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

Keywords: Building sector, decarbonisation, affordability, inclusiveness, transformation pathways

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

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 decorbonisation 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.

Framework and constraints in housing transition

Severe housing depreciation Public spending on housing Wohnungsgemeinnützigkeitsgesetz Social inclusion and affordability

Austrian climate & energy strategy
Energy prices EU energy policy provisions
Social welfare Paris agreement Housing affordability
Income at market prices Sustainable development goals

Demographic trends Regional & local energy targets

Living conditions Policy provisions
Housing prices Policy targets Wohnbauförderung

Socio-economic context Housing tenures

Accumulation of debt

Dwelling types

Economic conditions Biomass Renewable energy potentials

District heating Ambient heat Interest rates

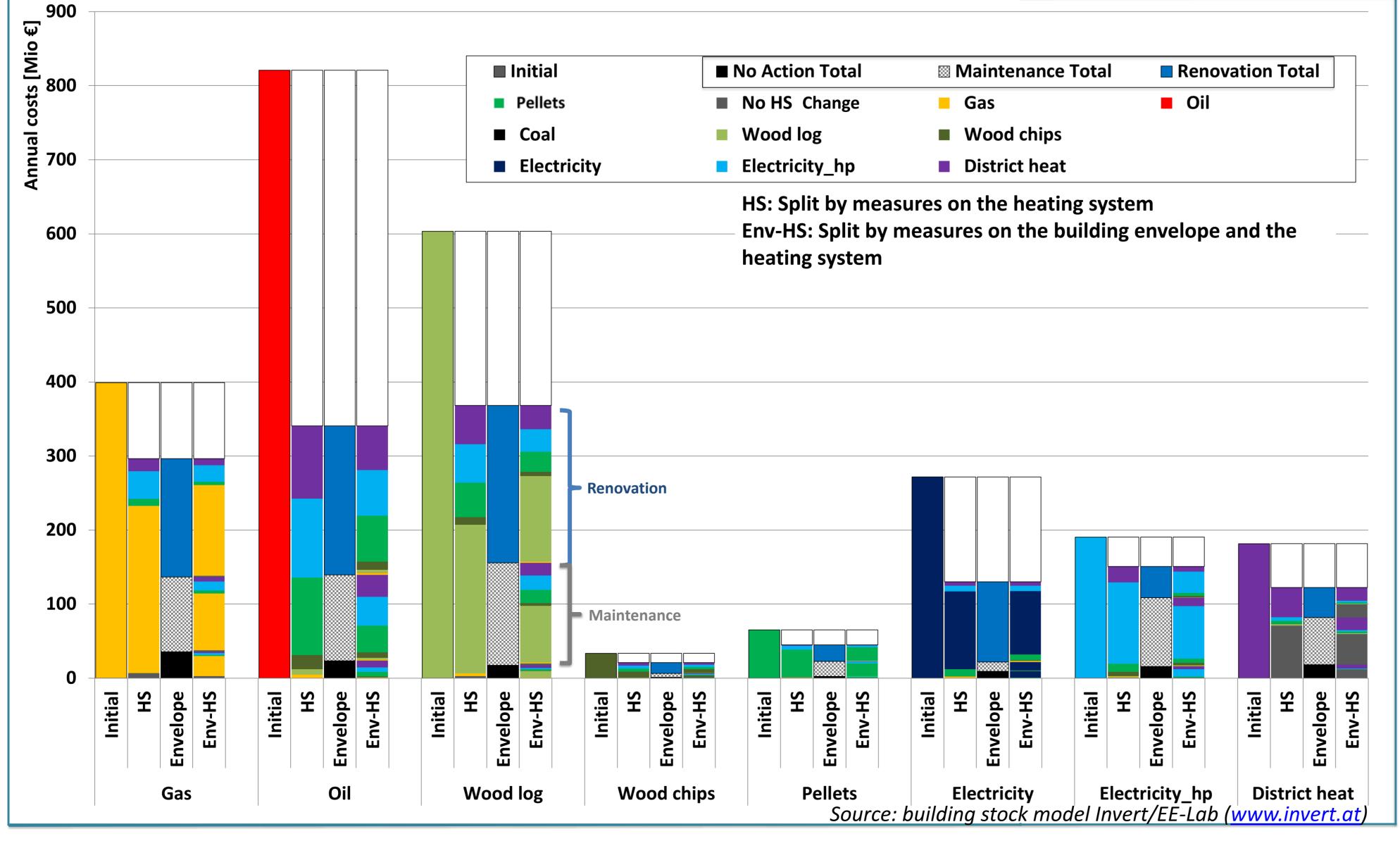
Energy efficiency Roof-top PV
Construction sector Roof-top Solar thermal
Ownership structure

Building stock & occupancy

Techno-economic modelling of decarb. pathways

The decarbonisation pathways for the Austrian housing sector are developed with a strongly disaggregated bottom-up model of the Austrian building stock (Invert/EE-Lab). In the following results selection we present the initial annual costs for single family houses with the annual costs after renovation, maintenance and heating system change in 2050.

Figure: Annual costs for heating in the decarbonisation scenario compared to the status quo by initial heating systems and renovation measures carried out



Project timeline NaWo-Focus Groups NaWo Award Klimatag Final Conference Start 03.2018 04.2019 03.2020 Interdisc. framework SHPs & Interviews End Case studies Pathway modelling Social innovation Reporting



Structures of housing provision (SHPs)

Achieving fully decarbonized and affordable housing needs to take into account the historically contingent and heterogeneous nature of housing provision.

Bikes and Rails (Vienna).

Source: Bikes and Rails

For Austria we identify five such main structures of housing provision, all of which following its own internal logic, relating to a specific set of actors and functions covering issues of (re-) production, ownership and consumption of housing:

- (1) Owner-occupied detached and semi-detached houses
- (2) Owner-occupied flats

House of Commons in Innsbruck (Tirol).

Source: Energie Tirol/Blitzkneisser

- (3) Private rental housing
- (4) Housing provided by limited-profit housing associations
- (5) Municipality or Public housing

Outlook and next steps

- Implementation of structures of housing provisions as agents in the building stock model Invert/EE-Lab
- Analysing the impact of decarbonisation on these agents and different income groups
- Derive recommendations on how to ensure affordability and inclusiveness in the decarbonisation transition pathway of the building stock in Austria

Contact and further information

The research leading to the presented results was performed in the framework of the project Decarb_Inclusive for the ACRP (Austrian Climate Research Program) with the funding number KR17AC0K13648 (10th Call, 2017)

Contact: Lukas Kranzl (kranzl@eeg.tuwien.ac.at) **More Info:**

www.eeg.tuwien.ac.at/decarb_inclusive https://www.klimabuendnis.at/na-wo-award











