
Interreg
North-West Europe
Housing 4.0 Energy
Thoma

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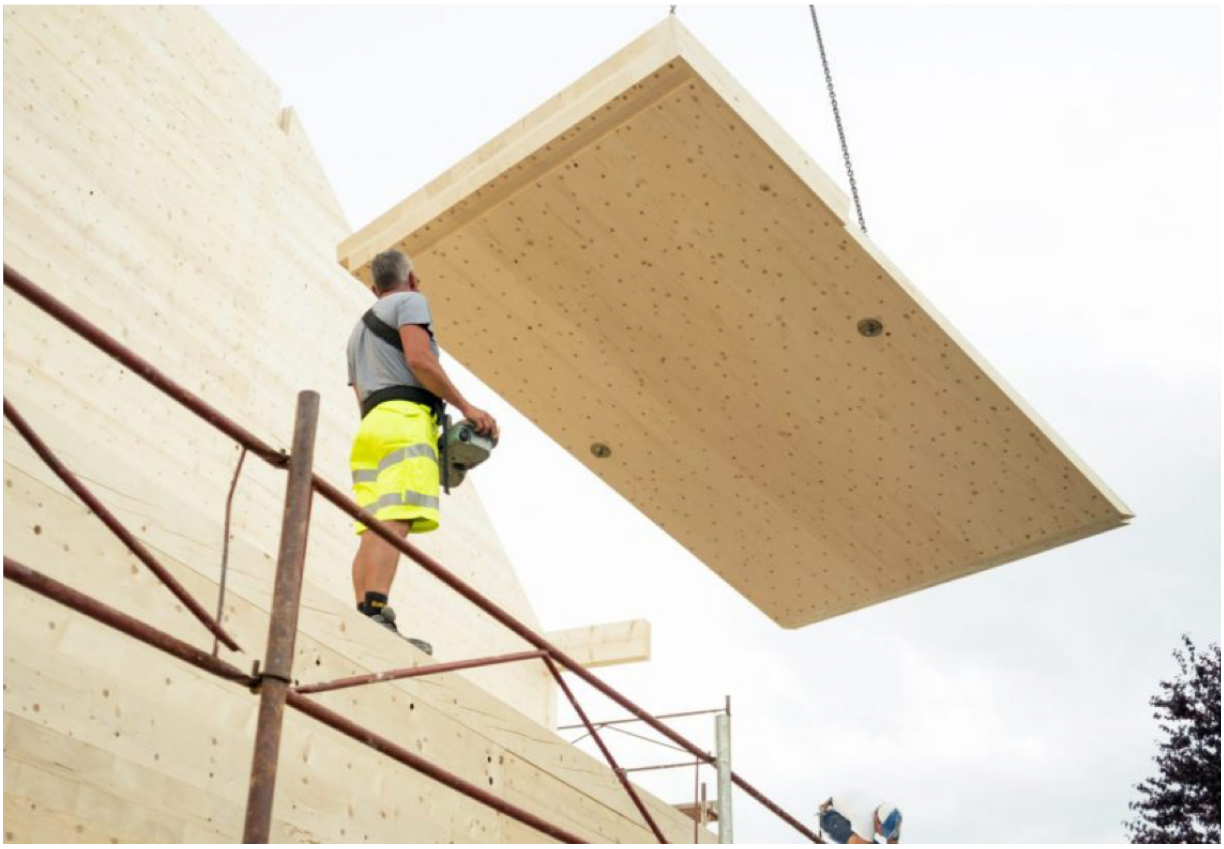
Thoma

