# Transitioning buildings to full reliance on renewable energy and assuring inclusive and affordable housing

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**Authors:** Lukas Kranzl, Andreas Müller, Fabian Schipfer, Koen Smet, Bernhard Leubolt, Markus Hafner-Auinger, Thomas Kautnek

## Synopsis

This project focuses on **transitioning buildings** to full reliance on renewable energy, while assuring inclusive and affordable housing.

The **Decarb_Inclusive** project combines
(1) techno-economic modelling of decarbonisation scenarios with
(2) an analysis of possible effects on real estate prices and aspects of social inclusion, and
(3) transdisciplinary research on policy options to implement social innovations.

The active engagement of stakeholders and municipalities ensures the targeting of policy makers and academia. To maximise the science-society interface of the project an award (**NaWo Award**) was designed and tendered to find and select environmentally and socially sustainable housing innovations.

## Scenario simulation

Comparison of two full-decarbonisation scenarios
- Scenario "with": CO2 tax with renovation obligation
- Scenario "w/o": CO2 tax without renovation obligation

| Indicator | Heat demand reduction | | Energy cost reduction | | Comfort losses due to less heating | | Investment [€/m²] | |
|---|---|---|---|---|---|---|---|---|
| | with | w/o | with | w/o | with | w/o | with | w/o |
| Owner-occupied | 54% | 43% | 21% | 8% | -3% | 0% | 160 | 127 |
| Owner-occupied low-income | 54% | 40% | 17% | 3% | -3% | 1% | 158 | 122 |
| Tenant | 42% | 3% | 0% | -44% | 1% | 13% | 157 | 72 |
| Tenant low-income | 41% | 2% | 3% | -40% | 1% | 13% | 158 | 73 |

## Socio-environmental innovation

Driven by challenges
- Increasing costs of real estate
- Increasing space demand per person
- Changing demographics (age, family structures, migration)
- Urban sprawl increases demand in transport & complicates district heating
- Poor coordination of stakeholders (state, civil society, private)

Socio-environmental innovation (social and environmental innovations)
- Joint use of space (see NaWo Award winners)
- Support for mixing of millieux, age groups and family types
- Coordination, conflict management, moderation, knowledge- and know-how transfer

## Structures of housing provision relevance matrix

V – relevant  X – irrelevant  O – situation dependend

| | Owner-occupied detached | Owner-occupied flat | Private rental | Limited-profit rental | Municipal |
|---|---|---|---|---|---|
| **Structural Features** | | | | | |
| Economic criteria (e.g. loan accessability, expected energy savings, time horizon, revenue vs. expanses) | V | V | V | V | V |
| Use value (e.g. living comfort) | V | V/O | X | X | X |
| Welfare critera (e.g. ecological and social goals) | V | O/X | O/X | V | V |
| Investor-user discrepancy | X | O/V | V | O/V | O/V |
| Decision making, mulite-owner complexity (Stakeholder structure of the building) | X | V | V | O/X | X |
| Regulatory incentive (e.g. obligation to renovate and refurbish) | X | X | X | V | X |
| | | | | | |
| **Household Features** | | | | | |
| Age of household | V | V | O | X | X |
| Household income and wealth | V | V | O | X | X |
| | | | | | |

## Key findings

Full decarbonisation of the Austrian building sector is feasible including a
- 50% cut in energy consumption and a
- broad building- and settlement specific mix in integrated renewable heat supply
  -> heat pumps, biomass, district heating, solar and biogas

✓ affordable

Cost drivers are not decarbonisation measures but dynamics of the market including
- Real estate prices
- Additional demand for holiday homes
- Real estate investments („Betongold")

X cost-drivers

## Policy recommendations

High efficiency standards and integration of renewable heating has reached life cycle cost parity in conventional residential housing construction (new building).

However policy measures are required to reach decarbonisation targets in time while ensuring affordability and inclusion:
- Establishing cost transparency → gradually increasing CO2 taxes
- Rental housing → renovation obligation / Sanierungsgebot
- Municipal & limited profit housing → harness potentials of relatively simple decision structures and centralised management; limit privatisation; dedicated object support
- Owner occupied housing/flats → owner specific support measures (subject support)
- Limit cost drivers → avoid unused property; limit institutional investments,
- Enable social innovation → commoning space use (e.g. gardening, guest rooms/ appartments); co-housing for affordable housing and social cohesion);
- Changes in the condominium and tenancy law (e.g. obligatory formation of reserves for building renovation or voting rules)

## NaWo Award Winners & best practices case studies


KliNaWo (Feldkirch, Vorarlberg).
Source: Energieinstitut Vorarlberg


Sonnengarten im Limberg (Zell am See, Salzburg).
Source: Stadtgemeinde Zell am See


House of Commons in Innsbruck (Tirol).
Source: Energie Tirol/ Blitzkneisser


Bikes and Rails (Vienna).
Source: Bikes and Rails

## Contact and further information

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**Contact**: Lukas Kranzl (kranzl@eeg.tuwien.ac.at)
**More Info:**
www.eeg.tuwien.ac.at/decarb_inclusive
https://www.klimabuendnis.at/na-wo-award

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