynote Speaker Martin Proesler

Mission of Smarter Habitat:
„Creating affordable housing for people all over the world“

Visiting the disaster area of Haiti in 2012 led Datty Ruth, current CEO and "spiritus rector" of Smarter Habitat to his “awakening”: A U.S.-entrepreneur friend of his had built 40 fire- and weatherproof houses of 56m² each on the Clinton Foundation site there for only 8,500 U.S. dollars each. This was convincing, but outside this site, two years after the devastating earthquake, still around 1 million people were living under disastrous conditions in tents amidst the ruins. As a result of these impressions, he has ever since been driven by the will to give poor people a decent roof over their heads. In view of the increasing number of troublespots worldwide and the steadily growing need for housing all over the world – according to estimates by UN-Habitat and the World Bank, there is already a shortage of around 300 million homes for 1.7 billion people, expected to rise to 500 million by 2030 – his vision has become his mission.

The building sector needs to be offered a bio-based, cost- and resource-efficient building material, preferrably made from regionally available plant-based raw materials.

In several years of research and development work in cooperation with the renown Fraunhofer Institute IMWS and C3 Technologies GmbH, both located in Halle/Saale in Germany as well as the “Institute of Chemistry and Process Engineering of Composite Materials" at the University of Göttingen, the material- and process engineering foundations for the industrial production of the innovative **ecoHAB©**-panels of Smarter Habitat were laid. The panels are particularly suitable for drywall construction and, as a circular, green alternative to the raw material-, energy- and cost-intensive products used to date (such as gypsum boards). In addition to excellent physical properties the lightweight panels are also reusable, recyclable and partially even compostable – unlike gypsum boards and gypsum fiberboards, of which 265 million m² were produced in 2020 in Germany alone and around 280,000t were disposed in 2019 as waste in landfills, according to Statista.

Datty Ruth

ecoHAB©-Panels are climate-friendly, versatile and easy to use.

Smarter Habitat aims to achieve a rapid global rollout via two business areas: The first is the construction of a pilot factory in Ramstein in Germany for the production of sample series as well as series production for drywall panels for the German and European markets. The factory is also regarded as a training center for the international licensees. The latter can acquire licenses for the **ecoHAB©** technology and production in a franchise model providing they commit to implementing Smarter Habitat's sustainability code of ethics in their companies. Meanwhile, with over 30 LOIs for international licensing and European product requests, Datty Ruth believes the company is well on its way. He concluded his presentation by promoting further investment – whether through impact investments or BAFIN-approved crowdfunding.

How it all began with popcorn at the Cinema

The lecture held by Professor Alireza Kharazipour, head of the team "Chemistry and Process Engineering of Composite Materials" at the Büsgen Institute of the University of Göttingen, revolved around "Popcorn as an ideal composite material for lightweight panels".
In his search for a suitable substitute for plastic and wood in the production of composite materials, the Professor came up with the idea of investigating this natural resource more closely 15 years ago, when on the occasion of an evening at the cinema.
For its experiments, the institute uses starch-containing cereals such as fodder corn, rice or millet, which are characterized by their structure-giving and dimension-stabilizing properties and are not used as food.
The manufacturing process, which was initially developed on a laboratory scale, is now used to some extent in industrial production:

Professor Alireza Kharazipour

The grains are first ground to corn grits and then puffed (expanded) in an automated, continuously heated belt machine. The popped material is then subjected to the coating process in a mixing unit, in which glue is applied and then hydrophobized and impregnated against pest damage in a special process. In a next step, the material is pressed and shaped. In industrial production, this process uses energy-saving radio wave technology, which enables three-dimensional shaping within seconds. The areas of application for the popcorn-based ultralight composites are many: as core layers for insulation panels, as composite panels for interior wall cladding or as so-called sandwich panels that can be used as lightweight panels, room dividers, acoustic walls and much more. The state-of-the-art 2D and 3D forming technology also allows the production of individual packaging - an ideal substitute for the non-recyclable Styrofoam - through to children's toys and furniture.
Professor Kharazipour concluded his presentation by thanking the faculty and students who have contributed to these developments, as well as the industry collaborators and licensees who ensure that university research is translated into market-ready products, thus making a valuable contribution to sustainability.

