

# WARUM VERPFLICHTENDE THERMISCHE GEBÄUDESANIERUNG ERFORDERLICH UND SOZIAL VERTRÄGLICH IST

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## Overview

Achieving the 1,5 °C target will require almost complete decarbonisation of the building sector even until the year 2040 in EU countries [1]. Several authors have developed scenarios showing that complete decarbonisation of the building stock's energy demand is feasible until mid of the century (e.g. [2]). However, achieving these targets will require substantial investment. And related profound analyses how this transition process will be possible considering affordability and social inclusiveness are still missing. While CO<sub>2</sub>-taxes are included in almost all proposed future policy packages as a key instrument, it is not clear how a CO<sub>2</sub>-tax might affect low-income households and how different institutional settings such as structures of housing provision might affect the level of target achievement.

Thus, a thorough consideration of institutional settings, structures of housing provision and low-income households in this transition process is important not only to ensure the achievement of the climate and energy policy targets but also to guarantee affordability and inclusiveness.

In this contribution, we will deal with following key research questions:

- Is a CO<sub>2</sub>-tax sufficient to achieve decarbonisation in the Austrian housing sector, in particular considering different structures of housing provision and low-income households?
- Which impact would a CO<sub>2</sub>-tax imposed on the housing sector have on low-income households for the case of Austria?
- To which extent are regulatory policy instruments able to complement CO<sub>2</sub>-taxes and compensate for possible negative impacts of CO<sub>2</sub>-taxes on low-income households?

## Methods

In order to deal with the questions above, we start with an analysis of the structures of housing provision in Austria. Followed by a literature review, we carried out a series of interviews in order to identify and describe the key structures of housing provision and their characterization, in particular regarding their potential impact on investment behavior and economic rationale. By distinguishing low-income households from the rest of households in each of these structures of housing provisions, we described agents and integrated these results into the existing building stock model Invert/EE-Lab ([www.invert.at](http://www.invert.at), [3]). Invert/EE-Lab builds on a strongly disaggregated bottom-up building stock, represented by building archetypes. Considering the life-time distribution of building components and assuming certain investment rationales for different agents, scenarios of the building stock evolution in the coming years and decades can be derived. After having extended Invert/EE-Lab by the agent types described above, we developed two scenarios of the Austrian housing sector until 2050. (1) A scenario assuming a CO<sub>2</sub>-tax, continuously increasing until a level of 250€/t CO<sub>2</sub> in 2050 combined with the obligation to renovate inefficient buildings; and (2) a scenario with the same level of CO<sub>2</sub>-tax, however, without a renovation obligation.

By analyzing the model results for these two scenarios and different agent types, we derive the possible impact of these policy settings on low-income households in different structures of housing provision.

## Results

As key structures of housing provision in Austria, we identified following types: (1) Owner occupied detached homes, (2) owner occupied flats, (3) private rented dwellings, (4) limited profit housing and (5) municipal housing. We will describe them in more detail in the full paper.

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Table 1 shows the model results for owners and renters of dwellings distinguished by income for the two described scenario and policy settings. Results highlight the impact of the landlord-tenant dilemma: CO<sub>2</sub>-taxes as such do not create an incentive for building owners to renovate buildings (at least as long as their possibilities to transfer the investment to the renters are limited). Due to the imposed CO<sub>2</sub>-tax, this leads to higher energy expenses for renters and subsequently to reduced comfort – assuming renters partly compensate the increasing energy prices by adapting indoor temperature during the heating season. Under these scenario assumptions, investments in rented dwellings are much lower than in owner occupied dwellings, although payback time of the measures are very similar, however with split incentives for the rented dwellings. Due to less favourable conditions for getting financing for low-income households, the investments are lower in this group of agents.

In the full paper we will present more detailed scenario results, also in terms of decarbonisation targets, energy carrier split, renovation activities and overall costs. Moreover, we will interpret the results in light of the higher share of low-income households in rented apartments than in owner occupied dwellings.

Table 1. Model results for different agents, structures of housing provision and policy settings

Indicator	Reduced energy needs for space heating		Reduced energy costs		Comfort loss: Cost induced decreased heating		Investment per m <sup>2</sup>		Payback Time (considering the total of users and investors)	
	with obligation	no obligation	with obligation	no obligation	with obligation	no obligation	with obligation	no obligation	with obligation	no obligation
Owner	54%	43%	21%	8%	-3%	0%	160	127	11.6	11.2
Owner, low income	54%	40%	17%	3%	-3%	1%	158	122	11.8	11.2
Renters	42%	3%	0%	-44%	1%	13%	157	72	11.6	12.1
Renters, low income	41%	2%	3%	-40%	1%	13%	158	73	11.3	11.7

### Conclusions

The results indicate that CO<sub>2</sub>-taxes alone are not sufficient for achieving decarbonisation targets and that they may lead to adverse effects for low-income households. Mandatory, well prepared and accompanied long-term targets for building renovation, can compensate for these negative effects and make sure that the CO<sub>2</sub>-tax can unleash its full impact.

In the full paper we will discuss limitations of the approach, other options for dealing with the landlord-tenant dilemma and we will discuss additional arguments why regulatory approaches in building renovation policies are required.

### Referenzen

- [1] European Commission, „A Clean Planet for all A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy. Communication from the Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank.“, Brussels, COM(2018) 773 final, Nov. 2018.
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