REDUCING
HOUSING
INEQUALITIES

Case Study Working Paper: Linz (Austria)

An extract from Deliverable 5.1, *'Case study reports on green transition initiatives and their impact on housing inequalities,'* of the ReHousIn project

ReHousIn Deliverable D5.1

February 2026

Title	Case Study Working Paper: Linz (Austria)
Author(s)	Michael Friesenecker, Nina Lobnig (TU Wien)
Cite as	Friesenecker, M., Lobnig, N. (2026). *Case Study Working Paper: Linz (Austria).* ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition. *https://rehousin.eu/documents/case-study-report-linz*
Submission date	2026-02-24
Dissemination Level	[Public]
Work package	WP5: Local impacts of the green transition on housing inequalities
Project title	ReHousIn: Contextualized pathways to Reduce Housing Inequalities in the green and digital transition.
Grant Agreement No.	101132540
Coordinator	Metropolitan Research Institute (MRI)

This document has been prepared in the framework of the European project ReHousIn – "Contextualized pathways to reduce housing inequalities in the green and digital transition".

The ReHousIn project aims to spark innovative policy solutions towards inclusionary and quality housing. To achieve this, it investigates the complex relationship between green transition initiatives and housing inequalities in European urban and rural contexts, and develops innovative policy recommendations for better and context-sensitive integration between environmentally sustainable interventions and socially inclusive housing.

This project is co-funded by the European Union. The UCL's work on this project is funded by UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee. The ETH work on this project is funded by the Swiss State Secretariat for Education, Research and Innovation (SERI) under the Swiss government's Horizon Europe funding guarantee.

Co-funded by the European Union

UK Research and Innovation

State Secretariat for Education, Research and Innovation SERI

Contents

1 Introduction

1.1 City profile, challenges around just (housing and ecological) transition

Linz is the capital city of the federal state of Upper Austria (see Figure 1). As the third-largest city in Austria, Linz has a population of 214,987 (2026). It has grown moderately by about 17% and approximately 30,000 people in the last 25 years (Stadt Linz, 2026a). Population growth was primarily driven by immigration from non-Austrian citizens, whereas on average, Austrian citizens moved to areas surrounding Linz rather than moving into the city (Stadt Linz, 2026a). The share of non-Austrian citizens, therefore, increased from 13% in 2005 to around 31% in 2025 (Stadt Linz, 2026a).

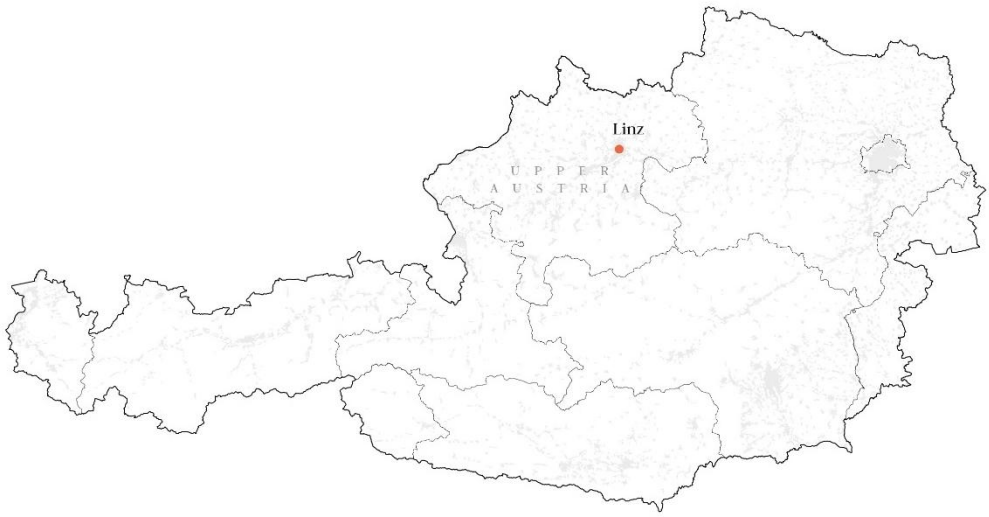

Figure 1. Location of Linz in Austria

Linz has evolved from an industrial city focused on steel production in the post-war period to a city with a diversified economic base, aiming to combine its industrial orientation with the development of digital technologies and creative industries. The city's economic strategy aims to promote and demand climate-neutrality, digitalisation, and resource-efficiency from leading industrial and manufacturing businesses, framed as a green new deal, to reduce city-wide emissions (Stadt Linz 2022). In terms of employment, a large proportion of people still work in manufacturing (15%) and in health and social work activities (16%). Other important sectors include wholesale and trade (10%), administrative and support service activities (including personal leasing, 9%), and public administration (8%) (Stadt Linz, 2026b). This also mirrors the educational structure of the City, with about 23% having attained compulsory-only education, 41% having attained basic vocational training, 20% having attained higher (vocational) education, and 16% having attained post-secondary and tertiary educational levels (Stadt Linz, 2026c). At the same time, non-Austrian citizens are clearly overrepresented in the lower education classes.

Politically, since the establishment of the Austrian Second Republic in 1945, Linz has consistently been governed by a Social Democratic (SPÖ) mayor, except for the period

between 2015 and 2019, when the SPÖ formed a coalition with the right-wing Freedom Party (FPÖ).

In terms of housing, Linz has a relatively high proportion of social housing: 55% in total, of which about 53% is provided by limited-profit housing associations (LPHAs; see Appendix 1 – Glossary for a short characterisation of this housing actor) and 2% by the municipality. The share of social housing is remarkable and is even higher than in Vienna, with about 43%. As shown in Table 1, the private rental segment accounts for 23% and consists mainly of free-market rental units. In contrast, about 7% of the stock is price-regulated under the federal Tenancy Law (Mietrechtsgesetz – MRG, see Glossary). Another fifth is ownership, dominated by apartment ownership units.

The central areas of Linz (Innere Stadt in Figure 2) are characterised by buildings built before 1919, often privately owned and rented out. According to the federal Tenancy Law, privately owned buildings (up until 1945) are subject to price regulation, including basic tenant security regulations, e.g., regulations regarding the right of exit. However, time-limited contracts have become increasingly common in recent years, introducing volatility and market pressures into the regulated housing private rental segment. About two-thirds of the housing units in Linz, however, are built after 1945, with the majority (45%) between 1945 and 1990 (Stadt Linz, 2026d). Hence, the majority of units are price-unregulated rental units either owned by private persons or real estate companies, with some basic regulation regarding tenant security on the one hand. And apartment ownership units, on the other hand. These two units dominate areas on the outskirts of Linz, including Pöstlingberg and St. Magdalena to the north, Froschberg to the west, and Pichling to the south-east (see Figure 2).

Table 1. Linz: Housing Market Segments - 2021

	Persons		Dwelling stock Total		Dwelling stock Main Residencies	
	#	%	#	%	#	%
Owner-occupation	**46 507**	**23.1**	**21 407**	**17.8**	**21 407**	**20.4**
House	18 847	9.4	7 993	6.7	7 993	7.6
Apartment	27 660	13.7	13 414	11.2	13 414	12.8
Rental	**151 100**	**75.1**	**81 467**	**67.9**	**81 467**	**77.8**
Private Rental	*43 326*	*21.5*	*24 471*	*20.4*	*24 471*	*23.4*
rent-regulated	13 760	6.8	7 656	6.4	7 656	7.3
free market	29 566	14.7	16 815	14.0	16 815	16.0
Social Rental	*107 774*	*53.6*	*56 996*	*47.5*	*56 996*	*54.4*
Publicly Owned**	2 359	1.2	1 413	1.2	1 413	1.3
Non-profit Owned	105 415	52.4	55 583	46.3	55 583	53.1
Other	**3 651**	**1.8**	**1 894**	**1.6**	**1 894**	**1.8**
Second or Non-Residencies	**-**	**-**	**15 272**	**12.8**	**-**	**-**
Total	**201 258**	**100**	**120 040**	**100**	**104 768**	**100**

*in primary residences; **owned by municipalities (in German *Gemeindebauten*)

Source: compiled by authors, data from: STATcube – Statistical Database of Statistics Austria

Units owned by limited-profit housing associations have a substantial share of residential buildings from the interwar and wartime period (1911–1945), particularly those constructed by limited-profit housing associations such as GWG, Neue Heimat, and WAG (see glossary for details on limited-profit housing associations – LPHA). In contrast, most of the buildings date from after World War II. Linz represents an especially interesting case due to its history of social housing developed during the National Socialist regime and its close connection to the city's industrial expansion. With the founding of the *Hermann Göring Werke Linz* in 1938 and the rapid industrialisation that followed, Linz became an important industrial centre within the "*German Reich*". The establishment of armament and steel industries created an urgent demand for housing for industrial workers.[1] As a result, between 1938 and 1945, around 11,000 apartments were built—mainly by municipal and non-profit housing companies such as WAG (which still exists today, though it gave up its non-profit status in 2001), Neue Heimat, and the municipal housing company of the City of Linz.

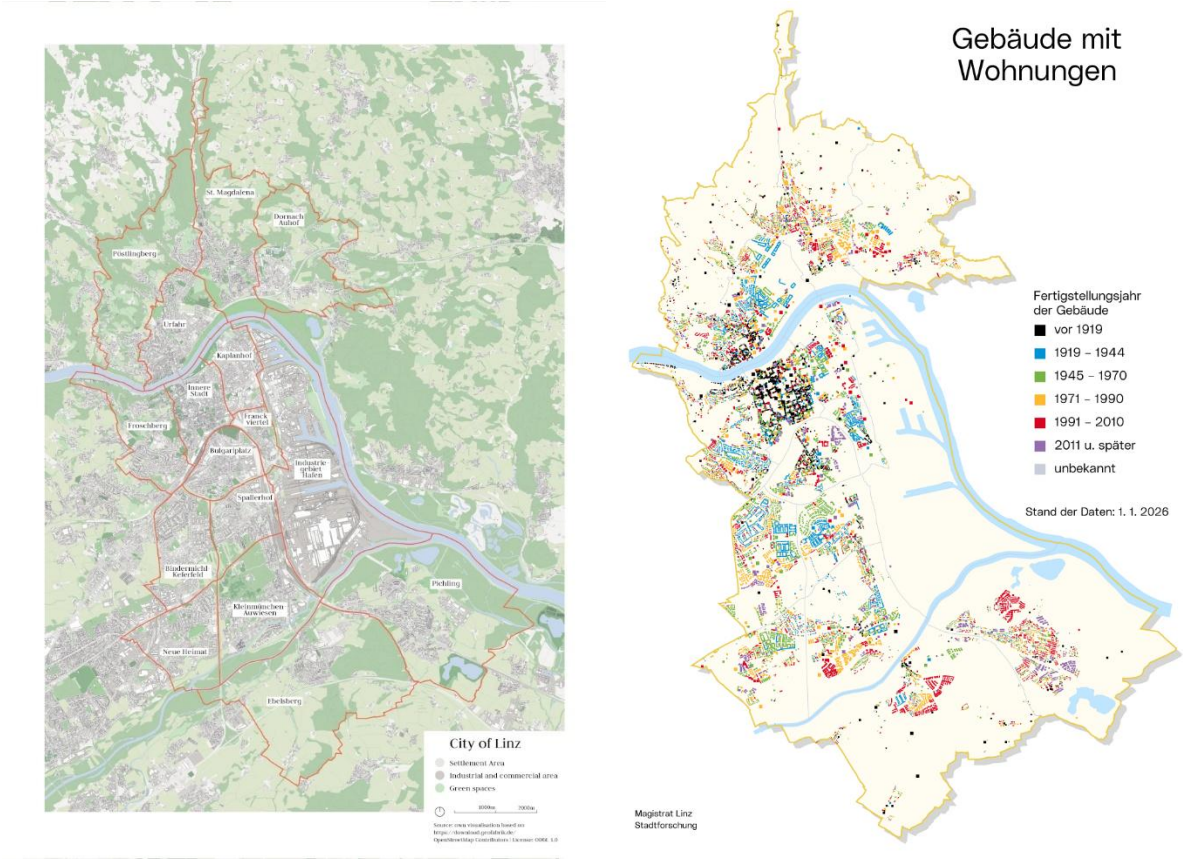

Figure 2: Neighbourhoods in Linz (left) and year of completion of residential buildings in the city of Linz (right). Sources: Left Map (own visualisation based on OpenStreetMap), Right map: Stadt Linz (https://www.linz.at/zahlen/050_Infrastruktur/080_GebaeudeundWohnungen/040_Wohnungen/#gallery-7)

[1] https://hdgoe.at/ns-wohnungsbau

These large, courtyard-style residential complexes, built in districts such as Bindermichl, Spallerhof, Wimhölzl-Hinterland, continue to shape the cityscape today. In Linz, these housing estates are still commonly referred to as *"Hitlerbauten"*— a term used for residential buildings constructed during the Nazi period. Characteristic features include the spacious green courtyards and solid architectural forms, often reminiscent of the regional *Vierkanthof* (four-sided farmstead)[2]. Some of these projects, such as the Bindermichl estate — originally planned with six different typologies and about 7,000 housing units under the responsibility of WAG — were only partially completed during the war, with several buildings finished after 1945. Other neighbourhoods, such as the Franckviertel, contain earlier workers' housing built during the industrialisation period for employees of local factories, such as the Franck company (Kolar, 2021). Today, still around one in eight residents of Linz live in one of these settlements known as *"Hitlerbauten."*[3] Moreover, many of these estates remain under the management of long-established non-profit housing associations in Linz and face multiple challenges, especially those related to retrofitting and energy-efficient refurbishment.