More than wood

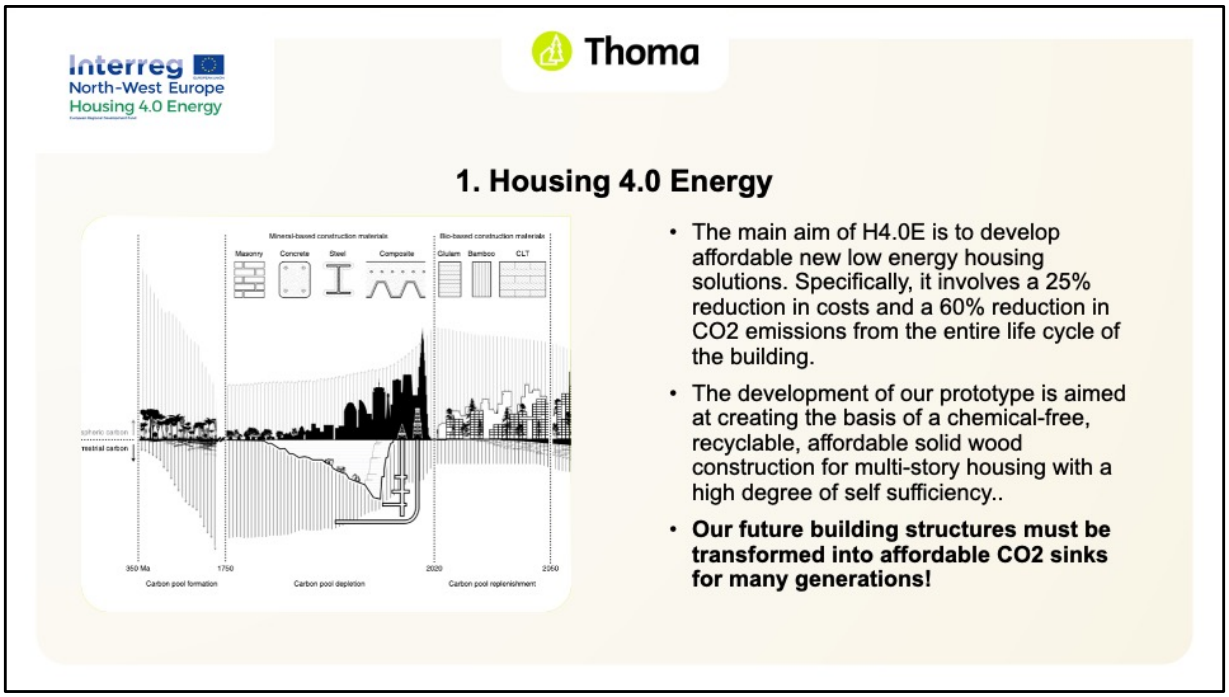


Interreg North-West Europe Housing 4.0 Energy

Thoma

Agenda

1. Introduction to H4.0E
   www.nweurope.eu/h40e
2. Introduction to Thoma
   www.thoma.at/?lang=en
3. The technical basis of Holz100 Glue-free Cross Laminated Timber
   www.thoma.at/thoma-planungshandbuch/?lang=en
4. The H4.0E project, prototype
   Lahr im Schwarzwald, Germany
   https://www.thoma.at/holz100-schwarzwald-gmbh/
5. Simple building technology, independence for many generations, prototype focus
6. The importance of circular economy in ecological building design, prototype focus
7. "True timber construction" a tender stimulus for planners, prototype deep link
8. Q/A Meeting, 1 hour
   6.10.2021 at 4 p.m. London time
   Registration by 4.10 at the latest at
   mailto:info@thoma.at
   subject: registration for H4.0E Q/A (for attention to FLORIAN THOMA)



40 % of greenhouse gases are produced during construction and through the operation of houses and infrastructure.

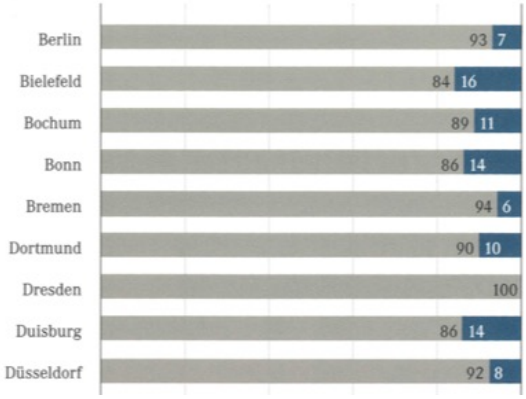
50 % of the waste mass is generated during construction.

