LIFE CYCLE HABITATION

Demonstration Project with Carbon Neutral Construction and Innovative Energy Supply System

With the contribution of the LIFE financial instrument of the European Union and the Federation of Austria

Project Team

- Project Management

  GrAT – Center for Appropriate Technology – TU Wien
- LIFE Project Partner - building engineering

  teamgmi Ingenieurbüro GmbH

- Arch. Scheicher – design and construction details
- Kubic Project – electrical engineering
- Philipp Lopaur – consultant monitoring

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Center for Appropriate Technology

- Headquater

  Technical University Vienna
- Branch Office and **Location of Life Cycle Habitation**

  S-House in Böheimkirchen / Lower Austria
- International Project Locations
  - Philippines
  - Nepal
  - Africa

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Expertise and Key Projects

Sustainable Building & Renewable Energy

S-House

Zero Carbon Cottage

Zero Carbon Resorts

Materials from Renewable Resources

Strawbale Insulation

Biodegradable Composite and Polymers

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Appropriate Technology

Technology in general, or a particular technology, that is designed to take account of the social, economic, and environmental circumstances in which it is employed, often aiming to meet a specific practical need, and typically (in developing countries) utilizing locally available resources and cheap or renewable energy sources.

Sustainable & Energy efficient Industrial Developement, Nepal

Zero Carbon Cottage Palawan, Philippines

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Buildings, Energy Use and CO_2 Emissions:

Global Status

Buildings and construction (including manufacturing of materials):

- **36%** of global final energy use and
- **39%** of energy-related carbon dioxide (CO_2) emissions

Source: UN Environment and International Energy Agency (2017): Towards a zero-emission, efficient, and resilient buildings and construction sector. Global Status Report 2017

EU Status

Buildings are responsible for

- **40%** of energy consumption and
- **36%** of CO_2 emissions.

Source: European Commission 2018, https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings

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Buildings, Energy Use and CO_2 Emissions:

GLOBAL and EU POLICY GOALS in short:

Improving the energy performance of (residential) buildings and to cut down energy consumption and CO_2 emissions in the building and construction sector!

- energy efficient
- low – carbon
- resilient
- recyclable

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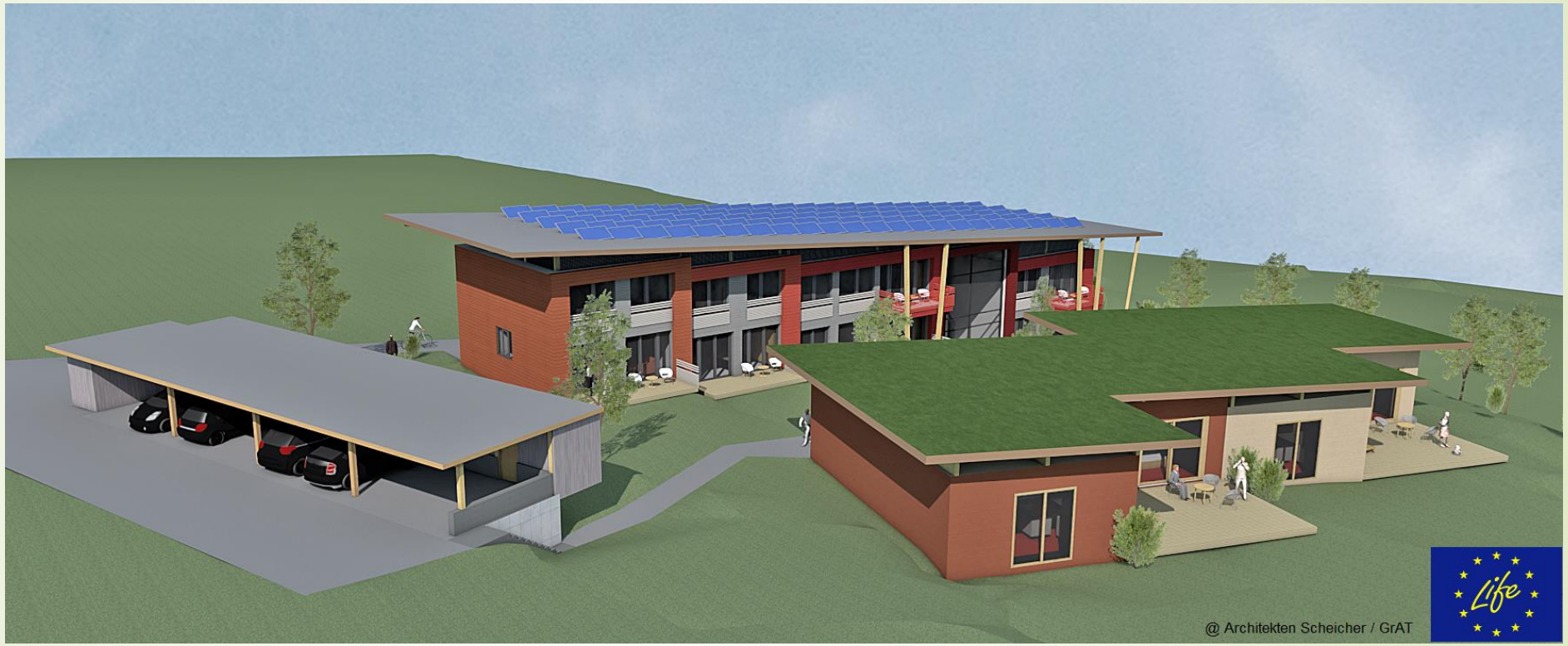