Housing and rental prices are moderate and relatively evenly distributed across the city (apart from the city centre, where private rental housing dominates), and have also risen over the last few years, though not to the extent seen in other Austrian cities. The high proportion of LPHAs is clearly dampening housing prices in the City. For instance, a recent study found that in Linz–Wels, households in limited-profit housing have substantially lower median equivalised incomes than those in private main rent (Linz–Wels: €1,385 vs €2,100), indicating that the limited-profit segment is more strongly targeted towards lower-income groups in the urban core (Raab, 2025, p. 87).

Rent levels also differ systematically across segments. Amann et al. (2023, p. 25) show that in Upper Austria (2022), average housing costs in LPHA rentals amount to about €7.7/m², compared to roughly €8.8/m² in private rentals (including utility payments, excluding energy costs). For Linz specifically, Zeller et al. (2018) report an average rent of €11.20/m², well below the average in Salzburg, a city of similar size, but more pressured by tourist housing. In Linz, the pressure from tourism is limited, and the share of second residences, with about 13% in 2021 (as shown in Table 1), is relatively low compared to other municipalities. Even in a city with a historically strong limited-profit housing sector, Zeller et al. (2018, p. 609) highlight rising commodification pressures in Linz, including increased apartment ownership, market-oriented dynamics in the private rental sector and a focus on housing as an asset.

Limited-profit housing associations in Linz were under increasing pressure due to rising land prices. As a reaction, the city council of Linz passed a resolution in 2020 entitled the '*Linzer Modell*', which is a planning and land-use policy instrument to secure subsidised/social housing in a context of rising land prices and scarce, well-located plots. It ties rezoning, upzoning, and the disposal of city land to binding affordability obligations through spatial planning contracts

[2] https://www.ooegeschichte.at/ausstellungen/hitlerbauten-in-linz
[3] https://newsv2.orf.at/stories/2141853/2141910/

(*Raumordnungsverträge*). The Linzer Modell applies: (1) before selling or granting building rights on city-owned land, 50% of the site must be designated for subsidized multi-storey housing, (2) when privately owned land is (re)zoned to allow housing with at least 5,000 m² gross floor area, the owner must deliver a minimum of one-third of the project as dwellings eligible under the Upper Austria Housing Subsidy Act; and (3) when privately owned land is upzoned to add at least 3,000 m² gross floor area, at least one-third of the additional residential floor area must be subsidized. In short, the model reserves a fair share of development capacity in well-served locations for regulated, affordable housing by making affordability a precondition of plan changes and municipal land transfers.

Given the City's high share of limited-profit housing associations, the case study does not focus on a specific area but rather on the challenges and opportunities that the extensive limited-profit housing segment poses for implementing green initiatives compared to the private segment. Regarding green initiatives, we focused on a) Nature-based Solutions (NbS), such as tree planting, façade greening, green roofs, b) retrofitting in combination with decarbonising the heating system, as these are currently the most pressing issues in Austria to curb emissions, and c) densification to avoid land take, which is another main challenge in Austria's environmental policy. From a housing inequality perspective, we will focus on whether actors perceive these green initiatives as already increasing housing costs and contributing to the pricing out and indirect displacement of residents, particularly vulnerable persons and households, or whether they perceive risks from these developments in the near future.

1.2 Green Transition Interventions in Linz

Since adopting its first Climate Strategy in 2019, Linz has continuously expanded its climate policy framework, creating a city climatologist and climate coordinator, establishing a municipal climate fund, and convening a climate advisory board in 2020. Several pilot projects and programs have been implemented.

Linz has become one of the leading cities in Austria to develop a comprehensive climate adaptation concept, including an action program (released in mid-2023)[4]. Developed in 2023 through a participatory process involving experts, the city administration, municipal enterprises, and residents, the "Future Linz – Linz's Climate-Resilient Path to Climate Change Adaptation" concept identifies local climate impacts and links them to concrete adaptation measures. The concept includes, for instance, a heat risk map that identifies places where heat impacts intersect with the presence of vulnerable groups. The accompanying action plan will prioritise these areas for greening. As early as 2021, for example, a tree planting campaign was launched in the more sealed areas of the city centre (see chapter 3.2). The Linz City Council has defined 10 overarching adaptation goals that guide all actions, aiming to create and maintain climate-effective open spaces, enhance the outdoor quality of life, and preserve

[4] https://www.linz.at/umwelt/111674.php

biodiversity. The goals also emphasise considering climate risks from extreme events in urban planning and disaster management, improving climate-relevant data, and integrating climate governance into city administration and development. The adaptation framework includes 15 action fields, such as Buildings & Housing, Energy/Electricity, Urban Planning & Spatial Development, Urban Green Spaces, Nature Conservation, Ecosystems, and Biodiversity, among others. The structure of Linz's Climate Change Adaptation Concept links climate impacts, urban action fields, and their specific consequences. Research-based findings on climate impacts across different urban sectors yield tangible effects that require targeted action.

To address multiple climate impacts simultaneously, recommended measures, especially in the fields of urban planning and buildings and housing, include (Magistrat Linz – Planung, Technik und Umwelt, 2023):

- Integrating adaptation measures into zoning and land-use planning.
- Greening urban squares and streets with trees and shrubs.
- Providing shade through vegetation.
- Installing green roofs and facades on public buildings.
- De-sealing surfaces and preventing new impervious areas.
- Increasing the inner-city green share and preserving natural areas.
- Reducing urban parking spaces to improve climate resilience and comfort

The City of Linz provides investment subsidies for a wide range of urban greening measures within its municipal area, targeting private individuals, companies, organisations, and associations. These measures are part of the city's broader climate adaptation strategy, which aims to counteract urban overheating, particularly during summer months. Well-designed green infrastructure, such as roof and façade greening, helps mitigate urban heat islands by lowering surface and ambient temperatures (Magistrat Linz – Planung, Technik und Umwelt, 2020). To support such initiatives, the municipality offers environmental subsidies of up to EUR 15,000 per project. Funding is available for different types of building greening, with specific minimum requirements and ceilings: ground-based façade greening with a minimum area of 30 m² is subsidised up to EUR 4,500, wall-bound façade greening with a minimum of 20 m² up to EUR 15,000, extensive roof greening with a vegetation layer of 8–15 cm up to EUR 5,000, and intensive roof greening with a vegetation layer of at least 15 cm up to EUR 7,500. In all cases, the subsidy covers up to 30% of the total project costs.

Against the background of this comprehensive NbS-oriented strategy, Linz provides a paradigmatic case that allows us to probe the (perceived) effects of NbS implementation in neighbourhoods that are dominated by strongly regulated and low- to mid-income oriented limited-profit housing associations (LPHAs) compared to more market-oriented housing segments.

In 2024, the city government of Linz adopted a guideline positioning the city as a climate-friendly industrial hub, embedding climate protection as a cross-cutting principle in urban development and defining 52 measures within the Climate Neutrality Concept "Climate Neutral Industrial City Linz 2040" across seven fields of action; Governance, Energy, Buildings, Transport/Mobility, Industry & Economy, Consumption, and others. The strategy was developed through a broad stakeholder process involving politics, administration, industry, science, and civil society.

In the Buildings field, key measures include developing climate-neutral neighbourhoods, promoting social and public housing built to low-energy and climate-neutral standards, thermally and energetically renovating existing buildings, pursuing infill development, constructing new buildings with CO_2-optimized and circular building methods (e.g., hybrid or timber construction), and activating vacant sites and brownfields, particularly for commercial use. The city also plans to consult regional authorities to align housing subsidies with climate-neutrality objectives. The levers here are climate-neutral urban development, life-cycle assessment in construction, building renovation and optimisation, and reduced land and resource consumption. In the Energy field, measures include energy consultations for residents, businesses, and associations, expanding photovoltaic installations, forming renewable energy communities (EEGs), and implementing climate-oriented energy spatial planning. Targets include equal access to renewable energy and the mitigation of energy poverty. Across both fields, the city emphasises emissions-free buildings, the use of circular construction materials, energy-efficient renovation of municipal stock, and alignment with EU directives such as the Energy Performance of Buildings Directive (EPBD) and the Energy Efficiency Directive (EED III) (Magistrat Linz – Büro Stadtregierung Linz, 2024).

Given this emission-reducing, resource-efficiency-oriented strategy, Linz provides another paradigmatic case for assessing the (perceived) effects of retrofits and densification projects undertaken by limited-profit housing associations (LPHAs) compared to more market-oriented housing segments, allowing the inference of differential impacts on affordability and consequential neighbourhood dynamics. Amongst this, it is also a critical case that probes the possibilities and limitations of civic initiatives in retrofitting through potential energy communities, primarily to assess the role of multi-level policy arrangements. Since the operations of limited-profit housing associations in Linz are subject to housing subsidy regulations of the federal state, as well as other regulations in spatial planning and building regulations, it is a paradigmatic case for analysing synergies and trade-offs for the housing affordability and housing security for low- to mid-income and other marginal groups in different housing segments that emerge from multi-level settings, especially for energetic retrofits, heating decarbonisation and densification projects. That is also why the following briefly delves into selected policies at the federal state level in Upper Austria.

Essential policies at the federal state level of Upper Austria

Due to Austria's federal political system, Linz remains subject to the authority and legislation of the Upper Austrian provincial government. Austria's federal political system results in a range of plans, strategies, and regulations at the provincial level in Upper Austria. Consequently, these are also relevant for Linz.

Environmental policies. For instance, the Upper Austria Climate and Energy Strategy builds on existing climate plans and provides an overarching framework to coordinate efforts toward achieving climate goals, with updated technical and governance requirements as needed. The region aims to be climate-neutral by 2040, with remaining emissions offset through enhanced natural carbon sinks. In the long term, the strategy envisions achieving harmful emissions as effective technologies develop, reducing atmospheric CO_2 concentrations.

The strategy identifies three main clusters in the building sector: heating system changes, new construction, and thermal renovations, all of which involve both climate mitigation and adaptation. This includes **a)** the phasing out of fossil-fuel heating systems to reduce carbon

emissions; **b)** the adaptation of building standards and densification efforts, where new housing demand should primarily be addressed through infill development and higher-density or other measures that minimise land consumption, and **c)** the expansion of energetic retrofits (and decarbonisation. The 2021–2027 government agreement introduces a renovation offensive, offering targeted, project-based funding for innovative renovation projects to ensure affordable, energy-efficient housing. Thermal renovations aim to achieve at least a low-energy standard, with life-cycle costs as an economic benchmark. Federal targets require higher funding allocations, continued tax deductibility, and adherence to minimum standards coordinated through OIB Guideline 6. Subsidy programs are to continue supporting renovations with attention to ecological criteria (building density, location, energy performance) and the integration of climate adaptation measures. Overall, the strategy emphasises combining climate mitigation and adaptation, promoting energy-efficient, sustainable buildings, optimised urban development, and the phase-out of fossil energy to achieve long-term climate neutrality and urban resilience (Amt der Oberösterreichischen Landesregierung - Direktion Umwelt und Wasserwirtschaft, 2022).

Housing policies. In housing policy, the most essential regulations include the Upper Austrian Housing Subsidy Act (*Oberösterreichische Wohnbauförderung*[5]) within which the Department of Housing Subsidies, which is run by the right-wing Austrian Freedom Party (FPÖ) since 2009, determine the strategic approach, adapts the subsidy orientation and criteria through specific ordinances6 as well as approves every subsidised housing unit being built in Upper Austria. Upper Austria's housing subsidy approach shifted its focus from equally subsidising multi-apartment buildings and single-family houses (50%/50% in 2012, according to Amann & Mundt, 2013) to a stronger emphasis on subsidising multi-apartment buildings (65%) over single-family dwellings (35%) in 2022 (Amann et al., 2023). Historically, compared with other regions in Austria, Upper Austria has maintained a strong focus on single-family houses while still allocating a significant share of resources to subsidised rental housing (Zeller et al., 2018). Around 80% of housing subsidy funds for new construction flow to LPHAs (Zeller et al., 2018), highlighting their central role in providing affordable rental units in multi-storey buildings (Amann et al., 2023).