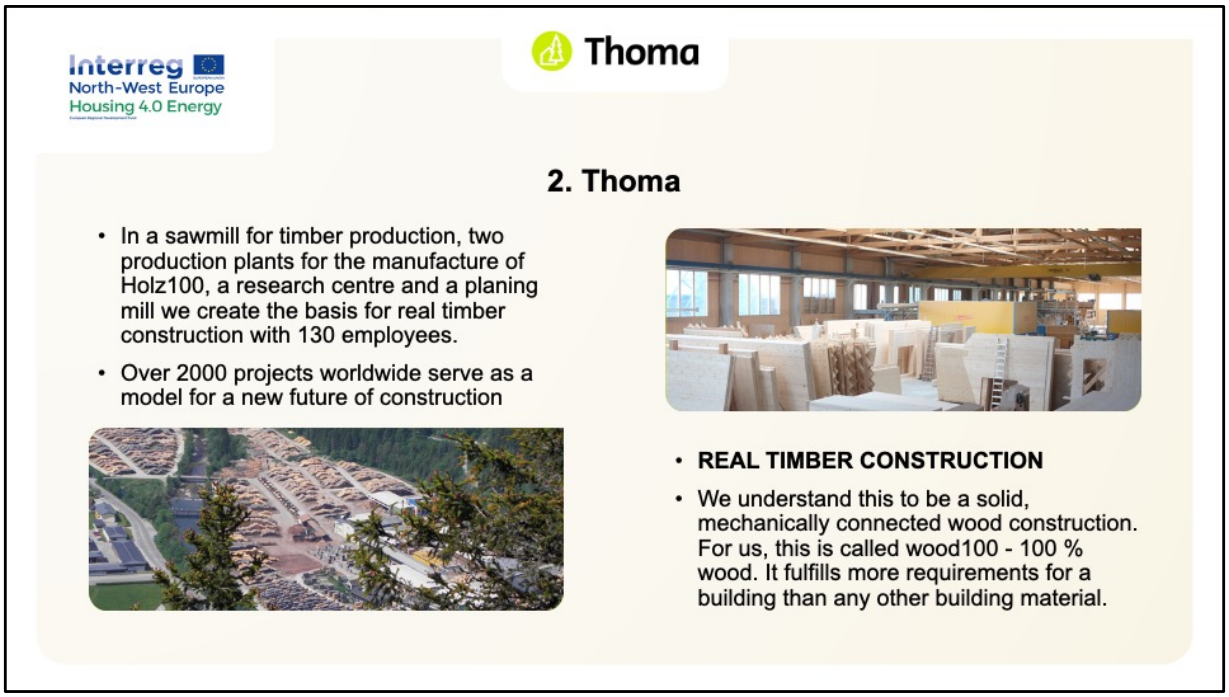
60 % of the energy and resource demand is accounted to the construction sector.

Between 2011 and 2019, the share of **subsidized rental housing stock** in Germany **fell by an average of 21 percent**, despite a tripling of the volume of new construction. This is due to expiring commitments and the sale of municipal stock.

Many low-income households exist. Around **21% of households have a net income of €1,600** or less per month. The share of **subsidized housing in the rental housing stock averages 9.4 %**. The supply of subsidized housing in the lower price segment cannot meet demand.

Picture: Breakdown of subsidized (blue) and privately financed (gray) apartments in 2019 (bulwiengesa, 2021)

