



# INTEGRATING SUSTAINABILITY AND HEALTH IN BUILDINGS THROUGH RENEWABLE MATERIALS



INNORENEW CoE INTERNATIONAL CONFERENCE  
2020



## **INNORENEW CoE**

Livade 6, 6310 Izola, Slovenia

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# WELCOME



As we open the second InnoRenew CoE International Conference, it's hard not to think of all that has changed in the year and a half that has passed since our debut conference.

Although the pandemic has dramatically changed our day-to-day lives, it has not changed society's need to address the rapidly changing climate, reconsider our economic priorities, and refocus our attention on important social issues. Buildings remain part of the solution to many problems, and I think it is becoming clear that we need to consider much more about buildings than the basics of shelter.

As the pandemic kept us indoors, many of us may have realised that our indoor environment plays an even more important role in our well-being and happiness than we previously acknowledged. Likewise, we may have considered more carefully how buildings affect the well-being of those who live in different circumstances. Access to safe, comfortable, and healthy living and working spaces is (and should be) a priority in a just society.

Another major change that will affect our work in the years to come is the introduction of the European Green Deal, which will be a major driver of sustainable development in Europe. The European Green Deal prioritises investment and innovation in building renovation solutions for energy performance and attempts to ensure these solutions reach all members of society. The European Green Deal recognizes the need to establish high-performance housing for all and will support renovation in social housing, schools, and other facilities that are often left behind. This is a step in the right direction for inclusive, high-performing buildings.

I rarely find proclamations of success convincing when it comes to sustainability – especially about buildings. We must continue to drive change through research, development, and innovation to make our built environment a beacon of sustainable development. We cannot be satisfied with the environmental performance of our products or buildings; we cannot allow people to be excluded from our advancements; and we cannot forget that buildings impact the well-being and happiness of their occupants.

At this year's InnoRenew CoE International Conference, we wanted to showcase how renewable materials play an integral role in sustainable construction by highlighting environmental performance, safety, and health as well as the economic, digital, and social links that bind us to the materials in the built environment. Conference presenters will discuss advances in design, material development, health research, retrofitting, environmental assessment, and many other topics that increase the efficiency and performance of the building and renewable materials sectors.

Carlo Battisti, President of Living Future Europe, will weave together these complementary threads in his keynote address, "Healthy, living transparent. The quiet revolution of materials". He works to push for change and supports researchers, architects, engineers, and other construction professionals to achieve it. His efforts have expanded knowledge and acceptance of restorative sustainability and regenerative design within Europe's construction community. We are excited and grateful for his participation in our conference.

Together, the contributions paint a hopeful picture. But we must continue to push the science forward, embed these innovations in normal construction practices, and ensure inclusion of all who can benefit from our hard work.

While I wish these matters could have been discussed in person in Izola, we must embrace new options for discourse on these topics. I hope the conference inspires you to reach out to one another and continue sharing, collaborating, and building communities that embrace the challenge of creating a sustainable and just built environment. You may also consider our new open access and peer-reviewed journal, *Interdisciplinary Perspectives on the Built Environment*, as a place to share the insights your work provides.

Thank you,

Dr Michael Burnard  
Deputy Director, InnoRenew CoE  
Assist. Prof., University of Primorska

# SCHEDULE AT A GLANCE

## MORNING

**WELCOME**  
9:00–9:05

**KEYNOTE**  
9:05–9:35

**FLASH TALKS**  
9:35–10:35

**COFFEE BREAK**  
10:35–11:00

**HUMAN HEALTH IN THE  
BUILT ENVIRONMENT**  
11:00–12:30

**LUNCH**  
12:30–14:00

## AFTERNOON

**COMPLEMENTARY TOPICS**  
14:00–15:30

**COFFEE BREAK**  
15:30–15:55

**SUSTAINABLE CONSTRUCTION  
WITH RENEWABLE MATERIALS**  
15:55–17:25

**CLOSING**  
17:25–17:30

# KEYNOTE ADDRESS



**CARLO BATTISTI**  
**PRESIDENT, LIVING FUTURE EUROPE**

*Healthy, living, transparent.  
The quiet revolution of materials.*

Carlo Battisti has a degree in civil engineering from the Politecnico of Milan, nearly twenty years of experience in construction companies and a master's in management and organizational development from MIP International Business School. His certifications include Certified Project Manager IPMA®; LEED®, Living Future and WELL Accredited Professional; GBC Home AP, GBC Historic Building AP; USGBC® and WELL Faculty™.