In general, the energy performance of building envelopes is high in subsidised housing, especially in the limited-profit housing sector. Still, the renovation rate for comprehensive renovations has been declining over the last few years (Amann et al., 2023). Also, Upper Austria grants subsidies for renovation measures. The subsidy amounts to a quarter of the eligible costs for buildings with up to three residential units. Alternatively, one-off non-repayable construction cost subsidies are available (15% of eligible expenses). For individual

[5] https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LROO&Gesetzesnummer=10000366
[6] https://www.land-oberoesterreich.gv.at/13704.htm

component renovations, the maximum eligible costs are €15,000 per component. For comprehensive renovations, the limit is €50,000.

While the housing construction subsidy has supported demolition and simultaneous rebuilding of single-family homes since 2015, since 2020, this approach has also been extended to multi-storey residential buildings under the Upper Austria Residential Renovation Ordinances I[7] and II[8]. The renovation ordinances prioritise building expansions through higher subsidies. At the same time, additional bonuses are granted for locations that minimise motorised private transport, for example, with a bonus if renovations are within an existing settlement area. With the renovation regulations effective from June 2020, a model with bonuses for renovation measures has also been created for owner-occupied homes, replacing the previous renovation levels. This makes gradual renovation in stages more attractive. In buildings with more than three residential units, the loan amount is limited to 80% of eligible renovation costs, with upper limits varying by renovation measure. The subsidy amounts to 20 to 30% (for comprehensive renovations).

The demolition and new construction renovation programme has been very successful, especially in existing residential areas (Amann et al. 2023). Since 2020, this has also been extended to multi-storey residential buildings, making it very attractive to commercial developers (ibid.). The advantage for them is that the renovation subsidy can be combined with a shorter, more favourable depreciation period under tax law. Furthermore, the government of the federal province of Upper Austria introduced this densification regulation on January 1, 2025 (*Oberösterreichische Nachverdichtungsverordnung 2025*[9]). The regulation provides subsidised loans for the construction of rental or purchase apartments in residential buildings with more than three units, provided that the building increases the ratio of living space to land area. Subsidies can be granted to non-profit housing associations, commercial developers, and municipalities for the demolition of an existing building and simultaneous construction of a new residential building, for new construction on already sealed land, or for extensions and conversions to add apartments. The maximum loan amount is €1,100 per square meter of living space, plus €15,000 per apartment and €4,000 per balcony or terrace. Loans have a 45-year term, with an interest rate of 0.5% for the first 25 years and 1% for the remaining term.

Table 2. Key data on the case study area of Linz.

	Linz (City-wide)
City characteristics	- Statutory city (Upper Austria) with a population of around 210,118 (2023) and moderate population growth (+15%/10y). - Shift from a former industrial to an increasingly post-industrial economy, about 7% unemployment rate (Statistik Austria 2021)

[7] https://www.ris.bka.gv.at/Dokumente/LgblAuth/LGBLA_OB_20200529_44/LGBLA_OB_20200529_44.html
[8] https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrOO&Gesetzesnummer=20001080
[9] https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrOO&Gesetzesnummer=20001335

	- Housing structure: 53% LPHA share, 2% public, 23% private rental, 20% ownership; about 17% are built before 1944; 45% between 1945 and 1980; and 30% of stock after 1991. - Dense historic centre with a lack of green spaces, while historic LPHAs buildings are often characterised by large courtyards and green infrastructure - High district heating connection rates in many LPHA-dominated areas; Heating prices are moderate for district heating citywide, but rising because of the post-energy crisis - Negligible tourism/second home pressures
Duration	- *Strategies:* Climate Strategy Linz (2019) led to two aligned strategies: Climate Adaptation Strategy (2023) and Climate Neutrality Concept (2024) - *Implementation:* Administrative changes: establishment of climate coordinator & city climatologist (2020); Introduction of *Klimafonds Linz* to foster (civic) climate related projects; Introduction of Urban Development Committee in 2019 and constant retooling of (legal) urban planning tools; Tree planting programme (2021) and legal changes enhancing green infrastructure on public grounds and buildings; Introduction of Pilotproject "*Linz mit Ambitio3xn*" (Linz with Ambition).
Funding	- *Linz with Ambitions* funded under the federal Mission "*Klimaneutrale Stadt*" and Pionierstadt (2023-2028, public–public, ~€2m/5y); - *Klimafonds Linz* (municipal micro-grants, 2020–2025); - *Other public funds from the City* - *OÖ Wohnbauförderung* (public housing subsidies at the federal state level providing loans/grants for renovation/new build amongst private equity by LPHAs and other housing developers)
Actor constellation	Municipality/City of Linz; Federal State of Upper Austria (mainly the Housing Subsidy Department); Federal level (funding/building regulations); Public Utility Companies (e.g. Linz AG); Limited Profit Housing Associations (LPHAs); Private building owners/developers; Tenant Advocacy Organisations; Civic groups; Consultants/research partners
Aims and objectives	- Municipality-wide reduction of −90% GHG, ≤10% compensation by 2024 (Climate Neutrality Concept) - Municipality-wide preservation and expansion of green and blue infrastructure, integration of climate adaptation into urban planning and governance to counter climate hazards, and awareness raising.
Specific physical measures	- *Nature-based Solutions*: tree planting in streets, green space preservation, de-sealing, green roofs and facades. - *Retrofit/heat decarbonisation:* mainly energetic envelope improvements, district heating connections or heat pumps/photovoltaic installations, heating-circuit optimisation. - *Densification*: rooftop additions (*Aufstockung*), block infill, brownfield redevelopment, reconstructing projects (replacement where accessibility/fabric demand it)
Accompanying housing policy/regulatory measures	Urban Development Committee linked to climate mitigation and adaptation criteria (2019); Building plans and codes defining minima and binding plantation of trees and green roofs (2021); Prioritising subsidised housing through zoning: 1/3 subsidised units at rezoning (2020); Densification ordinance (2025) supports densification projects with adapted subsidy schemes (2025).
Key social tensions or/and	*Expected benefits* include reduced heat exposure in vulnerable areas; potential lower total costs via retrofit and metered district heating; improved accessibility

benefits between greening and housing	through densification cross-subsidy, whereas evidence hints that social plans and renovate-in-place tempered displacement. In general, the high LPHA share buffers rent surges. Tensions relate to private-rental stress, where fixed-term contracts and general price inflation increase precarious housing situations. Recent price inflation has increased tensions between greening and affordability, especially regarding heat changes, as cost reductions are not always significant. Also, costly double infrastructures where heat switches are not compulsory increase rent payments through higher operational costs. NbS and densification, when implemented in the LPHA segment, rarely show trade-offs.

2 Methods

Qualitative data for the Linz case study were collected mainly through semi-structured interviews conducted between September 2025 and February 2026. In total, 15 interviews were conducted with actors involved in urban development, housing, climate policy, and civic engagement in Linz. The interviewees represented public administration at the municipal level, academia, architecture and planning practice, limited-profit housing associations, private consultancy, and civic initiatives. This diversity was intended to capture multiple institutional and societal perspectives on green transition activities in the city. The sampling strategy combined purposive and snowball sampling. Initial interview partners were identified based on their formal roles in housing policy, climate governance, urban planning, and related fields using desktop research. Additional interviewees were subsequently identified through recommendations made during the interviews.

All interviews were conducted in person, primarily at the interviewees' workplaces. In accordance with TU Wien's ethical approval guidance, participants were informed about the project's objectives and data protection regulations. Before audio-recording the interviews, written informed consent was obtained from all interviewees, including a confidentiality clause. The interviews were transcribed in a two-step process. An initial automated transcription was produced using A-train software (Haberl et al. 2023). In a second step, all recordings were manually reviewed and corrected where necessary. Interviews conducted in German were analysed in the original language. For data analysis, the qualitative analysis software MAXQDA was used. For reporting citations, parts of the interviews were translated into English.

In addition, background research was conducted in preparation for the interviews. This included the review of legal documents, policy strategies, planning documents, municipal reports, academic literature, and grey literature relevant to housing, climate policy, urban development, and energy transition in Linz.

Nonetheless, the research is subject to some limitations. While focusing on mechanisms or trade-offs that implementing green initiatives in a city with a large protected, limited-profit housing sector might generate, it must be noted that the full diversity of practices of limited-profit housing associations cannot be captured. However, the selection of limited-profit housing associations was intended to identify the most important actors. Furthermore, capturing civic perspectives, especially those from marginalised residents, proved challenging, as Linz (as

Austria in general) is characterised by a relatively small number of organised civic groups in housing. While interviews with civic institutions and initiatives (such as tenant organisations and other activists) provided essential insights into resident-related concerns, these perspectives cannot fully substitute for a broader range of individual resident voices, particularly those of more marginalised groups with limited capacity for formal representation. In addition, as many of the green initiative measures examined are still ongoing, the findings reflect anticipatory assessments and evolving dynamics rather than finalised outcomes.

3 Perceptions of Green Initiatives in Case Study Areas: Linz

3.1 Precedents and implementation

Public officials in Linz describe that the decisive push around 2019–2020, which legitimised new climate governance and accelerated strategy-making, was anchored in the Paris Agreement, which Austria signed, and was additionally amplified by the Fridays for Future protests at this time. A climate coordinator role was introduced in 2020, under which an interdepartmental process produced the "Climate Neutrality Concept" (Klimaneutralitätskonzept) with a 2040 target (90% reduction, max 10% compensation) and a plan to implement a citywide greenhouse gas monitoring system to track annual progress. Alongside the Neutrality Concept, the climate adaptation strategy was developed in parallel and tightly coupled to decarbonisation.

"*Fridays for Future, the Paris Agreement—these made it impossible for cities to ignore the mandate. In Linz, we created roles and structures and secured the political backing to act. That's how these concepts and step-by-step implementations could take shape*." (Consultant and former climate coordinator for the city of Linz)

Officials underscore that the climate adaptation strategy explicitly frames social equity as a field of action, such as mapping vulnerable groups, and also addresses displacement and price effects, or emphasises pairing measures with safeguards to raise awareness of potential social implications. This "social" approach was later mirrored in the neutrality strategy, even if ex-ante assessment proved methodologically difficult; the potential for social impacts was acknowledged when describing actions (see also Linz City Administration, 2024).

For implementation, officials situate recent climate action within a formal, intergovernmental architecture that both institutionalises capacity and accelerates existing strategies. They describe the "Linz with Ambition" project as a public–public cooperation with the federal Mission "Climate Neutral City" (*Klimaneutrale Stadt*), not as a conventional grant, but channelling about €2 million over five years predominantly into staffing to build seven new competencies across the city administration and its public utility companies. Furthermore, regular knowledge exchange and formats like a "climate breakfast" reinforced learning across Austrian pioneer cities and peer cities like Zurich within this funded project.

Civic actors recount the same period as a bottom-up opening catalysed by the "*Klimafonds Linz*" (Climate Fund Linz), which served as a low-barrier fund for subsidising projects by the

city itself and by civic-led initiatives. One project, for instance, was "*Klimasoziales Linz*" (Climate-Social Linz), where, amongst others, art teams worked with underrepresented groups such as single mothers, children, and youth using speculative design to visualise futures for mobility, cohabitation, and land use, making trade-offs discussable beyond expert circles and motivating participation. These cultural and social practices complemented technical pilots in housing and energy, including bottom-up approaches to housing retrofits.

"The city's Climate Fund really tried to give citizens a way to kick-start things, so low-threshold that two private people could get support. That was unheard of then, but it helped prove what was possible." (Civic initiative representative)

However, civic initiatives also underline the fragility of supportive policy instruments: the Klimafonds' discontinuation in 2025 is seen as a setback driven by political headwinds and contentious comparisons with other spending priorities. Despite uneven project quality, they argue the fund's catalytic value—in mobilising people, testing formats, and surfacing social dimensions—outweighed its risks, especially when paired with the new climate coordinator and climatologist roles that anchored collaboration.

In contrast to these more recent developments, housing experts and providers narrate long-standing, incremental upgrading within the limited-profit sector following a renovation cycle of 20-30 years (depending on the limited-profit housing association), sustained the energetic improvements of building envelopes according to building standards since the 1990s and high connection rates to Linz's dense, price-competitive district heating. This highlights a long-standing practice among the city's key sector, which accounts for roughly 50% of the housing stock. However, this steady practice contrasts with priorities at the federal state level since 2009, the policy level that provides housing subsidies, which kept the focus instead on new-build output and cost damping through standardisation, while comparatively underweighting renovation.