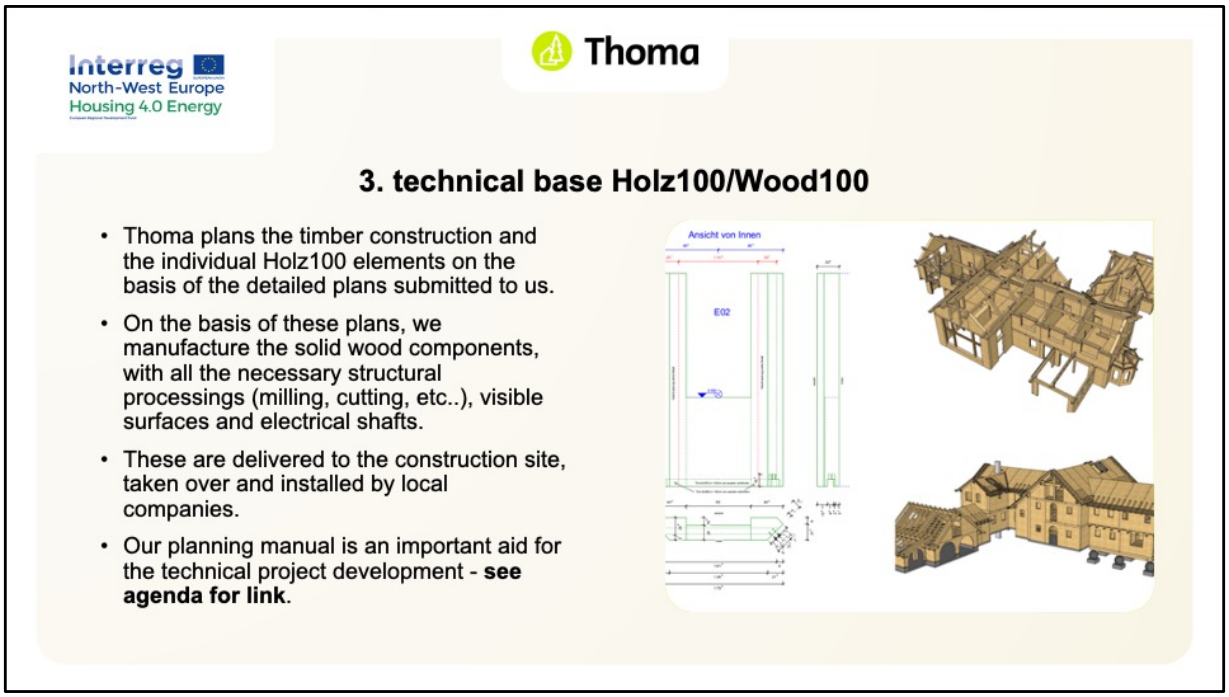




Our family business started in 1994 with the idea of building houses that do not burden the inhabitants with construction chemicals and make them healthy again. The path we took was the processing of solid wood under strict avoidance of any kind of coatings, glue and other synthetic treatments. We have always used mechanical joints. When processing the wood, we pay attention to the right time of harvesting (winter-cut moonwood). This increases the wood's resistance to fungi and wood-destroying insects in a natural and scientifically proven way, and makes it possible to avoid toxic wood preservatives.

In 2000, we developed the world's first mechanical connected CLT wall. It‘s called Holz100. The last 20 years of our work has been dominated by the further development of this solid timber construction method.

Thoma houses are the model for a waste-free construction industry based on the circular principle of the forest. Currently, the construction industry is the biggest waste producer in the world. Through innovation & patents, we are the first to build energy self-sufficient wooden houses or at least houses with very low energy requirements - without polluting insulating materials and without complicated technology. Thoma houses that heat and cool themselves make nuclear power plants superfluous. They put an end to wars over oil.

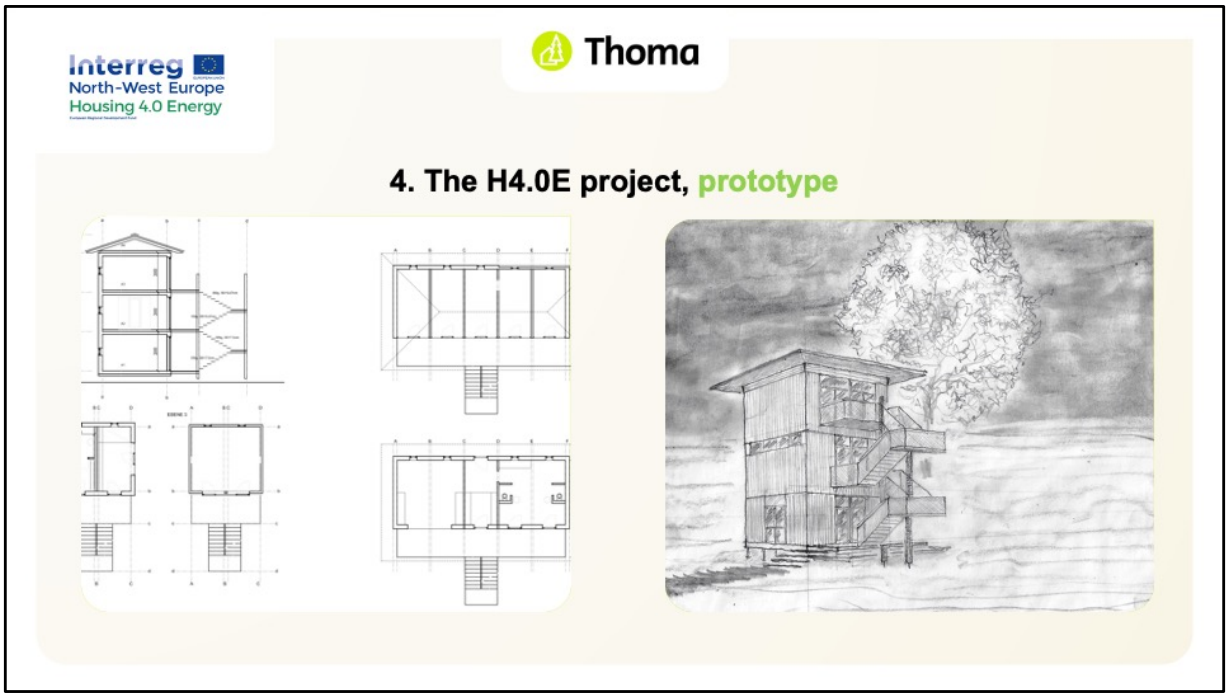


The requirements for statics, building physics, fire protection and details are increasing from single-family houses to multi-storey residential buildings. In our research centre, we are working that we can provide the necessary information to fulfil these tasks. In cooperation with research institutes and universities, we produce the necessary certificates and product developments for real timber construction. The key to success lies in project development that is appropriate for the material. The potential of Holz100 must be exploited and its limitations must be taken into account.