Since 2009, he has been working with IDM South Tyrol (Italy) as an innovation manager in the Business Development department, Construction. From 2010 to 2011, he worked with the Energy and Environment Cluster of Trentino as manager of the business unit for sustainable products. From 2015 to 2016, he was the co-owner of a startup focused on LEED consulting. In 2015, he co-founded the Living Future Italy Collaborative.

Since 2017, he has been working with Eurac Research as Chair and Project Manager of COST Action 16114 RESTORE (REthinking Sustainability TOwards a Regenerative Economy). The RESTORE COST Action (2017–2021) will affect a paradigm shift towards restorative sustainability for new and existing buildings and space design across Europe through the collaboration of 160+ researchers from 40 European countries.

Since 2018, he is European Executive Director for the International Living Future Institute and current President of Living Future Europe. The Institute's mission will hasten the change and provide needed direction towards a regenerative design transition in Europe. It is actively pursuing European market alignment and adaptations of the Living Building Challenge (LBC).

# AGENDA

## WELCOME | 9:00-9:05

Dr Michael Burnard, InnoRenew CoE

## KEYNOTE | 9:05-9:35

Carlo Battisti, Living Future Europe

## FLASH TALKS | 9:35-10:35

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## COFFEE BREAK | 10:35-11:00

\*Unable to present



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# AGENDA

## SUSTAINABLE CONSTRUCTION WITH RENEWABLE MATERIALS | 15:55-17:25

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## CLOSING | 17:25-17:30

**THANK YOU FOR ATTENDING IRIC2020!**

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# *Flash Talks*

# Testing the Thermal Properties of Loose-Fill Straw Insulation

Hana Remešová<sup>1</sup>, Nathan Kotlarewski<sup>2</sup>, Matthew Schwarzkopf<sup>1</sup>

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<sup>2</sup> University of Tasmania, ARC Centre for Forest Value, Nathan.Kotlarewski@utas.edu.au

Current research suggests that natural materials such as straw can be a suitable insulation alternative to reduce energy demands in the construction and building industry, particularly during service due to its excellent thermal properties, low embodied energy, carbon storage, and acceptable mechanical properties (Chaussinand, Scartezzini, Nik, & Nik, 2015; Maraldi, Molari, Molari, & Regazzi, 2018; Mattila, Grönroos, Judl, & Korhonen, 2012; Sabapathy & Gedupudi, 2019). Traditional construction with straw utilises the material for insulation in the form of straw bales. The objective of this research was to test the thermal properties of straw as loose-fill insulation in traditional wall construction to validate if its thermal performance is competitive against readily available synthetic insulation batts.

A commercially available synthetic batt (15 kg/m<sup>3</sup>) and three straw samples of densities 31 kg/m<sup>3</sup>, 54 kg/m<sup>3</sup>, and 69 kg/m<sup>3</sup> were tested between two chambers fitted with thermocouples to measure the increase in heat from a heated chamber to the adjacent chamber over a set time. The results aligned with the literature, noting the insulation properties of the straw were dependent on density; even the sample with the lowest density (31 kg/m<sup>3</sup>) acted as an insulator to the adjacent chamber. The highest density sample (69 kg/m<sup>3</sup>) resulted in the lowest temperature increase of 0,95°C (20,7°C to 21,65°C) compared to the synthetic batt, which prevented any increase in temperature of the adjacent chamber. This study suggests that the use of straw presents a plausible future application in the construction industry as a natural material for insulation in buildings. When sourced locally, it has low environmental impact and lower costs associated with transportation. However, future research and development is required to determine a standardised building material for its use in build-ings.

**Keywords:** straw, insulation, loose-fill, energy efficiency

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