Housing experts characterise the past decade in Linz as defined by land scarcity and sustained price inflation, which progressively eroded the feasibility of subsidised schemes on market-priced plots. Since 2009, provincial housing policy has maintained its emphasis on maintaining new-build output and dampening costs through standardisation, while giving comparatively less weight to renovation, despite an ageing stock. As a result, even where demand for affordable housing was high, rising land prices, combined with rigid criteria for building subsidies, made it infeasible on the most expensive sites. Therefore, around 2020, following increased energy prices and the push for decarbonisation, densification also became more critical. As reported by limited-profit housing providers, adding extra storeys, infill, and selective reconstruction are now evident across portfolios, signalling experimentation beyond routine energy retrofits.

"Land is scarce and expensive. Some plots are now so costly that subsidised housing is not approved. The Linzer Model foresees a quota at rezoning as a response to rising land prices and limited, affordable sites — without it, many projects wouldn't be feasible." (Housing Expert)

Against this backdrop, the Linzer Modell emerged as a planning lever to secure affordability at the point of rezoning. When converting green to building land, roughly one-third of new units must be subsidised, regulated through rezoning conditions and urban development

agreements[10]. Experts are frank that this was necessary because land became too scarce and expensive for many subsidised projects to pass provincial feasibility criteria; without a quota at the planning stage, affordable units would be crowded out entirely.

3.2 Participation and governance (procedural)

Public officials describe participation and governance as a mix of formalised planning instruments, broad but structured engagement, and multilevel coordination bounded by legal and fiscal constraints. They point to the council-approved climate adaptation strategy and climate neutrality concept as both mandate and a convening device: because these were co-developed across departments, utilities, external experts, and residents including cross-department "consultation days" involving 52 municipal staff and external partners from in October 2022 and 2023, an extensive prior household survey to 13,000 households, and a sharpened focus on monitoring citywide greenhouse gas emissions to steer decisions toward the 90% emission reduction (see also Linz City Administration, 2024, p. 19). The implementation of climate mitigation and adaptation measures is described as easier to "mainstream" into routine administrative work through broad collaborative efforts. In their view, co-produced strategies map responsibilities across the EU, federal, Land, and city levels and anchor them in specific departments and utilities, with the intention of preventing the passing of responsibility across actors.

They also see municipal levers as strongest at rezoning or building code changes; once projects fall under building law, adaptation measures are hard to mandate, pushing reliance on soft tools like the urban design commission and cooperative planning procedures. A budget-alignment working group under the piloting project "Linz with Ambition" is, in officials' eyes, another key step toward institutionalising climate budgeting. Still, they note that the full rollout is paused due to pending federal regulations.

Officials further perceive a need for procedural durability and more explicit higher-level rules. Funding tied to political cycles, divergent timelines between industrial and housing decarbonisation, and legal gaps all shape what they believe can be delivered within one term. Strategically, they describe a pilot-to-blueprint pathway (e.g., using Franckviertel for district heat decarbonisation) while lobbying, often together with LPHAs, for lifecycle standards and "existing stock before replacement" principles at the federal-state and federal levels. On greening and heat mitigation, officials feel they must mix formal levers where available with negotiated standards elsewhere.

[10] see https://www.linz.at/stadtentwicklung/114753.php

"It requires clarity about what to do—and staying power beyond a single political term. Funding often runs on electoral cycles, which makes it challenging. But doing nothing is not an option." (City Official)

When officials describe their participation in implementing concrete retrofitting, decarbonisation, and greening measures, they recount targeting inputs to specific decisions (e.g., CityBike station locations) and co-organising with local initiatives, reflecting what they see as a pragmatic, needs-first approach. For street greening, they perceive polarised views around parking pressure and acknowledge the difficulty of quantifying opinion at the street scale.

Limited-profit housing associations and housing experts, by contrast, perceive governance primarily through feasibility frames set by federal-state instruments and cost controls. They describe a long-standing emphasis on keeping new-build output stable, while prescribed standardised building material standards keep rents as low as possible. A focus on renovation became only more critical in recent changes to the housing subsidy scheme. In their assessment, the densification ordinance is a pivotal fix because it treats rooftop additions and infill under new-build funding criteria. These unlocking projects were not viable under earlier renovation subsidies. The densification ordinance released in 2025 is welcomed by limited-profit housing associations for its higher volumes and longer concessional terms. Yet, interviewees still see headwinds: inflation, cost volatility, and policy side effects such as the rent cap's freezing of the maintenance and improvement contribution.

On decarbonisation, housing providers perceive legal asymmetries as a core barrier. They report they cannot compel individual heating switches, forcing expensive parallel systems (district heating plus legacy gas) during transitions, even when the switching networks are ready. They also perceive weak incentives in current rental and non-profit law to monetise "green investments," making much of the push mission-driven rather than financially rewarded. Conversely, in their view, targeted provincial changes to revised renovation funding and densification rules can materially improve loan terms and rent calculations, bringing stalled projects within reach.

For greening, all interviewed housing providers say they always seek to maximise trees and extensive green roofs within tight cost parameters, while facade greening remains largely out of reach. In the context of retrofitting projects, providers' perceptions of participation are resolutely practical. They report moving away from large town halls, which are increasingly seen as counterproductive, to staircase- and building-level meetings, quarterly letters, and door-to-door conversations with social work specialists. In their experience, this format better explains heating changes in non-technical terms, reduces rumour, and builds consent around potential rent effects and construction disruption. From a civic perspective, tenant advocates add that §18 procedures cluster in LPHA stock. These procedures usually allow for an (usually not dramatic) increase in the rent after a court decision. However, tenant advocates perceive greater acceptance among long-term residents, where upgrades become more visible and baseline rents were long suppressed, so they have faced more pushback from recent movers. In general, tenant advocates situate participation within affordability stress and legal complexity.

"*We learned that 150–200-person briefings don't work. We now meet tenants in smaller groups, follow up quarterly in writing, and will likely go door-to-door to explain heating changes in simple, clear terms*." (Housing Provider)

Environmental civic initiatives see the Climate Fund as a rare, low-threshold pathway for grassroots experimentation, where early grants funded expert studies and founders' time, enabling initiatives that would otherwise have folded. Its discontinuation is perceived as a setback and reinforces their view that stronger levers, such as federal-state housing-subsidy criteria, lifecycle standards, and rezoning conditions, remain underweight in addressing renovation and climate costs. They also perceive limits in some city instruments and raise concerns about political steering in design bodies, while urging more inclusive formats that reach beyond the "already engaged" and maintain momentum between consultation and delivery.

"*The Climate Fund truly gave residents a low-threshold way to start things. Without early funding for studies and our time, we would have given up after two months*." (Civic Initiative Representative)

3.3 (In)equity (distributional)

Across actor groups, interviewees frame (in)equity in Linz as a question of who bears costs and who benefits from decarbonisation, greening, and densification—and how policy design can reduce unequal burdens. As already mentioned in section 3.1, public officials describe a deliberate "equity-by-design" approach in both adaptation and neutrality strategies: prioritising heat-vulnerable residential areas, integrating social vulnerability indicators (age, income, unemployment), and focusing on access to publicly available cooling within a five-minute walk. In the climate-neutrality concept, for instance, it refers to vulnerability characteristics that "include low income, age above 65 years, health impairments, migration background or low level of education. Other vulnerable groups are infants, toddlers" (Linz City Administration 2024, p. 39). Furthermore, officials acknowledge distributional asymmetries: dense, low-green neighbourhoods experience persistent night-time heat. At the same time, better-off areas "on the green hills" remain cooler—risks officials explicitly label as unfair and socially consequential. In senior facilities and other municipal buildings, targeted heat-shielding is being incorporated into renovation cycles.

"*People living in dense areas with little greenery simply have worse living conditions than those on the green hills around Linz. That is unjust—and it makes climate adaptation a social imperative*." (City Official)

A flagship equity move, in the officials' view, is the pre-emptive rollout of district heating in Franckviertel to lower household connection costs and phase out gas, thereby tackling energy poverty (via the project Linz with Ambition). They highlight the inefficiency of "double infrastructures" kept alive by a few hold-out users, and the intention to create a citywide blueprint that decarbonises heat while minimising financial barriers for tenants. At the same time, officials concede the limits of their tools: rental law prevents compelling individual heating switches, and the social impacts of neutrality measures could only be flagged qualitatively

rather than quantified ex ante, with explicit instructions to add compensation measures where risks of disadvantages were anticipated.

Housing providers and experts emphasise distributional issues at the intersection of policy, legacy stock, and tenant protections. Experts recall decades of underinvestment in some non-profit estates justified by "keeping rents low," which ultimately left low-income residents with inadequate amenities and higher vulnerability. Recent projects aim to reverse this logic: providers strive to keep rent costs steady through renovation, deliver net savings via sharply lower heating costs, and avoid pricing out residents, especially long-term elderly tenants on unlimited contracts, by using on-site densification to finance upgrades. Yet they stress that legal and financial asymmetries persist: they cannot force individual switches to district heating, and current rental/non-profit law provides weak ways to refinance "green investment" costs, prompting calls for targeted subsidies to support part-by-part or building-wide conversions.

Limited-profit housing providers also foreground the role of social plans when relocations are unavoidable. They note that robust support packages in earlier projects, covering moving costs and guaranteeing affordable alternatives, were introduced in response to tenant protests and are now expected practice. In parallel, they argue that non-profits dampen overall housing costs relative to the private market, but acknowledge that operating-cost inflation because of heightened building norms and general macro-economic conditions as well as repayment schedules can still push burdens onto pensioners and low-to-middle income households, even within the LPHA segment, but even more so outside the LPHA segment where fixed-term leases ("*befristete Mietverträge*") drive insecurity and rent hikes.

Civic interviewees' equity lens highlights both social conflict within buildings and the time poverty of those most affected by climate risks. In mixed-ownership blocks, distrust, envy, and management churn can block cost-neutral improvements such as third-party-financed photovoltaics, suggesting that distributional politics within home-ownership apartments can stall decarbonisation even when funding solutions exist. Civic actors also stress that residents most exposed to heat (e.g., low-income households, single parents) often lack the time and bandwidth to participate in planning processes, reinforcing a mismatch between impact and voice.

> "*The people most affected by heat, those dealing with precarious housing and tight budgets, often have no time to engage. They're directly affected by tropical nights and poor housing conditions, but participation asks for time they don't have."* (Civic group representative)

Tenant advocates underline that housing cost burdens now affect the "settled middle class" due to recent inflation and rising energy prices, not only the poorest. Additionally, fixed-term contracts on the private rental market create leverage for rent increases at renewal, amplifying insecurity. Tenant advocates and housing providers together highlight the uneven reach of rent brakes across housing segments, with limited-profit housing providers being hit the hardest, while at the same time limiting capital for necessary reinvestments in building maintenance. The rent brake should limit the influence of inflation and was introduced on the federal level in 2023. It also applies the maintenance and improvement contribution, which is the primary source of funding for retrofits of limited-profit housing associations. In follow-up reforms, this obligation was lifted again.

While they acknowledge the dampening role of non-profits and the moderating effect of district heating prices in Linz, they caution that greening features can create maintenance obligations and operating costs if not carefully designed and funded, raising questions about who pays for climate adaptation, such as maintaining green spaces, in multi-apartment buildings. For civic groups, this context heightens their expectation that decarbonisation, densification and greening be paired with clear social safeguards and transparent communication about who pays, who benefits, and when.

3.4 Political mobilisation

Political mobilisation in Linz is perceived by interviewees as multi-register and issue-driven, combining protest-oriented action with institutionalised engagement and policy advocacy. Actors do not frame mobilisation purely as opposition; instead, they see it as a means to articulate interests around heat adaptation, street space, housing affordability, and energy transition, and to influence agendas across municipal and federal levels.