Parallel to this technical basis, we offer technical developments adapted to the project. This includes, for example, static concepts, various design variants with the associated cost estimates for Holz100, as well as consultations and concepts for sound insulation, fire protection and thermal insulation.

In addition to the technical development of Holz 100, we aim to provide holistic concepts for stringent, ecological and healthy housing. The other materials of the building as well as the concept of the building services are important aspects to consider. That is why we think in an interdisciplinary and networked way.

We cooperate in a network with local contractors who are trained and able to handle projects in this sense. ***www.thoma.at/partner/partner-in-ihrer-naehe***



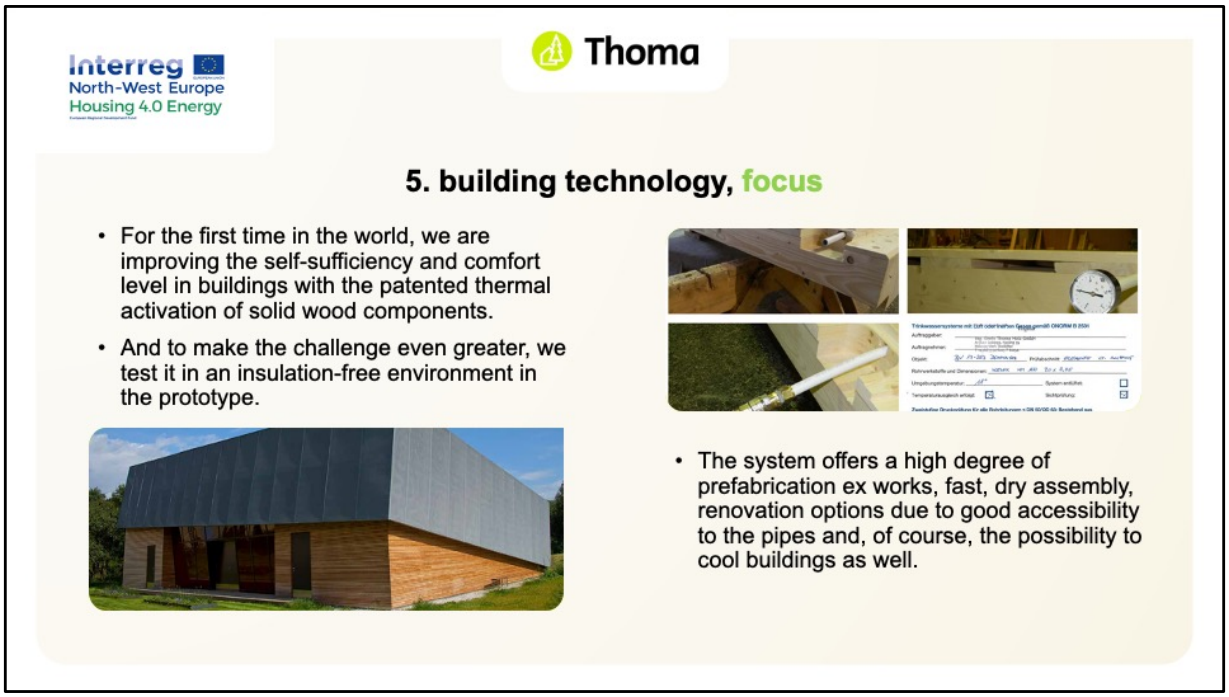
At our Holz100 plant in Lahr, we are trying to break completely new ground with a prototype.

For the first time, a three-storey building is to be dismantled into its individual parts after a five-year period of use. These parts will be used to construct a two-storey building in a new form at another location. The focus of the development is on the highest possible degree of reusability of the components for multi storey buildings. Without down cycling or modification of the materials after dismantling.

The building is heated and cooled self-sufficiently with environmental energy at a low level of complexity of the building services. This guarantees the functionality of the energy concept for many years without high maintenance and running costs.

This development represents a consistent basis for further development of digitalisation and industrialisation of planning and production processes. Enabling a higher degree of prefabrication, rapid cost certainty and short construction times.