Process technologies for biogranulates: „*No* after us, the Deluge…“

One of the cooperation partners of the University of Göttingen is CEREX AG, based in Bleienbach near Bern in Switzerland. Its owner and managing director Rudolf Bichsel began his presentation by emphasizing the importance to replace environmentally harmful plastic foam such as EPS (Expanded PolyStyrene / Styrofoam) with bioparticle foam processed with bio-adhesives in view of climate change. Based on a unique process technology that the company has developed over many years in the field of production of cereals and which has made CEREX AG the world market leader in this field.

This knowledge and CEREX's own, largely patented know-how is now also being used for processing biogranulates as a composite material - always under the premise of offering the construction industry a purely vegetable and sustainable material. Only forage corn (so-called industrial corn) is used for this purpose, as popcorn corn is unsuitable due to its husked parts

and low yields. In a first step, the corn is cleaned and granulated in a specially developed grinding plant. In the subsequent puffing process, the granules are expanded. In the coating process, the puffed material is treated with a heat-reactive bio-glue with integrated pest protection and hydrophobized. Radio wave technology (Kurtz-Ersa WaveFoamer) is used for shaping, ultimately processing the biobased material into a wide variety of shapes - primarily into panels for the construction sector.

All in all, this provides a bio-based building material that is versatile, robust and, with the right gluing, hardly combustible. Tests have shown that even at 1,300 °C only the outer layer melts or chars. Another advantage is, that by incinerating it in biogas plants or using it as a fertilizer after rotting, the material can be returned to a natural cycle in the interests of sustainability. And so, Rudolf Bichsel also ended his presentation with the request:
No after us, the Deluge! Stop talking – act now!"

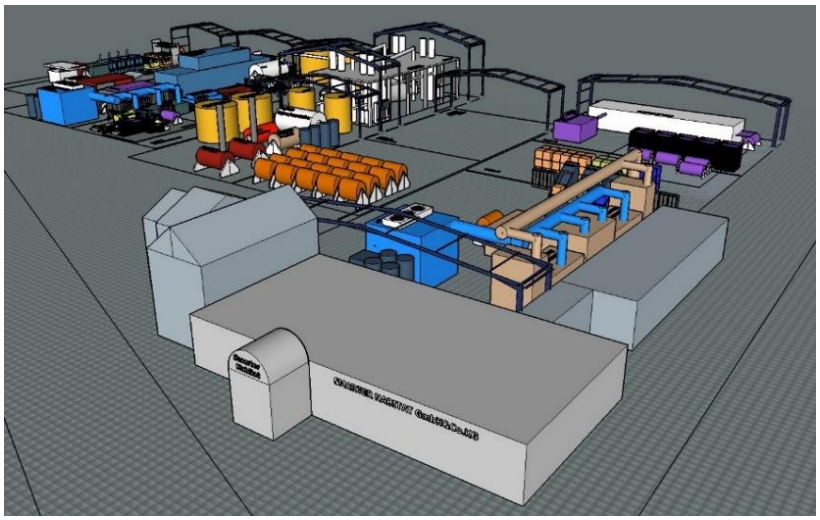
Inspiring Discussion following the first Panel** (from left to right)**: Martin Proesler, Rudolf Bichsel, Dr. Ines Marbach, Professor Kharazipour and Datty Ruth

„20 years from now, plant-based building materials will be standard!"

Following a short lunch break at the university refectory "Lunchbox", the second panel continued. As the "technical engine of Smarter Habitat", Dr. Ines Marbach now welcomed Engineer Klaus J. Lauth, CTO of Smarter Habitat, to his presentation "**ecoHAB©** - from

Ramstein to the World", which was devoted specifically to the equipment and production technology of the pilot factory. The production halls at the 11,500 m² site in Ramstein have a floor space of around 8,000 m². The maximum production capacity will be approximately 1 million m² p.y.; for the second year after commissioning, Smarter Habitat expects a capacity of around 240,000 m² of panels.

Mr. Lauth set off stating it being undisputed, that a game-changing building material had been developed in close collaboration with scientists and industrial partners in the past few years leading to the **ecoHAB**© panels. The experienced mechanical engineer and automation technology specialist went on to say: “The real challenge now is, to bring together the resources, chemical formulations, plant engineering and process technology into series production, i.e. to move from laboratory scale to a production scaling. Another complicating factor," he continued, "is, that some of the equipment we need doesn't yet exist." As a result, existing machinery and manufacturing equipment would have to be adapted to meet the production requirements of Smarter Habitat.