Officials emphasise that the current phase is about persuasion and delivery as much as planning. Greening and reallocation in dense streets trigger polarised reactions, often centred on "parking pressure", which officials find hard to verify at the street scale. They view continued, transparent communication and visible benefits as essential to sustain support, alongside iterative risk monitoring to show whether exposure to urban heat declines as measures roll out. Some argue that citywide signals are needed beyond incrementalism, given climate targets and cost headwinds:

> *"It won't be enough to publish strong concepts. We have to convince residents, investors, and the broader economy, and keep funding steady, even when quality requirements raise costs."* (City Official)

Housing providers and experts depict mobilisation as capable of reshaping projects and procedures. Early "demolition and rebuild" announcements provoked tenant protests that pushed the city to adopt a social plan covering moving logistics, costs, and affordable rehousing, which interviewees say has since become an expected template for similar schemes. At the same time, they describe a changed communications terrain: small but vocal opponents can dominate social media and email campaigns, while supportive majorities remain quiet, complicating consent-building even when internal backing is strong. Political mobilisation centres on affordability as a prerequisite for climate action, with tenant advocates calling for a general rent cap of about 2% annually, more substantial renovation subsidies, income-targeted support, and instruments such as a "warm rent" model that aligns landlord incentives with energy performance. They also call for larger, more stable housing budgets and better needs data for Upper Austria to steer supply mixes. However, political coalitions that support these claims are considered rather unlikely given the complexities of a federalist country like Austria.

Civic interviewees present mobilisation as pragmatic and experimental, catalysed by Fridays for Future and enabled by the city's Climate Fund, which lowered barriers to resident-led pilots. Attempts to implement photovoltaics and other measures in mixed-ownership buildings exposed trust deficits and distributional conflicts within homeowners' associations, showing

how governance inside buildings can stall decarbonisation even when financing solutions exist:

> *"We applied as private residents to see if climate measures in a 30+ unit house were doable. We didn't get it over the line — not for lack of ideas or financing, but because distrust and distributional disputes blocked consensus."* (Resident who initiated climate mitigation measures in a multi-ownership building)

Furthermore, institutional advocacy remains essential, as tenant organisations report a steady rise in representation needs across local assemblies, arbitration board cases, and public campaigns, especially as fixed-term contracts amplify insecurity through retrofitting and operating-cost inflation. In this view, mobilisation in Austria is also channelled through more institutionalised organisations, especially tenant advocacy organisations, which are often strongly intertwined with politics.

3.5 Socio-ecological impacts/benefits (positive)

From the officials' perspective, expanding district heating to the limited-profit housing estates in Franckviertel that are not yet connected is framed as a flagship benefit of the pilot project "Linz with Ambition," with citywide potential to establish clear standards for reducing the city's emissions. By pre-emptively extending pipes ahead of individual requests and offering lower-cost connections, the public utility company of Linz aims to phase out expensive "double infrastructures" (gas plus district heating) and cut household barriers to switching, framed explicitly as support against energy poverty. This lever builds on structurally high connection rates and a broader systematic decarbonisation trajectory of district heating, which officials see as achievable within the target window. The dual strategy of decarbonised heat production in district heating and continued efficiency gains, including the phase-out of remaining gas stoves, should lower bills and reduce utility costs for tenants, as no parallel networks need to be maintained. Civic and tenant representatives add that district-heating prices in Linz have risen far less than in other cities in recent years, cushioning the increase in total housing costs mediated by a public utility company.

Adaptation to urban heat is perceived to deliver multiple co-benefits when driven by nature-based solutions. Officials emphasise that trees and greened public spaces break urban heat islands through shading and evapotranspiration, while also supporting rainwater retention, enhancing biodiversity through greened networks, and providing overall environmental benefits that pure building shadows cannot offer without additional measures such as green roofs. The tree-planting offensive (*Baumoffensive*) is informed by heat-risk mapping and street-use criteria, prioritising places where shade benefits walkers and cyclists and where existing tree cover is scarce. Civic actors recognise visible adoption of these adaptation measures, including "sponge city" techniques that enhance subsurface water storage for street trees, as a concrete sign that the adaptation strategy is translating into practice, but they remain too fragmented. Although officials argue that scaling greening across the whole city can equalise neighbourhood living conditions and reduce the premium effects of isolated upgrades, trade-offs tend to characterise the implementation of adaptation measures.

"If we truly green the entire city, distinctions in 'quality of life' between quarters diminish." (City Official)

Officials and housing providers highlight positive health and well-being gains from exemplar projects and day-to-day upgrades. Demonstration buildings and greener streets are seen as persuasive tools for investors and residents alike: "Lowered energy bills, children playing, shade from trees, that means we feel good in the city" (City Official). Housing providers report that deep envelope improvements reduce the heating demand, so tenants experience direct savings where consumption-based billing applies: *"If the heating demand drops significantly, the tenant benefits directly because district heating is billed by usage"* (Housing Provider).

Ensuring barrier-free access and social facilities are considered necessary by housing providers as a means of convincing residents to agree to renovation and, in some cases, demolition and new construction. While limited-profit housing providers aim to keep base rents steady through renovations while delivering net savings via lower heating costs, they usually add private outdoor access (balconies, ground-floor terraces), reorganise courtyards and "terraces for all" with 50 cm substrate for planting, preserve mature trees where possible, strengthen pedestrian permeability, and add play areas.

"We now try to offer the same rent before and after renovation, tenants should see lower total costs because heating bills should fall by more than half. We'll solve the financing puzzle, but we don't earn an extra Euro for doing the green upgrade." (Housing Provider)

Overall, limited-profit housing providers show a high level of awareness of improvements that enhance everyday comfort and the microclimate. Green roofs are now standard for new builds and are considered necessary climate adaptation measures for extreme stormwater events. Modest tree planting in existing gardens is described as a low-cost, high-impact step when conditions allow. Civic and research partners similarly stress inclusion-oriented benefits: planning for residents to remain in place during retrofitting work; making interior upgrades (e.g., barrier-free bathrooms) optional rather than mandatory; and expanding shared spaces and gardens to support participation and community life.

As already mentioned, densification is perceived to yield resource and mobility benefits when implemented in the right locations and with the right instruments, as it requires no additional infrastructure. Experts point to brownfield transformations, such as "the Grüne Mitte", which has been one of the most significant brownfield developments on the former freight station, as long-running examples of adding housing built by limited-profit housing developers while unlocking large, accessible green spaces as a good practice that combines greening and affordability. Providers have described three pathways to densification that would yield socio-ecological benefits. These are: a) replacing underused above-ground garages with underground parking and surface greening; b) adding rooftops in well-connected areas by limited-profit housing providers to guarantee affordability; and c) selectively replacing blocks where renovating to barrier-free standards or replacing poor construction materials would outweigh the investment costs. However, it was emphasised that it is a common approach to assess each case based on its long-term suitability, the accessibility improvements it will deliver, and how it will encourage better use of existing streets, utilities, and transit. Housing providers view the densification ordinance as a policy enabler that steers toward inner development, reduces additional land sealing, and makes mixed-tenure supply financially

workable. In turn, mixed-tenure tools such as the Linz Modell help ensure that affordable units are located in central areas, supporting social mix and access to urban amenities.

> *"First, I am not building on greenfield sites, but rather utilising existing land resources, which are very inexpensive because they are old properties that I purchased at a low price. Second, I am creating barrier-free access in the flat, but also to the flat itself, which is not technically possible everywhere with old properties."* (Limited-profit housing provider)

Finally, providing affordability in housing is seen as a system-level socio-ecological benefit in its own right. Tenant advocates underscore the dampening effect of the limited-profit sector on rents relative to the private market, with LPHA units, especially those where loan payments have been paid off after 30 to 40 years, offering significantly lower overall housing costs. This stabilising function is framed as essential for retaining diverse households in well-located, greener districts—so that environmental benefits accrue to existing residents rather than pricing them out.

3.6 Socio-ecological impacts/harms (negative)

Public officials describe a strategic and political intent to prioritise renovation and, when demolition is unavoidable, deconstruction with local reuse (often framed as "Reconstructing"). Civic and research actors report that when replacement occurs, it is typically conventional (concrete/brick with mineral or plastic insulation), leading to substantially higher emissions and material throughput than ecological renovation, e.g. with wood. They therefore clearly advocate for a "renovation first" approach without compromise. Limited-profit housing developers and housing experts report that, often, decades of underinvestment, as well as the creation of barrier-free units, underlie arguments for replacement.

Officials also describe feasibility limits: projects that depended entirely on provincial subsidies (which have changed with the densification ordinance), while fully circular material loops are not achievable under current economics. Housing experts also link ecological concerns to long-standing cost-damping rules at the federal and federal-state levels: standardised economic parameters and equipment catalogues stabilise costs but constrain higher-quality envelopes or adaptation features, producing systemic trade-offs in times of a climate crisis. Furthermore, officials caution against abandoning climate change adaptation measures on and around buildings due to upfront costs, noting that not adapting carries social harms, e.g., increased overheating.

Affordability risks are reported through operating-cost channels and parallel infrastructures. Providers and tenant advisers say decarbonisation does not consistently lower bills: small, local biomass or heat networks can be pricier than prior oil systems, particularly outside the core city, whereas these risks are rarely communicated up front. However, where individual household switches cannot be compelled, estates must maintain gas lines and chimneys alongside district heating, creating a double or triple infrastructure whose testing and maintenance costs are socialised across tenants, even when few remain on gas. Interviewees also describe extreme recent increases in indexed rents and operating costs (cleaning, insurance, maintenance) driven by price inflation in Austria, compounding affordability pressures even when net rents remain moderated in the regulated segments of limited-profit

housing estates and the regulated private rental market. The intended social buffers around renovation do not always hold evenly. Limited-profit providers admit that in some complex 1990s-era buildings with costly geometries, keeping post-renovation rents flat is not feasible without moderate increases of €1–2/m². Tenant advocates emphasise that, while LPHA segments often remain cheaper than private units even after rent increases following §18 procedures, the "very low" base rents increase, which especially burdens recent movers.

> *"These heating systems are not cheap… in many cases, the new heat costs more than the old oil heating, and no one warns tenants it can be pricier."* (Tenant association representative)

Perceptions of gentrification and indirect displacement through pricing out focus on central areas where elevated heat stress, historic housing stock and competitive housing demand intersect. Nevertheless, officials see risks of displacement as context-dependent and slower-changing than in more liberalised cities. Furthermore, they anticipate that citywide greening could equalise qualities across neighbourhoods but call for rent-stabilising instruments if localised gentrification trends appear. They prefer to monitor any price effects of greening and stress that other factors are stronger rent drivers than greening itself. Tenant advisers add that they do not yet observe rent surges directly tied to greening measures. Housing experts, however, describe a parallel dynamic of inner-city modernisation by private and commercial owners (e.g. along Landstraße and Markartviertel) that has steadily removed low-rent units, with affected households relocating to cheaper districts or nearby municipalities. In their view, fast demolitions have also occurred, enabled by current legislative conditions. Across all interviewees, however, the large and dispersed limited-profit stock, which accounts for roughly half the city's housing, is perceived as moderating displacement and segregation.

> *"The inner city is being modernised and renovated… low-rent units disappear and come back much more expensive; households move to cheaper quarters or edge municipalities."* (Housing Expert)

Street greening and traffic reallocation often provoke pushback over parking and public space use for events; new garages intended to serve large mixed-use projects can shift traffic and noise burdens into quieter residential areas. Within estates, densification and new shared-space amenities can create social frictions: concerns about noise and safety near kiosks and meeting points; intergenerational tolerance gaps when playgrounds or communal areas are added; and resistance from long-time residents who fear loss of views or the informal use of green patches.

> *"Change is hard on principle for many people. Long-held privileges, such as views and informally used green patches, may make them feel threatened, escalating into opposition to retrofitting projects."* (Housing Provider)

3.7 Tensions and power dynamics between stakeholders/actors

Interviews highlight multi-level policy coordination as a key issue. City officials describe misalignments between municipal climate aims and provincial subsidy logics. For instance, the city would like to orient itself towards non-binding federal-level building standards for renovations (defined as the '*klimaaktiv'* building standard; for details, see BMWET, 2025) and

would like to see more adaptation measures implemented in buildings (e.g., exterior shading and facade greening). However, these were deemed 'unrealistic' under the current provincial funding legislation. LPHAs risk not receiving funding if they add features beyond those in the catalogue, even if they pay for them themselves.

Administrative hurdles and competency gaps limit municipal capacity to implement climate mitigation and adaptation measures. Officials note that many densification projects in the existing proceed via a simple building notification (*Bauanzeige*), which need no approval from the administrative units. This limits the city's binding levers; even once a project is under building law, municipal influence is narrow. When a new building plan is required, planners refer to the Urban Development Committee (*städtebauliche Kommission*). Using this instrument in recent projects often led building developers to change their projects when climate adaptation measures or other building standards were not implemented, citing cost pressures.