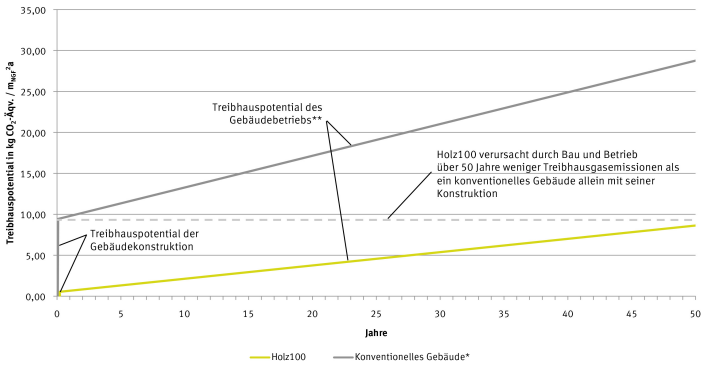
Through the digitalisation and industrialisation, the low running costs, the (cheap) reuse of the building components, the prototype becomes one of the answers for the social housing crisis we face at the moment.

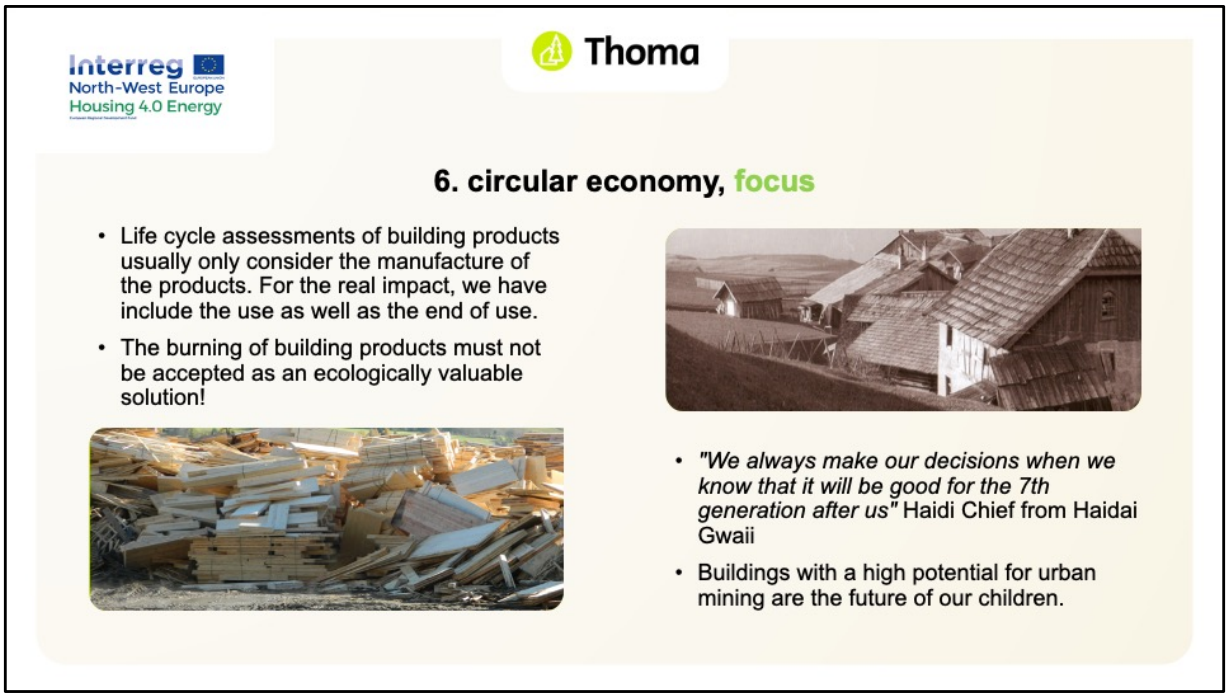


In real timber construction, the heating and cooling load peaks in the buildings are massively reduced by the storage capacity and poor heat conduction of the wood. The U-value as the most important assessment criterion of thermal building quality is far too short-sighted! With an appropriate design of the building services, we achieve a very high degree of self-sufficiency (>70 %) with low investment costs in the building services from the prototype. And we make the building independent from expensive maintenance costs.

An impressive example is the Austrian Film Archive in Laxenburg, Austria (picture). Here, 60,000 old nitrate film treasures are stored on 250 m2. Thanks to the 36.4 cm thick Holz100 walls, the cooling requirements (year-round, constant 4° Celsius) of the entire building can be met completely self-sufficiently with a 2.5 KW cooling system using a photovoltaic system.

The emission of CO2 per m2 living space over 50 years (operation & construction) with Holz100 is around 70 % less than in the reference building according to ENEV.