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PROJECT IMPACT ON THE LIFECYCLE OF BUILDINGS

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Project objectives and requirements:

- carbon – neutral construction
- highly energy efficienct
- passive house standard
- saving natural resources
- health and well-being of residents
- affordable and replicable

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Carbon – neutral construction and saving natural resources:

- Use of regional renewables (straw, wood)
- Minimal invasive point foundations
- Modular prefabrication with local SMEs
- Reducing transport ways

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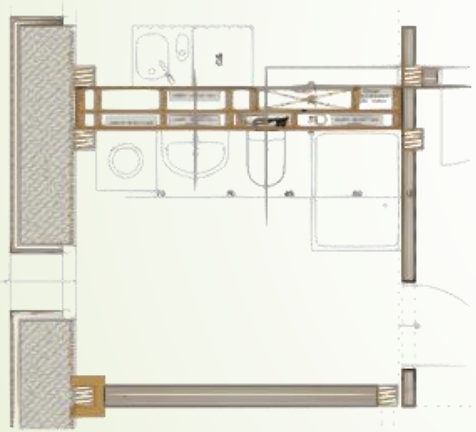
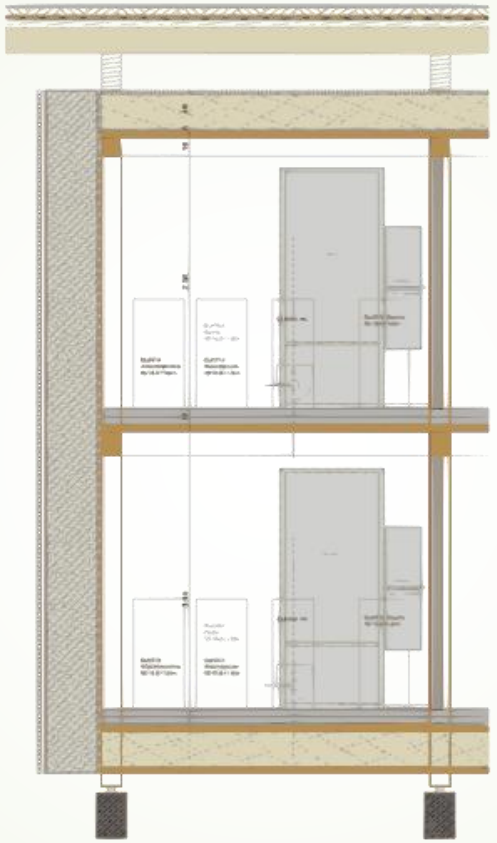
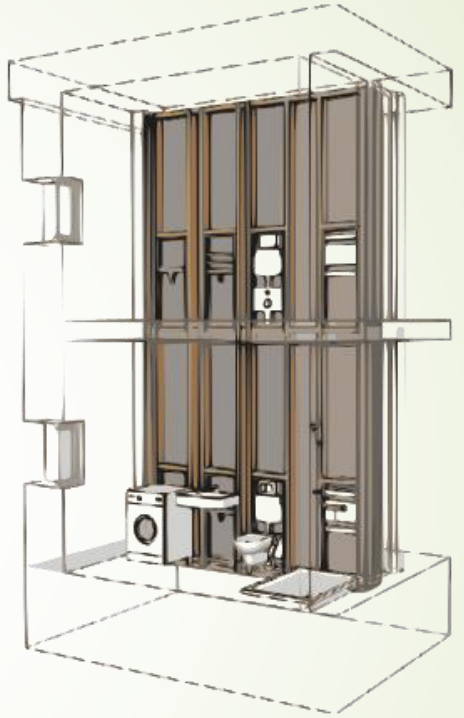
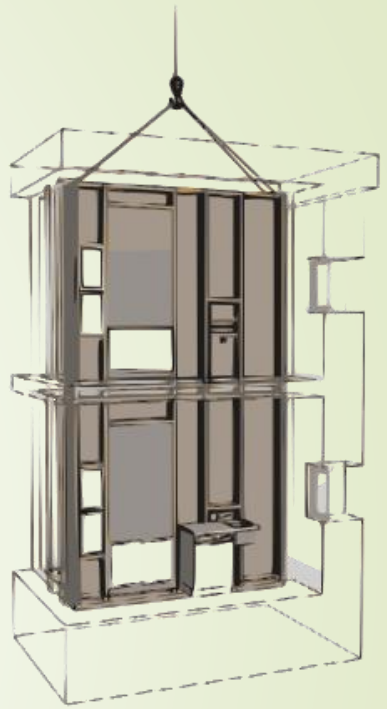
Innovation – Prefabricated Installation Modules