"We were always arguing from the defensive… later all the 'nice-to-have' items such as green roofs or open spaces were gone because 'there was no money left.'" (City Official)

Actor constellations draw both cooperation and critique. Limited profit-housing providers describe a pragmatic relationship with the housing department of the federal state, including regular joint fixes, shared modelling of cost calculations aimed at providing affordable rents given subsidy conditions, and iterative adjustments (such as the densification ordinance), while underscoring that approval power for subsidised projects lies with the federal state. Civic interviewees, by contrast, criticise local instruments by the city as underpowered and politically steered: they argue stronger levers (stricter demolition control, binding rezoning conditions) are underused and claim that urban development and design committees legitimised over-scaled projects without robust city-led volume studies; and characterise much of the climate governance as "greenwashing" that avoids real levers.

"This is 90–99% greenwashing… the real levers are not touched." (Civic initiative representative)

A recurring theme in multi-level policy coordination concerns cross-level funding and bureaucratic complexity as implementation frictions. Experts and tenant advocates highlight overlapping federal and federal-state subsidy schemes for retrofitting and decarbonisation, which are often, by design, non-stackable, and ex-post disbursement that biases actors toward lower-standard solutions that fit unbureaucratic and well-known funding schemes. Housing providers report that some federal programs were as generous as the support of the federal state but too bureaucratic to use, reinforcing a default toward the simpler housing subsidy at the federal state level. Housing experts also criticise the lack of a comprehensive housing strategy at the federal and state levels and the weak data on needs, and call for income-targeted subsidy design and more precise instruments (e.g., rent caps, upfront support) to address affordability without sacrificing standards.

"Federal subsidy conditions were as good as the provincial ones, but so bureaucratic, everyone said: keep it, we'll take the provincial subsidy instead." (Housing provider)

Grassroots projects might run into micro-scale procedural and resident barriers. A tenant-led photovoltaic initiative in a mixed-ownership block collapsed amid mistrust, homeowner association disputes over parking, and changes to building management. Despite successful technical scoping and grant funding, this example illustrates how participatory frictions and a lack of institutional support can derail otherwise viable measures. During construction works, residents report noise nuisance that shapes acceptance, even where rents don't rise in limited-profit housing, underscoring the need for targeted outreach, persuasion, and practical mitigation. On heat conversions, providers and tenant advocates report regulatory limits to compelling individual switches, forcing estates to maintain parallel infrastructures alongside district heating, with costs socialised across tenants. At the microscale of streets and squares, greening measures face competing claims over scarce space (trees vs parking, event setups) and underground constraints; officials frame these as political choices rather than purely technical issues, and trials like dissolving a street segment into green mobility triggered intense neighbourhood debates as mobility patterns were forced to change. Across cases, stakeholders point to underused municipal levers and fragmented responsibilities at the federal, state, and city levels, underscoring the need for clear institutional leadership, early co-design, and targeted outreach to sustain acceptance.

3.8 Innovative governance mechanisms

City officials and planners emphasise three strands of innovation: data-driven planning and monitoring, procedural reforms that make climate criteria central to planning, and pilot-to-blueprint delivery models for heat and housing. On the data side, they describe a digital city model with 3D buildings and tree-shadow simulation, linked to microclimate stations and a public dashboard, plus a citywide greenhouse-gas inventory co-developed with the emissions cadastre of the federal state to standardise methods and reduce dependency on external datasets. Governance-wise, city official considers cross-municipal dialogues ("*Dialog Klima-Governance OÖ*") as essential governance innovations that enable exchanges, but also the creation of an "extraordinary Climate City Senate" where updated emission budgets are presented to elected officials to support governance. Delivery-wise, the Franckviertel pilot project aims to flip the connection logic to decarbonised heating infrastructure. The public utility company, Linz AG, extends district heating in advance and then connects buildings, aiming to decommission costly dual gas/heat infrastructure and reduce barriers for low-cost switching framed as both decarbonisation and anti-energy-poverty strategies.

> *"A central goal is to expand district heating in Franckviertel ahead of connections… then phase out gas where possible. This creates a blueprint for citywide rollout." (*City Official)

Officials also report system changes in urban development instruments. This innovation needs to be viewed in light of the establishment of introducing a climate coordinator and climatologist. They are authorised to make statements on large project submissions to ensure alignment with climate-neutrality targets issued by the climate coordinator and adaptation targets issued by the city climatologist. Furthermore, the Urban Development Committee (*städtebauliche Kommission*) introduced in 2019 was retooled with external members (including a dedicated landscape and open space expert to strengthen climate adaptation measures) and linked to 'klimaaktiv' building criteria so that expectations that were set in early design approvals carry through to building code changes and approved building permits. Similar standards are being

integrated into cooperative planning processes that prepare and set the framework for urban development and public-building portfolios. On adaptation measures, e.g. trees and green spaces, planners point to codified minimums in building plans, e.g., one tree per 750 m² building plot, green roofs from 100 m² roof area, and to prioritisation rules that weight heat-risk maps, street use, and existing shade to steer a tree planting program since 2020 (*Baumoffensive*).

> *"We needed an anticipatory tool, hence the urban development commission with 'klimaaktiv' standards, and a clear link to building permit approvals to avoid 'nice-to-haves' being cut later."* (City Official)

Housing experts and providers describe financing and technical mechanisms that let them combine decarbonisation with affordability. They highlight the densification ordinance, which has been in place since 2025, that treats densification like a "new-build subsidy", enabling rooftop additions and allowing cross-subsidisation of deep renovations, together with a maintenance and improvement contribution that tenants need to pay as part of rent (as stipulated by the national Limited-profit Housing Act - WGG). Some limited-housing providers report that they are currently working on photovoltaic rollouts on existing roofs, alongside the installation of photovoltaic panels on carports whose power revenues finance the carports, generating additional revenue for limited-profit housing associations. Some providers also trial heating circuit optimisation to lower temperatures and reduce energy use, even in district heating systems. On the design level, limited-profit housing associations prioritise unbuilt soil around buildings and larger courtyards to support big-canopy trees and integrate core activation for summer comfort, paired with envelope upgrades that lower heating demands and directly reduce tenant heating bills. Limited-housing providers also underline renovate-in-place strategies and incremental switching incentives, acknowledging the need for targeted financial incentives in the regulated housing stock.

> *"So, figuratively speaking, you take a two-story building and add another two stories on top; those two upper stories then finance, let's say, half of the roof renovation and half of the lift installation, because whether the lift runs to four floors or two, the costs don't double. That way, you can make the renovation affordable, including financial means from the maintenance and improvement contribution."* (Housing Provider)

Policy and planning levers are used to preserve affordability while delivering climate goals. Experts describe the Linzer Modell: at rezoning, roughly one-third of units must be subsidised, ensuring social mix in high-cost areas where subsidised housing would otherwise fail the feasibility criteria of the housing department of the federal state. At the same time, housing experts point to proposals that align incentives with energetic performance, such as deductions for poor thermal quality based on energy performance certificates, or a "warm rent" model that bundles rent and heat at a high-efficiency benchmark, shifting the cost of inefficiency away from tenants and creating clear upgrade incentives for owners.

> *"Land is scarce and expensive… the Linzer Modell's one-third quota at rezoning keeps subsidised housing by limited-profit housing developers in prime locations."* (Housing Expert)

Civic and research actors add bottom-up and commons-oriented pilots to the toolkit. They advocate "renovation first," arguing that ecological renovation outperforms conventional

replacement on embodied carbon and material flows and should be paired with inclusionary measures such as renovate-in-place, optional interior works, and staged heating centralisation so tenants can switch progressively.

> *"Ecological renovation is comparatively resource-efficient; wherever possible, renovate first—and do it in ways that let tenants stay."* (Civic Initiative Representative)

3.9 Tourism and market pressures

Tourism is not perceived as a major driver in Linz's current transformation. Interviewees focus instead on market pressures, especially high-end, investor-led projects and land-price dynamics, while noting that these are moderated by the city's strong limited-profit sector and planning instruments.

Public officials describe episodes of investor pressure around significant, high-rise proposals, which prompted the creation and use of the Urban Development Commission (*städtebauliche Kommission*) to bring external expertise (including open space planning) and to evaluate projects against clearer standards, rather than reacting case by case. Housing experts confirm a growing but contained segment of luxury and investor-owned developments (e.g., Bruckner Tower, Quadrill, Lux Tower), driven by local/regional capital rather than global funds, and supported by planning approvals for high-end schemes. At the same time, they stress that pressure has not reached the scale of those in larger European metropolises.

> *"We were being overruled by real estate tycoons [Bautycoons]'… the commission helps us anticipate and evaluate, so 'nice-to-haves' like green roofs or free space aren't cut away later."* (City Official)

Civic interviewees point to specific instances where public assets were disposed of through highest-bid procedures, outcompeting LPHAs and reinforcing investor-led outcomes. They also note extremely high prices in select projects, sometimes with units held as investment assets rather than lived-in homes. At the same time, tenant advisers report fewer extreme cases of deferred maintenance or displacement pressure than in larger markets; private contracts are commonly time-limited, and post-renovation rent adjustments follow legal frameworks and standard surcharges, tempering more aggressive practices.

> *"Cases where tenants are living in terrible conditions and a landlord does nothing may occur, but I might see two or three such cases a year. Generally, no, because private tenancy agreements are usually fixed-term, the landlord can raise the rent anyway. And if the building has been thoroughly renovated, they'll charge a different rent; if they add a location surcharge, that applies in the private segment as well."* (Tenant Advocacy)

Overall, interviewees depict market pressures such as luxury towers, investor apartments, and high land prices as present, but moderated by LPHA dominance in the housing stock and by governance tools. Tourism pressures do not emerge as a salient factor in shaping housing dynamics.

3.10 Gaps in Perceptions Between Civic Groups and Public Agencies

Civic interviewees acknowledge visible steps toward a strategic reorientation through the climate-neutrality concept and climate adaptation strategies, as well as through programs and implementation practices (e.g., the tree-planting program and sponge city installations). Still, they describe the latter as partial and uneven. They "see" new trees and sponge-city elements, yet are unsure how widely they have been implemented and emphasise that core levers (such as traffic) remain underused. This extends to a broader critique of 'green branding' by some actors, half-hearted regulation, and ineffective advisory bodies, which reinforces the sense that implementation is cursory or insufficiently binding.

In parts, city officials themselves underpin the "not enough yet" reading. They argue that incremental greening with a park here, a tree there, will not meet the challenge of urban overheating and call for bolder reallocation, such as annually dissolving a through-street for green space. They also acknowledge that current tools are modest and often non-binding: standard plan requirements and climate-related statements can be sidelined until instrument reforms make them enforceable. Their accounts of complex constraints, parking pressure, event space claims, underground utilities, etc., help explain why delivery of adaptation measures remains piecemeal and contested.

Housing providers add a practice-based critique that underscores quality and durability concerns. They favour soil-first, big-canopy tree strategies and are openly sceptical of façade greening due to maintenance failures; several installations have been removed, they note, and summer irrigation demands can be ecologically and financially problematic. This suggests that some "quick wins" have not been well matched to local operating realities, reinforcing perceptions of cursory greening when solutions are ill-suited or under-maintained. Officials, too, stress the need to control and sustain open space quality over time, implying gaps beyond initial delivery.

Perceptions also diverge on densification and retrofitting/decarbonisation. Public agencies and providers argue that reconstructing and densifying (now subsidised like new-build) can deliver barrier-free access, better urban form, and more units on existing infrastructure, often making deep renovation work via rooftop additions. At the same time, civic actors emphasise renovation-first inclusion (stay-in-place, optional interior works) and caution against routine upzoning without clear social/climate criteria. Affordability runs through these debates: limited-profit providers point to models that aim to hold base rents steady while cutting energy costs, whereas tenant advocates push for stronger tenant-side protections and thermal-performance-linked incentives so decarbonisation does not raise housing costs, also in private rental segments that are not regulated.

Furthermore, both officials and civic actors see the city's large non-profit sector as a structural buffer against classic displacement and segregation.

> *"Given the high share of public/non-profit housing, I don't think that happens here … I can't imagine such enclaves in Linz."* (City Official)

Nevertheless, civic representatives report rising pressure in the private segment driven by index-linked rent jumps, fixed-term rental contracts, and operating-cost inflation. They link price dynamics more to inner-city modernisations and investor projects than to street greening. On the effects of NbS, specifically retrofitting and densification, officials acknowledge potential value-uplift risks and discuss targeted safeguards. Still, tenant advocates say they see little direct impact on rents from trees or sponge-city measures to date.

"We have no perception of rent increases due to greening or densification … most of it is operating-cost increases and indexation." (Tenant advisory)

Hence, they argue that affordability strains stem primarily from broader market and cost drivers. Providers position densification/reconstructing with social plans and retrofit co-financing (e.g., rooftop additions funding lifts/roofs) as ways to add units, improve quality, and hold base rents while lowering energy bills; civic voices counter that without robust criteria and tenant-side protections, routine upzoning and replacement of buildings risks pricing out lower-income households.