Systematics of a life cycle assessment burning scenario

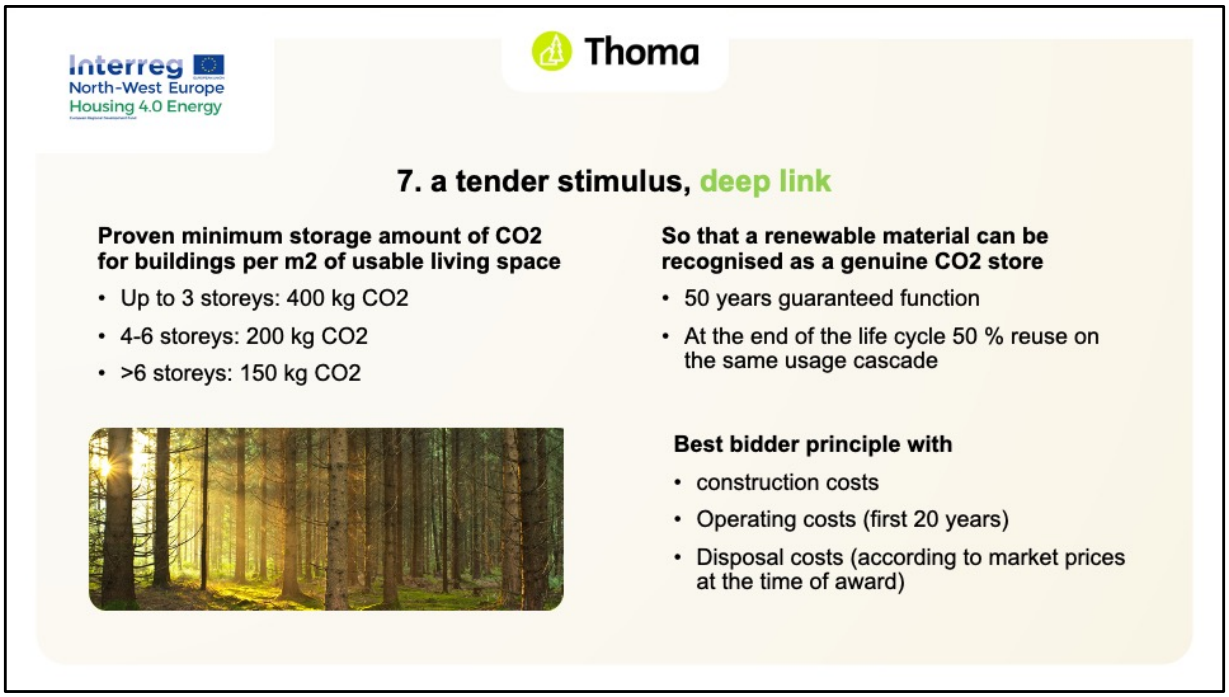
- If 1 m³ of Holz100 is thermally utilised 740 kg CO2 are emitted.
- To provide this amount of energy alternatively with the usual energy mix in the EU, 1221 kg of CO2 are emitted
- This leads to 481 kg CO2 Credit (1221 kg – 740 kg), respectively, burning Holz100 emits in net terms only 259 kg of CO2 (740 kg - 481 kg).

Taking into account the production processes (credits for side products and expenses like fuels and electricity), 831 kg CO2 per m³ of Holz100 are stored in the life cycle assessment. This means that in net terms 831 - 259 kg = **572 kg CO2 remain "stored" over the entire life cycle of the product after burning.**

Sounds good, but there are some problems behind:

- Many building materials cannot be separated by type because they are glued together.
- Material with chemical content releases many substances of concern, while burning them.
- Cement and brick industries use these fuels in plants with problematic handling of the toxins produced during burning. But with this calculation model a "climate-friendly" product ist then advertised.
- Finally, is burning really the answer to the next " infinite " source of energy?

More than 70% of the environmental impact for the production of Holz100 occurs at the sawmill. Imagine the potential of reusing the boards!



Three ambitious proposals for tender criteria that will transform our building industry.

1) According to the state of the art in solid wood buildings by Thoma, an average of 0.8 cbm of wood is used per m2 of living space (for single-family homes). This results in about 700 kg of stored CO2 per m2 of living space. In multi-storey residential buildings, this amount is reduced to about half due to the proportionally smaller wall and roof areas. The basis is an environmental declaration with balanced CO2 values of the products, which has already taken into account the CO2 emission of the production.

2) Wood which, for example, has to be disposed of as special building waste after 5 to 20 years is ultimately not a CO2 sink in the climate-positive sense, but an environmental burden which does not perform this task.

3) Instead of the lowest bidder principle, the costs of the whole life cycle are used.