- ✓ Minimizes construction time
- ✓ Less thermal bridges
- ✓ Short and efficient pipe routing

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Installationsmodul Wohnhaus Top 3-

1555/ LIFE CYCLE HABITATION

DP-02 WH

Innovation – Blow-in Insulation Material Straw

Advantages:

- ✓ Free of any additives
- ✓ More flexibility in construction details than with straw bales
- ✓ Allows easy and cost effective prefabrication

- ✓ Regional providers
- ✓ GWP during utilization phase negativ
- ✓ No hazardous waste when dismanteling

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Demonstration – Permeable flooring

Some advantages:

- ✓ Less seiling of soil
- ✓ Better microclimate
- ✓ Permeable to rainwater – positive for groundwater level

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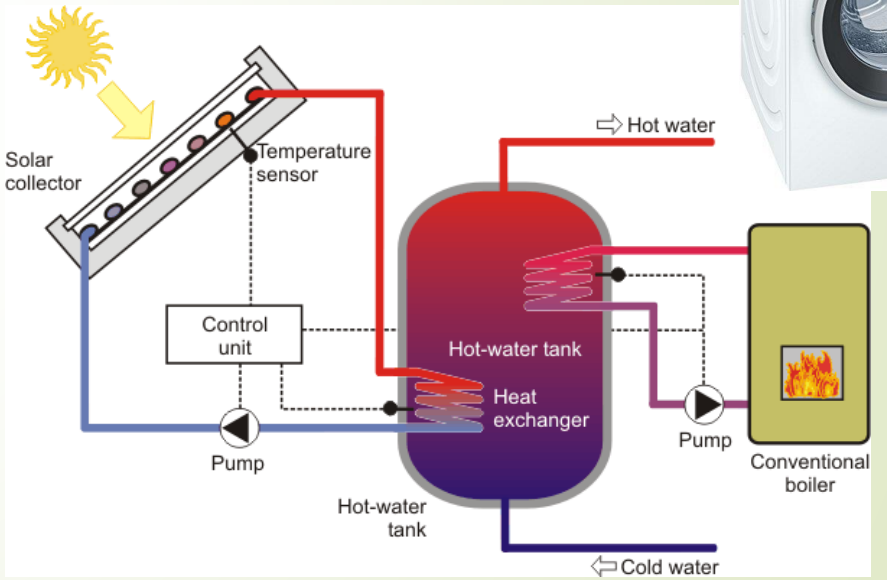
Energy efficency:

- Using renewable energy
- Intelligent energy management
- Using thermal energy directly
- Increasing user awareness



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Monitoring:

- **Resource consumption, CO_2-balance, AP, etc.** for the building phase is monitored, including
  - production of building materials,
  - transport and processing,
  - building construction on-site.
- **Energy consumption** during the usage phase
  - Electricity, heat, hot water (own production, consumption for different applications, surplus or minus per month)
- **Room climate and user comfort**
  - average room temperature, humidity, CO_2

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Communication & Policy Suggestions:

DISSEMINATION and REPLICATION:

Target groups:	*Planers, architects, real estate developers, policy makers*
Communication tools:	*Publications, conferences and exhibitions, guided on-site tours, publication on monitoring results*
Target groups:	*Future inhabitants, private (future) home owners, etc.*
Communication tools:	*Publications (layman's report), press releases and reports, guided on-site tours*

Some POLICY SUGGESTIONS:

- *Adapting residential building subsidies to more ecological criteria*
- *Better education on renewable building materials for building experts of communities*
- *More funding for R&D on renewable building materials for SMEs*

Life

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Hier entstehen innovative, lebenszyklusorientierte Gebäude gedämmt mit Stroh

2 Reihenhäuser und 4 Wohnungen (2-4 Zimmer)

1 Doppelhaus (á 4 Zimmer)

THANK YOU FOR YOUR ATTENTION!

Mehr Informationen auf: www.lch.grat.at; contact@grat.at; +43 1 58 801 49 523

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