4 Critical Analysis: Linz

4.1 Uneven social impacts of green transition interventions

In Linz, observable affordability strains over the last three years stem primarily from macro drivers (index-linked rent hikes, operating-cost inflation, and land/finance pressures) rather than from the green transition interventions per se. Tenant advocates and civic actors have identified the most significant issues in the private rental sector. Fixed-term contracts allow landlords to gradually increase rent at retrofits, while operating costs (insurance and services) have risen sharply. Inner-city modernisations and investor-led projects have also steadily removed lower-rent units from central districts. By contrast, NbS-inspired measures such as street greening and the sponge-city principle, as well as decarbonisation efforts through district heating expansion, have not (yet) shown a consistent direct link to rent increases in Linz. Officials and tenant advisers alike report little evidence of rent increases attributable to greening itself, and limited-profit providers emphasise strategies to keep base rents low while cutting energy bills through envelope upgrades and district heat (where consumption-based billing applies).

Two caveats complicate this benign picture. First, green transitions can add costs if poorly designed. Limited-profit providers flag that parallel infrastructures (district heat plus legacy gas for holdouts) socialise maintenance across tenants, and small, local heat networks outside core Linz can be pricier than anticipated. Cost risks that are often not communicated up front. Second, densification and reconstruction can raise displacement risks if undertaken without robust safeguards. In Linz's limited-profit sector, general rent regulation, as well as support for social plans for extreme hardship cases, relocation, renovate-in-place logistics, and cross-subsidies via rooftop additions, have moderated those risks. Yet civic actors worry that routine upzoning and replacement could still price out lower-income households, especially in the private segment, unless criteria and protections are made explicit (e.g., performance-linked rent deductions, warm-rent models, binding social-impact conditions in planning approvals).

The city's structural buffers, in the form of its dominant LPHA stock and historically high district-heating coverage, have clearly dampened "green/ecological gentrification" pathways visible in more liberalised markets. It is still too early to see the effect of the Linz Model, which foresees a one-third subsidised quota for rezoning privately owned land. Where harms do appear in Linz, they are indirect, such as cost pass-throughs from macro inflation, investor upgrading cycles in central areas, and micro-conflicts around new shared spaces or construction nuisances. In short, while the transition has not yet been the primary driver of inequality in Linz, it can amplify existing pressures if affordability and governance misalignments are not managed.

Short-term affordability stress is already felt through indexation, operating costs, and selected inner-city modernisations, while the direct, rent-raising impact of greening measures remains limited. Retrofit/decarbonisation effects are mixed: where consumption is metered, and envelopes are improved, tenants probably feel savings; where parallel heat infrastructures persist, operating costs tend to rise. Densification effects are also varied: selective replacement paired with social plans can improve quality and add accessible units without generalised displacement, but noisy sites and the loss of informal green spaces or views can create local resistance.

In the medium term, two trajectories are plausible. If current governance arrangements are maintained, e.g. the densification ordinance, the Linz model and rezoning, and district heating rollouts, Linz could increase inner-city development and retrofitting while maintaining moderate aggregate affordability through the LPHA sector. However, if macroeconomic headwinds persist, municipal instruments remain non-binding and federal-state housing subsidy rules undervalue renovation and adaptation, risks will rise: (i) double infrastructures will last longer; (ii) routine replacements in the private sector will lead to higher prices; and (iii) greening will impose maintenance obligations without providing clarity on funding, which will result in costs being shifted onto tenants. The discontinuation of the city's climate funds (*Klimafonds*) also signals the fragility of low-threshold civic innovation, unless a more sustainable alternative replaces it.

4.2 Key critical points defining housing justice and inequalities

Strong social buffers and multi-level policy frictions define housing justice in Linz. The city's huge limited-profit sector (roughly half of the stock) and high district-heating penetration, rooted in post-war housing institutions and routine envelope upgrades since the 1990s, moderate classic displacement and energy-poverty pathways far more than in many peer cities. Connection rates in LPHA estates are typically high (often exceeding 80% in areas like the Franckviertel), and tenant advisers report that recent district-heating price increases were lower than in some other Austrian cities. These features create a protected baseline for a just transition. Where envelopes are improved, and heat is networked and metered by use, tenants can experience lower total costs, especially if base rents in limited-profit housing are held constant. At the same time, Upper Austria's subsidy logic has, for years, prioritised the standardised output of new-build units under "economic parameters" over the quality of renovation and adaptation, producing a misalignment with municipal efforts to embed *klimaaktiv* criteria in planning and to steer "district-heating first" decarbonisation and risk-led nature-based cooling.

This structural context sits atop a distinctive historical legacy. Interwar and wartime estates, the so-called "*Hitlerbauten*", and post-war buildings with generous courtyards but heterogeneous technical standards now concentrate the transition agenda: deep renovation and heat switching, barrier-free retrofits, and courtyard-based tree planting. The estates' spatial form creates an opportunity to equitably distribute shade, permeability, and everyday amenities, especially when the city's adaptation strategy prioritises heat-exposed areas using risk maps and social vulnerability indicators. Limited-profit housing providers' soil-first, big-canopy strategies align with this goal, whereas façade greening is often infeasible due to maintenance and irrigation burdens. In this sense, Linz's NbS agenda is not a cosmetic overlay but a historically conditioned lens through which environmental benefits can be redistributed, provided long-term maintenance is funded so that operating-cost drift does not undermine the households the measures aim to support.

Where green transition measures have intersected with LPHA practice, they have generally delivered tangible justice gains. Renovate-in-place protocols, optional interior upgrades, and social plans that require temporary relocations have become expected templates, reflecting a learning curve shaped by earlier tenant protests. Financially, the recent densification ordinance treats densification projects like new builds, unlocking future rooftop additions and infill with concessional 45-year loans; these additions often co-finance deep-envelope works and lifts while keeping base rents steady and lowering energy bills under consumption-based district heating. At the planning scale, the Linz Modell secures a one-third subsidised quota at rezoning of private land, protecting future affordable supply in prime locations that would otherwise fail provincial feasibility tests as land values escalate. Together, these instruments have the potential to further moderate displacement risks even as environmental quality rises.

Yet limitations have significant consequences. A legal asymmetry prevents providers from compelling individual heating switches, necessitating costly parallel infrastructure (district heating plus legacy gas) and the socialisation of testing and maintenance across tenants. This blunts the equity dividend of decarbonisation. In the private rental market, where fixed-term contracts allow rents to be adjusted incrementally, recent index-linked increases and operating-cost inflation have increased total housing costs independently of greening measures. Interviewees consistently differentiate these macro pressures from NbS per se; street greening and sponge city elements have not produced measurable rent surges. Instead, conflicts revolve around parking, event space, disruption during works, and occasional externalities in operating costs when maintenance is unfunded or billing is opaque. Modernisations and investor projects in central areas have steadily removed low-rent units, with households relocating to cheaper districts or edge municipalities. Here, the city's buffers moderate, but do not eliminate, market-driven exclusionary pressures.

Densification is the most double-edged component. With the right leadership and tools, it can be both environmentally friendly and socially fair. This could involve replacing surface car parks with underground parking and planting, adding storeys to roofs to fund deep renovations and barrier-free access, and selectively reconstructing buildings where accessibility or poor condition makes it necessary. A case-by-case assessment is central to this, taking into account long-term suitability, accessibility improvements, and the efficient use of existing infrastructure. However, in the private sector, routine upzoning and replacement without binding social and climate criteria risks converting environmental improvement into exclusion through pricing. Performance-linked rent instruments, such as warm-rent models that bundle rent and heating

costs based on an energy-efficiency benchmark, or deductions tied to energy building certificate (*Energieausweis*) classes, would better align incentives so that retrofitting benefits accrue to tenants rather than being eroded by rent or service charge increases.

The city's recent governance reforms have begun to shift the focus of implementation from advice to steering. This includes introducing a climate coordinator and a climatologist, retooling the Urban Development Committee with external expertise and *klimaaktiv* criteria, and piloting pre-emptive district-heating extensions. These measures aim to align expectations at stages where levers are strongest, such as rezoning and changes to building plans. However, the success of these measures hinges on enforceability. Once projects proceed under building law or via notification, municipal leverage narrows, and 'nice-to-haves' such as green roofs or open-space quality are vulnerable to cost pressures. Furthermore, the discontinuation of the city's climate funds (*Klimafonds*) highlights the vulnerability of low-threshold civic innovation, which enabled residents, especially those with limited time and resources, to initiate building-scale transitions and identify social impacts in time to address them.

In summary, Linz's green transition has not primarily driven housing inequality; rather, it intersects with an affordability landscape characterised by private-market churn, operating-cost inflation and central-area upgrading. The city's high LPHA share and high district heating penetration create robust buffers that could translate environmental upgrading into housing justice. Whether this translation succeeds depends on enforcing tighter controls on rezoning and permitting, normalising 'existing stock before replacement' in subsidy law, closing the legal gap that forces dual infrastructure, explicitly funding NbS maintenance and equipping the private sector with performance-linked rent tools. If these conditions are met, Linz's structural advantages could facilitate an equitable transition. Otherwise, environmental improvement could become a vector of exclusion, with benefits accruing unevenly and costs drifting towards those least able to pay.

4.3 Concluding reflections

The case study of Linz reported a combination of green transition interventions, ranging from retrofitting limited-profit estates to instances of soft densification and infill in existing residential areas, such as rooftop additions. It also involves densification on brownfield sites, such as the Grüne Mitte development on the former freight yard, which limited-profit housing developers exclusively developed. In parallel, the City implements networked nature-based solutions (NbS) through climate risk-oriented street tree planting and sponge city installations in heat-exposed corridors and squares. This hybrid portfolio of NbS differs from large-scale, iconic park or river renaturalisation projects in that it relies on dispersed, data-guided micro-interventions tied to everyday streets and LPHA courtyards. The case study also covered the pilot-to-blueprint heat decarbonisation model (district heating first in Franckviertel) and general retrofitting and decarbonisation approaches in the limited-profit housing sector

Regarding stressors, affordability pressure in Linz is driven primarily by rent and operating-cost inflation in the private segment, and by macro-level price dynamics, not by tourism or second homes. Tenant representatives highlight indexation and fixed-term contracts as the primary sources of affordability drivers. In retrofits and decarbonisation, most interviewees link risks to double-infrastructure during heat transitions, while district-heating prices in Linz have risen

less than in other cities, moderating energy-poverty exposure. Greening itself is not reported to trigger rent surges; distributional risks are more about maintenance costs and street-space conflicts than direct “green gentrification.”

Actor constellations are distinctive and help explain the moderated risks. The LPHA sector (≈50% of stock), public utility companies (e.g., Linz AG for district heating), and a retooled municipal planning apparatus (climate coordinator/climatologist, Urban Development Committee with *klimaaktiv* criteria) anchor delivery of green transition initiatives. The federal state (Upper Austria) retains decisive levers via housing subsidies and equipment catalogues, historically favouring output in new builds, but the 2025 densification ordinance is a partial realignment. Nevertheless, tenant advocates and civic initiatives became more critical and active actors, which helps to implement a justice-oriented green transition.

In sum, the equity outcomes hinge less on the presence of NbS, retrofitting or densification per se. Still, more on the enforceability of rezoning/building plan changes, funded maintenance to prevent operating-cost drift, legal capacity to avoid double infrastructures in heat conversion, and performance-linked rent instruments so that retrofit gains become a shared dividend rather than a new cost vector.