3D-Animation der Smarter Habitat Pilotfabrik in Ramstein

Dipl.-Ing. Klaus J. Lauth

The main focus here is, to implement a continuous, automated manufacturing process for the individual production steps. This ranges from the preparation of the plant-based raw materials – both for the laminates (flax, hemp or other long-fibered agricultural products and waste) as cover layers and for the core material from feed corn – to the production of the nonwovens, their impregnation and the pressing of the laminates. In addition, the company is involved in the puffing and coating of the filling material, right through to the bonding of the two materials up to final packaging. Here, a dedicated film blowing line based on bio-degradable starch is being planned to round up the sustainability claim of Smarter Habitat.
Additionally, all thermal requirements are to be powered by solar thermal energy in order to have the smallest possible CO_2 footprint also in terms of energy consumption. “The factory offers enough space to map an entire chain of sustainability”, Mr. Lauth concluded. "We have a pilot plant in the making here that is suitable for mass production of panels of any kind."

Regenerativie raw materials and thier significance for climate-neutral building

"If the difference between the emissions emitted and the emissions saved by producing CO_2-free energy is zero or less than zero within a year, we speak of climate-neutral construction." Private lecturer Dr. Markus Euring, head of the "Wood-based materials and hybrid materials" team at the Burckhardt Institute of the University of Göttingen and CAO of the biotechnology center there, introduced his essay with in its most academic definition. As his work focuses on renewable raw materials and near-natural binding compounds, Dr. Euring gave a profound insight into measures that represent major progress in terms of climate-neutral construction:
First and foremost is the use of renewable raw materials and their advantages: They are recyclable, can be separated by type, and their value chain can be widely utilized through the use in cascades (recycling, energy use, reusability, etc.) – in short, this turns buildings into a future source of raw materials. They also have a low CO_2 footprint – especially popcorn or corn, which as a C4 plant is able to capture more CO_2 than comparable renewable raw materials and also is quicker in building biomass. In addition, further CO_2 savings can be activated in the manufacturing process and in transport.

Exposition of products – right up to edible popcorn was offered…

Therefore, it makes a lot of sense to use this raw material as a building material: It features heat storing properties and is thus ideally suited as insulating material. Its high sound absorption properties makes it ideal for use in residential construction. As a board material, this natural raw material is made water-repellent and pest-resistant by likewise bio-based binders and coatings, and shows very pleasing results in terms of fire protection and stability. Finally, Dr. Euring invited the participants to individually check the overall positive effects of bio-based building materials by the product samples on display in the hall and, at the same time, to take a tour of the adjacent biotechnology center – the institute's "think tank".

Fire protection – an essential factor for sustainable construction

The next speaker was Dipl.-Oec. Franz Angerer, Marketing/Sales of IGNI Global Protection srl form Timişoara / Romainia. IGNI has been widely known through its fire retardants on a biological basis and is one of the cooperation partners of Smarter Habitat. IGNI's flame- and smoke-retardant substances are used in **ecoHAB**© panels. In his presentation, Mr. Angerer was keen to emphasize, that all of the company's fire retardants are biodegradable – in other words, "green products." They are certified to the highest fire protection class A1 and the highest smoke insulation class S1 and also have an extremely high thermo-insulating effect. "Due to the fact that we manufacture all components of our products, we are able to adapt them completely individually to any application. Another advantage is", he added "that we can adapt them to a wide variety of substrate materials – from the modular walls presented to wood, plastic and fiberglass, which is used primarily in shipbuilding." Through presentation of a video, the participants were able to see – especially for composite panels – how effective the fire retardants are against flames and smoke.

Confidently joining hands together for sustainable building of tomorrow

With plenty of information on the topic of sustainable building and a lively question and answer session, the symposium slowly drew to a close. In a short outlook, Datty Ruth outlined the next steps for Smarter Habitat being the construction of the pilot factory with training and education center, furthering the licensing and franchise model. Notably also the opportunity for investors for a worthwhile cause in view of the current great need for affordable housing in connection with sustainable building concepts. Here the moderator pointed to following discussions on the future of the start-up following the symposium by Smarter Habitat's Dipl.-Wirt.-Ing. Christian Bennhold, CFO, and Michael Gassner, CAO, as well as Marianne Brunert, Dipl. Oec. and certified financial planner, would be available as experts to interested investors.
Dr. Ines Marbach concluded the symposium, through which she had led very eloquently and charmingly, by thanking all speakers and participants and quoting from environmental psychology: "When we talk about problems, we create problems. When we talk about solutions, we create solutions. Today, we talked a lot about solutions here." This fitted seamlessly into the positive and confident spirit of this symposium in Göttingen.

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