It is not enough to base entire funding systems on simplified U-value calculations and the energy consumption of the building construction. This means that short-lived and ecologically problematic materials (insulating materials, adhesive tapes, etc) are used and expensive and complex building services are planned and fossil sources are still accepted.

In the end, our buildings must be long-lasting, run on environmental energy without major maintenance and operating costs, and leave the world without a trace.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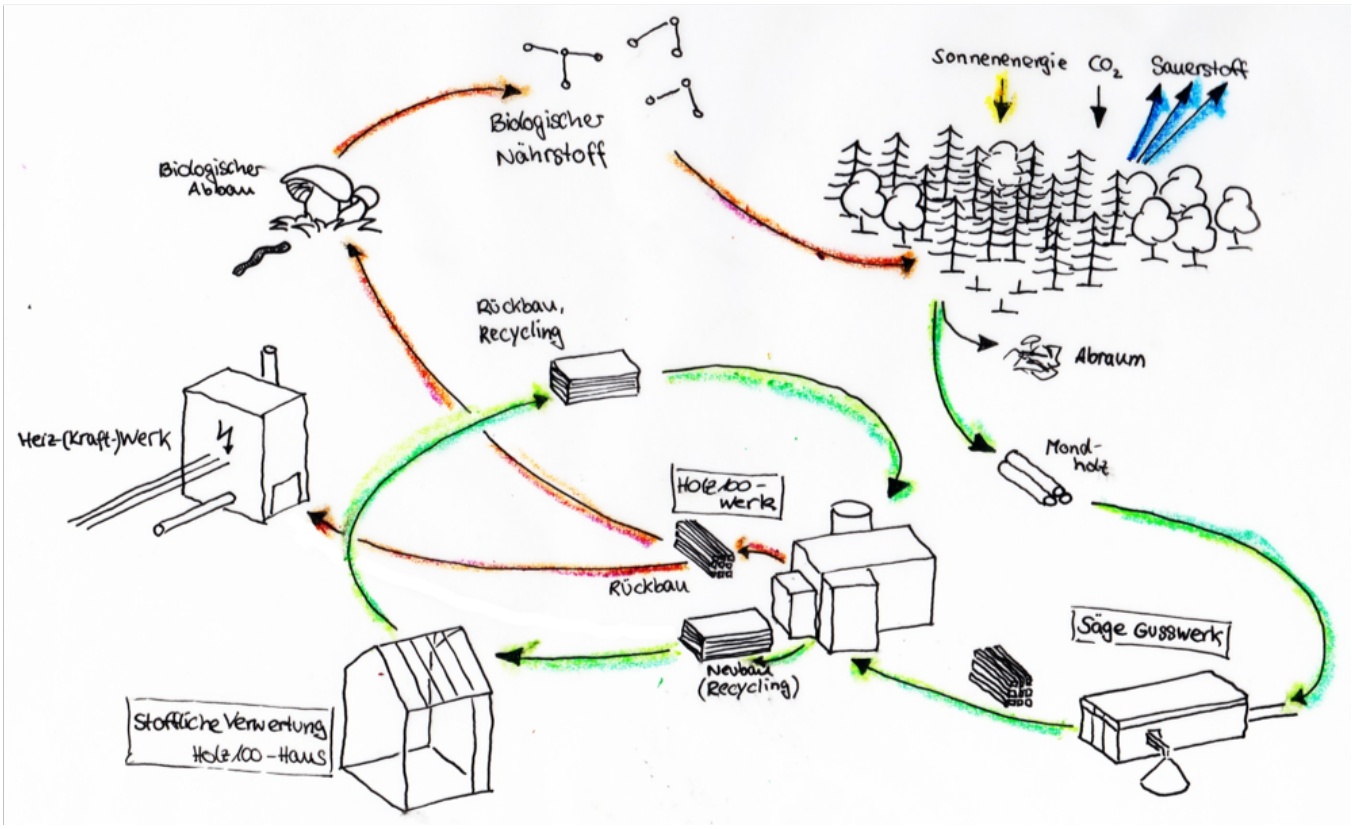
Thoma
Houses
like
a
tree,
cities
like
the
forest


Sonnenenergie
CO_2
Sauerstoff
Biologischer Nährstoff
Biologischer Abbau
Rückbau, Recycling
Abraum
Heiz-(Kraft-)Werk
Mond-holz
Holzbau-werk
Rückbau
Neubau (Recycling)
Säge Gusswerk
Stoffliche Verwertung
Holz/Co-Haus

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Thoma

Thoma Holz GmbH

Hasling 35
5622 Goldegg
Austria
Tel: **+43 6415 8910**
Fax: +43 6415 89204
info@thoma.at