5 Bibliography

Amann, W. & Mundt, A. (2013). *Berichtsstandard Wohnbauförderung 2012.* IIBW. https://iibw.at/documents/2013%20Amann_Mundt.%20Berichtsstandard%20Wohnbaufoerderung%20(20131220).pdf

Amann, B. W., Oberhuber, A., Mundt, A. (2023). *Berichtsstandard Wohnbauförderung* 2023. IIBW, im Auftrag des Landes Wien. https://iibw.at/de/forschungs-datenbank/415-berichtstandard-wohnbaufoerderung-2023

BMWET (2025). *klimaaktiv Kriterienkatalog für Wohnbauten Neubau und Sanierung 2025.* Bundesministerium für Wirtschaft, Energie und Tourismus (BMWET). https://www.klimaaktiv.at/fileadmin/Bibliothek/Publikationen/2025_klimaaktiv_Gebaeude.pdf

GBV & VÖWG (2025) *Position Paper: Lessons from Austria's Limited-Profit Housing model, Vienna's zoning law and Vienna's subsidy scheme for EU policies on affordable housing*. https://cms.gbv.at/repos/files/GBV/Intranet%5fdownloads/Intranet%5fdata/Presseaussendungen/Position%20Paper%20GBV-V%c3%96WG%20Strengthening%20EU%20Housing%20Policy%5f20.5.pdf?exp=86514&fps=1caa90d564e428721d7f31c0a0b435f1c6109b92

Haberl, A., Fleiß, J., Kowald, D., & Thalmann, S. (2023). *Take the aTrain. Introducing an Interface for the Accessible Transcription of Interviews.* (October 6, 2023). Available at SSRN: https://ssrn.com/abstract=4594103 or http://dx.doi.org/10.2139/ssrn.4594103

Kolar, F. (2021). Linzer Wohnbau im Nationalsozialismus. Repositum TU Wien. https://repositum.tuwien.at/bitstream/20.500.12708/17973/1/Kolar%20Florian%20-%202021%20-%20Linzer%20Wohnbau%20im%20Nationalsozialismus.pdf

Land Oberösterreich (2022*). DIE oberösterreichische Klima- und Energiestrategie. Oberösterreich am Weg zur klimafitten Region*. Amt der Oberösterreichischen Landesregierung - Direktion Umwelt und Wasserwirtschaft. https://www.land-oberoesterreich.gv.at/files/publikationen/us_klima_energiestrategie.pdf

Land Oberösterreich (2025a). *Oberösterreichische Nachverdichtungs-Verordnung 2025.* https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrOO&Gesetzesnummer=20001335

Land Oberösterreich (2025b). *Wohnbaubilanz 2024*. Amt der Oö. Landesregierung, Direktion Soziales und Gesundheit, Abteilung Wohnbauförderung https://www.land-oberoesterreich.gv.at/files/publikationen/wohnbaubilanz.pdf

Linz City Administration (2024). *Climate Neutral Industrial City Linz 2040.* https://www.linz.at/media/umwelt/KN-Konzept.pdf

Magistrat Linz – Planung, Technik und Umwelt (2020). Fassaden- und Dachbegrünung. Die Stadt mit Pflanzen kühlen. https://www.linz.at/serviceguide/brochure.php?id=451

Magistrat Linz – Planung, Technik und Umwelt (2023). *Zukunft Linz. Der klimagerechte Weg von Linz zur Anpassung an den Klimawandel.* www.linz.at/media/umwelt/Anpassungskonzept_Zukunft_Linz_2023.pdf

Stadt Linz (2022). *Linzer Stadtstrategie 2022.* https://www.linz.at/media/stadtentwicklung/Linzer-Stadtstrategie-2022.pdf

Stadt Linz (2026a). *Bevölkerung*. https://www.linz.at/zahlen/040_Bevoelkerung/

Stadt Linz (2026b). *Arbeitsstätten und Beschäftigte.* https://www.linz.at/zahlen/050_Infrastruktur/030_Wirtschaft/020_ArbeitsstaettenundBeschaeftigte/

Stadt Linz (2026c). *Volks-/Registerzählung*. https://www.linz.at/zahlen/040_Bevoelkerung/085_Volkszaehlung/

Stadt Linz (2026d). *Wohnungen.* *https://www.linz.at/zahlen/050_Infrastruktur/080_GebaeudeundWohnungen/040_Wohnungen/*

Zeller, C., Van-Hametner, A., Smigiel, C. & Kautzschmann, K. (2018) 'Wohnen in Österreich: Von der sozialen Infrastruktur zur Finanzanlage'. *PROKLA*, 48(193), pp. 597–615.

6 Appendix 1 – Glossary

6.1 Abbreviations

EU	European Union
NbS	Nature-based Solutions
LPHA	Limited-profit Housing Associations
OÖ	Oberösterreich (The federal state of Upper Austria)
GWG	GWG - Gemeinnützige Wohnungs-gesellschaft der Stadt Linz GmbH (Limited-profit Housing Association)
Neue Heimat	NEUE HEIMAT Oberösterreich Gemeinnützige Wohnungs- und SiedlungsgesmbH (Limited-profit Housing Association)
WAG	wag Wohnungsanlagen Gesellschaft m.b.H. (a former Limited-profit Housing Association which still manages dwelling units falling under the WGG).
WGG	Limited-profit Housing Act (regulating LPHAs)
MRG	Austrian Tenancy Act

6.2 Terms and Concepts

Linz with Ambition	‘Linz mit Ambitio3xn’ (Linz with Ambition) supports the City of Linz's goal of becoming climate neutral by 2040 (Climate Neutrality Concept). The project develops solution modules in the three areas of ambition governance, implementation, and learning environment, addressing key levers such as energy, mobility, and buildings. In the Franckviertel district, a climate-neutral neighbourhood is being developed as a blueprint for the whole of Linz, including decarbonisation of infrastructure, new mobility solutions and citizen participation. At the same time, administrative processes are being adapted, cooperation with pioneer cities, the Federal Ministry and research partners is being intensified, and civil society is being activated. In this way, Linz is making a decisive contribution as a pioneer city on the road to climate neutrality.
LPHA	Limited-Profit Housing Associations (Gemeinnützige Bauvereinigungen) are firmly institutionalised housing providers in Austria. Regulated by the Limited-Profit Housing Act, these providers set rents on a cost-based basis. Cost-rents consist of the repayment of loans, a renovation component – the maintenance and improvement contribution (Erhaltungs- und Verbesserungsbeitrag – EVB), and an interest of 3.5% on the equity the LPHA has invested. Surpluses need to be reinvested into new construction (see GBV & VÖWG, 2025).
Austrian Tenancy Act	The Austrian Tenancy Act (MRG) defines the rights and obligations of tenants and landlords depending on the type of rental agreement and the characteristics of the property. The law establishes three categories of regulation: full application, partial application, and exclusion from the MRG, each with varying levels of tenant protections. Properties in the full application scope, primarily older multi-unit buildings (pre-1945), are subject to rent control and strong tenant protections. Partial application covers newer buildings (build after June 1953) and allows market-driven rents while maintaining eviction protections. Fully excluded properties (e.g rental objects that have been newly constructed by the conversion of an attic or an extension on the basis of a building permit granted after 31 December 2001,) are not regulated under the MRG and offer no specific rent or eviction safeguards.

§18 procedures	Legal procedures under §18 of the Austrian Tenancy Act (MRG), governing increases in rent setting and adjustments for apartments in the process of renovations.
Urban Development Committee	The urban development committee (*Städtebauliche Kommission*) is an expert advisory body that supports the sustainable, innovative, and high-quality urban development of Linz by formulating concrete planning objectives to guide key urban decisions, particularly for complex large-scale projects. It consists of external and internal experts from fields such as architecture, urban and spatial planning, transport planning, and open-space planning.

7 Appendix 2 – Key interview data and transcripts

#	Position of Interviewee	Sector/company	Date of interview	Media
1	Housing Policy & Political Scientist	Johannes Kepler University Linz	17.09.2025	In Person
2	Architect / Sustainable Retrofitting Expert	Architectural Company	22.10.2025	In Person
3	Project manager, 'Linz with Ambitio3xn'	City of Linz	04.11.2025	In Person
4	Head of the Department of Urban Climatology and Environment	City of Linz	19.11.2025	In Person
5	Founder of a civic organisation for Energy Transition	Verein Energiewende Linz	26.11.2025	In Person
6	Employee, Planning, Technology and Environment Department	City of Linz	26.11.2025	In Person
7	Greenhouse Gas Monitoring Unit at Linz City Council ·	City of Linz	26.11.2025	In Person
8	Director of, and regional Spokesperson for Limited-Profit Housing Associations	WSG, LPHA	27.11.2025	In Person
9	Political Activist / Politician, former Architect	Independent Municipal Councillor for the City of Linz (Linz+)	28.11.2025	In Person
10	Consultant on climate neutrality and climate policy, former climate coordinator for the city of Linz	Self Employed	01.12.2025	In Person
11	Artist & Member of Civic Initiative	Klimasoziales Linz	03.12.2025	In Person
12	Property Developer for a limited-profit housing association	WAG-EBS	03.12.2025	In Person
13	Employee in the Economic, Social and Societal Policy Department focusing on housing policy	Upper Austrian Chamber of Labourers	15.12.2025	In Person
14	Tenant Interest Group Representative	Mietervereinigung, NGO	19.01.2026	In Person
15	Director of, and regional Spokesperson for Limited-Profit Housing Associations	Neue Heimat OÖ, LPHA	23.01.2026	In Person

8 Appendix 3 – Visuals

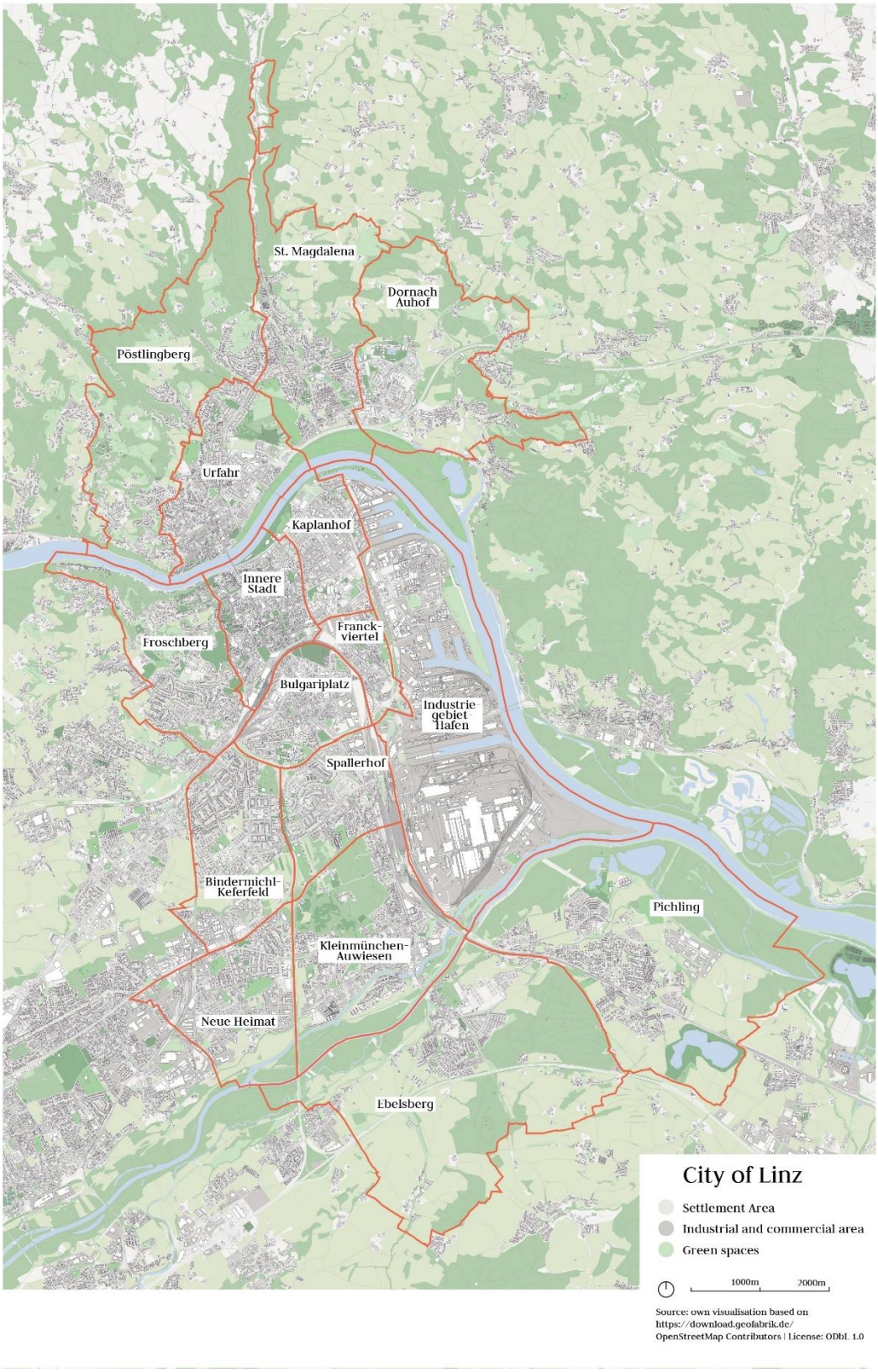

Figure 3: Overview of city structure, Linz

Figure 4: New “reconstructed” limited-profit estates in the front, in the back, interwar period housing estate (Picture: Michael Friesenecker)

Figure 5: Infill ownership apartments with the announcement of a 200m2 penthouse apartment at the top floor, located in Linz, Urfahr. (Picture: Michael Friesenecker)

Figure 6: Investor-driven highly densified buildings and urban development. (Pictures: Michael Friesenecker)